# US ARMY AIR AND MISSILE DEFENSE OPERATIONS

Field Manual
No. 44-100

Headquarters
Department of the Army
Washington, DC, 15 JUNE 2000

# US Army
# Air and Missile Defense Operations

## Contents

**Distribution Restriction:** Approved for public release; distribution is unlimited.

---

\* This publication supersedes FM 44-100, 15 June 1995

# Preface

FM 44-100 is the Army Air Defense Artillery (ADA) capstone doctrinal manual for the air defense combat function. It explains the Army ADA contributions to joint and multinational counterair and theater missile defense operations. It also addresses the range of offensive and defensive actions to counter the air threat. This manual provides the doctrinal basis for integrating the air defense combat function into the planning and conduct of strategic, operational, and tactical levels of operations. FM 44-100 conforms to the doctrinal principles of FM 100-5 and Joint Pubs 3-01 and 3-01.5. The contents of FM 44-100 apply to Army ADA units worldwide. Army ADA forces must adapt this doctrine to the specific requirements of each theater.

FM 44-100 provides doctrinal guidance for ADA commanders, trainers, and leaders at all levels and is the basis for Army ADA service school curricula development. This manual also provides the doctrinal basis for the implementation of air and missile defense measures in all Army units. The tactics, techniques, and procedures in the 44-series of field manuals complement FM 44-100.

This publication implements the following international agreement: STANAG 3805 Doctrine and Procedures for Airspace Control in Times of Crisis and War (ATP-40 (B)). The proponent of this manual is Headquarters TRADOC. Send comments and recommendations on DA Form 2028 (Recommended Changes to Publications and Blank Forms) directly to Commandant, US Army Air Defense Artillery School ATTN: ATSA-DOT-D, Fort Bliss, Texas 79916-3802.

Unless this publication states otherwise, masculine nouns and pronouns do not refer exclusively to men.

**Chapter 1**

# Introduction

This chapter describes the air defense (AD) combat function, relates the tenets of Army operations to air and missile defense operations, and defines the mission of air defense artillery (ADA). It also provides vignettes of successful air and missile defense operations.

## AIR AND MISSILE DEFENSE IN THE THREE-DIMENSIONAL BATTLE

1-1. This field manual provides the doctrinal foundation for Army air and missile defense operations in joint and multinational operations. Air defense is one of the seven combat functions, which include intelligence, maneuver, fire support, mobility and survivability, combat service support, and command and control. Air and missile defense forces provide protection from enemy air and missile attack. They prevent the enemy from separating friendly forces while freeing the commander to fully synchronize maneuver and firepower.

1-2. The air defense combat function contributes to joint theater counterair operations and to joint theater missile defense. Theater counterair operations protect the force and critical assets from attack by fixed- and rotary-wing aircraft and unmanned aerial vehicles (UAVs). Theater missile defense protects the force and critical assets from attack by theater missiles, which include ballistic missiles, cruise missiles (CMs), and air-to-surface missiles (ASM). Air and missile defense includes both offensive and defensive actions.

1-3. The airspace of a theater is as important a dimension of joint operations as the terrain. Friendly forces use airspace for critical purposes including maneuver, delivery of fires, reconnaissance and surveillance, transportation, and battle command. Effective control and use of airspace directly influence the outcome of campaigns and battles. Commanders consider airspace and the apportionment of air power in planning and supporting their operations. They expect the enemy to contest their use of the airspace and must protect their forces from enemy observation and attack. Air and missile defense operations contribute to gaining and maintaining the desired degree of air superiority, provide force protection, and help win the information war.

 1-4. Synchronization of ground operations with air operations is fundamental to the conduct of successful campaigns and battles. Friendly air forces, through such missions as counterair, air interdiction, and close air support, directly support the land campaign.

1-5. The Army's part in the theater campaign is diverse and requires a combined arms force. Air and missile defense forces protect the combined arms team, and other priority forces and assets by preventing enemy aircraft,

missiles, and unmanned aerial vehicles from locating, striking, and destroying them.

## AIR DEFENSE ARTILLERY MISSION

1-6. The mission of US Army Air Defense Artillery is to protect the force and selected geopolitical assets from aerial attack, missile attack, and surveillance.

### FORCES

1-7. ADA commanders allocate forces based on the supported commander's priorities. In addition, the mission is broadly written to include protection of critical assets, installations, and facilities along with joint and multinational forces when required.

### GEOPOLITICAL ASSETS

1-8. Geopolitical assets are nonmilitary assets that US, allied, or host nation civil authorities nominate for air and missile defense protection. These assets could be political, religious, ethnic, historical, or territorial in nature. Since protection of geopolitical assets may not directly support military operations, integration of geopolitical assets into the air and missile defense priorities list must be done at the highest levels. Geopolitical assets may include the territory of the USA.

### THREAT

1-9. The threat is not limited to attack aircraft, helicopters, and ballistic missiles. The threat includes all aircraft, indirect fire surface-launched missiles, aerial surveillance platforms, large caliber rockets, and theater missiles. Chapter 2 provides more detail and information on the threat.

### CONSEQUENCES

1-10. Successful air and missile defense is key to generating and sustaining combat power in force-projection operations. The ADA contribution to friendly efforts to counter threat reconnaissance, intelligence surveillance, and target acquisition efforts has gained greater emphasis. Current and future Army ADA capabilities, both active and reserve component, must synergistically combine with the AMD forces of other services to defeat the multifaceted threat. Army ADA participates in operations at all levels of war.

## NATIONAL MISSILE DEFENSE OPERATIONS

1-11. National Missile Defense is a joint service program to develop a fixed, land-based system to protect the United States against limited, long-range ballistic missile attacks. The US Army Space and Missile Defense Command (USASMDC) has responsibility for publishing National Missile Defense (NMD) doctrine.

# AIR DEFENSE IN RELATION TO ARMY TENETS

1-12. Air and missile defense operations are inherently joint operations, multicomponent, and embody Army doctrine. ADA forces are versatile, agile, and fight throughout the depth of the battlefield. Through aggressive planning and fully orchestrated execution, ADA allows the commander at any level to seize and maintain the initiative. Commanders integrate air and missile defense operations into campaigns fought at the operational level, and battles and engagements fought at the tactical level.

## VERSATILITY

1-13. ADA units meet diverse mission requirements. They require discipline, high standards, and thorough preparation. Commanders need to shift focus, task-organize, and move from one role or mission to another quickly and efficiently. ADA units are multifunctional, able to defeat several different air threats while operating at the strategic, operational, and tactical levels.

## AGILITY

1-14. Agility is as much a mental quality as a physical one. ADA units anticipate and counter enemy actions and react rapidly to changes in the situation. ADA forces must quickly change from offense to defense, entry operations to decisive operations, and counterair to theater missile defense. Concentrating coverage and fires, or screening the flanks from attack and surveillance, are tasks routinely accomplished by ADA units.

## DEPTH

1-15. ADA systems see deep into enemy airspace to contribute to the commander's situation awareness and defeat air, missile, and surveillance threats at maximum range. They achieve defense in depth using a systems approach technique, which gives multiple opportunities to defeat the enemy aerial threat. Depth also includes staying power, which is the access to adequate resources to continue the fight.

## SYNCHRONIZATION

1-16. Synchronization requires controlling the tempo of operations as well as weighting and shifting air and missile defense efforts. ADA units counter the entire aerial threat spectrum by integrating a system of systems. Commanders integrate their operations horizontally with all battlefield operating systems and vertically with both higher and lower ADA units.

## INITIATIVE

1-17. ADA units take the initiative by participating in planning for both offensive and defensive counterair and theater missile defense operations. ADA commanders recommend enemy airfields, missile launch sites, command and control nodes, and logistics for deep attack. They contribute to winning the information war by destroying threat aerial reconnaissance platforms.

## AIR DEFENSE IN FORCE PROTECTION

1-18. Commanders seek to apply overwhelming combat power to achieve victory with minimum casualties to their forces and assets. Combat power combines the elements of maneuver, firepower, protection, and leadership. Overwhelming combat power is the ability to focus sufficient force to ensure success and deny the enemy any chance of escape or effective retaliation. Commanders apply overwhelming combat power by bringing all combat elements to bear at the optimum time and place, giving the enemy no opportunity to respond effectively. Commanders integrate and coordinate a variety of functions with the elements of combat power. As a result, they convert the potential of forces, resources, and opportunities into actual capability through violent, coordinated action at the decisive time and place. They attempt to defeat the enemy's combat power by interfering with its ability to conduct reconnaissance, maneuver, and apply firepower.

1-19. While contributing to all four elements of combat power, ADA makes its greatest contribution to force protection. Protection conserves the fighting potential of a force so that commanders can apply it at the decisive time and place. It includes active and passive actions units take to preserve combat power and deny the enemy the ability to successfully attack the force. Force protection has five components:

- Air and missile defense operations
- OPSEC/deception operations
- Health/morale of soldiers
- Safety
- Avoidance of fratricide

1-20. The first component of force protection is air and missile defense operations. Offensive counterair and Theater Missile Defense (TMD) attack operations attempt to defeat or suppress enemy capabilities to launch air and missile attacks. Defensive counterair and TMD active defense destroy enemy aircraft and missiles that threaten the force.

1-21. The second component of 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 UAVs and aircraft conducting reconnaissance, surveillance, and target acquisition (RSTA) operations against the force. Frequent moves disrupt the enemy RSTA cycle. These measures help commanders protect their force from enemy observation throughout the conduct of operations.

1-22. The health and welfare aspect of force protection keeps soldiers healthy and maintains fighting morale. Commanders and leaders at all levels take care of their soldiers' basic health needs. They consider the welfare and spirit of soldiers as they build cohesion and unit esprit de corps.

1-23. Safety is the fourth component of protection and is a part of all operations. Commanders and leaders embrace safety as a principal element

in all they do. Safety in training, planning, and operations is crucial to the preservation of combat power and continued successful operations.

1-24. The fifth component of protection is the avoidance of fratricide. ADA forces use both technical and procedural means to identify friendly aircraft. Compliance with airspace control measures by all friendly airspace users is essential. The primary mechanisms to reduce fratricide are air defense airspace control measures, detailed situational awareness, strong leadership, disciplined units, synchronized operations, and anticipation of risks.

1-25. A related imperative for air and missile defense operations is the issuance of early warning (EW) throughout the theater.

## AIR DEFENSE COMBAT FUNCTION

1-26. Air defense is one of the seven combat functions that provide a structure for integrating and synchronizing critical combat activities in time, space, and purpose. At every echelon, commanders use the available battle command system to visualize, plan, direct, coordinate, adjust, and control the combat functions. The seven combat functions are:

- Intelligence
- Maneuver
- Fire support
- Air defense
- Mobility and survivability
- Logistics
- Battle command

1-27. The combat functions exist at all echelons of command. Successful operations occur when the combat functions interact horizontally and vertically. Horizontal interaction occurs when all combat functions interact at the same echelon to maximize combat power. Vertical integration occurs when higher and lower echelons within each combat function interact to synchronize operations. ADA commanders synchronize their operations by integrating them horizontally with other combat functions and vertically within the air defense combat function.

## RELATIONSHIP OF THEATER AIR DEFENSE AND THEATER MISSILE DEFENSE

1-28. Theater missile defense and theater air defense operations are highly related mission areas. Air targets are manned aircraft, cruise missiles, and UAVs, while TMD targets are comprised of theater missiles.

1-29. Aircraft demand extensive infrastructure support and generate great demands in terms of manpower and training. Aircraft require runways and sophisticated maintenance and support facilities to sustain operations. These static, lucrative targets are highly vulnerable to attack by the joint force. Mobile missile launchers are much less vulnerable, and are manned by fewer soldiers requiring significantly less training.

1-30. An aircraft threat has fixed nature aircraft-related support facilities, thus making the operational battlespace (opportunities to engage) much greater. Aircraft conducting operations against the force are exposed to defensive fires for tens of minutes, while missile engagement opportunities are measured in seconds.

1-31. The unique challenges posed by theater missile defense require a highly responsive C2 structure, which decentralizes engagement operations to the lowest level. By comparison, the requirement to avoid fratricide of friendly aircraft mandates strict, highly centralized control of theater air defense engagements.

## HISTORICAL PERSPECTIVE

1-32. World War II offered lessons about modern warfare that remain relevant 50 years later. Army divisions joined both joint and allied forces in the conduct of combined arms, force-projection operations supported by modern fighter aircraft and bombers. Enemy air forces were large, and highly capable, and had the potential to deliver both conventional and chemical munitions. They held US and allied forces at risk throughout the duration of the war. In addition to the air threat, the allies faced attack by surface-to-surface and cruise missiles. To counter the introduction of sizeable enemy air forces, the Army developed and fielded equally capable air defense forces. Early experiences at Kasserine Pass and in the Pacific taught the importance of air defense to force protection. By 1944, commanders routinely integrated air defense forces into Army operations at all echelons.

1-33. The Normandy campaign of June 1944, and the subsequent breakout, provides excellent examples of air defense operations in a force-projection scenario. Eleven battalions of antiaircraft artillery (AAA) supported the assaulting US divisions. As the beachhead expanded, additional AAA groups and brigades joined the assault forces to form a near-leak-proof defense. Though the Luftwaffe flew thousands of sorties against the forces and assets concentrated in the beachhead, the allies suffered no significant damage due to air attack. American antiaircraft artillery met the challenge by destroying more than 300 enemy aircraft.

1-34. Following bloody hedgerow fighting, American forces conducted a breakout in July 1944. The plan fully integrated and synchronized AAA with ground force operations. AAA again successfully protected the maneuver forces as they swept across France, destroying more than 300 German aircraft. As units moved forward, the allies captured new ports for use as forward logistics centers. The Germans made a determined effort to destroy the major port, Antwerp, using V-1 aircraft, the first cruise missiles. American air defenders rose to the challenge, destroying more than 70 percent of the missiles and keeping the port open throughout the five-month attack.

1-35. Operation OVERLORD is illustrative of the steps taken in a forced entry, force-projection operation. Air defense protected the force in the points of embarkation and throughout entry operations, expansion of the lodgment, and conduct of decisive operations. The threat posed by enemy aircraft and

missiles, potentially armed with weapons of mass destruction, presaged the situation faced by US forces during a more modern force-projection operation.

1-36. Fifty years after the end of World War II, American forces once again were called upon to conduct force-projection operations against a modern mechanized army that was supported by large numbers of technologically advanced aircraft and ballistic missiles. As during World War II, air defense forces were fully integrated into operations at all echelons.

1-37. Seven days after Iraq invaded Kuwait in August 1990, Stinger teams and Vulcan squads from 2-52 ADA and 3-4 ADA were on the ground in Saudi Arabia, protecting the advance elements of XVIII Airborne Corps and the 82d Airborne Division. They were quickly followed by a Patriot battery from 2-7 ADA which provided air and missile protection for the aerial port of debarkation at Dhahran. During the buildup preceding the ground war, elements of 21 Army air defense battalions were deployed to protect US and coalition forces and assets in Saudi Arabia, Turkey, and Israel.

1-38. 11th ADA Brigade's Patriot batteries made history the night of January 18, 1991, when Alpha Battery, 2-7 ADA, protecting forces in Dhahran, Saudi Arabia, recorded the first intercept of a ballistic missile in combat. As indicated by the debris from the BM that fell to the ground, the missile would have struck a village housing soldiers from VII Corps. Scud intercepts became a nightly event for the Patriot soldiers protecting coalition forces and the cities of Saudi Arabia and Israel. The fiery collisions of Patriot and Scud missiles were captured live by network television, and telecast worldwide to prime viewing audiences. The morale of the soldiers of the coalition, and the citizens of the United States, soared with each successful intercept.

1-39. Air defense units protected the divisions and corps in their tactical assembly areas, and were fully integrated into the maneuver units as they conducted breaching operations and attacked Iraqi divisions in Kuwait and Iraq. Patriot and Hawk batteries of TF 8-43 ADA and TF 2-1 ADA protected VII and XVIII Corps breach sites, and joined division ADA units in protecting the maneuver forces, fire support, logistics, and command and control elements throughout the attack. Stinger sections from 2-44 ADA participated in history's largest air assault on February 24th, when the 101st Airborne Division (Air Assault) attacked 150 miles into Iraq to seize Forward Operating Base Cobra. Vulcan crews from the mechanized and armored divisions destroyed numerous enemy infantry-fighting vehicles, killed and captured hundreds of Iraqi infantry, and reduced fortifications to piles of rubble. As a fitting end to the war, TF 8-43 ADA was given the honor of protecting Safwan Airfield, where coalition commanders received the surrender of the Iraqi armed forces on March 12, 1991.

BLANK

**Chapter 2**

# Threat

This chapter describes the air and missile threats facing U.S. military forces. This evolving threat will take on new, stressing characteristics during 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 seeks to negate U.S. capabilities by simple counters and avoids 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 (WMD); unmanned reconnaissance, surveillance, and target acquisition (RSTA) systems; precision strike weapons; large numbers of inexpensive rockets; land attack cruise missiles (LACM); and information warfare. Some states will rely on asymmetric capabilities as a substitute for, or complement to, large conventional forces. This trend started in the late 1980s, and is continuing today. The proliferation of low-cost, high-payoff, unmanned systems, theater missiles (TM), unmanned aerial vehicles (UAV), and large caliber rockets (LCR) is a recent trend.

## THE EVOLVING THREAT

2-1. Fixed-wing aircraft and helicopters are still formidable threats, however, the trend is toward the proliferation of unmanned systems: ballistic missiles, cruise missiles (CM), unmanned aerial vehicles (UAV), and rockets. The trend toward unmanned threats is driven by cost, training, operational factors and a strategy to counter, rather than match, enemy capabilities. Potential adversaries can obtain a significant number of UAV or CM for the price of one or two highly sophisticated aircraft, without the attendant costs of training, maintaining, basing, and sustaining a manned aircraft fleet. These weapons possess inherently lethal capabilities that stress the defense of the force, and they are increasingly available on the world market. Sophisticated and rudimentary versions of these unmanned systems pose a danger to deployed U.S. military forces. TBMs and CMs can deliver WMD on deployed forces or geopolitical assets. RSTA UAVs can detect U.S. force operations and provide the basis for near real time targeting, leading to potential disruption of decisive operations. Rockets, such as large-caliber multiple rocket launchers (MRL), pose special hazards and challenges across the spectrum of operations. Traditional air threats will still exist in the world of tomorrow. Helicopters continue to pose a significant lethal hazard for ground forces. Fixed-wing aircraft continue to evolve as expensive but highly capable weapon systems.

## TACTICAL BALLISTIC MISSILES

2-2. TBMs include short-range ballistic missiles (SRBM) with ranges up to 1,000 kilometers and medium-range ballistic missiles (MRBM) 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 (TEL), have the capability to carry WMD. Most TBMs are single-stage missiles with a circular error probable (CEP) accuracy of one-tenth of one percent of their range. State-of-the-art guidance technologies in some missiles will reduce these errors to less than 50 meters. What makes tactical ballistic missiles (TBMs) threatening? TBMs are inherently difficult to defend against. Characteristics that increase TBM effectiveness include a reduced radar cross section (RCS), high terminal velocity, reduced notification time for defending forces, a variety of difficult-to-kill warheads, and an all-weather capability. The major TBM trends are increased range and improved accuracy.

2-3. Integration of global positioning system (GPS) and terminal guidance are the current focus of improving accuracy. Solid fuels and multiple staging will increase TBM payloads and ranges. Improved TBMs may target point targets. Figure 2-1 illustrates the characteristics of TBMs.

**Targets**
- Geopolitical/population centers
- Airports and seaports
- Logistical areas
- Troop concentrations

**Current Capabilities**
- Range from 80 to 3000 Km
- Accuracy to within 50 m of target
- Low radar signature
- Warheads - conventional, WMD

**Future Trends**
- Improved accuracy
- improved guidance
- Improved control packages

- Improved terminal guidance
- Increased range
- Increased payload capacity

**Figure 2-1. Characteristics of TBMs**

## LARGE CALIBER ROCKETS

2-4. Large-caliber rockets (LCR) are similar to SRBM in size, trajectory, warheads, and battlefield targets. The ability of LCR to deliver high volumes of fire and a variety of warheads makes them ideal weapon systems for fire support missions. Highly mobile launchers effectively support forward artillery missions. This mobility and the rocket's short burn time result in little warning for maneuver forces and their short-range hamper engagement by current missile defense systems.

2-5. Rockets are widely proliferated, and their production and sale is increasing. The high volume of fire and multiple warhead capabilities of LCR make them a very appealing weapon system for threat nations. In the future, threat nations may deploy passive infrared (IR) and radio frequency (RF)

warheads with these missile systems, improving their use against armor systems, command and control nodes, and battlefield radar. Figure 2-2 illustrates LCR characteristics.

---

**Targets**
- Assembly areas
- Air defense/FA locations
- Defensive positions
- Troops in the offense
- Choke points/advance routes

**Current Capabilities**
- High rates of fire;rapid reload
- Highly mobile("shoot & scoot")
- Low signature flight trajectory
- Warheads - all types

**Future Trends**
- Passive infrared sensors
- Advanced antiarmor warheads
- Increased range -- in excess of 150 Km

---

**Figure 2-2. Characteristics of Large Caliber Rockets**

## CRUISE MISSILES

2-6. Cruise missiles (CM) are unmanned, powered, self-guided vehicles that exhibit sustained flight through aerodynamic lift at one or more predetermined, constant (cruise) altitudes and carry a warhead or other lethal payload. There are two types of CM: antiship cruise missiles (ASCM) and land attack cruise missiles (LACM). The Army is obviously most concerned with the LACM. For ease of discussion and unless otherwise noted, "CM" will denote the LACM. 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 (low or high) to avoid heavily defended areas, and can attack from any direction. Today's CM can hit a target with remarkable accuracy; tomorrow's smarter and more accurate CM will pose a far greater threat. Although only a limited number of LACM are currently available, numerous countries have ongoing development programs. These CM should become operational around 2000. What makes CM threatening? Emerging CMs pose serious threats because of their unique operational characteristics. The incorporation of new technologies in airframe and warhead design, propulsion systems, and guidance systems has contributed to vastly improved systems. The increased use of composite materials in airframe construction has created stronger and lighter airframes. A range of low observable and stealth technologies has reduced the RCS.

2-7. Increased use of air-breathing turbojet and turbofan engines permits subsonic speeds, providing longer ranges and flight altitudes as low as 20 meters above ground level (AGL). Sophisticated guidance systems, such as GPS, the inertial navigation system (INS), and terrain contour matching (TERCOM) contribute to overall accuracy and allow programming of unpredictable flight paths to optimize surprise. A terminal guidance seeker increases accuracy up to less than 10 meters. A wide array of conventional

warheads, to include submunitions, allows targeting of both soft and hard targets. NBC weapons pose the most serious threat, but currently very few countries have CM with nuclear warheads. However, the development of a chemical or biological warhead is not difficult. The May 1997 Quadrennial Defense Review report noted that the use of NBC weapons is a likely condition of future warfare, and that these weapons could be delivered by several means including CM. The success of cruise missiles in Operation Desert Storm led to increased interest in these systems and spurred current worldwide developments. Threat experts foresee an increase in the number of LACM within the next ten years, as well as extended ranges, improved accuracy, reduced RCS, and increased lethality. The addition of smart submunitions will allow the engagement of armored units on the move in the near future. Countermeasures and evasive maneuvers are also potential capabilities. Figure 2-3 illustrates cruise missile characteristics.

---

**Targets**
- Geopolitical/population centers
- Airports and seaports
- Logistical areas
- Command and control centers
- Troop concentrations

**Current Capabilities**
- Range from 30 to 3000 Km
- Highly accurate
- 360-degree threat
- Very low radar signature
- Air, sea, or ground launched
- Warheads -- all types

**Future Trends**
- More land attack variants
- Reduced radar signature
- Increased use antiarmor submunitions
- Improved accuracy

---

**Figure 2-3. Characteristics of Cruise Missiles**

## AIR-TO-SURFACE MISSILES

2-8. Air-to-surface missiles (ASM) are air-launched, precision-guided munitions designed to strike ground targets. They are ideal against targets, such as bridges, that are difficult to destroy with "dumb" bombs. They are similar to air-launched CM, but are smaller, have shorter ranges, lack the wings and aerodynamic lift associated with CM flights, and are launched by tactical fighter-bomber aircraft. The former Soviet Union and free world countries widely export ASM, and they are operational in numerous air forces around the world. What Makes ASM threatening? ASM are an extremely lethal threat because of their versatility and pinpoint accuracy. Most threat ASM are of Soviet or Russian origin and employ radio command, laser, anti-radiation homing, or electronic-optical guidance systems.

2-9. Missiles that employ anti-radiation homing systems are referred to as anti-radiation missiles (ARMs); they represent the greatest threat to air and

missile defense, artillery (counter-battery), aviation, and intelligence radar. Most ARMs have ranges of over 100 kilometers. An aircraft firing an ARM will usually launch from outside the lethal envelope of the air defense system being attacked. Laser-guided systems place the attacking aircraft in harm's way 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 electronic-optical systems have ranges in excess of 100 kilometers.

2-10. ASM, like CM, are becoming smarter and more versatile, reliable, accurate, and lethal. New capabilities may include a lock-on-after-launch capability or a loitering capability to attack enemy radar (for ARM variants) and may use dual mode seekers for increased reliability and combat capability. Figure 2-4 illustrates ASM characteristics.

**Targets**
- Armored vehicles
- Radar equipment
- Bridges & other point targets
- Air defense sites

**Current Capabilities**
- Range to 100 Km
- Supersonic speed (Mach 3)
- Extremely accurate
- Radio-command, laser, ARM
- Homing, electrooptical
- Fire and forget

**Future Trends**
- Improved accuracy and lethality
- Loitering capability
- Dual mode seekers -- increased reliability

**Figure 2-4. Characteristics of Air-to-Surface Missiles**

## UNMANNED AERIAL VEHICLES

2-11. UAVs include drones, characterized by preprogrammed flight paths and patterns, and remotely piloted vehicles (RPV), controlled by ground-based operators. Each can perform a variety of missions, ranging from reconnaissance and battlefield surveillance to attack and electronic warfare. What is it that makes UAVs threatening? UAVs serve as RSTA information 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. UAVs equipped with laser designators provide immediate targeting of assets for attack by smart munitions. The UAV's small RCS, low speed, and small thermal signature make them difficult to detect and engage. Mission-dictated flight profiles take full advantage of terrain, increasing system survivability and optimizing coverage. Flight altitudes are normally between 1,000 to 3,000 meters AGL. UAV conducting RSTA missions fly at altitudes safe from small arms fire.

2-12. UAV payloads consist of daylight television and IR video cameras, and film cameras (for reconnaissance missions). Other major payload categories include electronic warfare (EW), electronic intelligence, radar, and attack warheads. Several nations are developing and fielding anti-radiation homing UAV with the primary mission of attacking battlefield RF emitters (radar, communications). These platforms have a variety of launch options and are usually fire-and-forget systems. Other attack UAV systems employ terminal guidance to kill tanks or fighting vehicles.

2-13. Current projections indicate more than 50 developer countries and 75 user countries of UAVs by 2005. In addition to information gathering (still the dominant function), UAV roles will include electronic combat, decoy, ground attack, and suppression of enemy air defense (SEAD). A significant new capability involves the direct linkage of a reconnaissance UAV to an artillery unit's fire direction center. This linkage provides near real time information to ground commanders, followed by immediate fire and damage assessment. UAVs are also good candidates for stealth technology and spin-off technologies from CM developmental programs. Figure 2-5 illustrates UAV characteristics.

---

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

**Current Capabilities**
- RSTA, EW, attack missions
- Range to 1900 Km
- Altitude 300 m to 17+ Km
- Stand off/detect from 25 Km
- Payloads: daylight TV, cameras, HE warheads, laser spotters

**Future Trends**
- Added missions: decoy,SEAD, electronic combat
- Standoff range 50+ Km
- Detection to 70 Km
- All weather day/night capability

---

**Figure 2-5. Characteristics of Unmanned Aerial Vehicles**

## HELICOPTERS

2-14. Most countries maintain helicopters to support military operations. The majority of the helicopters are utility systems that are, or can be, armed to perform a variety of roles, thus offering an inexpensive and effective substitute to the more expensive attack helicopter. The versatility and survivability of helicopters make them ideal for use in most combat areas. What makes helicopters threatening? Threat ground-force commanders primarily rely 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. Figure 2-6 illustrates helicopter characteristics.

2-15. Attack and armed utility helicopters have improved technical capabilities that focus on ground-attack capabilities using enhanced fire control and aircraft survivability equipment. The best technology trends that stand out are:

- Retrofit of existing airframes with modular upgrades.
- Modular equipment (the main focus being electronic-optical sensors, weapons, and countermeasure equipment) that facilitates maintenance and reduces cost.
- Expanded night and adverse weather capabilities.
- Improved fire control systems and engagement capability (standoff hovering attacks at greater distances with much improved accuracy).
- Improved IR countermeasures against IR-seeking missiles.

---

**Targets**
- Troops/armored vehicles
- Convoys
- Command and control centers

**Current Capabilities**
- Attack, RSTA, electronic roles
- Range to 370 Km
- Speed to 350 Km/hr
- Terrain masking/hovering
- Payloads: guns, rockets, missiles, mines, laser systems, electronic countermeasures

**Future Trends**
- Modular upgrades to airframes
- Expanded night/adverse weather capability
- Improved fire control systems/engagement capability plus standoff at greater ranges
- Improved antitank guided missiles
- Improved infrared countermeasures

---

**Figure 2-6. Characteristics of Helicopters**

## FIXED-WING AIRCRAFT

2-16. Fixed-wing aircraft no longer present the most challenging threat to air defenders, however they remain a formidable threat. Coalition air power during the 1991 Gulf War provided the world with a remarkable demonstration of the capabilities of well-employed fixed-wing aircraft. There are more than 30,000 operational military aircraft today; of these, some 8,000 (many of which were Soviet produced) are in third world inventories. Some 45 countries have an aviation industry of some kind, and 21 countries design their own aircraft. While the Soviet Union was once the leading exporter of combat aircraft, today the United States, France, and Russia are the leaders.

What makes Fixed-Wing Aircraft threatening? Fixed-wing combat aircraft perform a variety of missions in both offensive and defensive operations: air interdiction, strategic attack, SEAD, and close air support. Fixed-wing aircraft can employ a variety of munitions, including guns, rockets, CM, and ASM. Integrated navigation/bombing computers and related mission equipment provide new combat aircraft with a precision-strike capability during day or night and in bad weather. In addition, new aircraft incorporate such features as radar warning receivers (RWR), on-board radar jammers, chaff, flares, and a smaller RCS to improve survivability and mission success rate.

2-17. Technological advances in low observable materials, aerodynamics, power plants, armaments, and aircraft systems has resulted in highly capable, but very expensive, aircraft. With the cost of a new fighter aircraft approaching $50 million, aircraft inventories will probably steadily decline. There will be a move toward multirole capabilities, rather than dedicated, single-mission platforms, and an increased use of precision, standoff munitions. Aircraft survivability continues to improve with incorporation of advanced EW suites, advanced countermeasures development, and reductions in radar and IR signatures. The upgrading of current aircraft capabilities will continue, rather than one-for-one replacements with next-generation aircraft. Figure 2-7 illustrates fixed-wing aircraft characteristics.

| Targets | Current Capabilities |
|---|---|
| • Ports and assembly/logistical areas | • Roles: CAS, SEAD, RSTA, electronic warfare, interdiction, attack |
| • Command and control centers | • Precision strike |
| • Geopolitical/population centers | • Mission equipment: missiles, guns, rockets, bombs, WMD |
| • Armored vehicles/formations | |

**Future Trends**
- Multiroled versus single-mission aircraft
- Greater use of precision and standoff munitions
- Reduced radar and infrared signatures
- Integrated electronic warfare suites

**Figure 2-7. Characteristics of Fixed-wing Aircraft**

## ELECTRONIC WARFARE

2-18. With the demise of the Soviet Union in 1991, the focus of electronic warfare against the air threat and ground based air defense has shifted from large fleets of standoff jammer aircraft to individual self-protection systems onboard fighter-bombers. This trend toward self-protection systems has extended to helicopters, and may evolve to UAVs and land attack cruise missiles (LACM) in the future.

## WEAPONS OF MASS DESTRUCTION

2-19. Any nation with the will and resources can turn their legitimate nuclear, medical, and chemical industries to weapons production. This threat exists in all regions of the world, from states with long-established programs to those with emerging capabilities. Despite the dissolution of the Warsaw Pact, the downfall of communism in the former Soviet Union, and extensive efforts to negotiate treaties that would reduce the number of nuclear weapons and eliminate chemical and biological weapons from military arsenals, the number of countries pursuing NBC weapons programs continues to increase.

2-20. Russia and China currently possess nuclear weapons and there are many other nations of nuclear proliferation concern. As many as 26 countries are developing, or are suspected of developing, chemical weapons.

2-21. Principal doctrine for chemical weapons use by threat nations is to maintain the momentum of an attack and to degrade their enemy's capability to fight. Chemical and biological agents can be delivered to target areas virtually anywhere in a theater of operation. Delivery means include ballistic missiles, aircraft bombs or rockets and spray, multiple rocket launchers, mortars, conventional artillery, CM, UAV, and Special Forces.

2-22. Nuclear weapons cause casualties and materiel damage through the effects of blast, thermal radiation, and nuclear radiation. Biological agents, consisting of pathogens and toxins, produce diseases in soldiers, thereby reducing their ability to accomplish their missions. These agents are primarily an inhalation threat. Threat forces will employ chemical agents to expose soldiers to a respiratory and percutaneous agent threat by attacking with non-persistent and persistent agents. Persistent agents will also be used to contaminate personal clothing, equipment, and materiel. This will mandate the diversion of resources to decontaminate personnel and equipment.

2-23. Insurgent or terrorist groups could manufacture or acquire chemical and biological weapons to attack AD forces and other high-payoff targets. Small laboratories, such as school labs, or the drug labs used for processing cocaine, can produce some chemical and biological warfare agents.

2-24. Threat nations will employ NBC weapons to incapacitate or kill personnel. In addition, unit effectiveness decreases while operating in a contaminated environment due to fear, the requirement to wear protective clothing, and the need to decontaminate personnel and equipment. ADA units throughout the theater will be high-priority targets for NBC attack. The air defense commander and staff must, therefore, train their soldiers and units for operations in an NBC environment.

## SUMMARY

2-25. Numbers of countries with the potential to present regional challenges to the United States and its allies will increase. While traditional air threats, such as fixed-wing aircraft and helicopters, will continue to improve, the acquisition of new, lower-cost, unmanned threats such as ballistic missiles, CMs, UAVs, and LCRs will add greater lethality. Ballistic missiles, in addition to being effective terror weapons, will have a more significant

military role as their range and accuracy improve. Cruise missiles are difficult to detect, highly accurate, and can attack from any direction. UAVs will add new attack, decoy, and targeting missions, though still emphasizing the traditional reconnaissance mission. LCRs, with multiple types of warheads available and long-range, high rates of fire, are another deadly threat. The use of WMD is a likely condition of future warfare, and many of the unmanned threat platforms are capable of delivering such weapons. These emerging threats present a serious challenge to ADA units. The regional proliferation of technologies and sophisticated weapons continues to grow (figure 2-8).

## PLATFORMS

**UNMANNED**

- -Ballistic Missiles
- -Cruise Missiles
- -Unmanned Aerial Vehicles
- -Rockets

**MANNED**

- -Attack Helicopters
- -Fixed-wing Aircraft

**HIGH**

**PROLIFERATION TRENDS**

**LOW**
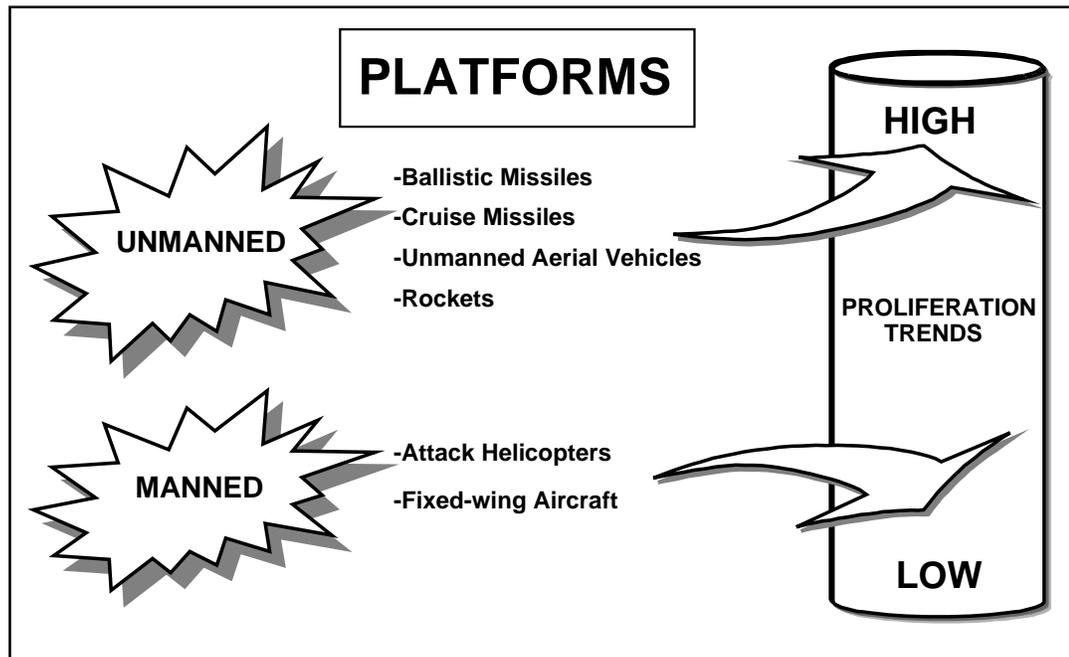
**Figure 2-8. Trends in Weapons Proliferation**

**Chapter 3**

# Joint Theater Air and Missile Defense Doctrine

This chapter addresses doctrine for joint theater air and missile defense (JTAMD) operations. It is based on joint publications. Joint operations are the integrated military activities of two or more service components of the US military. Unless stated otherwise, multinational procedures for alliances, such as the North Atlantic Treaty Organization (NATO), are the same as provided in joint doctrine.

## JTAMD OPERATIONS DOCTRINE

3-1. Joint theater air and missile defense operations doctrine is outlined in this section. Joint Pub 3-01 and Joint Pub 3-01.5 provide more detailed discussion. JTAMD includes all measures and means designed to nullify or reduce the effectiveness of surveillance and attacks against the joint force by air and missile threats. Air defense operations represent the Army's contribution to JTAMD operations.

3-2, JTAMD is conducted to attain and maintain a desired degree of air superiority by the destruction or neutralization of enemy air and missile forces. JTAMD operations include such measures as the use of interceptors, bombers, antiaircraft guns, surface to surface and surface-to-air missiles, air-to surface missiles, elements of information operations (IO), and electronic countermeasures to destroy the air or missile threat both before and after it is launched. Other measures that are taken to minimize the effects of hostile air actions are cover, concealment, dispersion, deception (including electronic), and mobility. Both offensive and defensive actions are involved. Offensive operations range throughout enemy territory and are generally conducted at the initiative of friendly forces. Defensive operations are normally conducted near or over friendly forces and are generally in reaction to enemy air activity.

### PURPOSE

3-3. The purpose of the joint theater air and missile defense mission is to attain a desired degree of air superiority to allow freedom of action and protect the joint force and selected geopolitical assets. At the start of force projection operations, control of the air environment may range from complete domination by hostile forces to air supremacy by the joint force. It may also range from temporary, local air superiority in a specific part of the area of operations to control over the entire area of operations or theater. Control may also vary over time. The degree of control required depends on the situation. The joint force commander (JFC) must ensure that his forces are capable of achieving sufficient air superiority to ensure protection of key assets and forces and freedom of action for critical operations. When enemy

air power threatens friendly operations, the requirement for friendly JTAMD must be a major consideration in the joint planning for those operations.

3-4. Air superiority, at the critical time and place, provides friendly forces a more favorable environment in which to perform air, land, sea and space operations. Limiting the enemy's use of its air power increases our potential for success and conserves the fighting force so commanders can apply it at the decisive time and place. Because offensive and defensive operations must often rely on the same airspace and resources, they cannot be considered in isolation from each other. The emphasis on either offensive or defensive JTAMD operations will depend on the overall situation and the joint force commander's concept of operations. JTAMD operations affect air, land, and maritime battles, and often cross the boundaries between them.

3-5. The ultimate goal of JTAMD operations is to control the airspace to allow commanders to execute their plans. The two types of complementary and mutually supportive JTAMD operations are offensive operations and defensive operations. Offensive operations are conducted to destroy, disrupt, or neutralize enemy aircraft, missiles, launch platforms, and supporting structures and systems as close to their source as possible. They are conducted at a time and place of friendly force choosing rather than in reaction to enemy initiatives. Defensive operations are those defensive measures designed to detect, identify, intercept, and destroy or negate enemy forces attempting to attack or penetrate the friendly air environment. Defensive operations are conducted primarily in reaction to enemy air offensive initiatives.

## JOINT THEATER AIR DEFENSE

3-6. Joint Theater air defense operational elements are active air defense and passive air defense. Active air defense is direct defensive action taken to nullify or reduce the effectiveness of hostile air action. It includes such measures as the use of aircraft, air defense weapons, weapons not used primarily in the air defense role, and electronic warfare. 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.

## JOINT THEATER MISSILE DEFENSE

3-7. Objectives of joint theater missile defense (JTMD) are:
- To demonstrate US resolve to deter aggression through the establishment of a TMD capability.
- To protect US deployed forces, allied forces, coalition forces, critical assets, and areas of vital interest or political importance from attack by theater missiles (TM).
- To detect and target TM systems; to detect, warn and report a TM launch; and to coordinate a multifaceted response to a TM attack, integrating that response with other combat operations.

- To reduce the probability of and/or minimize the effects of damage caused by a TM attack.
- To ensure that the JFC has the freedom to conduct joint operations without undue interference from TM operations conducted by the enemy.
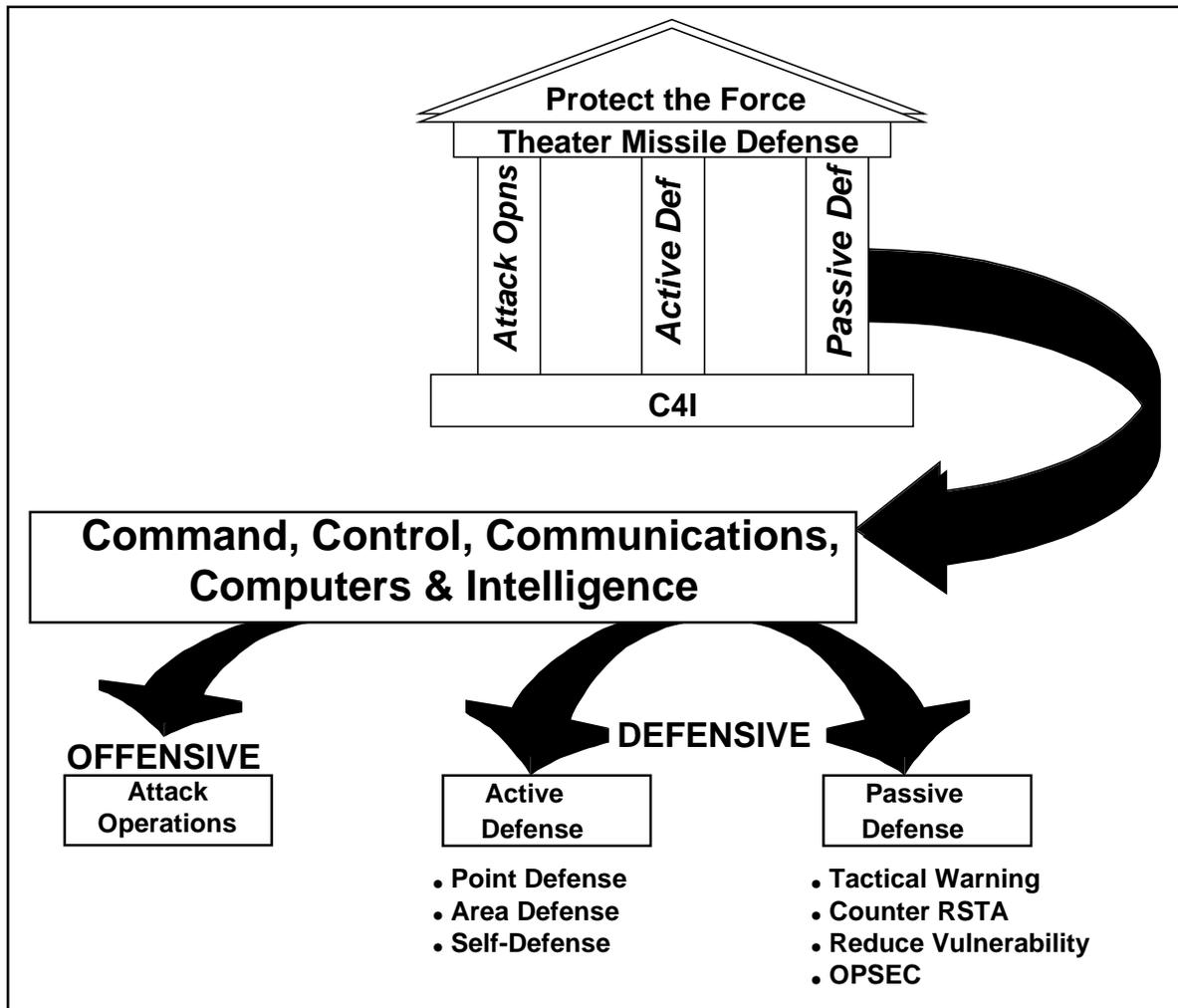


**Figure 3-1. JTMD Operational Elements**

3-8. JTMD is composed of four operational elements: passive missile defense; active missile defense; attack operations; and command, control, communications, computers, and intelligence (C4I) (figure 3-1). Because of the continual advancement and proliferation of TMs, the threat cannot currently be countered by any single technical solution, nor will it likely be in the future. The threat can only be countered by the synergistic performance achieved by coordinating and integrating all four operational elements into cohesive and coherent combat operations.

**Passive missile defense**

3-9. Passive missile defense applies to measures initiated to reduce vulnerability to TM attack and to minimize the effect of damage caused by TM attack. Passive missile defense includes TM early warning and NBC protection, counter-surveillance, deception, camouflage and concealment, hardening, electronic warfare, mobility, dispersal, redundancy, recovery, and reconstitution.

**Active missile defense**

3-10. Active missile defense applies to operations initiated to protect against a TM attack by destroying TM airborne launch platforms and/or destroying TMs in flight. Active missile defense includes a multilayered defense in depth via multiple engagements using air, land, and sea assets. It also includes active electronic warfare to disrupt remote or onboard guidance systems.

**Attack operations**

3-11. Attack operations destroy, disrupt, or neutralize TM launch platforms and supporting command, control, and communications (C3) nodes, logistic structures, and RSTA platforms. Attack operations include offensive action by air, land, sea, and special operations forces.

**Command, Control, Communications, Computers and Intelligence**

3-12. TMD C4I is an integrated system of doctrine, procedures, organizational structures, facilities, communications, computers, and supporting intelligence. It includes missile warning and cueing of defense systems by sensors and ground stations. C4I provides command authorities timely and accurate data and systems to plan, monitor, direct, control, and report TMD operations.

**AIRSPACE CONTROL AND AIR DEFENSE INTEGRATION**

3-13. **Airspace control.** Airspace control increases operational effectiveness by promoting the safe, efficient, and flexible use of airspace. Detailed guidance for airspace control is provided in Joint Pub 3-52. The joint force commander normally designates an airspace control authority (ACA) to coordinate and integrate use of the airspace. Airspace control is vital to all air operations and must include procedures to facilitate routing and recognition of friendly aircraft. Establishment of identification and weapon engagement zones and routing of non-combat air traffic are planned to permit maximum use of air defense resources while minimizing restrictions on other operations. Airspace control measures can decrease the possibility of fratricide and enable the rapid identification of approaching air threats.

3-14. **Air defense integration.** Conduct of the JTAMD battle requires the integrated operation of all available air defense weapon systems. Within a unified command, subordinate unified command, or joint task force, the JFC will assign overall responsibility for air defense to a single commander designated the area air defense commander (AADC). 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 and missile defense operations. Air and missile defense operations must be coordinated with air, land, sea, and space resources and operations.

## RULES OF ENGAGEMENT

3-15. Effective use of air and missile defense forces requires the establishment and understanding of common rules of engagement (ROE). Engagement operations must be controlled in order to avoid fratricide and to ensure the force is protected by a seamless air defense. This requires the delegation of engagement authority to the appropriate AD commanders and the establishment of weapon control procedures and rules of engagement. Rules of engagement must include hostile criteria. The optimum employment of air defense weapon systems requires early identification of friend and foe to maximize beyond visual range engagement while avoiding fratricide.

### Establishment

3-16. Unless already established by higher authority or an existing plan, the joint force commander (JFC) shall establish the appropriate ROE for both air and missile threats. Cruise missiles and UAVs present ROE challenges due to the fact that they have radar characteristics similar to manned aircraft. ROE for ballistic missiles should be as permissive as possible in order to facilitate rapid engagement of hostile missiles. Capabilities dictate that ADA units engage threatening ballistic missiles and ASMs based on classification, not identification. The component and supporting commanders are responsible for ensuring compliance with the established rules of engagement.

### Multinational

3-17. ROE must be delineated, published, disseminated to, and exercised by, alliance or coalition members for compliance and as a planning consideration for future operations. Any national ROE that differ from the multinational commander's ROE must be identified, published, and understood by all commands.

### Self-defense

3-18. Because there will never be sufficient specialized air defense assets to provide force protection for all units and vital assets, all units must be capable of using their organic weapons for self-defense against air attack. Self-defense is never denied.

## COMMAND RESPONSIBILITIES

3-19. Conduct of JTAMD operations by US forces fighting alone or as a member of an alliance or coalition is complex. It requires the contributions of ground, sea, air, and space forces of all components and allied or coalition forces, centrally controlled at the highest levels of command. Execution should be decentralized but closely coordinated by components and allies or coalition forces. The following paragraphs set forth the responsibilities and command relationships of the various commanders, staff elements, and

components involved in conducting JTAMD operations in both joint and multinational operations environments.

## Commander in Chief

3-20. The commander in chief (CINC) of a geographic combatant command, as the JFC, establishes theater guidance and objectives for JTAMD. He has combatant command (COCOM) of all assigned forces. The CINC uses joint staff elements and component commanders and their staffs to plan, monitor, give advice, coordinate, and execute joint operations. The CINC delegates command authority to assigned or attached subordinate commanders.

## Joint Force Commander

3-21. The JFC has operational control of assigned forces. The JFC has the authority to delegate operational control, assign tasks, and direct coordination among subordinate component commanders. The JFC also redirects and reorganizes forces to ensure unity of effort in the accomplishment of the mission.

3-22. The JFC establishes guidance and objectives for JTAMD. He uses component commanders, component staff, and joint staff elements to plan, monitor, give advice, coordinate, and execute the overall JTAMD operation. The JFC must define and implement a methodology for joint planning, prioritization of missions and targets, friendly asset protection, and apportionment and allocation of resources. The JFC's concept of operations specifies the objectives and provides guidance for the employment of targeting, attack, and defense forces to conduct JTAMD. Component commanders conduct JTAMD operations under the guidance and in support of the objectives of the JFC.

## JFC Staff

3-23. The JFC uses the joint staff to plan, to monitor, to give advice, and to coordinate overall operations. The joint staff develops and issues the JFC-approved concept of operations, which includes the following:

- Specific joint force offensive or defensive objectives, or both.
- Specific joint force guidance and objectives for JTAMD operations, to include prioritization of critical theater assets that must be protected with limited JTAMD resources.
- Requirements to develop, coordinate, and deconflict components' plans to meet JTAMD objectives.
- Guidance for planning and employing sensor and attack resources for JTMD operations.
- Identification of assets retained at the joint force level and available by request for JTMD operations, such as sensor and attack assets and special operations forces.
- Identification of areas of responsibility.

## Component Commanders

3-24. Component commanders plan and execute all JTAMD operations within their assigned AOs as directed by the JFC. 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. Inside their AOs, component commanders are normally designated as supported commanders for attack operations. Beyond surface AOs, the JFACC is normally designated supported commander for attack operations. Component commanders are responsible for providing 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 must protect with their assigned active defense forces.

3-25. Close coordination among component commanders, the JFC, and the AADC (if designated) is necessary to employ the most appropriate resources and measures to execute 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 joint theater missile defense (JTMD) operations.

# COMMAND, CONTROL, COMMUNICATIONS, COMPUTERS AND INTELLIGENCE

3-26. General requirements for C4I are contained in joint publications. More specific, Army-oriented information is contained in Chapters 4, 5, and 6 of this field manual.

## COMMAND AND CONTROL

3-27. All air and missile defense operations are integrated through weapons control procedures, coordination with adjacent AD units, coordination between service components, and through shared knowledge of the enemy and friendly situation. Components exercise both positive and procedural control of their assigned AD forces. An integrated air and missile defense requires the provision and exchange of essential near real time information. This information must include air defense warnings that allow commanders to implement the appropriate active and passive air defense measures. The exchange of near real time information requires the presence of adequate track capacity within systems that shares and correlates tracks using data processing systems and space-based and ground-based secure communications assets. When secure communications are not operational, enemy track information from airborne and ground-based sensors may be passed by non-secure data or voice broadcast.

3-28. 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.

## Command and Control Systems

3-29. Command and control systems should be survivable and redundant and may include:

- Air-, ground-, and space-based early warning and surveillance systems.
- Other netted civil and military sensors.
- Low-level radar systems.
- Mobile radar, including sea-based systems.
- Strategic warning systems.
- Intelligence systems.
- Identification systems.
- Electronic warfare systems.
- Communications systems.
- Data processing facilities.

## Contributing Command and Control Systems

3-30. Contributing systems may include military and civilian assets. Depending on the situation, all may be integrated with the air defense system.

3-31. **Airborne Early Warning**. Airborne sensors serve to overcome range and low-level detection limitations inherent in a surface-based sensor system and are integrated with surface systems. The use of airborne early warning systems will extend detection ranges and consequently increase the time available for reaction. At the same time, friendly positions will not be compromised, and the threats from low-level surprise attacks will be significantly reduced.

3-32. **Space Based Warning Systems**. Space platforms provide warning of ballistic missile attack and other intelligence information to either national or theater warning systems. Spaced-based systems can provide longer-range warning than airborne or surface-based sensors.

3-33. **Intelligence Sources**. These may provide indications of imminent hostile activity, potential early warning, and positive hostile identification before detection by the air defense system. The maximum possible use of this information is essential. Host nation intelligence sources may significantly augment US intelligence efforts.

3-34. **Logistics and Support Agencies**. These provide the continuity and sustainability required to enable the air and missile defense force to accomplish its mission. Adequate and timely support must be planned, coordinated, and executed.

3-35. **Civilian and Military Air Control Facilities**. Air traffic control facilities in the area of operations may contribute vital information to air and missile defense forces. These capabilities are exploited and, where possible, netted into the command and control system.

## Command and Control Relationships

3-36. Command relationships for all operations shall be per Joint Pub 0-2. The joint force commander normally assigns responsibility for overall AD operations to a single area air defense commander. With respect to the conduct of JTAMD operations, the following principles normally apply:

- **Exercise of operational control.** A joint force commander exercises operational control of all assigned forces to ensure unity of effort. Normally, this authority is exercised through his component commanders. JTAMD operations are conducted under the guidance of, and to achieve the objectives of, the joint force commander.

- **Command.** Air and missile defense forces that may be committed to JTAMD operations remain under the command of their respective component commander. Air and missile defense forces are normally assigned either to the component headquarters or are organic to Army corps, US Marine amphibious forces, divisions, armored cavalry regiments, and separate Army brigades. Forces are integrated into the air defense system according to the established joint operational procedures and the overall air and missile defense priorities of the joint force commander and his component and intermediate commanders.

- All air and missile 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.

## Active Air Defense Command and Control

3-37. The JFC exercises control of active air defense operations by integration of JTAMD systems and forces into the C4I systems supporting theater operations. Component commanders retain command of their active defense forces and 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's air and missile defense priorities. Corps commanders employ their organic active air defense forces similarly.

## Joint Theater Missile Defense Command and Control

3-38. Joint Theater Missile Defense (JTMD) C4I functions are performed through an arrangement of personnel, equipment, communications, facilities, databases, and procedures. They are designed for planning, directing, coordinating, and controlling forces to accomplish JTMD. Effective control requires continuous surveillance of likely missile launch areas. A confirmed launch triggers reaction by a pre-planned selection of appropriate defensive systems, according to established ROE. 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. US Commander in Chief, Space Command (USCINCSPACE) ensures that space-based systems are responsive to the joint or multinational force commander.

3-39. **Attack operations.** Designation of engagement areas, assignment of areas of operations (AO) and coordination of JTMD attack operations are prescribed by the JFC. The JFC will normally task component commanders for conduct of attack operations against TMs within their assigned AOs.

Subordinate commanders control attack resources and coordinate and conduct their operations according to joint doctrine and procedures. The JFACC is normally the supported commander to plan and conduct attack operations against theater missiles that are outside the other component commanders' AOs.

3-40. Effective attack operations require real-time coordination between all component commanders as well as continuous wide-area surveillance over the entire area of responsibility. 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.

3-41. **Linkages.** The C4I system links passive and active missile defense and attack capabilities to provide timely assessment of the threat, rapid dissemination of tactical warning, targeting data, mission assignment, and post-strike assessments to the appropriate JTMD element. The C4I system must provide rapid communications among intelligence assets, fusion and decision-making nodes, warning systems, and weapon systems, to include a capability for rapid coordination with supporting commanders in chief. C4I capabilities should also support the principles of centralized control, decentralized execution, and coordinated efforts by units assigned JTMD tasks.

3-42. **Resources.** Inherent in effective JTMD operations is an absolute requirement for vertical and horizontal technical and procedural interoperability. This is especially true for the C4I operational elements. JTMD C4I systems, facilities, procedures, and organizations integrate applicable joint and multinational capabilities. The JFC must exercise JTMD C4I interoperability among all components during peacetime joint force and multinational exercises. C4I must fulfill the following requirements:

- Passive missile defense measures require predicting and detecting a launch, predicting the launch and impact points, and providing threat identification (NBC or conventional) and timely warning.
- 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.
- Attack operations require accurate identification and location of launch platforms and support systems and timely transmission of targeting data to attack systems.

3-43. **Planning.** C4I planning begins with the JFC 's 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. C4I planning for passive missile defense, active missile defense, and attack operations must be coordinated among all components of the force on a continual basis to ensure complementary efforts and to achieve synergism.

3-44. Planning considerations for C4I of JTMD operations must 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 JTMD elements that must complement

each other, and the possible impact of JTMD on other missions and tasks, are all considerations.

## COMMUNICATIONS AND COMPUTERS

3-45. Effective control of diverse systems requires the capability to collect, process, display, and communicate vast amounts of information while denying the enemy access to the information. Communications systems, including space-based resources, must be capable of providing secure near real time exchange of essential information between the joint force commander and subordinate commanders and forces. The systems must be 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.

3-46. To speed the exchange of essential information, it may be necessary to delineate 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. The systems should have redundancy and must have a backup capability and procedures to maintain continuity of operations should the primary system fail.

## INTELLIGENCE

3-47. The intelligence system must provide current, accurate, and timely all-source information of enemy capabilities and activities. These systems must be integrated and synchronized to ensure responsiveness to operational needs. The intelligence system must accommodate a variety of different armed forces (national, allied, or coalition) communications systems. The intelligence system is vital to the decision-making cycle and must support the status, assessment, planning, warning, and IPB functions, as well as target prioritization recommendations.

### Capabilities

3-48. C4I systems must rapidly disseminate intelligence to the components and support air, sea, and ground attack operations requirements with a rapid targeting capability. C4I for JTAMD actions must be integrated into the overall theater communications network and yet be capable of decentralized control or autonomous operations. Service organizations conducting JTAMD actions must maintain an interface with and be interoperable with the other components' organizations.

3-49. Theaters may have offensive constraints or limitations, requiring a reactive C4I process. A reactive mode demands extensive preparation and preplanning using continuous IPB to provide critical targeting data. The preparation and planning process within the C4I framework focuses sensor, surveillance, and intelligence management to allow target acquisition and tracking of the enemy air and theater missile systems and supporting operations.

**Theater Missile Intelligence**

3-50. Intelligence preparation must provide near real time data on enemy TM forward operating bases, missile launch, load, and hide sites, EW systems, C4I facilities, surveillance and control systems, and logistical support and infrastructure. The C4I process must detect and disseminate prelaunch signatures that indicate enemy missile launch preparations, and pass the launch warning to friendly units.

3-51. Launch warnings provide the means to alert and increase the readiness of friendly defensive assets, and for the employment of offensive and passive countermeasures. Increasing the readiness posture includes weapon systems, ISR assets, and command and control nodes for the level of threat activity anticipated.

3-52. Once a launch is observed, the preparation and planning measures provide a capability for concurrent and simultaneous defensive and offensive response.

3-53. An identified enemy missile launch through sensor and surveillance systems keys the C4I process, which uses communications interfaces to provide near real time defensive and offensive attack responses. In-flight threat missile trajectory data are passed in near real time directly to interceptors, point defense, and self-protection systems. Simultaneously, while enemy missiles are in flight, updated enemy launch locations, predicted impact areas, and target data base information are passed to the appropriate command and control centers and offensive systems. Concurrently, launch warnings are provided to all units and commands within the theater.

3-54. Depending on the capabilities of the sensor and surveillance systems, and the sources and quality of the intelligence, cueing of additional systems may be necessary to provide more refined and accurate threat missile data. National or theater sensor and surveillance assets may search areas that will then require more refined ISR by theater and tactical assets. Friendly aerial reconnaissance, ground surveillance systems, and other intelligence assets are rapidly cued to achieve the necessary accuracy for IPB targeting objectives.

**Multinational Considerations**

3-55. Intelligence requirements in support of multinational JTAMD operations must be determined and prioritized to plan the collection and analytical effort and to allocate appropriate resources to these functions. Some designated national intelligence systems will augment organic systems of US forces that are part of multinational commands. These systems must be integrated and synchronized to ensure responsiveness to operational needs.

## DEFENSIVE OPERATIONS

3-56. Defensive air and missile defense operations provide a secure area from which all elements of the joint force can operate. To accomplish this, defensive air and missile defense 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. Defensive operations employ both active and passive air and missile defense measures.

## ACTIVE AIR DEFENSE OPERATIONS

3-57. Active air defense protects friendly forces and geopolitical assets by destroying attacking aircraft, missiles, and UAVs. Active air defense operations use aircraft, ADA, maritime AD, space-based systems and sensors, and electronic warfare support measures, along with signals intelligence. Active air defense operations are supported by dedicated, secure, and highly responsive communications 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 to prevent enemy surveillance and attack. Airspace control in an active air defense environment is difficult but is crucial to successful friendly air operations and effective air and missile defense. Positive control and procedural measures may 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 and missile defense forces must readily identify all aircraft in the area by electronic, visual, or procedural means. Rapid, reliable, and secure means of identification are critical to the effectiveness of air defense as well as to the survival of friendly aircraft.

### Active Air Defense Resources

3-58. Air defense assets may be provided by all service components and may include support by space-based assets. Resources of the active air defense system may include weapon systems, command and control systems and additional contributing systems.

### Active Air Defense Weapon Systems

3-59. All systems have limitations such as reaction time, range, identification capability, and flexibility of operation. However, limitations of one type of system are often offset or mitigated by the capabilities of another type of system. Therefore, an effective active air defense requires a mix of weapon types and systems. This balance is required between aircraft, surface-to-air weapons, and the specific types of aircraft, missiles, and guns.

### Execution of Active Air Defense Operations

3-60. Execution of active air defense operations requires surveillance and reporting systems capable of near real time production and dissemination of tracking data, which is necessary for the effective engagement of targets. As a track is detected, it must be classified and/or identified. This information then must be disseminated as rapidly as possible. The detailed and timely track data allows the command and control and integrated weapon systems to evaluate the track, determine the significance of the threat, and either designate air and missile defense forces for engagement or advise units of the passage of friendly aircraft.

**Employment of Active Air Defense**

3-61. Early warning of enemy air attack is vital if early engagement and defense in depth are to be achieved. Active air defense is developed to permit the interception of intruding threat aircraft as early as possible and as far forward as feasible. Engagement should continue through weapons release, departure from the target area, and return to base. Firing doctrine should address the allocation of available weapons to inbound threats before any allocation to outbound aircraft. The following paragraphs address how weapon systems may be employed.

3-62. **Fighter-interceptor**. Fighter aircraft may fly three basic missions:
- **Interception.** Intercept missions may involve the scramble of aircraft from ground alert status, redirection of aircraft from combat air patrols, or redirection of aircraft from other type missions.
- **Combat air patrol (CAP)**. These missions enable rapid reaction to threat intrusion and may be positioned well forward of areas to be defended, over a specific area, in support of friendly air or surface forces, over critical areas of a combat zone, or over air, land, and sea corridors.
- **Air escort**. Air escort missions in support of other aircraft. Unescorted aircraft normally carry self-defense weapons.

3-63. **Armed Helicopters**. Aerial combat is an integral part of the ground commander's scheme of maneuver and may be controlled by either the aviation or ground maneuver force commander. Although it is a self-defense mission, air combat can occur during both offensive and defensive operations. Air combat is inherent in aviation's maneuver role in the reconnaissance and security, attack, and air assault missions and must be linked to the aviation command and control system.

3-64. **Surface-to-Air Weapons.** Surface-to-air weapons are employed to protect the force. These weapons offer large amounts of firepower and instant responsiveness. For maximum effect, a mix of types of surface-to-air weapons should be employed in an integrated air defense since the optimal capabilities of each weapon system occur at different ranges and altitudes. Surface-to-air systems provide the best overall coverage when their operations are both integrated and coordinated. Integration and coordination ensures both a minimum-risk passage for friendly aircraft and a means to deconflict employment of surface-to-air weapons and fighters.

**PASSIVE DEFENSE OPERATIONS**

3-65. Passive defense is all measures, other than active defense, taken to minimize the effectiveness of hostile air and missile threats against friendly forces and assets. 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. It includes measures initiated to reduce vulnerability and to minimize the effect of damage caused by TM attack. It does not involve the employment of lethal weapons. Passive defense measures by all elements of the joint force are essential to force protection.

3-66. Depending on the situation and time available in the area of operations, a variety of actions can be taken to improve the joint force's passive defense posture. These actions include:

- Providing a capability for rapid battle damage repair, recovery, and reconstitution.
- Providing nuclear, biological, and chemical defensive equipment and facilities.
- Providing sufficient assets to allow redundancy of systems and equipment.
- Providing alert, tactical warning and all clear systems.
- Adopting a comprehensive electromagnetic-emission control policy (including infrared and optical).
- Netting available communications and air-, land-, sea-, and space-based sensor systems.
- Reducing vulnerability by providing camouflage, concealment, cover, dispersal, deception, hardening, and increased mobility of assets.
- Repositioning electromagnetic emitters to prevent targeting.
- Providing operations and communications security.
- Using limited visibility or hours of darkness for movement, resupply, and support of operations.
- Training civilian authorities.

3-67. Theater Commanders-in-Chief, with support from USSPACECOM, are responsible for establishing theater event reporting systems to acquire, process, and disseminate warning information to joint force components and host-nation civil authorities. They are also responsible for implementing tactical event system architectures that are integrated with operations and intelligence communications nets. Component commanders are responsible for providing warning to assigned forces. Tactical warning initiates passive defense actions. Warnings are both general (that missile launches are imminent or have occurred) and specific (that specific units or areas are in danger of attack). The Commander-in-Chief's tactical warning requirements are supported by national and theater intelligence and warning systems.

3-68. The tactical event system (TES) and the joint tactical ground station (JTAGS) are of primary importance for tactical warning of ballistic missile attack. Both are US Space Command (USSPACECOM) assets which support theater tactical warning requirements with near real time warning of ballistic missile launches within the CINC's area of interest.

## JOINT THEATER MISSILE DEFENSE OPERATIONS

3-69. A single measure cannot provide complete protection against a determined TM attack. A combination of passive defense, active defense, and attack operations, all fully integrated and coordinated by a robust and efficient C4I architecture, is required to meet the stringent performance requirements demanded of JTMD. Such a mix must provide for the survivability of combat forces, minimize the impact on friendly combat operations, create uncertainty in enemy planning, and deter or deny enemy effective use of TMs. The following paragraphs discuss the planning and

preparation for JTMD, the process of transition to JTMD operations, and the active missile defense element of JTMD.

## JTMD Preparation for War

3-70. Successful JTMD operations are highly dependent on the simultaneous and sequential execution of a wide spectrum of tasks and activities, some of which occur or begin prior to the initiation of the use of force. Significant among these is intelligence preparation of the battlefield (IPB), JTMD preparation and training, and planning and development of the JFC approved defended asset list (DAL). During operations planning, forces are organized and enemy TM and TM-related targets are prioritized and assigned and ROE are established. The plan should include passive defense measures, along with a concept of operations for active defense and attack operations. As discussed in the following paragraphs, requirements and planning considerations for a contingency theater are different than those for a mature theater.

3-71. **Mature Theater.** Well-rehearsed TM defense plans and preparations allow forces in a mature theater to transition swiftly from peace to war. TM defense systems must provide timely C4I and target acquisition before hostilities commence. Preparatory activities include IPB, detection of launch platform preparations, and transmission of timely warnings to alert responsible commanders. Passive missile defense preparation should be conducted.

3-72. Forces are organized, threat targets prioritized and assigned, and ROE established to protect assets and provide freedom of maneuver for friendly forces during the peacetime phase. Passive and active missile defense measures are planned.

3-73. **Contingency Theater.** The availability of TMD active defense from the initiation of the operation in an immature or contingency theater will depend on whether the force must conduct opposed or unopposed force entry operations. During an opposed forced entry, land force TMD efforts may initially be limited to passive defense and attack operations until sufficient active defense assets can be deployed into the lodgment area(s). Naval forces may provide limited active defense of forces and assets in the littoral. Counter-ISR operations are essential to passive defense. Early, detailed advanced planning is fundamental to establishing a credible JTMD capability as quickly as possible. If entry is unopposed, Army TMD active defense forces must be deployed during early entry to protect the ports of debarkation and initial force and logistics concentrations. JTMD requirements are very similar to those of a mature theater. The principal differences are the time to deploy JTMD forces and available JTMD resources.

3-74. Forced entry operations may employ airborne, amphibious, or a combination of air, sea, and land insertion means, supported by space-based systems. Whatever the situation, the TM threat must be addressed and an appropriate defense provided early to counter the threat. During initial phases of amphibious operations the Navy component may have the primary role for providing the defense. As assault forces deploy ashore, land-based

systems must be employed and integrated into the TMD. Upon agreement, the primary responsibility for JTMD operations may be passed to forces ashore. During situations in which the Naval forces are in support of land operations, Naval and land-based JTMD operations must be coordinated to ensure unity of effort.

3-75. Since JTMD assets available to the JFC will generally be limited, especially in opposed entry operations, special emphasis should be placed on providing physical security for critical JTMD assets against terrorist and similar threats.

## JTMD Transition to War

3-76. The first indication of an impending act of war may be the detection of fixed or mobile TM launch platform preparations. Tactical warnings alert commanders and associated weapon systems, sensors, fusion centers, command and control nodes, military forces, and, in some cases, civil authorities to prepare for the expected attack. Once a launch is observed, a launch warning is passed to commands, units, and civil authorities to trigger passive and active defensive actions. Target flight data are passed by the C4I system to active missile defense units, and launch point estimates are passed to attack systems.

3-77. Air Defense commanders at all echelons plan and monitor execution of TMD activities. Air defense commanders are responsible for the active defense operational element of TMD. Additionally, they are directly involved in passive defense, by providing warning of missile attack within the land component, and possibly the joint force. ADA commanders perform active air and missile IPB, recommend air and TMD intelligence priorities, and recommend TMD attack operations targets.

## JTMD Active Missile Defense

3-78. Active missile defense applies to operations initiated to protect against a TM attack by destroying TM airborne launch platforms and or destroying TMs in flight. Active missile defense includes 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.

3-79. A role of active missile defense is to destroy incoming TMs in flight in order to protect selected assets and forces. This includes destroying ballistic missiles, air-to-surface missiles, anti-ship missiles, and cruise missiles as early as possible during their flight trajectory, and enemy aircraft armed with ASMs or CMs before they can be launched. Defensive measures also include those actions that mitigate the effectiveness of targeting and delivery systems through electronic and electronic-optical attack of remote or onboard guidance systems. To create a coherent TM defense, active missile defense operations must complement passive missile defense and attack operations.

3-80. Some appropriate detection and attack systems include space-, air-, land-, and sea-based systems. Space-based data and components must be directly downlinked and integrated with theater assets for such things as IPB, launch warning, launch point prediction, threat classification, impact

point prediction, weapons system cueing, communications, damage assessment.

3-81. Incoming missiles are destroyed by surface-to-air missiles during the latter phases of a missile's trajectory. Because an enemy attack may integrate aircraft and missiles, active missile defense must be coordinated with active air defense operations.

3-82. The ability to destroy missiles in flight must be coupled with dynamic and imaginative deployment of defensive systems to prevent the enemy from knowing what is defended. This causes uncertainty and reduces the enemy's expectation of a successful attack. Due to resource limitations, active missile defense operations defend those assets deemed the most important and critical by the JFC and component commanders. The JFC, component commanders, and intermediate commanders establish priorities for TMD and accept risk that the enemy could attack lower priority assets that are not defended. The principal contributors to active missile defense operations include surface-to-air missile systems and aircraft that engage enemy airborne launch platforms.

## OFFENSIVE OPERATIONS

3-83. Offensive air and missile defense operations, including JTMD attack operations, must be considered for integration into tactical operations at all echelons wherever hostile air power has the potential to threaten friendly operations. Allocation of forces to theater-level offensive operations will be based on the joint force commander's assessment of the threat, the mission, and the forces available. Component commanders and their subordinates consider the same factors as they integrate offensive targets into their fire support priorities.

### TYPES OF TARGETS

3-84. Offensive air and missile defense operations will attack enemy targets in the air and on the surface and as close to their sources as possible. The following potential targets should be considered in the conduct of offensive operations:

- Fixed- and rotary-wing aircraft and UAVs.
- Airfields and operating bases.
- Electronic warfare systems.
- C3 facilities and installations.
- Surveillance and control systems.
- Logistics and infrastructure that support air and theater missile operations.

### FORCES AVAILABLE

3-85. The manner in which the offensive battle is prosecuted will depend on the forces and systems available and on their general capabilities. Various forces and systems are discussed in the following paragraphs.

3-86. **Aircraft.** Aircraft conduct attack-strike operations against targets on the ground 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.

3-87. **Surface Firepower.** Artillery and naval gunfire may be employed against targets. Land-attack cruise missiles 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 (ATACMS), cruise missiles, and unguided rockets, such as Multiple Launch Rocket System (MLRS), may also be used.

3-88. **UAVs.** Unmanned Aerial Vehicles 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.

3-89. **SOF.** Special operations forces (SOF) normally conduct direct action strikes and collect intelligence. They can also provide terminal guidance for air attacks against enemy airfields, operating bases, and other facilities that support enemy air operations.

3-90. **Maneuver Forces.** Though the majority of offensive AMD tasks require the use of air and fire support assets, maneuver forces may also contribute. Mechanized or armored units, airborne and air-assault infantry, US Marine amphibious forces, and attack aviation may all be used to attack airfields, forward operating bases, and other offensive AMD targets.

## CONDUCT OF JTMD ATTACK OPERATIONS

3-91. Attack operations are characterized by offensive actions to destroy and disrupt enemy TM capabilities before, during, and after launch. 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, RSTA platforms, C2 nodes, and missile stocks and infrastructure. The preferred method of countering enemy TM operations is to attack and destroy or disrupt TMs prior to their launch.

3-92. Attack operations can be preemptive or reactive. A sustained effort is required to reduce the enemy's TM 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 C4I process and rapid targeting capability. Attack operations use all-source intelligence, missile-warning systems, and air defense radar to locate and target enemy TM systems, their components, and supporting nodes.

3-93. Attack operations are highly dependent upon predictive and developed intelligence. Because it is difficult to detect highly mobile launch systems, a C4I capability should 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.

**Planning**

3-94. 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. ADA planners must coordinate with the S2 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 JTMD attack operations. Component commanders then plan attack operations based on the assignment of attack responsibilities, the JFC's concept, priorities, and allocation of attack resources.

3-95. Effective JTMD attack operations requires the integration and coordination of all joint force plans. The JFC may task an organization within his joint staff to integrate component commanders' plans or may delegate this responsibility to a subordinate commander. If established, the joint targeting coordination board (JTCB) 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.

3-96. Commanders continually reassess friendly and enemy dispositions throughout the planning cycle. They use all available intelligence to anticipate enemy attack plans, predict TM system dispositions, and plan appropriate attack responses.

**Execution**

3-97. Conduct of attack operations is reliant on sensor systems, a responsive near real time sensor management and communications network, and highly responsive, long-range attack weapon systems. At the tactical level, responsive intelligence and operations interfaces are required for rapid targeting and engagement of mobile TM launchers and support assets. Execution of air and ground JTMD attack operations is centrally planned, executed in a decentralized manner, and governed by applicable joint policies, doctrine, and procedures.

## MULTINATIONAL TAMD OPERATIONS CONSIDERATIONS

3-98. TAMD operations are required within the context of an alliance, coalition, or other international arrangement. Within this context, the JFC is subordinate to the CINC or may be the multinational CINC. In either event, the JFC must consider those areas peculiar to multinational operations that may influence the ability to achieve multinational unity of effort.

Multinational CINCs and their subordinates identify the requirements and implications of multinational operations, organize their forces, train for success, and conduct multinational operations as necessary.

## RESPONSIBILITIES

3-99. Requirements, responsibilities, and organizational considerations for conducting TAMD operations in a multinational environment are similar to joint operations. However, special considerations and areas of emphasis are needed to ensure unity of effort with other nation's forces. Each theater and each country is unique. Even within formal alliances, there are varying national interests that should be identified and considered. Differences in doctrine, training, equipment, and organization must be identified and considered when determining alliance interoperability requirements for employing forces. The multinational CINC is responsible to both national and allied or coalition leaders. Leaders of the alliance or coalition must approve command relationships among the elements of the alliance or coalition.

## ORGANIZATIONAL CONSIDERATIONS

3-100. When national forces of the multinational force are not uniformly capable of actively defending against enemy air or missile capabilities, provisions must be made to ensure that TAMD assets are provided for defense within JFC-established priorities. This may entail introducing TAMD assets from another theater. For this reason, TAMD units and support organizations must train, orient, and exercise to operate in the total spectrum of potential operational environments. As in joint operations, multinational CINCs may choose to organize on an area or functional basis, or a combination of the two. In either case, multinational force capabilities must be considered.

## OPERATIONS

3-101. Consensus on the threat, a clearly defined chain of command, and a responsive, interoperable command and control structure are crucial to successful multinational TAMD operations. Particular care must be taken to ensure that national forces and selected geopolitical assets are provided requisite protection 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.

## THREAT

3-102. Threats to the total multinational force, to include rear areas, must be considered. Consensus on the threat will facilitate the integration of national and alliance or coalition intelligence collection efforts, allocation of collection resources, and threat evaluation.

## SYNERGY

3-103. National forces are assigned TAMD missions that will produce, in concert with other forces, more significant effects than if employed alone.

Tasks to national forces are assigned commensurate with their equipment and capabilities.

## INTEROPERABILITY

3-104. C4I systems must be sufficiently interoperable to respond to the needs of the multinational command. Information critical to TAMD needs is identified and systems are established to speed the flow of critical information throughout the multinational chain of command.

## WARNING

3-105. Multinational commanders must plan and disseminate warning and attack predictions to civil authorities. They must establish simple, effective systems.

## EXERCISES

3-106. Key to establishing and refining sound procedures is multinational exercises with full participation of C4I assets. Exercises provide an excellent environment for the simultaneous practice of multiechelon responsibilities to evaluate and to sustain the requisite skills and procedures for effective TAMD operations. Exercises are particularly 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**

# Fundamentals of
# Army Air and Missile Defense Operations

This chapter describes the principles and fundamentals for the employment of the air defense combat function, and the integration of air and missile defense (AMD) capabilities into joint and combined arms operations.

## JOINT, MULTINATIONAL, AND INTERAGENCY OPERATIONS

4-1. The campaign is a joint and multinational series of battles. The services and national forces coordinate and synchronize their efforts to bring combat operations to a successful conclusion. The Army, through the air defense combat function, participates in joint counterair and theater missile defense operations. Moreover, the Army provides a wide spectrum of air defense-capable systems and forces

4-2. Combatant commanders seek the synergy inherent in joint operations by synchronizing the complementary combat capabilities of all the components and supporting commands into a unified effort. Participation in joint training exercises and understanding joint doctrine is a prerequisite to joint capability. Commanders must train leaders and units to operate as part of the joint team. Liaison is a vital part of this cohesiveness.

4-3. Forward area based ADA forces support collective security arrangements and operate as part of multinational formations. Additionally, ADA units enhance relationships with regional partners through combined exercises, continual contacts, and liaison.

4-4. ADA forces must be prepared to conduct a number of operations that integrate warfighting and stability and support operations. Robust liaison will facilitate understanding, coordination, and mission accomplishment.

## INTEGRATION OF ARMY AIR DEFENSE CAPABILITIES

4-5. The air defense capabilities of the US Army are best realized through the integration of its many combat functions and tactical units. Army ADA works in concert with joint and multinational air and missile defense forces.

### TOTAL FORCE

4-6. ADA conducts operations as a total force of Active Component (AC), Reserve Component (RC), and civilians. ADA brigades are task-organized with a mix of active and reserve component battalions. Multi-component units, such as the army air and missile defense command (AAMDC), leverage the advantages of AC and RC personnel creating more capable and cost

effective units. In a multi-component unit, AC soldiers perform the day to day and perishable skill duties. The AC soldiers are available to respond to immediate small-scale contingencies and pre-mobilization requirements. RC soldiers are integrated within the unit, train with the unit, and are available to fully man the unit in crisis situations. Planning for the integration of reserve components and civilians is essential to the successful conduct of ADA operations.

## TYPES OF FORCES

4-7. ADA has a wide mix of forces available to accomplish the mission. ADA units can be long range or short range, high or low altitude, and mobile or semi-mobile. Individual systems may have widely varying capabilities against different threat classes. The commander task organizes the force to defeat the threat and protect the force. The commander must also integrate the efforts of combat support and combat service support forces.

## BALANCE

4-8. Components of combat power can be joined in multiple ways based upon METT-TC. These combinations change over time and may be different in deep, close, and rear operations. Balance and a wide choice of employment options are key to success. Denial of threat RSTA activities is essential to protect friendly forces and assets, and to maintain surprise and the freedom to maneuver.

## COMBINED ARMS

4-9. As the military prefers to fight as a joint team, the Army prefers to fight as a combined arms team. ADA is part of the simultaneous application of the combat functions in every operation. These arms and services are integrated horizontally at each command level, normally battalion through corps, and vertically between command echelons. Combined arms teams strive to conduct fully integrated operations in the dimensions of time, space, purpose, and resources. Combined arms forces operate over increasingly large areas of the battlefield with less force density than in the past. Modern combined arms warfare puts added stress on maintaining dispersed and noncontiguous formations. The application of combined arms is complex and demanding. It requires detailed planning and violent execution by highly trained soldiers and units that have been thoroughly rehearsed.

4-10. At operational and tactical levels of war, freedom to maneuver is crucial to achieving superior combat power. Freedom to maneuver facilitates the ability of land and air forces to shape the battlefield, achieve advantage, set the terms for combat and future operations, and exploit success. Freedom to maneuver is the catalyst that permits land, air, and sea forces to reach their full destructive potential. Combined with the synergistic effect of synchronized surface and air operations, freedom to maneuver ultimately leads to success on the battlefield.

4-11. The ability of any unit at any echelon to maneuver freely on the battlefield centers around reliable logistical support and effective battle command. Friendly forces must anticipate enemy efforts to deny or disrupt

freedom to maneuver. Enemy air power represents the most flexible, far-reaching, and destructive threat to friendly operations.

4-12. To retain the freedom to maneuver and to protect critical assets, the joint and multinational forces must not only prevent attacks but also destroy the enemy's ability to attack. The rapid destruction of the enemy's air capability enhances friendly force flexibility and contributes to early victory. Therefore, the counterair and theater missile defense forces must kill enemy air platforms and missiles at the earliest opportunity, consistent with the force's mission. The results are protection of the force from the immediate air threat and reduction of the air and missile threat to future operations.

4-13. All members of the combined arms team must contribute to air and missile defense to achieve success. ADA is the only Army force dedicated to execute air and missile defense operations. Other members of the combined arms team, supported by an accurate and timely air and missile defense early warning and intelligence capability, can support the ADA effort.

4-14. Field artillery units can attack theater missile (TM) launch sites, critical air operation support facilities, and enemy ground-based air defenses. Army aviation, with air combat capabilities, can engage enemy aircraft in self-defense or when the ground force commander determines the need to use aviation in an air defense role. Combined arms elements can also strike deep against air operations support facilities and enemy air defenses. Special operations forces can perform deep offensive and reconnaissance operations to cripple and disrupt missile and air operation facilities. Other combined arms units can use organic weapons in self-defense against selected air targets. Smoke units can conceal large areas or restrict contour flight approaches.

4-15. Combat arms, combat support, and combat service support branches participate in the air and missile defense mission directly or indirectly. Combat service support units provide the personnel and material to carry out the mission. Engineer units provide terrain analysis, fortification construction, and assistance in rapid displacement and emplacement of ADA units.

4-16. The US Army focuses on the counterair and theater missile defense missions from a different perspective than other services. Within the Army, each echelon of command views the focus of these missions differently. At echelons above corps, the focus tends toward theater-level counterair and TMD objectives. At division 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.

4-17. At theater level the commander must control the airspace to protect strategic forces and geopolitical assets, the loss of which would imperil the conduct of the campaign. Corps commanders exercise control over most of the ground forces in the theater. Objectives of air and missile defense at the corps level are protecting the force, providing freedom to maneuver, controlling the air environment, and destroying enemy air and missile power on the ground and in flight.

4-18. Because the division commander is primarily concerned with tactical-level operations, the requirement for divisional air defense focuses on protecting the force. The division must be free to maneuver to shape the battlefield and destroy the enemy.

## TECHNOLOGY

4-19. Advances in electronics, communications, automation, surveillance, precision-guided weapons, and the exploitation of space-based capabilities have increased the lethality, range, accuracy, and reliability of ADA weapons. ADA can best use technology in future conflicts when it is integrated according to joint and Army doctrine.

# LEVELS OF WAR

4-20. Levels of war help commanders visualize a logical flow of operations, allocate resources, and assign tasks. Each level is defined by the outcome intended, not by the level of command or size of the unit. The levels of war apply to combat as well as stability and support operations.

## STRATEGIC LEVEL

4-21. Strategy involves the art and science of employing armed forces with instruments of national power to secure strategic goals. At the strategic level of war, the US, acting alone or as a member of a group of nations, uses national interests to determine a strategy to ensure an effective, responsive national power-projection capability. The National Command Authority and the Chairman of the Joint Chiefs of Staff translate strategy into military policy and requirements. These are the starting points for developing theater campaign plans.

4-22. Theater commanders participate in national, alliance, and coalition discussions as the theater military experts. 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 theater-strategic goals and is the basis for operational-level planning. Combatant and subordinate commanders usually plan and execute campaigns. Combatant commanders have strategic intents, concepts, and objectives.

4-23. National missile defense (NMD) is inherently a strategic operation. Satellite defense, depending on the expected outcome, may also be a strategic operation conducted by U.S. Space Command. Defense against air and missile attacks that originate outside the CINC's battlespace may be theater-strategic operations.

4-24. Defense of theater-strategic forces and geopolitical assets may also fall into the strategic level of war. Many stability and support operations are strategic-level. Since casualties may be a critical vulnerability that could impact on national resolve, ADA units are just as critical then as they are during war.

4-25. Echelons above corps (EAC) air defense commands such as the Army air and missile defense command (AAMDC) may participate in strategic or theater-strategic planning and execution. Depending on the nature of the

operation, corps ADA brigades and divisional battalions may also become involved in strategic or theater-strategic planning and execution.

## OPERATIONAL LEVEL

4-26. The focus at the operational 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. This is achieved through the design, organization, and execution of subordinate operations and major operations. The operational level is the vital link between national and theater-strategic aims and the tactical employment of forces. Service component or subordinate joint commanders have operational intents, concepts, and objectives. No specific level of command is solely concerned with operational art. In its simplest form, operational art determines when, where, and for what purposes major forces will fight. It governs the deployment, commitment, withdrawal of forces, and sequencing of successive battles and major operations. Air and missile defense of military forces in a theater of war or operations is an operational-level task.

4-27. Army air and missile defense commands, EAC ADA brigades, and corps ADA brigades usually plan and execute at the operational level of war. In some situations, ADA battalions are employed to protect operational forces and assets.

## TACTICAL LEVEL

4-28. War at the tactical level is concerned with the execution of battles and engagements. Activities at the tactical level focus on the ordered arrangement and maneuver of combat elements in relation to each other and the threat. Battles and engagements are planned and executed to accomplish military objectives. Tactics is battlefield problem solving that is usually rapid and dynamic in nature. ADA brigades and battalions conduct operations at the tactical level.

# PLANNING CONSIDERATIONS

4-29. Planning is a continuous process that begins with the receipt of a mission and the commander's guidance, and continues concurrently with combat operations. Planning and fighting are often conducted concurrently. Planning is done as thoroughly as time allows. Successful planning requires an appreciation of the simultaneous nature of operations, awareness of the total mission, anticipation of future events, and an understanding of the operational framework and battlefield organization.

## SIMULTANEOUS OPERATIONS

4-30. Multiple types of operations go on simultaneously throughout the commander's battlespace. A wide variety of combat and non-combat operations require synchronization to achieve designated objectives.

4-31. The combatant commander's single unifying campaign plan synchronizes actions taken at each level of war against the threat. The intent is to destroy or disrupt the enemy's key capabilities and functions and exploit

the resulting advantage before the enemy can react. Commanders at all levels require vision to fight simultaneously and to respond to contingency requirements. Subordinate service and functional commanders prepare operations plans with supporting actions and operational and tactical objectives that embody the strategic objectives given in the CINC's campaign plan.

## TOTAL MISSION AWARENESS

4-32. From receipt of the mission to its accomplishment, commanders at all levels consider everything that may affect their operation. Awareness is thinking beyond the current moment and throughout the dimensions of the commander's battlespace. By having total mission awareness, the commander thinks about immediate tasks to accomplish and about activities before and after the immediate tasks.

## TEAMWORK

4-33. An effective fighting force requires teamwork that is based on individual trust and unit cohesion. In many cases of force-projection operations, deploying units will find themselves assigned to an organization that has not previously trained or worked with them. Additionally, many Army units may be operating in a joint, multinational, or interagency environment for the first time. Forging a team is one of the early challenges facing commanders. Team-building techniques should include commanders' meetings, leader reconnaissance, and liaison team exchanges.

## FUNDAMENTALS

4-34. Army planning requires a complete definition of the mission, expression of the commander's intent, development of a concept of operations and completion of commander and staff estimates, if time allows. These items form the basis for a plan or order and set the conditions for decisive victory. The initial plan establishes the commander's intent, concept of operations, and tasks for subordinate units. It allows the greatest possible latitude for subordinate leaders. It is flexible enough to permit leaders to seize opportunities consistent with the commander's intent. The plan sets the stage for future operations. The best mission orders are those that specify what the subordinate commanders are to do without directing them how they must do it.

## SEQUENCING OPERATIONS

4-35. Army commanders determine the best sequence of operations to set a tempo and shape the battlespace so that forces will reach the desired objective. Commanders consider a variety of factors that affect sequencing decisions. Force projection operations are complicated by a rapidly changing threat situation. The sequence of operations that commanders choose should be flexible enough to accommodate change.

### Phases

4-36. The sequence of major operations or battles relates directly to the commander's decision on phasing. A phase represents a period during which

a number of forces are involved in similar activities. A transition to another phase indicates a shift in emphasis. During planning, commanders establish conditions for moving into each phase. Actions by the enemy can determine conditions for phases. Combat service support (CSS) is crucial to phasing. Operational planners must consider establishing logistics bases, lines of communications, priorities for services and support, and protection of logistics. CSS is key to sequencing the major operations of a campaign; and air and missile defense is critical to protection of all CSS activities.

### Branches and Sequels

4-37. No plan of operations survives intact after first contact with the enemy. The commander builds flexibility into the plan to preserve freedom of action under rapidly changing conditions. Branches and sequels directly relate to the concept of phasing. Their proper use can add flexibility to a campaign or operation plan.

4-38. Branches are contingency plans or options built into the basic plan for changing the disposition, orientation, or direction of movement, and for accepting or declining battle. They give commanders flexibility by anticipating enemy reactions that could alter the basic plan.

4-39. Sequels are subsequent operations based on the possible outcomes of the current operation. Executing a sequel will normally mean beginning another phase of the campaign. This is a continuous process during an operation so that the commander always has options.

### DECEPTION

4-40. Deception operations are designed to mislead enemy decision-makers by distorting, concealing, and falsifying friendly intentions, capabilities, and dispositions. The deception target is the enemy commander. The objective is to mislead the opposing military commander, which supports the goal of inducing the enemy to conduct activities that unwittingly serve friendly purposes.

4-41. Deception operations can be planned at all levels and must support the higher headquarters deception plan. In some cases, strategic and operational plans may include the employment of operational and tactical forces without their commanders being aware of the deception effort. Tactical deception may relate to smaller or more localized areas or forces where actions indirectly deceive the enemy as to exactly when, where, how, or who will accomplish the missions.

4-42. Many ADA units have unique and powerful signatures. Since ADA units are vital to force protection, they may be frequently deployed and employed in support of deception operations. Equally important, whenever possible ADA units should take actions that deceive threat RSTA as to their own locations and capabilities.

### REHEARSALS

4-43. A rehearsal is the process of practicing a plan before actual execution. Rehearsing key combat actions allows participants to become familiar with the operation and to visualize the plan. Rehearsals assist units in orienting

themselves to their environment and to other units during execution. Rehearsals provide an opportunity for subordinate leaders to analyze and understand the plan. Rehearsals also provide a forum to "proof" the plan, which validates its feasibility, logic, and adequacy of battle command measures. Rehearsals with combat units usually occur at the tactical level, while operational level headquarters can rehearse key aspects of a plan using command post exercises. Even if time does not permit a complete rehearsal with a full complement of troops and equipment, some form of rehearsal must take place with all key leaders.

4-44. ADA commanders and leaders must conduct some form of rehearsal with their units. They must also participate in the rehearsal of the supported units. Time management must be utilized to accomplish both tasks.

## WEAPONS OF MASS DESTRUCTION

4-45. The use of weapons of mass destruction can have an enormous impact on the conduct of all operations. Not only does their sheer killing and destructive power redefine the tactical battlefield, but the strategic, operational, psychological, and political impacts of their use affect campaign designs. The effects of these weapons can cause large-scale shifts in tactical objectives, phases, and courses of action at all levels. Planning for the possibility of their use against friendly forces is critical to campaign design.

4-46. A swift end to the conflict will partially negate the opportunity to employ these weapons. Still, force protection is an imperative in this environment. Effective air and missile defense is crucial. Commanders implement defensive principles of avoidance, protection, and decontamination. Commanders also take offensive preventive measures such as raids, air attacks, and operations designed to locate and neutralize such weapons.

4-47. ADA units provide for the protection of the force and geopolitical assets from many forms of chemical or biological air or missile attack. In order to provide such protection, ADA soldiers must be prepared to survive, fight, and win under conditions produced by weapons of mass destruction.

# OPERATIONAL FRAMEWORK AND BATTLEFIELD ORGANIZATION

4-48. An operational framework helps commanders relate their forces to one another and to the enemy in time, space, resources, and purpose. This framework establishes an area of geopolitical and operational responsibility for the commander and provides a way to visualize how to employ forces against the enemy. To understand this framework is to understand the relationship among the area of operations (AO), battlespace, and the battlefield organization. Proper relationships allow for simultaneous operations and massing of effects against the enemy.

4-49. US joint doctrine establishes a framework wherein joint forces can apply combat power simultaneously throughout the land, sea, air, and space dimensions of the theater. US Army doctrine also prefers such a framework. Selecting choices to comply with that framework is the business of tactical- and operational-level commanders and staffs. See FM 100-5 for a detailed

discussion of the operational framework and battlefield organization concepts.

## THEATER STRUCTURE

4-50. The CINC achieves theater focus by structuring the theater through the application of operational art. Theater structure is a product of the CINC's strategic objective, forces allocated for the theater, strategy for employing the factors of mission, enemy, terrain and weather, troops, time available, and civil considerations (METT-TC), and the presence of alliance or coalition structures.

4-51. During stability and support operations commanders-in-chief can focus their efforts through the designation of an AO. If required, the AO may be further subdivided by delineating a joint operations area (JOA), joint zone (JZ), or joint special operations area (JSOA).

4-52. During war a commander-in-chief achieves focus through the designation of theaters-of-war (figure 4-1). Within that theater, single or multiple theaters of operation can be formed. Multiple theaters of operation are formed when there are multiple major threats. A JSOA can also be designated. The JSOA within the theater of war can overlap into the theater of operations.
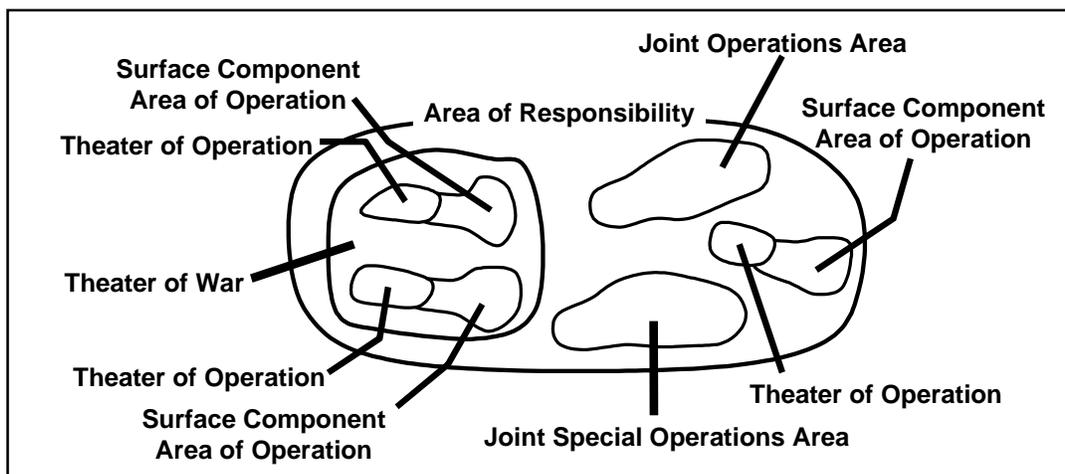


**Figure 4-1. Theater Structure Diagram**

4-53. A theater of war does not normally encompass the theater commander's entire area of responsibility (AOR). The theater commander may thus conduct combat operations within a theater of war and react to a separate contingency in a theater of operations or JSOA elsewhere in his AOR. The theater commander would continue normal peacetime activities throughout the remainder of the AOR.

4-54. Nation assistance and similar activities do not cease when higher levels of violence begin. The theater environment is often one of simultaneous activities across the full range of military operations.

4-55. The theater commander could also establish a combat zone (CZ) and communications zone (COMMZ). The CZ is an area required by combat forces to conduct operations. It normally extends forward from the corps rear boundary. The COMMZ constitutes the rear portion of a theater of operations, reaching back to the CONUS base or perhaps to another combatant commander's AOR. The COMMZ contains those theater organizations, lines of communications (LOC), and other agencies required to support forces in the field. The COMMZ includes air and seaports that support the flow of forces and material into the theater. It is usually contiguous to the CZ but may be separate and connected only by a thin LOC.

# THEATER COMBAT OPERATIONS

4-56. Battlefield success requires a combined arms effort that is well-integrated into joint and multinational operations. Weapons of increased complexity and lethality characterize the battlefield. The air battle is an integral part of the joint battle, and the US Army contributes to the air battle through air and missile defense operations.

4-57. Army doctrine describes the structure of modern warfare and recognizes its inherent three-dimensional nature. Synchronizing ground operations with air operations is the bedrock on which this doctrine is based.

## THE CAMPAIGN IN A THEATER OF OPERATIONS

4-58. The principal task of theater commanders and their subordinates is to plan and execute campaigns. The goal of campaigns is to achieve strategic military objectives through the concentration of superior strength against enemy vulnerabilities at the decisive time and place. Participating services work in concert toward common goals and synchronize their efforts.

### The Campaign Plan

4-59. The theater campaign plan originates with broad, strategic guidance from the National Command Authority, Joint Chiefs of Staff, or multinational command authority. Based on this guidance, the JFC and staff complete an estimate of the situation, decide upon a course of action, and direct the preparation of the theater campaign plan.

4-60. A campaign plan reflects the JFC's translation of national and alliance or coalition strategies into a theater military strategy. The campaign plan expresses operational military objectives that support the theater strategy, and it defines those objectives in terms of desired results of combat operations. The campaign plan also expresses the commander's mission priorities and decisions regarding apportionment of the resources of component air, land, and sea forces. Through the theater campaign plan, the JFC states the intent and provides a blueprint for conducting the early phases of the campaign. The plan also provides a general concept for follow-on campaign operations and contains campaign sustainment guidance.

4-61. Component commanders assist in preparing theater campaign plans and develop mutually supporting and synchronized air, land, and sea operations plans. Their plans implement the theater commander's guidance as it affects the employment of their respective forces. The JFC ensures the

supporting plans embody the theater campaign objectives and provide for maximum combat power at the right place and time. Synchronization and unity of effort are the principal benefits of the JFC's review and integration of the supporting operations plans into the theater campaign plan.

### Roles of the Components in the Campaign

4-62. The US Army, Air Force, Navy, and Marine Corps, as well as multinational forces, support the theater campaign through interlocking missions and combat functions. The joint and multinational air forces contribute to the air operations. Through their participation in air interdiction, counterair, and close air support, the joint air forces directly support the theater commander's land operations. Due to the land, sea, and air capabilities of the Navy and Marine Corps, the JFC integrates them into all aspects of the theater campaign plan.
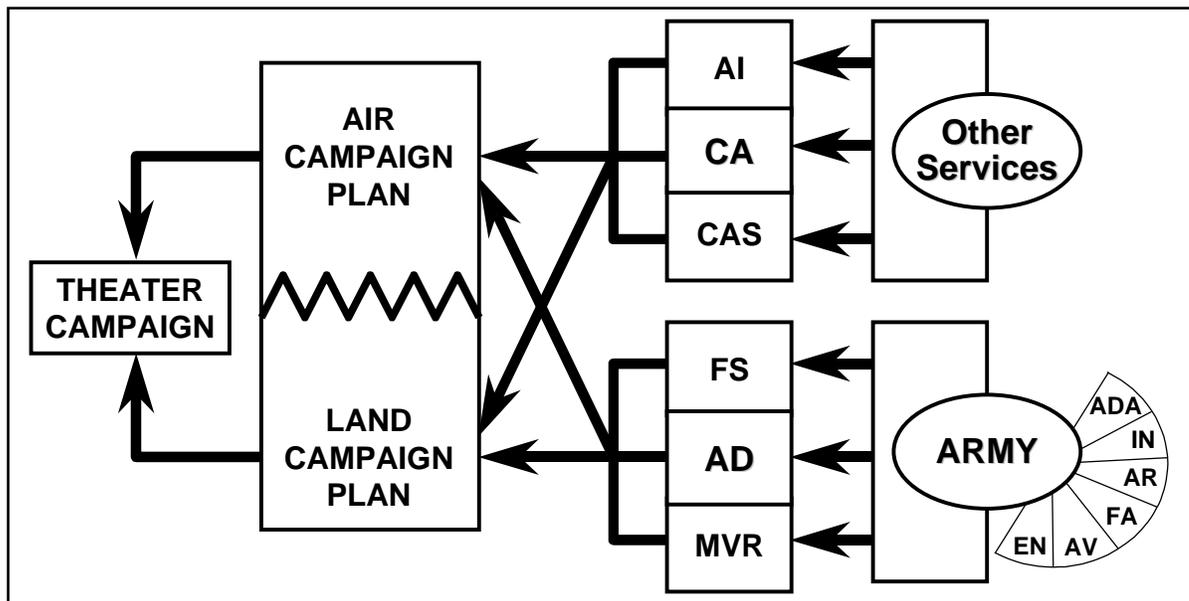
**Figure 4-2. Campaign Planning Linkages**

4-63. The Army's role in the theater campaign is also multidimensional and requires combined arms. The Army's combat functions directly support land operations and also support air operations. For example, the air defense combat function, for which ADA is both the proponent and principal contributor, is the Army's primary means to integrate Army contributions to joint counterair and theater missile defense operations. The campaign planning linkages depicts an example of integrated Army and Air Force support that is required to conduct the theater campaign (figure 4-2).

### THE AIR OPERATION

4-64. Army doctrine stresses the importance of the relationship between air and ground operations. The airspace of a theater is as important a dimension of ground operations as the terrain itself. To ensure maximum benefit from

air operations, the theater commander may designate a joint force air component commander (JFACC). The JFACC is responsible for air operations planning, coordination, allocation, tasking, and execution of air operations.

## Joint Air Operations

4-65. Normally, the forces under the JFACC's control perform the air operations combat missions concurrently. The missions are mutually supporting and include, but are not limited to, air interdiction (AI), close air support (CAS), counterair (CA), strategic attack, tactical surveillance and reconnaissance, tactical airlift, and support of maritime operations. Air operations influence all other combat operations. Air operations may be independent of land and sea activities and can achieve certain independent results. However, they normally combine with other combat operations to produce interrelated results that support the theater commander's objectives. Each element of the air operation is important to the successful completion of the theater campaign; but strategic attack, AI, CAS, and counterair components are the primary contributors to land operations. TMD attack operations do not ordinarily receive their own air apportionment category. Rather, TMD attack operations are a part of strategic attack and offensive counterair.

## COUNTERAIR AND THEATER MISSILE DEFENSE OPERATIONS

4-66. Airspace provides an added dimension to maneuver. Forces use the air environment for maneuver, delivery of fires, surveillance, reconnaissance, electronic warfare, battle command, and transportation. The commander who best exploits the full potential of airspace will more effectively exercise freedom to maneuver forces at the right place and time. Air superiority enables commanders to better optimize their tactical flexibility and their freedom to execute attacks to neutralize or destroy an enemy's potential to wage war. Counterair and theater missile defense operations protect friendly forces, enable friendly forces to use airspace, and deny use of airspace to the enemy. Thus, counterair and theater missile defense operations are an integral part of planning, fighting, and winning the campaign.

## Operational Elements of Counterair and Theater Missile Defense

4-67. The operational elements of counterair operations are offensive counterair (OCA), and defensive counterair (DCA). The four operational elements of theater missile defense (TMD) are active missile defense, passive missile defense, attack operations, and TMD C4I.

## General Requirements of Counterair and Defense Operations

4-68. Operations require coordination of each service's capabilities. A fully coordinated battle command system facilitates inter-service synchronization of activities. The proper mix and synchronization of surface-based and aerial platforms provide the commander with flexible and agile forces that complement each other and deny the enemy a preferred attack option. Similarly, flexible offensive forces must simultaneously engage the threat by performing attack, OCA, AI, SEAD, and CAS operations to degrade the

enemy's capability to bring combat power to bear and to exploit every possible enemy weakness.

## APPORTIONMENT

4-69. Contributions by Army assets, particularly ADA and FA, to the joint theater air and missile defense mission is important to overall air and ground operations. The Army air defense contribution to the counterair and theater missile defense operation is a major factor in providing ground-force commanders greater combat air power to achieve their objectives. Army contributions directly influence the JFC's apportionment of the total air effort. The JFC determines the allocation of capabilities and forces, made available by components, necessary to support his goals. The JFC normally apportions the available capabilities and forces for each of the mission areas of strategic attack, interdiction, CAS, counterair, and maritime support by percent, priority of effort, or weight of effort.

4-70. Attack operations may be factored into OCA, but can be accomplished in other mission areas such as interdiction. After joint and Army AMD forces have established air superiority, the JFC can reduce the apportionment of capabilities and forces to counterair. These assets can then be tasked in support of other air, sea, and ground operations.

## FORCE PROJECTION CONSIDERATIONS

4-71. Force projection is the military component of power projection. Force projection operations usually begin as a rapid response to a crisis somewhere in the world. Force projection operations challenge ADA leaders. Early critical decisions are required at every level in war and stability operations and support operations. ADA commanders will routinely be required to plan and execute multiple concurrent activities.

4-72. Projecting the force anywhere in the world is a joint mission and total Army mission that involves active and reserve component units, the mobilization base, and Department of the Army civilians. It includes the mobilization, deployment, and sustainment of the employed force; and the redeployment and demobilization of the force in preparation for future missions. ADA units should not expect to move smoothly from one stage to the next stage of force projection operations.

4-73. Force projection is a complex process in which each action affects many others. Deployed forces and lines of communications require protection. The intelligence community may only have general information about a contingency area. Host nation support may be unknown. Missions might change at any point. Despite the complexity of force-projection operations, ADA units must execute them successfully.

### LETHALITY

4-74. Credible, robust and lethal forces must be introduced early in force-projection operations. Sufficient combat power to resolve a crisis on favorable terms must be deployed. These forces must be interoperable and flexible to take into account unforeseen circumstances. The early entry air and missile

defense force must possess the lethality to protect the force the moment it arrives in theater. Commanders cannot depend on having the time to build up lethal forces in a theater. An air and missile defense task force with enough assets and access to joint and multinational counterair, theater missile defense, and intelligence assets might even be able to deter the enemy from attacking critical functions such as battle command, logistics, and maneuver.

## ANTICIPATION

4-75. ADA commanders and units everywhere in the Army must expect to be alerted and deployed with little prior warning. If units have been assigned a region of focus, planning must begin long before alerting. Continuous force tracking (total asset visibility) and intelligence readiness are important elements of anticipation. Plans must be simple, deployment options redundant, and deployment flow sufficiently versatile to generate alternative options. Early deploying air and missile defense forces must have the combat capability to protect lodgments from the moment of arrival since hostilities can begin at any time.

## FORCE TAILORING AND TEAMWORK

4-76. Force tailoring is the process of determining the right mix and sequence of units. Crisis response ADA forces on quick alert may have little time to tailor forces. Their force packages should include sufficient combat power to sustain them for the short term. Tailoring includes force refinement, which is the continuous process of adjustment conducted by the supported and supporting commanders. The resulting force represents the best compromise between mission, optimum force, actual force available, time, lift available, and theater supportability. Initial and follow-on ADA reinforcement forces can then be tailored to meet the specific concerns of the long-term mission.

4-77. Commanders find they may need to substitute one type of ADA unit for another or to add ADA units that have never trained together. This places a premium on early and continuous teamwork that builds the cohesion that is essential for mission success. Units must standardize tactics, techniques, and procedures to enhance teamwork and total force integration. ADA commanders must select a force composition appropriate for the mission, build the team, and plan for simultaneous deployment and rapid employment of the ADA force.

## INTELLIGENCE

4-78. The intelligence combat function must provide timely, relevant, accurate, and predictive all-source intelligence on threat capabilities and activities. The enemy's' mobility operations entering the theater include advanced conventional weaponry, WMDs, and various types of sea mines. Today's enemies possess the motives and means to interrupt the deployment of multinational forces and US forces. Ports of debarkation (PODs) are particularly attractive targets since they are likely to be bottlenecks where people and materiel pile up.

4-79. The following principles are critical to Intelligence and Electronic Warfare operations:

- the commander drives intelligence
- intelligence synchronization
- broadcast dissemination
- split-based operations
- tactical tailoring

4-80. Intelligence must support the air defense commander during all phases of the decision-making process. During planning the commander at each level drives the intelligence effort. They initially drive intelligence through the identification of priority intelligence requirements (PIR). Each commander must broker subordinate commanders' intelligence requirements, after which, intelligence assets are tasked to meet those requirements.

## BATTLE COMMAND

4-81. Force-projection operations will challenge ADA battle command. Two or more phases may be conducted concurrently. The deployment phase may result in the physical separation of units in space and time. The enemy may attack unexpectedly before deployment is complete. Simplicity and the ability to adapt and adjust are key considerations. ADA commanders must adapt to the nature of the deployment flow and prepare plans that rapidly build combat power, provide protection of the force, and facilitate future operations.

4-82. ADA commanders must have robust battle command means during force projection. They must accurately track friendly forces and forecast their arrival in theater. Space-based systems can greatly facilitate the commander's near-real-time knowledge of unit status and other key assets, as well as connecting into joint and multinational counterair and theater missile defenses. Establishing adequate communications networks will require innovation. Communications must be secure, reliable, timely, and compatible with the mix of supporting, supported, and adjacent forces and services. ADA units must rapidly establish communications with other organizations and services in the operation.

## LOGISTICS

4-83. Successful ADA force projection requires flexible and modular logistics. The nature of logistical projection depends on the factors of METT-TC. Force projection may require the development of forward support bases, intermediate staging bases, and lodgments in theater. Contracted logistics may provide some initial support. Direct contractor support may be provided to ADA units throughout the campaign. Split-based logistical operations (part in theater and part in the US) reduce the burden on the deployment flow and preclude unnecessary stock in theater. A split-based logistics concept relies on assured communications systems.

## TRAINING

4-84. Realistic ADA mission training is important. Units build on home-station training by focusing on missions and conditions they expect to encounter during force projection operations. Although training begins at

home stations, ADA units continue to train to standard and to rehearse following arrival in theater and throughout the conduct of operations as time, the threat, and other conditions permit. Units should regularly review soldier and equipment readiness and perform emergency deployment readiness exercises to ensure preparedness for deployment. Lessons learned should be passed up the chain of command, from unit to unit and from early deploying units to follow-on forces. Training continues after combat ceases.

## MULTINATIONAL OPERATIONS

4-85. Force-projection operations will almost always involve operations with other nations. Measures taken to achieve unity of effort and mutual trust greatly facilitate operations with host nations. Commanders and soldiers should be sensitive to cultural differences that may impact on operations.

4-86. Multinational counterair and missile defense requirements must be incorporated into the overall plan. Likewise, multinational capabilities must be maximized during operations.

## MEDIA IMPACT

4-87. The impact of the media on the conduct of air and missile defense operations is substantially greater today than in any previous era. Providing early and continuous access to the press throughout force projection enhances operations and strengthens public support. However, misuse of the media can endanger units; provide the enemy vital target, combat damage, and friendly force deployment data; and weaken public support. ADA commanders must take the presence of the media and its potential impacts into account during all phases of force projection operations.

## POSTCONFLICT CONSIDERATIONS

4-88. At all stages of force-projection operations, commanders at all levels must consider issues related to the end of hostilities and the transition to peace. At every level, analysis of the objectives for the operation should always include consideration of the anticipated consequences of the war to help smooth the transition from active combat to post conflict operations.

# FORCE PROJECTION OPERATIONS

4-89. Force projection is the military's ability to respond quickly and decisively to global requirements. It is fundamental to Army doctrine. The eight stages of force-projection operations follow a general sequence, although these stages often overlap in time and space. Activities of one stage will often blend with another.

4-90. ADA commanders should assume no set arrangement of events. They should be prepared to deal with many concurrent activities. They should conceptualize a logical flow through the stages but be prepared to make adjustments. The stages of force projection include the following:

- mobilization
- pre-deployment activities
- deployment

- entry operations
  - reception, staging, onward-movement and integration
- decisive operations
  - ADA employment principles
  - ADA employment guidelines
  - Air and missile defense priorities
- post-conflict or post-crisis operations
- redeployment
- demobilization

## STAGE ONE -- MOBILIZATION

4-91. Current strategy places an enormous premium on the ability to rapidly generate the forces (units), manpower (individuals), and logistics support required to support the commander in achieving his mission. Mobilization is a phased, concurrent, and continuous process designed to rapidly expand and enhance the mission capability of the Army in support of a military response to crisis or natural disaster. The authority to order mobilization resides with the President and/or the Congress.

4-92. Mobilization includes five levels, which support mobilization for specific or limited contingencies up to the full mobilization necessary to support large, protracted wars. The mobilization flow for an RC unit consists of planning, alert, activities at home station, activities at mobilization station, and activities at the port of embarkation. ADA commanders anticipating augmentation by RC units or individuals must be involved in providing training guidance and mobilization planning during the planning and alert phases. During the remaining phases, commanders must be prepared to receive units and/or individuals, organize personnel, supplies, and materiel, certify the proficiency of individuals and units and deploy the units into theater.

4-93. ADA commanders must be involved in the mobilization process because of the current reliance on the RC. In nearly every contingency, RC units and individuals are relied upon to accomplish the mission. Details of the mobilization process are in FM 100-17.

## STAGE TWO -- PREDEPLOYMENT ACTIVITY

4-94. Since all units are an integral part of the force-projection strategy, unit mission-essential task lists must reflect appropriate mobilization and deployment tasks. AC commanders anticipating augmentation by RC units should involve themselves in the RC unit's training program to insure that RC training is relevant to the AC unit's mission and training program. ADA unit training must emphasize all critical aspects of force projection.

4-95. Task organization is conducted based on the mission and resources available. The theater campaign plan will specify command, intelligence, logistics, and any multinational operations relationships, if known. The G2 or S2 must begin a detailed IPB as early as possible to support planning. Anticipatory logistics planning during this stage is key to successful execution of later stages. Operations security is critical during this stage. The

combatant or joint force commander will establish the sequence in which Army units should deploy relative to the movement of forces of the other services. ADA commanders must prioritize deployment sequences consistent with METT-TC. ADA commanders use available time to complete training and certification as well as building team cohesion. For forward presence forces, it may be necessary to provide air defense force protection and counter-RSTA during this stage.

## STAGE THREE -- DEPLOYMENT

4-96. ADA units are trained, structured, and postured for rapid deployment. Deployment planning tools, described in FM 55-65, allow commanders to adapt to rapidly changing circumstances. Lift assets are limited, but critical to the successful projection of the force. ADA commanders make every effort to integrate the capabilities of the host nation, joint and multinational forces, and forward presence forces with those of the deploying force. Commanders must balance the factors of METT-TC against available lift assets to determine the composition of the initial response force. Each crisis will have unique demands, causing commanders to balance requirements against lift. In deployment, commanders must maintain versatility and agility in force mix, their combat capability, sustainment, and lift, along with the need to forecast future events that call for decisions early in the deployment stage.

4-97. ADA commanders are responsible to provide forces protection during deployment. They must tailor the force to accomplish the mission against the threat developed during IPB. They may have to sacrifice mobility, redundant communications, and sustainability to bring in sufficient firepower to protect the force and designated assets during the initial phases of the deployment. Counter-RSTA will also be a significant part of the responsibilities of the ADA commanders, especially with respect to UAVs. Protection of joint air and missile defense priorities may outweigh defense of service priorities.

## STAGE FOUR -- ENTRY OPERATIONS

4-98. The requirements of entry operations will vary. Each operation will be different. Entry may be either opposed or unopposed. Forces are most vulnerable and the success of the operation at greatest risk during initial entry. This vulnerability is most acute when the enemy possesses weapons of mass destruction. Defensive and offensive operations to counter these weapons will affect ADA, Army, joint, and multinational planning. Protecting the entry force will be critical to the success of this phase of the operation.

4-99, Continuous intelligence support is critical. Entry force commanders will have in-flight intelligence during deployment and entry operations. Once on the ground, a deployable intelligence support element (DISE) will provide split-based intelligence operations by bringing together communications capabilities, automated intelligence fusion systems, and broadcast downlinks in a scalable, deployable package.

4-100. Even as entry operations are beginning, the commander shifts focus to building up capabilities in preparation for operations. Entry operations include rapid buildup and expansion that may require the following:

- Positioning the forces must achieve initial mission success and also maximize future employment options.
- Establishing forward operating and logistics bases.
- Closing the remainder of the force.
- Expanding the lodgment.
- Linking up with other forces.
- Preparing for future operations.

4-101. ADA forces provide the requisite force protection, in coordination with other joint and multinational air and missile defense elements. Early deployment of counter-missile and counter-RSTA ADA units is crucial to the success of entry operations. Even in an apparently benign entry operation, protection of the force remains a critical command consideration. Theater missile defense operations protect the lodgment, geopolitical assets, and debarking forces. Counter-RSTA operations deny the enemy targeting information, which is key to the enemy sustaining an effective air or missile attack. Units conducting counter-RSTA operations may need to be deployed away from the force to achieve early engagement. As the joint force expands the lodgment, ADA units continue to protect the force and geopolitical assets and deny threat RSTA throughout the AO. This is particularly critical to deceiving the enemy on the US intended course of action.

## Reception, Staging, Onward-Movement and Integration

4-102. As forces enter the theater of operations they will undergo reception, staging, onward-movement, and integration (RSOI) processing. These terms are defined as follows:

- Reception is unit arrival in theater, which includes receiving and marshalling personnel, equipment and supplies at APODs and SPODs. Includes linking up selected personnel with equipment. Normally, personnel will deploy to APODs and then linkup with heavy equipment at SPODs.
- Staging is building combat power, which includes the re-integration of combat-ready unit equipment and personnel. Unit personnel and equipment are linked up and checked in preparation for forward movement to tactical assembly areas (TAA). Units complete all actions required to ensure they are brought up to full readiness for integration into the forward combat zone. These actions include pre-combat checks, logistics (LOG) upload, life support supply issues, training, and rehearsals.
- Onward Movement is unit deployment from the staging area to the gaining command in the field. Includes movement of personnel, equipment, and supplies to TAA, or operating bases in the rear area or possibly into forward combat areas.
- Integration is unit arrival at the TAA of the gaining command, and the integration into the gaining command's command and

control structure. Requires coordination and liaison to ensure rapid assimilation into parent units. Depending upon the urgency of the situation, integration may occur during staging and onward movement, as the receiving command may need to rapidly establish command and control.

4-103. Six imperatives must be achieved in order for units to successfully conduct RSOI operations. The six RSOI Imperatives are as follows:

- **Protect the force**. Includes active and passive air and missile defense measures throughout the RSOI process.
- **Assist forward presence or host nation forces**. This may include a relief in place of forward-deployed forces, delivering supplies and securing routes, lodgments, borders, or zones of separation.
- **Reconfigure**. The unit must be tailored to meet the impending mission. This includes task organizing and prioritizing CSS assets, and ensuring that the combat force will arrive in the desired sequence.
- **Build combat capability**. This imperative requires interfacing with the theater LOG architecture and conducting large unit supply operations. CSS units must constitute rapidly in order to support the force and overall buildup of air and missile defense forces.
- **Train**. Training of soldiers to theater specific ROE, status of forces agreement (SOFA) provisions and stipulations, local customs and language skills, conduct of noncombatant evacuation operations, individual and collective conventional combat tasks and specific weapon system requirements. Training must be accomplished as appropriate.
- **Acclimate**. This begins with mobilization and consists of immunizations and issuing of specialized equipment based on the geographical area. It includes attaining interoperability with forward presence and host nation forces and weapon systems. It requires a command information program to keep soldiers informed about cultural, linguistic, geographical, and climatic conditions.

4-104. RSOI requires home-station training to be successful and is imperative to effective force projection operations. RSOI is the means by which commanders shape and expedite force closure in the theater of operations. Effective, well-conceived RSOI operations greatly speed force closure; conversely, an ineffective RSOI delays force closure and compromises the CINC's ability to implement the concept of operations.

## STAGE FIVE -- DECISIVE OPERATIONS

4-105. At some point in time, the joint force commander will decide to move against the enemy. The ground commander might reposition forces to facilitate the imminent start of combat. ADA units will be required to cover the force from the enemy while it moves. ADA units may be involved in deception operations related to repositioning the force.

4-106. Army commanders normally seek to engage threat forces simultaneously throughout the depth of the AO. The commander weights the main effort with sufficient, sustained combat power to win the decisive battles and allocates enough combat power to supporting efforts to ensure overall victory. Force agility, initiative, and synchronized operations throughout the width and depth of the battlefield characterizes ADA operations. Counter-RSTA and force protection remains crucial to the multinational, joint, and Army commanders' plans. Commanders conduct their operations with a sound logistical foundation integrated with their concept of combat operations. Countering helicopters increases in importance during the operations phase. Ensuring freedom to maneuver and minimizing casualties for the force are two of the primary objectives of air defense.

4-107. ADA commanders must use the same types of planning processes used by the supported force. This facilitates understanding and synchronization. Naturally the factors which go into the planning process for ADA units will be task organized to their mission and capabilities. ADA commanders use employment principles and guidelines to design air and missile defenses. When applying these principles and guidelines, planners must consider the tactical and technical capabilities of each weapon and sensor system as well as the relevant factors of METT-TC, IPB, and the air and missile defense priorities.

## Air Defense Artillery Employment Principles

4-108. Commanders apply four principles when planning active air and missile defense operations. These principles are mass, mix, mobility, and integration.

4-109. **Mass** is the concentration of air and missile 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 and missile defense combat power, commanders may have to accept risks in other areas of the battlefield.

4-110. **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. All joint and multinational arms resources 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.

4-111. **Mobility** is the capability to move from place to place while retaining the ability to perform the air defense mission. The mobility of air and missile defense resources must be equivalent to the mobility of the supported force. First priority for mobility should be planning moves that support accomplishment of the mission. Tactical situations may dictate additional moves to enhance survivability. Strategic mobility is essential to support force-projection operations.

4-112. **Integration** is the close coordination of effort and unity of action, which maximizes operational effectiveness. It is applicable, regardless of command relationships established. Active air and missile defense operations

must be integrated into the supported commander's concept of the operation. The AD plan describes vertical and horizontal integration of air defense systems across the width and depth of the battlefield and includes integration with joint and multinational forces.

**Air Defense Artillery Employment Guidelines**

4-113. Planning and positioning ADA resources involves applying six employment guidelines. The guidelines are mutual support, overlapping fires, balanced fires, weighted coverage, early engagement, and defense in depth (figure 4-3).

4-114. **Mutual support** is achieved by positioning weapons so that the fires of one weapon can engage targets within the dead zone of the adjacent weapon system. For gun systems, this dead zone is usually small. For missile systems, the dead zone can be large and the need for mutual support is great. Mutual support can also be used to cover non-operational units or units at lower states of readiness.
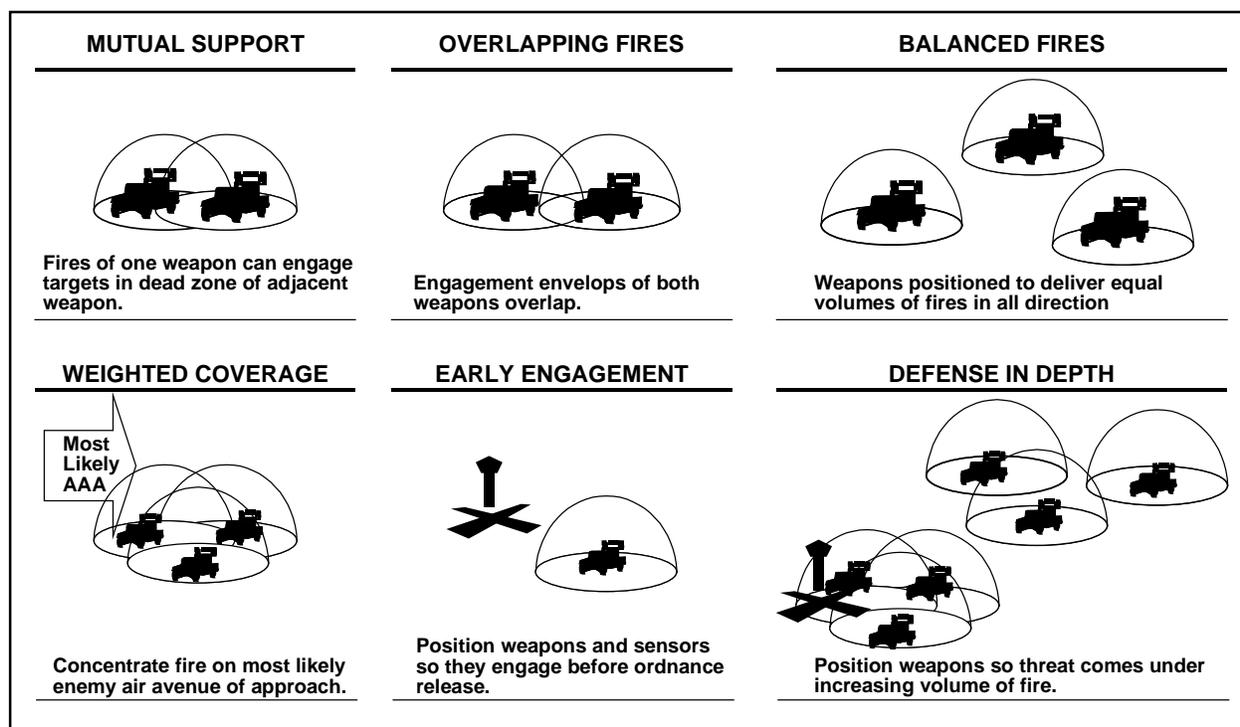


**Figure 4-3. ADA Employment Guidelines**

4-115. **Overlapping fires** are achieved by positioning weapons so their engagement envelopes overlap. Because of the many altitudes from which the enemy can attack or conduct RSTA operations, the defense planner must apply mutual support or overlapping fires vertically and horizontally.

4-116. **Balanced fires** are achieved by positioning weapons to deliver an equal volume of fire in all directions. This may be necessary when air defense

is used in an area where the terrain does not canalize the enemy, or when the air avenue of approach is not predictable.

4-117. **Weighted coverage** is achieved by combining and concentrating fires toward the most likely threat air avenues of approach or direction of attack. Based on the tactical situation, a commander may risk leaving one direction of attack unprotected or lightly protected to weight coverage toward another direction.

4-118. **Early engagement** is achieved by positioning sensors and weapons so they can engage the threat before ordnance release or target acquisition. Ideally, ADA should engage and destroy the enemy before it can fire on or acquire the defended asset or force.

4-119. **Defense in depth** is achieved by positioning sensors and weapons so the air threat will come under an increasing volume of fire as it approaches the protected asset or force. Defense in depth lowers the probability that the enemy will reach the defended asset or force.

## Air and Missile Defense Priorities

4-120. The ADA commander considers METT-TC, IPB, and the supported commander's intent and concept of operations before recommending air and missile defense priorities. The ADA commander develops these priorities based on the factors of criticality, vulnerability, recuperability, and the threat. The ADA commander recommends these priorities to the supported commander for approval.

4-121. **Criticality.** 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.

4-122. **Vulnerability.** Vulnerability is the degree to which an asset or force is susceptible to surveillance and attack or to damage if attacked. When assessing vulnerability consideration should be given to the following factors about the asset or force:

- hardness
- specific mission in the overall operation
- ability to disperse or displace to another position
- capability to provide for its own air and missile defense
- amount of protection afforded by its passive air and missile defense measures

4-123. **Recuperability.** 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. The ADA commander considers the time to replace soldiers, equipment, or entire units, as well as whether a different element can perform the same mission. Assessment of geopolitical assets is provided by coordination with civil authorities.

4-124. **Threat**. The probability of an asset or force being targeted for surveillance or attack by enemy air must be assessed as part of the threat. The use of threat information to develop AD priorities is a reverse IPB process--what we expect enemy air to survey and attack, based on IPB. Targeting information provided by intelligence estimates, past enemy surveillance and attack methods, and threat doctrine is useful in evaluating air and missile defense priorities. To determine the relative importance of assets and forces, the ADA commander considers certain characteristics that make an asset or force a lucrative target for the enemy. In effect, this is reverse target value analysis.

## STAGE SIX -- POSTCONFLICT OR POSTCRISIS OPERATIONS

4-125. Deployed forces transition to a period of post-conflict operations after hostility has ceased or a truce is declared. This transition can occur in one part of a theater while combat operations are still underway in other parts. Post-conflict operations focus on restoring order, minimizing confusion following the operation, reestablishing host nation infrastructure, preparing forces for redeployment, and continuing a presence to allow other elements of national power to achieve the overall strategic aims. Post-conflict operations place demands on every level of command. ADA units may be called upon to conduct humanitarian assistance and population control. ADA personnel may be required to control prisoners, handle refugees, and perform other related humanitarian assistance and control activities.

4-126. However, the post-conflict stage may be interrupted by the resumption of hostilities. Thus, units must rapidly consolidate, reconstitute, train, and prepare to remain in theater should the fighting resume. During this time, force protection is vital to prevent isolated attacks. ADA forces concentrate on providing force security and preventing surprise, permitting unimpeded reconstitution and facilitating unopposed embarkation of forces that are no longer needed in theater. Air and missile defense forces may remain in theater after the end of hostilities to perform stability and support operations.

## STAGE SEVEN -- REDEPLOYMENT

4-127. The objective of this stage is to return to home station the forces that are no longer needed. Post-conflict requirements have a direct effect on the redeployment flow. Commanders contend with the same challenge as in deployment, which is balancing the factors of METT-TC against available lift assets. Forces not required for subsequent operations will return to home station and prepare for future missions.

4-128. Protection of the force during redeployment is as critical as during deployment or any other stage of the operation. While the most significant aerial attack capabilities may have been eliminated, air and missile defense forces must be prepared to counter desperation or retaliatory air and missile attacks.

4-129. Reconstitution activities can begin in theater prior to redeployment. They include rebuilding unit integrity and accounting for soldiers and equipment. If the force has been exposed to nuclear, chemical, or biological

contaminants, reconstitution activities may include thorough decontamination of personnel and equipment. These activities continue after arrival at home station with the focus on the rebuilding of units back to pre-mobilization levels of readiness, regeneration of logistics stockpiles, and the accountability of mobilized equipment and supplies.

## STAGE EIGHT -- DEMOBILIZATION

4-130. Demobilization is the process by which units, individuals, and materiel transfer from active to a pre-mobilization posture. Although the overall focus is generally on units and individuals, the demobilization of logistics also requires significant resources. The unique requirements of RC soldiers (e.g., re-employment rights, etc.) and RC units demand the attention of the commander. Lessons learned must be captured before demobilization is completed.

BLANK

**Chapter 5**

# Army Air Defense Artillery Battle Command

This chapter provides doctrine for Army ADA battle command. It addresses the responsibilities of the commander and some aspects of command and control as it relates to battle management. It also addresses the command systems capabilities necessary to help the commander to integrate and coordinate functions and execute successful operations. Battle command is a vital factor in executing the tenets of Army operations, surviving, and winning quickly and decisively on future battlefields or in stability and support operations.

## BATTLE COMMAND CONCEPT

5-1. Battle command is the art of battle decision making, and leading and motivating soldiers and their organizations into action to accomplish missions at least cost to soldiers. Battle command includes visualizing the current and desired future states of friendly and enemy forces and then deciding how to get from one to the other at least cost. The commander assigns missions and tasks, prioritizes and allocates resources, selects the critical time and place to act, and knows how and when to make adjustments during the fight. In addition to deciding, battle command includes leading and motivating units toward the desired results. This leadership must be up front. Leaders must be with soldiers. They must feel the pain and pride then decide on the best course of action to accomplish the mission at least cost to soldiers.

5-2. Commanders assess; conduct risk assessment and risk management; and see, hear, and understand 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.

### THE ELEMENTS OF BATTLE COMMAND

5-3. Battle command has two vital components: decision making and leadership. Both components demand skill, wisdom, experience, and courage. As such, command is more an art than a science. In battle, it is often guided by intuition and feel gained from years of practice and study. The two elements of battle command are tightly interwoven. They integrate leading, guiding and motivating with the knowledge to establish and define the limits of control throughout the course of a mission.

#### Decision Making

5-4. Decision-making is recognizing that a decision is needed, then when and what to decide. Decision-making brings with it the cost of committing

resources, foreclosing options, incurring risk, and revealing intentions to the enemy. Commanders anticipate the activities that will be put into motion once a decision is made. They know how irreversible some commitments will be once execution begins. Uncertainty and chance will always complicate decision-making.

5-5. A commander cannot know everything. However, he must know that which is important. The battle command system must provide him a solid base of information from which he can pick and choose what he needs. The commander must glean the information he knows to be vital from what is available and provided by others. He bears personal responsibility for defining the critical information, friendly or enemy, he must have. The commander cannot be a prisoner of a command post. He must retain access to the information he needs to command from wherever he is on the battlefield.

5-6. Battle command demands that leaders position themselves where they can best command without depriving them of the ability to respond to changing situations. The commander must be able to go where he can best assess the operation and risks and make the necessary adjustments.

5-7. Battle command demands that the commander retain his objectivity when making decisions and not be swayed by the passions of the moment. The successful commander requires a balanced detachment from the unimportant, with an instinctive recognition of what is important and what requires his direct involvement. The commander cannot attempt to address personally every action. Knowing what requires his attention and what his staff and subordinate commanders can handle is key to time management and a decentralized command environment.

## Leadership

5-8. Leadership is taking responsibility for actions of the command and the decisions that cause those actions. Commanders will be compelled to act without all the relevant information and must be prepared to deal with the consequences thereof. The lack of available information does not invalidate the responsibility of command. Forces, when put in motion, are not easily reversed. After forces have been put in motion, the commander must provide the strength and will to follow through with the choices, and the wisdom to know when they must be changed and further decisions made.

5-9. A commander's strength of character and ability to motivate are among the most vital components of successful command. The commander serves as a role model. He promotes the proper ethical perspectives, sustains a positive and progressive command climate, and fosters a sense of organizational unity and cohesion. Commanders are technically and tactically proficient and possess the moral toughness that provides soldiers the will to fight.

## COMMAND

5-10. Command is the art of motivating and directing soldiers and organizations to accomplish a mission and must be supported by the means to regulate the forces to achieve the commander's intent. Command, and the decision-making and problem solving that are part of it, is not done in isolation. The commander's staff and subordinates assist in developing,

modifying, and improving the initial versions of courses of action and in developing future courses of action for events that likely are not yet totally clear.

5-11. Battle commanders must be flexible enough to respond to changing situations and to anticipate the demands of, and solutions to, future operations. They must train themselves, their staffs, soldiers and units so that they are prepared for whatever missions they are assigned. Commanders must be able to visualize the future, formulate concepts, allocate means, and direct the necessary missions required for achieving victory.

5-12. Commanders make estimates of future operations and assessments of the current situation to determine their own intent and formulate the concept of the operation. The prioritization of actions and considerations of the acceptable degree of risk guides the commander in determining the amount of control he can, and should, delegate to others to synchronize actions across the area of operations. Command without freedom of action to subordinates denies their initiative and lessens the ability of the battle commander to employ all of his resources to their fullest potential.

## CONTROL

5-13. Control is inherent in battle command. Control is more scientific than command. A commander commands while the headquarters and staffs coordinate and make necessary adjustments consistent with the commander's intent. Control monitors the status of organizational activities, identifies deviations from the commander's intent, and regulates the forces and means toward an intended aim.

5-14. Control provides the commander freedom to operate, to delegate authority, and lead from any position on the battlefield, while synchronizing actions vertically and horizontally throughout the AO. Control derives from understanding the commander's intent, implementing good SOPs, training units and soldiers prior to battle, rehearsing, using graphic control measures specific to the situation, and maintaining continuous dialogue between commanders at all levels. Proper control ensures all operations are synchronized and sustained throughout their duration. The process of controlling an organization is directed towards ensuring that the efforts of all elements are synchronized, adjusting as the situation dictates. However, focus must be maintained on the intended end state and purpose as expressed in the commander's intent. Skilled staffs work within the commander's intent to direct and control units and allocate the means to support that intent.

5-15. A staff's role is defined and focused by the commander. The staff and subordinates assist the commander in developing, modifying, and improving the initial versions of courses of action based on their expertise.

5-16. The staff performs the fact-filtering and development work. But when completed, it is the commander who makes the judgment-informed decisions. It is through the staff and battle command systems that the commander exercises control. Staffs compute requirements, allocate means, and integrate efforts. They monitor the status of organizations, identify variance, correct

deviations, and push analyzed information to the commander. Staffs acquire and apply means to carry out the commander's intent and develop specific instructions from general guidance.

5-17. Control provides the means to regulate, to synchronize, and to monitor forces and functions through collection, fusion, assessment, and dissemination of information and data. Control is associated with functional areas and depends upon data and information systems. It allows the commander through the staff to monitor the status and efforts of the command and adjacent units and to maintain situation awareness throughout the battlespace. Responsive control means (communications, computers, and sensors) allow the commander to manage and direct the process.

5-18. The communications segment of the battle command and intelligence, surveillance and reconnaissance (ISR) systems must provide information quickly and with reasonable security, to whomever needs it. Information transfer between sensors and weapon systems or forces is necessary in every type and level of battle management. Information-age technology can provide the commander an abundance of near-real-time information that can, if properly presented, reduce uncertainty and confusion. However, if improperly managed, it could burden the commander.

5-19. Speed of operations has quickened because of advances in the rate of intelligence and information flow. The ability to gather, manage, process, and circulate near-real-time information among sensors, weapons, and highly mobile forces give operational and tactical commanders the means to set battle tempo. Tempo is a function of speed of operations within time to accomplish missions based on the commander's plan and available resources.

5-20. Tempo requires both mental and physical agility by leaders and organizations. Commanders must understand these relationships and manage them effectively. Commanders must possess the mental agility and discipline to make timely decisions to modify the tempo to their advantage, deny the enemy the initiative, and decisively defeat it at the selected time and place.

## BATTLE COMMAND SYSTEMS

5-21. The battle command system must support the ability of the commander to adjust plans for future operations while focusing on the current fight. The battle command system for air defense is grouped into two categories, engagement operations (EO) and force operations (FO). EO and FO functions are closely related. There is a real-time interaction that takes place between many of the EO and FO functions during battle. This interaction results in continued force optimization as the battle progresses. The related tools for implementing command decisions include communications and computers.

5-22. Reliable communications are imperative to battle command and control. Effective battle command requires reliable signal support systems to enable the commander to conduct operations at varying tempos over extended distances. Good signal planning increases the commander's options to exploit success and facilitate future operations. The battle command style of the commander dictates the structure of his supporting communications system.

The commander is able to move freely about the battlefield and is electronically linked with the command post to access time-sensitive data and to influence the battle. Space-based systems provide commanders with communications, reconnaissance, intelligence, surveillance, navigation and positioning information, early warning, and weather, terrain, and environmental monitoring (WTEM) that greatly facilitate battle command. Satellite communications support all battlefield operating systems. These space-based systems significantly enhance the speed and accuracy of information that commanders exchange with subordinates. For more details on space operations, see appendix C.

### Engagement Operations

5-23. EO includes those functions required to execute the air, missile, and counter-surveillance battles. The air surveillance function establishes a correlated air picture with target types and identification. The mission control function processes commands from higher echelon units, evaluates the threat, optimizes engagement performance, monitors the outcome of engagements, and manages the employment of sensors and decoys. The attack operations support function determines the location of enemy air and missile launch sites and provides it to attack systems. The data distribution function distributes the air picture and track data.

### Force Operations

5-24. Force Operations include functions that are required for planning, coordinating, preparing, and sustaining the total ADA mission. The situation analysis function 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 function develops and assesses various options and produces a preferred course of action.

5-25. The coordination function implements the coordination and cooperation actions required to develop, distribute, and execute the plan. The directives and orders function promulgates the plan in a timely manner. The monitoring and controlling function observes and records activities taken in response to orders issued and performs alerting based on the situation. The routine staff function supports the overall battle command process. Predictive EO algorithms will use FO information from the situation analysis function as the basis for recommending or directing EO activities.

## COMMANDER'S RESPONSIBILITIES

5-26. Key to the planning conducted at each level of command is the role of the commander. The commander does not merely participate in the processes--the commander drives them! From initial intelligence preparation of the battlefield through course of action development to the actual issue of orders and directives, the personal involvement of the commander is critical.

## COMMANDER

5-27. The commander is the key to concept formulation, planning, and executing at each level of command. The commander's personal responsibility is formulating a single unifying vision and expressing it in the commander's intent. Commanders must understand the intent of the commander two levels up and understand the intent and concept of operation of the immediate senior commander. Commanders must also understand the battle from the perspective of adjacent units and subordinate commanders who must execute the decisions. The commander's estimate and assessment process helps decide how to accomplish the assigned mission.

5-28. Commanders must determine and specify the commander's critical information requirements (CCIR) that are needed to understand the battlefield and the flow of operations. CCIR consists of three types of information: priority intelligence requirements (PIR), friendly force information requirements (FFIR), and essential elements of friendly information (EEFI). The commander must focus the organization and battle command systems to give the information needed to conduct the estimate and refine the assessment driven by time or event. The commander must, however, still be prepared to make decisions and accept risk without complete information, recognizing that waiting for complete information may result in lost opportunities to act. Too much information can paralyze a force as quickly as too little data if the commander is hesitant to act in ambiguous situations. The commander must tell the staff what information is important to collect. Whatever factors are present, the commander is personally responsible for establishment of the commander's critical information requirements.

5-29. Once the commander has the necessary information, he must possess the creativity and intuition to visualize the flow of events toward a future state. The commander formulates a concise expression of how elements of the command will operate together to accomplish their operational responsibilities and missions.

5-30. Commanders must be able to convey to subordinates a clear, concise statement of the commander's intent for future operations, which includes the purpose; what tasks and when they want those tasks accomplished; and the desired end-state. Their concept of the operation must include an overall scheme of operations, the necessary interfaces and coordination, the sequence from one phase to another, and the priorities and risks the commander is willing to take. Connectivity must exist between current operations and the branches and sequels of the future plan. While a portion of this future state may be directed by a higher level commander's intent, the commander must possess the ability to envision the organization's future state within its battle space.

5-31. Techniques and procedures may vary, but planning and executing operations are continuous and concurrent activities. Commanders must master time-space-resource-purpose relationships and understand the ways they affect friendly and enemy capabilities to achieve success in battle. They must be able to orchestrate all functions affecting their battle space: intelligence, fires, forces positioning, resources, deception, and timing. In

addition, they must have a personal awareness of the battle to influence the tempo and impact of the operation. Commanders make necessary adjustments to current operations and possible modifications of future operations through interactions with other commanders and staffs as well as their own staffs.

5-32. Decision-making and problem solving are not done in isolation. However, the commander must determine which decisions designated subordinates may make. Typical decisions retained by commanders are for changes in intent, mission, concept of operations, priorities (main effort, air or missile defense), or major reallocation of resources.

## ADA COMMAND FUNCTIONS

5-33. The ADA commander is the proponent for the air defense combat function at each echelon. The ADA commander has total responsibility for active AD planning within the Army component, and possibly for the entire land force. These responsibilities include recommending air defense missions for other members of the combined arms team, and integration with the AADC and other components. The ADA commander ensures that organic, assigned, and supporting ADA units accomplish AD objectives in support of the ground commander's concept of operations. The AAMDC commander, EAC and corps ADA brigade commanders, and divisional ADA battalion commanders develop counterair and theater missile defense plans for protection of their supported commander's air and missile defense priorities. They also prepare the air defense annexes to division and corps OPLANs and the Army Forces Commander or the JFLCC's operations plan.

5-34. Corps and divisional ADA units accomplish the majority of tactical air and missile defense missions. The corps ADA brigade and the divisional ADA battalion, respectively, are the corps and division commanders' primary air and missile defense resources (figure 5-1, page 5-8). The corps commander's requirement to provide air and missile defense resources to forces is no different from the requirement to provide maneuver and fire support resources. The corps commander must ensure that forces at all levels have air defense protection and must reinforce those defenses when necessary. Of particular importance is the corps commander's requirement to provide high–to–medium altitude (HIMAD) ADA protection to divisions, with specific emphasis on giving support to offensive operations. The division commanders require corps support for high–to–medium altitude (HIMAD) air defense and any additional SHORAD weapons needed for mission accomplishment.

## AIR AND MISSILE DEFENSE COORDINATOR FUNCTIONS

5-35. The AMDCOORD is responsible for planning air and missile defense operations to support the force commander's concept of the operation. The AMDCOORD is an integral member of the maneuver commander's staff planning team. The AMDCOORD, with input from the G2, assesses the air and missile threat and the commander's intent in order to develop TMD, OCA, and DCA priorities. The AMDCOORD assists the fire support coordinator in integrating OCA and TMD attack operations priorities into the force's targeting process. The AMDCOORD recommends active, passive, and other combined arms air and missile defense measures in the air defense

estimate. After staff coordination and approval of the air defense estimate, the AMDCOORD develops the air defense annex to the operation plan. Appendix B provides a more detailed description of the air defense estimate and annex.

5-36. The AMDCOORD also coordinates with ADA elements at higher and lower echelons, as well as with adjacent units. Coordination ensures vertical and horizontal integration of ADA coverage throughout the battlefield. For example, the corps AMDCOORD integrates corps ADA with theater, division, and adjacent corps ADA forces. In force-projection operations, this will include integration with joint or multinational counterair and theater missile defense participants. The division AMDCOORD ensures the air defense plan interfaces with the corps and adjacent division air defense plans.
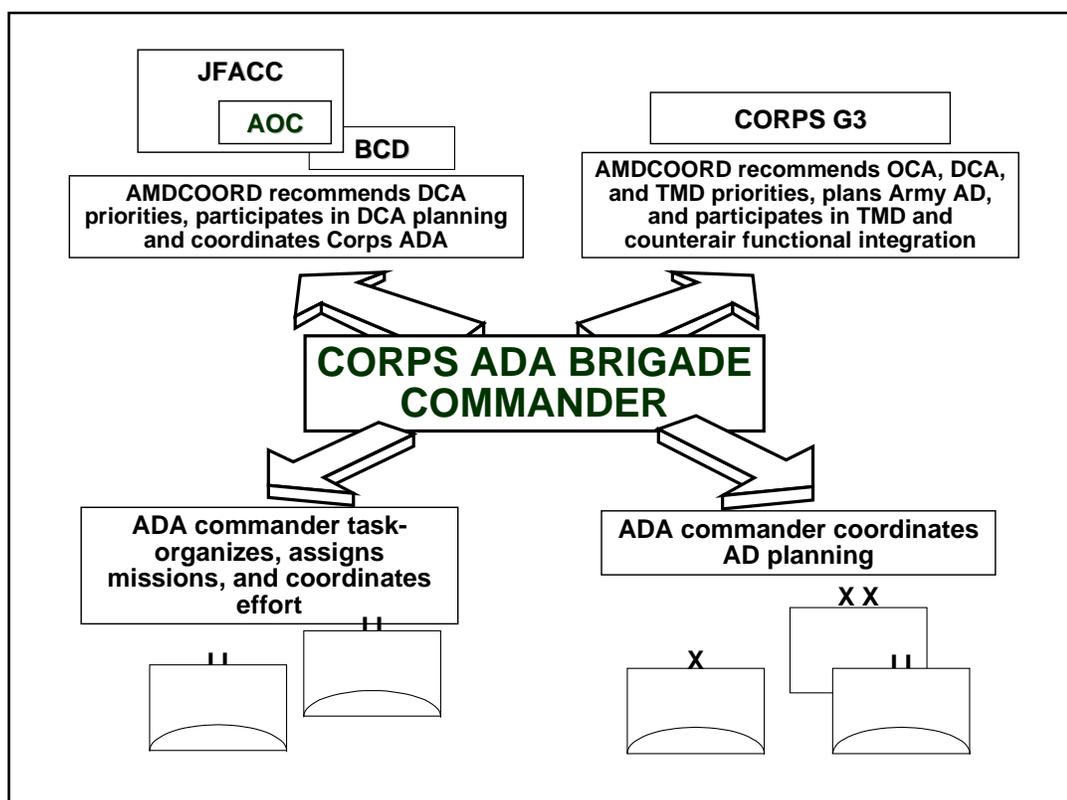


**Figure 5-1. ADA Brigade Commander Functions**

## THEATER ARMY AIR AND MISSILE DEFENSE COORDINATOR

5-37. The Theater Army Air Defense Coordinator (TAAMDCOORD) performs several functions. He is the Army air and missile defense coordinator to the Army forces commander, JFLCC (if designated), JFACC, and AADC. 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 Army forces commander and JFLCC participates in the J3/J5 cells and assists in developing Army OCA and DCA input to the air operations plan. He participates in the integration

of Army TMD operations. The TAAMDCOORD also participates in the AADC's DCA planning as AMDCOORD and Army AD representative to the JFACC. In addition, the TAAMDCOORD ensures that corps air and missile defense requirements are integrated into joint counterair and TMD planning.

5-38. The TAAMDCOORD contributes the majority of the joint force surface-to-air missile forces as the commander of the highest echelon AD command in the theater. He deploys resources in the combat and communications zones and influences tactical operations by shifting the ADA force between these two areas based on the concept of the operation (figure 5-2).
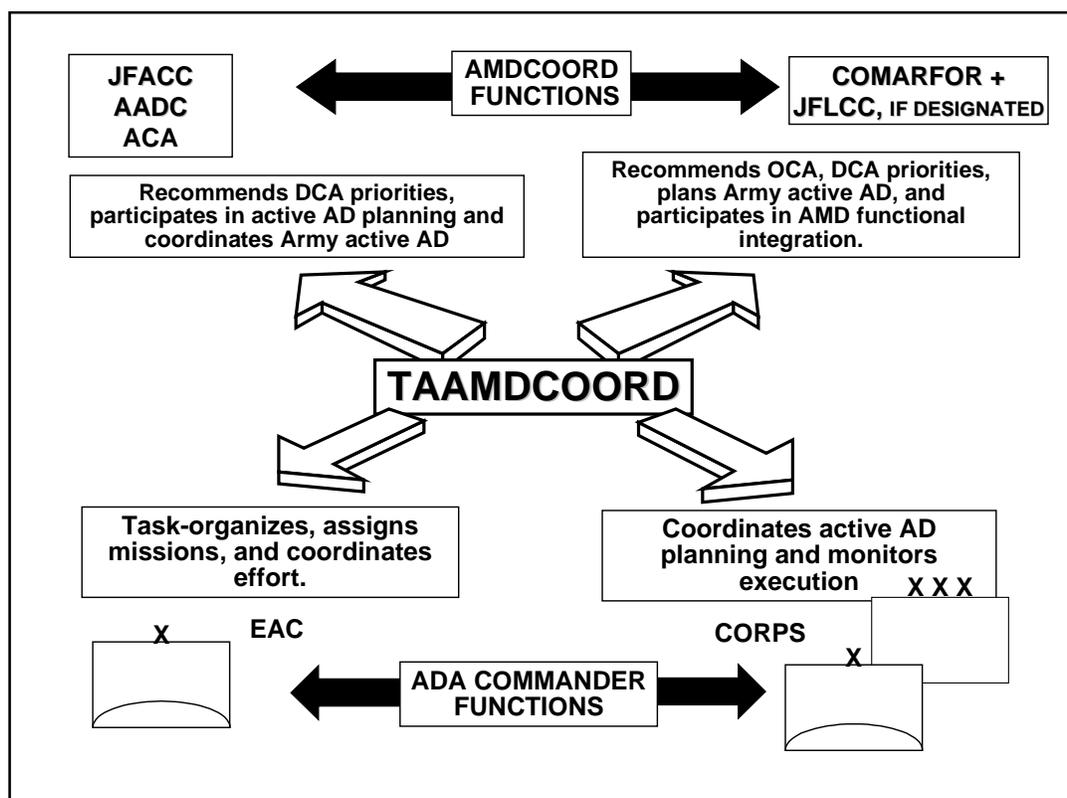


**Figure 5-2. TAAMDCOORD Functions**

## DEPUTY AREA AIR DEFENSE COMMANDER

5-39. Based on the factors of METT-TC (mission, enemy, terrain and weather, troops, time available and civil considerations) the joint force commander (JFC) and area air defense commander (AADC) will determine whether a deputy area air defense commander (DAADC) should be designated. Normally, the commander of the Army Air and Missile Defense Command (AAMDC) assumes the role of the DAADC because the AAMDC has the necessary personnel and equipment to support the DAADC mission. This designation formalizes the relationship between the land-based AD assets dedicated to theater level missions and the AADC and also ensures fully integrated and synchronized counterair and TMD operations.

5-40. The DAADC, combined with a robust AAMDC liaison team to support the AADC/DAADC relationship, 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 air defense plan development.
- Advises the AADC on matters regarding land-based active defense operations and ensures effective integration of ARFOR assets into the air defense plan.
- Advises the AADC about ARFOR air defense weapons capabilities.

5-41. Although the AAMDC commander may serve as a "deputy" AADC, it is not envisioned that the DAADC would assume the role of the AADC if the AADC were incapacitated. The DAADC is not a true deputy commander in that sense. The DAADC's primary responsibilities are to assist the AADC in planning, coordinating, integrating, and synchronizing land-based AD and TMD systems. Neither the AAMDC commander nor his staff has the tactical, technical, or procedural expertise and capability to perform all of the DCA functions of an AADC in a joint environment.

## ROLE OF THE AAMDC

5-42. The Army Air and Missile Defense Command (AAMDC) performs critical theater level air and missile defense planning, integration, coordination, and execution functions for the Army forces (ARFOR) commander and the Joint Forces Land Component Commander (JFLCC) if designated (AAMDC does not conduct engagement operations). The AAMDC integrates the four operational elements of TMD: active missile defense, attack operations, passive missile defense, and command, control, communications, computers, and intelligence (C4I) to protect contingency, forward deployed, and reinforcing forces as well as designated assets from the CINC's defended asset list (DAL). The AAMDC consists of intelligence, fire support, aviation, chemical, air defense artillery, special forces, and signal personnel melded into an effective TMD team. 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 TAAMDCOORD for the COMARFOR (or JFLCC if designated), and performs the functions of the DAADC for the AADC. The AAMDC normally locates with the ARFOR headquarters; however, the location of the commander and the role he is performing is dependent on METT-TC.

## ROLE OF THE EAC ADA BRIGADE

5-43. The EAC ADA brigade missions at this level may have operational significance, for example, theater level sustaining bases, military or political headquarters, or ports of debarkation. The EAC ADA commander is responsible for the planning and execution of ADA plans and missions at the tactical level. He ensures that the EAC ADA brigade is integrated and

synchronized with adjacent, higher and lower ADA operations within his AO. The EAC ADA brigade commander may also function as the AMDCOORD.

5-44. EAC brigades will deploy early into the theater to protect APODs, SPODs, early arriving forces and critical supplies. As entry forces move into tactical assembly areas (TAA) for expansion operations, ADA forces maneuver and reposition to provide optimized forces protection. As the lodgment is expanded ADA forces conduct combat operations to protect critical political, communications, transportation, and military forces. As deployment operations conclude, EAC ADA brigades and multinational forces will form a cohesive integrated defense from which to conduct military operations.

5-45. Units conducting active defense at theater level normally consist of one or more EAC ADA brigades that provides command and control over assigned forces. The brigade commander task organizes active defense forces to protect selected priority assets, designated by the AAMDC commander, from the DAL.

## ROLE OF THE CORP ADA BRIGADE

5-46. The Corps ADA brigade commander is the corps air defense officer and serves as the corps commander's air and missile defense coordinator (AMDCOORD). Since the corps can operate at the strategic, operational and tactical levels of war, the brigade commander has a unique role in the planning of air and missile defense operations. His responsibilities include the following:

- Ensuring corps counterair and TMD requirements are integrated into theater counterair and TMD plans.
- Coordinating the overall counterair and TMD planning with the corps higher headquarters (ARFOR), adjacent corps, subordinate elements within the corps and with EAC brigades and the AAMDC as appropriate.
- Developing and recommending to the corps commander counterair and TMD priorities in conjunction with the G3 plans and other corps staff elements.
- Preparing the air defense estimate and annex for corps plans and orders.
- Advising the corps commander on overall counterair and TMD integration, synchronization, and employment to include monitoring organic and attached unit status and locations down to battery level, and divisional, regimental, separate ADA brigade status down to battery level. This also includes nominating appropriate targets for attack operations as part of the TMD fight.
- Informing the corps commander of the counterair and TMD rules of engagement and procedures applicable to counterair and TMD assets operating within the corps AO.
- Assessing the air and missile threat, in concert with the corps G2, and assisting the G2 in preparation of the integrated IPB.
- Making recommendation to the corps commander on reconstitution or reorganization of ADA soldiers and equipment within the corps.

## BATTLE COMMAND ORGANIZATIONS

5-47. ADA commanders and leaders organize their personnel and equipment to command and control their units. There are three types of command and control organizations that are standard in ADA units: command posts (CP), tactical operations centers (TOC), and fire direction centers (FDC).

### COMMAND POSTS

5-48. The principal facility employed by the commander to control operations is a CP. The commander is located anywhere on the battlefield where he can best command the force and is only present at the CP when necessary. A 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. The commander may form an alternate or assault CP. ADA units from AAMDC to platoon level form CPs tailored to their needs.

5-49. Command posts must support the commander wherever he is. They must provide assured access to timely, accurate, and relevant information through integrated, interoperable digitized links with all echelons, other services, other government agencies, and multinational forces. Command posts must also provide the commander with the ability to respond to changing circumstances from any point within or outside the battlespace while moving or stationary.

5-50. 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.
- Effectively manage logistics ensuring a continuity of combat consumables.
- Provide a focal point for the receipt and development of intelligence.
- Plan future operations.
- Monitor combat operations of supported, adjacent, and higher echelon organizations.
- Provide situation information to higher headquarters.
- Conduct air and missile defense engagement operations through the FDC.

### TACTICAL OPERATIONS CENTERS

5-51. A TOC is a sub-element of a headquarters CP with staffing elements (AAMDC, brigades, and battalions). A TOC consists of a physical grouping of the staff elements concerned with current and future tactical operations and tactical support. A key standardized, digitized element of equipment in the AAMDC and brigade TOCs is the Air and Missile Defense Planning and Control System. At the battalion TOC level, the key standard, digitized equipment is the Air and Missile Defense workstation, which is completely compatible with the AAMDC and brigade equipment.

### FIRE DIRECTION CENTERS

5-52. A fire direction center is that sub-element of brigade and battalion TOCs, and battery CPs, where the commander exercises engagement operations. The FDC receives digitized target intelligence and fire control orders and translates them into units appropriate fire directions and fire distribution. Multiple systems are used in ADA for FDCs based on the type and level of the ADA unit.

### COMMUNICATIONS

5-53. Tactical information must be communicated among commanders, staffs, and weapon systems. The commander must be able to communicate his intent while moving freely about the battlefield. Electronically linked with his command post, the commander must be able to access time-sensitive operational and intelligence information to assess and influence the battle at the critical time and place. A seamless, secure communications network that provides horizontal and vertical integration of voice, data graphics, imagery, and video information is essential. This network must support integrated combat operations, and the focus must be on the war-fighting commander. Implied in these requirements are streamlined communications procedures, global connectivity of extended-range assets, and integrated communications among the various joint and multinational forces, operations, intelligence, logistics, and administrative functions. These communications networks must provide entry at key points in the force to facilitate data exchange through automated routing and filtering of information.

## COMMAND AND SUPPORT RELATIONSHIPS

5-54. The Joint Force Commander, component commander, and corps/division/brigade/battalion/battery commander establishes command and support relationships for ADA units in accordance with joint and army doctrine. As discussed in Chapter 3, ADA forces assigned to corps and lower maneuver elements are under the operational control of the echelon commander. At echelons above corps, ADA forces are under the operational control of the component commander.

### COMMAND RELATIONSHIPS

5-55. Placing an ADA unit under another unit using one of the following can form command relationships: attachment, operational control (OPCON), or tactical control (TACON). 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. The command relationships and inherent responsibilities are depicted in table 5-1, page 5-14.

### Attachment

5-56. Attachment is the placement of units or personnel in an organization where such placement is relatively temporary. Subject to the limitations imposed by the attachment order, the commander of the formation, unit, or organization receiving the attachment has the responsibility to provide the attached units with sustainment support above its organic capability.

However, the responsibility for transfer, promotion of personnel, nonjudicial punishment, courts martial, and administrative actions, such as SIDPERS transactions and unit strength reporting, are normally retained by the parent formation, unit, or organization.

**Table 5-1. Command Relationships**

| | **Inherent Responsibilities** | | | | | | |
|---|---|---|---|---|---|---|---|
| | Relationship with: | Task organized by: | Receives logistics from: | Positioned by: | Provides liaison: | Maintains commo with: | Priorities established by: | Gaining unit can further impose: |
| **Attached** | Gaining Unit | Gaining Unit | Gaining Unit | Gaining Unit | Per Gaining Unit | Gaining Unit | Gaining Unit | Attached, OPCON, TACON, GS, GSR, R, DS |
| **OPCON** | Gaining Unit | Gaining Unit (see note) | Parent Unit | Gaining Unit | Per Gaining Unit | Parent unit and Gaining Unit | Gaining Unit | OPCON, TACON, GS, GSR, R, DS |
| **TACON** | Gaining Unit | Parent Unit | Parent Unit | Gaining Unit (maneuver) | Per Gaining Unit | Parent unit and Gaining Unit | Gaining Unit | GS, GSR, R, DS |
| NOTE: Except when involving Multinational forces in NATO, then Parent Unit. | | | | | | | |

## Operational Control

5-57. Command authority that may be exercised by commanders at any echelon at or below the level of combatant command is operational control (OPCON). Operational control is inherent in combatant command (command authority). Operational control 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. Operational control includes authoritative direction over all aspects of military operations and joint training necessary to accomplish missions assigned to the command. Operational control should be exercised through the commanders of subordinate organizations. Normally this authority is exercised through subordinate joint force commanders and service and/or functional component commanders. Operational control provides full authority to organize commands and forces and to employ those forces, as the commander in operational control considers necessary to accomplish assigned missions. Operational control does not, in and of itself, include authoritative direction for logistics or matters of administration, discipline, internal organization, or unit training.

## Tactical Control

5-58. Tactical control (TACON) is the command authority over assigned or attached forces or commands, or military capability or forces made available for tasking, that is limited to the detailed and, usually, local direction and control of movements or maneuvers necessary to accomplish missions or tasks assigned. Tactical control is inherent in operational control. Tactical control may be delegated to, and exercised at any level at or below the level of

combatant command. Tactical control allows commanders below combatant command level to apply force and direct the tactical use of logistics assets but does not provide authority to change organizational structure or direct administrative and logistical support.

## SUPPORT RELATIONSHIPS

5-59. Support relationships define specific relationships and responsibilities between supporting and supported units. Support relationships are established routinely as general support (GS), general support reinforcing (GSR), reinforcing (R), and direct support (DS). The support relationships and inherent responsibilities are depicted in table 5-2.

**Table 5-2. Support Relationships**

|  | Inherent Responsibilities | | | | | | | |
|---|---|---|---|---|---|---|---|---|
|  | Relationship with: | Task organized by: | Receives logistics from: | Positioned by: | Provides liaison: | Maintains commo with: | Priorities established by: | Gaining unit can further impose: |
| **GS** | Parent Unit | Parent Unit | Parent Unit | Parent Unit | Per Parent Unit | Parent Unit | Parent Unit | NA |
| **GS-R** | Parent Unit | Parent Unit | Parent Unit | Parent Unit | Per Parent Unit and reinforced unit | Parent Unit and reinforced unit | 1. Parent unit 2.Reinforced unit | NA |
| **R** | Parent Unit | Parent Unit | Parent Unit | Reinforced unit | Reinforced unit | Parent Unit and reinforced unit | 1. Reinforced unit 2. Parent Unit | NA |
| **DS** | Parent Unit | Parent Unit | Parent Unit | Supported Unit | Supported Unit | Parent Unit and Supported Unit | Supported unit | NA |

### Direct support

5-60. In Direct Support (DS), the supporting unit provides dedicated support to a specific unit. A DS ADA unit provides dedicated air and missile defense for a specific element of the force, which has no organic air and missile defense. The supporting ADA unit coordinates its movement and positioning with the supported unit. A SHORAD 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.

### General support

5-61. An ADA unit in General Support (GS) provides support for the force as a whole. It is not committed to any specific element of the supported force. It does not support a specific unit within the larger unit's area of operations. An ADA unit in GS remains under the control of its higher ADA commander, and is positioned by its ADA commander. GS is commonly used to protect EAC, corps, or division level assets.

## Reinforcing

5-62. A reinforcing (R) ADA unit augments the coverage of another ADA unit and strengthens the air and missile defense capabilities of the force. A reinforcing ADA unit is positioned to protect one or more of the reinforced unit's priorities as specified by the supported ADA unit commander. For example, a corps high- to medium-altitude air defense (HIMAD) battalion could reinforce the limitations of the SHORAD ADA battalion assigned to the division.

## General support reinforcing

5-63. An ADA unit with a General Support Reinforcing (GS-R) mission provides support for the force as a whole and secondarily augments the support provided by another ADA unit. ADA units with a GS-R mission have a primary responsibility to provide support to the force as a whole within a specific area, but must coordinate with the supported ADA unit to reinforce the coverage of assets in the AO.

# COORDINATION AND LIAISON

5-64. Automation and digitization are becoming bigger factors in battle command, but the combat functions still require personal involvement. Since the commander cannot be at all places at all times, the staff and liaison teams support command intent and information needs.

## COORDINATION LINKAGES

5-65. Staff coordination is a function of the organization of the staff, command post configuration, doctrine, and local SOP. The AMDCOORD must have a representative in the staff cells to plan and execute deep, close, and rear operations.

5-66. This representation provides horizontal and vertical coordination to the various elements of the joint force. These staff elements include intelligence, fire support, EW, Air Force staff, Army aviation, Navy and or USMC air control systems, maneuver, and the Army airspace command and control (A2C2) cell at all echelons of command. Staff coordination is possible due to the battle command structure that integrates the combat functions. The combat functions provide an interface among all staff elements at each level of command. The result is a vertical and horizontal integration of staff activity that serves to unify the effort of the force at all echelons.

## LIAISON

5-67. Liaison is essential in multinational, joint, interagency, and combined arms operations. Robust liaison facilitates understanding, coordination, and mission accomplishment. Liaison personnel must be familiar with the staff and operational organizations, doctrine, and procedures of the force with which they will work as well as being subject matter experts on the air defense combat function. Liaison requirements and manning should be fulfilled through the use of new information technology systems as they are fielded and implemented in units.

5-68. 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 all major theater and ARFOR elements to integrate ARFOR air defense and TMD operations. Elements that the AAMDC deploys liaison teams to include the following:

- joint force commander (JFC)
- joint force air component commander (JFACC)
- area air defense commander (AADC)
- 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

5-69. The AAMDC normally deploys a robust liaison team to the AADC location to support the DAADC and the AADC. The liaison team is lead by an ADA Colonel (O6) when the DAADC is not present and may consist of active defense, attack operations, and intelligence preparation of the battlefield (IPB) experienced personnel to execute 24-hour AMD operations.

5-70. If the AAMDC is not in theater, the senior ADA organization in the theater is responsible to provide liaison to the land component commander, the battlefield coordination detachment, and the area air defense commander. It may also find it necessary to send liaison teams to the air operations headquarters of other services or multinational forces. In addition, liaison teams may also be required at other combat function locations, for logistics or intelligence, for example.

5-71. Corps ADA brigade commanders may provide liaison to the CRC and all CPs of the corps and to selected major subordinate commands. In some cases, it may even be necessary to send liaison teams to divisions to supplement the divisional AMDCOORD.

5-72. ADA battalion commanders provide liaison to the supported forces or to the headquarters of the force in whose area they are operating. Dedicated liaison teams are provided to each committed and defended maneuver brigade task force or equivalent level force. ADA commanders as AMDCOORD may supplement or replace liaison teams. At battalion task force level and below, liaison teams are not provided on a dedicated basis. ADA leaders perform duties as AMDCOORD, ADA commander, and AD staff officer. Liaison manning should be adjusted as new information systems are implemented and liaison requirements change.

## ADA FIRE CONTROL OFFICER

5-73. The air defense artillery fire control officer (ADAFCO) is a liaison between AADC DCA operations and land-based ADA systems for engagement operations. The ADAFCO works with either the regional air defense commander (RADC) or sector air defense commander (SADC). He provides a

single Army point of contact between land-based AMD fire direction centers and the controlling authority. The ADAFCO operates a console and, as required, assigns hostile targets to the tactical director at the FDC. It is a highly efficient arrangement for air defense operations because the ADAFCO normally is a Patriot officer and is more tactically proficient at controlling land-based air defense fires.

# INTEGRATED COMBAT AIRSPACE COMMAND AND CONTROL

5-74. Airspace control provides increased operational effectiveness by promoting the safe, efficient, and flexible use of airspace. Airspace control permits greater flexibility of operations. Airspace control consists of the coordination, integration, and regulation of the use of airspace with defined dimensions. Within a joint force AO, the JFC assigns overall responsibility and authority for airspace control to one component commander. The mission of the airspace control authority is to coordinate and integrate the use of airspace within the joint AO. Because of the close relationship between airspace control and air and missile defense, the airspace control authority (ACA) is normally the AADC. Subject to the authority of the joint force commander, the ACA establishes the broad policies and procedures for airspace control operations and coordination among units operating in the airspace control area.

5-75. Airspace control measures afford the ACA the means to procedurally or positively control all airspace users. Airspace control measures are rules to reserve airspace for specific users, restrict actions of airspace users, control actions of specific airspace users, or require airspace users to accomplish specific actions. The ACA implements the airspace control measures through the theater airspace control plan and specific directives. The AMDCOORD and A2C2 element at each echelon provide Army requirements to the battlefield coordination detachment (BCD) at the joint air operations center for incorporation into the airspace control plan.

5-76. Identification is an important function of airspace control in air and missile defense operations. Hostile and friendly identification ensures timely engagement of targets and reduces the potential for fratricide. The tactical situation, electronic interference, or equipment malfunction may preclude positive friendly identification, but airspace control measures provide a procedural backup. From an ADA perspective, many airspace control measures provide a means of probable friendly identification and default hostile identification. These measures allow friendly forces optimum use of airspace while minimizing the risk of engagement by friendly air defense. Examples are minimum risk routes and standard-use Army aircraft flight routes and air corridors.

5-77. For TMD, capabilities dictate that ADA units engage enemy TMs based on classification, not identification. This enables ADA units that can classify targets as ASM or ballistic missiles to engage those threatening targets based on classification.

5-78. Airspace control measures afford commanders the means to control airspace use, protect ground operations or facilities, and control other users of the airspace. High-density airspace control zones and restricted operations

zones are examples of supplemental fire control measures. Joint Pub 3-52, FM 100-103, and FM 100-103-1 provide further details.

## POSITIVE CONTROL

5-79. Positive control relies upon near-real-time data from sensors, IFF, computers, digital data links, 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 attack, sabotage, or jamming. Line-of-sight requirements and limited communications can also restrict the availability of data from facilities that are operational.

## PROCEDURAL CONTROL

5-80. Procedural control overcomes positive control and identification shortcomings. Procedural control relies upon techniques such as segmenting airspace by volume, time, and using 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. For example, it provides an immediate backup system should degradation of positive control occur. Additionally, procedural techniques provide a management means for air defense systems that do not have near-real-time data transmission capabilities.

## MIX OF POSITIVE AND PROCEDURAL CONTROL

5-81. An optimum method of controlling air defense operations is a mix of positive and procedural techniques. Commanders charged with air battle management consider the factors of METT-TC in their analysis. They specifically focus on mission, AO, and the threat expected.

5-82. 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.

5-83. Air traffic behind the division generally moves in ways that are normally well suited for positive control. Air defense is usually in a critical or static asset defense role in this area. In this area of the battlefield, positive control is easier to effect and is usually the preferred method.

5-84. 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.

5-85. The nature of the theater may also dictate what type of control is used. Mature theaters have elaborate and tested electronic management facilities in place. Contingency theaters may have no such systems in place and will rely more heavily on procedural control. As the lodgment area expands and additional assets arrive in the theater, a transition to positive control may take place.

# ENGAGEMENT OPERATIONS PRINCIPLES

5-86. 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

5-87. Centralized control with decentralized execution permits the full exploitation of the combat effectiveness of air defense operations at each level of command. Centralized control ensures unity of effort. Decentralized execution gives subordinate commanders the flexibility that is essential to achieve the tenet of agility.

5-88. 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 battlefield. 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 ADA, centralized control is executed through compliance with theater ROE and AMD weapon control procedures and measures. Data integration and operational control complete the synchronization.

5-89. 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 time lines of air and missile threats. Thorough planning and coordination link centralized control and decentralized execution.

## AIR BATTLE MANAGEMENT

5-90. Airspace control and AMD engagement operations are coordinated through the principle of air battle management. Air battle management maximizes the effectiveness of both offensive and defensive operations.

5-91. Air battle management is essential in an air environment that has large quantities of both enemy and friendly air users. Current weapon systems, although highly sophisticated, do not possess infallible identification technology. Therefore, the goal of air battle management is to control the engagement of air targets, ensuring the destruction of enemy aircraft and missiles while preventing fratricide and unnecessary multiple engagements.

5-92. Coordination is necessary to prevent interference among all airspace users. As a participant in air battle management, the AMDCOORD 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 measures.

## MANAGEMENT BY EXCEPTION

5-93. 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 monitoring the air battle may make direct target assignments to that unit on a management by exception basis. This would be done when necessary to ensure proper fire distribution, to prevent engagement of friendly air platforms, or to prevent simultaneous engagements of hostile air targets.

# ENGAGEMENT OPERATIONS PROCEDURES

5-94. Engagement operations procedures facilitate the integration of air and missile defense into both the force commander concept of the operation and the battle for air superiority. The AADC establishes and promulgates JFC approved ROE for air and missile defense.

5-95. Warning procedures and alert statuses alert, prepare, or cause units to build up for combat action. Most warning procedures and alert statuses have specific application for air and missile defense forces.

## DEFENSE READINESS CONDITIONS

5-96. Defense readiness conditions (DEFCON) 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 5,4,3,2, and 1 as appropriate. Defense readiness conditions are most applicable to national missile defense.

## WEAPONS ALERT DESIGNATORS

5-97. Weapons alert designators (WAD) describe a progressive system of alert postures. They are used by the AD 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 meet the threat, provide maintenance, and allow crew rest. An example WAD system is illustrated in tables 5-3 and 5-4, page 5-22.

## STATES OF READINESS AND STATES OF EMISSIONS CONTROL

5-98. States of readiness (SOR) describe the degree of readiness of ADA fire units and sensors expressed in minutes from time of alert notification to time of weapon firing or sensor in operation. States of readiness can also be modified to include emission control and system configuration considerations and are then called states of emission (SOE) control. SOR and SOE are based on the WAD and air defense warning. ADA battalion commanders for their subordinate batteries, platoons, and fire units normally designate them. Additionally, SOR and SOE can be used to specify personnel manning requirements. ADA commanders use WAD, SOR, and SOE to ready the force in a logical way for action against the enemy while retaining the ability to stand down units for rest or maintenance. Table 5-5 and table 5-6, page 5-23, is an example of a sample SOR/SOE system. Actual timelines and manning

requirements will be determined by theater plans or the unit TACSOP and assigned mission while taking into account the factors of METT-TC.

**Table 5-3. HIMAD Weapons Alert Designators**

| WAD | RTF | 5 min | 1 hr | 3 hr | 6 hr | RTM |
|-----|-----|-------|------|------|------|-----|
| A | ALL | | | | | |
| B | 60% | 20% | 20% | | | |
| C | 40% | 20% | 20% | 20% | | |
| D | 30% | 20% | 20% | 20% | 10% | |
| E | 30% | 20% | | | 30% | 20% |
| F | 60% | | | | 20% | 20% |
| G | 50% | 20% | | | 30% | |
| H | 30% | 20% | | 20% | | 30% |
| NOTE: x% = % of fire units. RTF = Ready to Fire. RTM = Ready to Move. | | | | | | |

**Table 5-4. SHORAD Weapons Alert Designators**

| WAD | RTF | 5 min | 15 min | 30 min | 1 (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. | | | | | |

**AIR DEFENSE WARNINGS**

5-99. Air defense warnings (ADW) represent the commander's evaluation of the probability of air and/or missile attack within the AO. ADW are routinely issued by area, region, or sector AD commanders. Any commander can issue them. In no case can a commander lower ADW issued by the AD area, region, or sector commander. The issuance of an ADW is not tied to any other warning procedure or alert status. Therefore, a commander may issue an ADW irrespective of DEFCON or WAD.

5-100. ADA commanders do not change the readiness posture of their units by changing the ADW, but instead raise or lower the WAD or SOR and SOE. The three ADW are as follows:

- **ADW Red.** Attack by hostile aircraft and/or missiles is imminent or in progress. This means that hostile aircraft and/or missiles are within a respective AO, or are in the immediate vicinity of a respective AO with high probability of entry thereto.
- **ADW Yellow.** Attack by hostile aircraft and/or missiles is probable. This means that hostile aircraft and/or missiles are advancing toward a respective AO, or, unknown aircraft and/or missiles are suspected to be hostile and are advancing towards, or are within, a respective AO.
- **ADW White.** Attack by hostile aircraft and/or missiles are improbable. ADW White can be declared either before or after ADW Yellow or ADW Red.

**Table 5-5. HIMAD SOR/SOE Definition**

| SOE 1 | BS, ABT (air breathing threat) |
|---|---|
| SOE 2 | BS, BM (ballistic missile) |
| SOE 3 | Battle Passive |
| SOR 4 | 5 min |
| SOR 5 | 1 hour |
| SOR 6 | 3 hours to assume SOE 1/2/3 |
| SOR 7 | 6 hours to assume SOE 1/2/3 |
| SOR 8 | Non-Mission capable status |
| SOR 9 | Unit moving, in transition, or reduced readiness battery (RRB) status |
| SOR 0 | Destroyed |

**Table 5-6. SHORAD SOR/SOE Definition**

| SOR 1 | The team is prepared to engage targets. |
|---|---|
| SOR 2 | The team is capable of engaging targets within 5 minutes. |
| SOR 3 | The team is capable of engaging targets within 15 minutes. |
| SOR 4 | The team is capable of engaging targets within 30 minutes. |
| SOR 5 | The team is capable of engaging targets within 1 hour or more. |
|  |  |
| SOE 1 | Radiating and sensor broadcast net (SBN) broadcasting. |
| SOE 2 | Prepared to radiate (radar operating but not emitting), SBN broadcasting. |
| SOE 3 | Prepared to radiate within 15 minutes, SBN broadcasting. |
| SOE 4 | Prepared to radiate within 30 minutes, SBN broadcasting. |
| SOE 5 | Prepared to radiate within 1 hour or more, SBN broadcasting. |

**AIR DEFENSE EMERGENCY**

5-101. Air defense emergency (ADE) is an emergency condition, declared by the Commander in Chief, North American Aerospace Defense Command. It indicates that attack upon the continental United States, Canada, or US installations in Greenland by hostile aircraft or missiles is considered probable, is imminent, or is taking place.

**LOCAL AIR DEFENSE WARNINGS**

5-102. Local air defense warnings (LADW) allow the local commander to alert his force to air and/or missile attack without changing the ADW. LADW are designed to alert a particular unit, several units, or an area of the battlefield. LADW parallel ADW and reflect the local air and missile threat. Response to the LADW is METT-TC dependent. The three LADW are as follows:

- **Dynamite.** Attack is in progress. Enemy aircraft/missiles are within 50 km of the boundaries of a unit AO or upon identification of predicted impact point for tactical ballistic missiles within the boundaries of a unit's AO.

- **Lookout**. Attack possible based on location and flight profile of a detected air platform. Enemy aircraft and/or missiles are within 100 km of the boundaries of a unit AO or ballistic missile launch is detected.

- **Snowman.** Attack is not likely. Enemy aircraft and/or missiles are more than 100 km from the boundaries of a unit AO and no tactical ballistic missile launch are detected.

## RULES OF ENGAGEMENT

5-103. 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 encountered forces. 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
- hostile criteria
- weapon control status
- level of control
- modes of control
- autonomous operations
- fire control orders

### Right of Self Defense

5-104. Commanders at all echelons have the responsibility to 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. Self-defense operations allow friendly units to defend themselves against direct attacks or threats of attack through the use of organic weapons and systems. The right of self-defense is inherent in all ROE and weapon control procedures.

### Hostile Criteria

5-105. Hostile criteria are basic rules that assist in the identification of friendly or hostile air platforms (FW/RW aircraft, CMs, UAVs). 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 commander may also consider specific threat characteristics or hostile acts. 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 will delegate engagement authority. Delegation of the controlling and

identification authority to lower echelons is normal for ADA and non-ADA units that do not have near-real-time transmission capability for identification data. Such units have both identification and engagement authority. Capabilities dictate that ADA units engage threatening ballistic missiles and ASMs based on classification, not identification.

## Weapon Control Status

5-106. Weapon control statuses (weapons free, weapons tight, weapons hold) describe the relative degree of control of air defense fires. Weapon control statuses apply to weapon systems, volumes of airspace, or types of air platforms. The degree or extent of control varies depending on the tactical situation. Establishment of separate weapon control statuses for fixed and rotary wing aircraft, UAV and for missiles is normal. Air and missile defense forces must have the ability to receive and disseminate weapon control statuses for all classes of air platforms.

5-107. **Weapons Free**. Weapons can fire at any air target not positively identified as friendly. This is the least restrictive weapon control status.

5-108. **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 ASMs based on classification, not identification.

5-109. **Weapons Hold**. Do not fire except in self-defense or in response to a formal order. This is the most restrictive weapon control status.

5-110. There is no difference between weapons free and weapons tight for theater missile targets. Normally, ADA units will use weapons tight to allow theater missile engagements and do not use weapons free with respect to theater missile targets.

## Level of Control

5-111. Level of control describes the AD echelon at which positive management of the air battle is being conducted. This can be an AADC, RADC, SADC, ADA brigade FDC, battalion FDC, or the individual fire unit. This is the level that has engagement authority. This may be a different level for fixed-wing aircraft, rotary-wing aircraft, UAVs, and theater missiles. The AADC will specify the level of control in the air defense plan and this may change over the course of an operation.

5-112. Engagement authority is delegated to the lowest level in SHORAD fire units. HIMAD fire units normally have engagement authority for theater missile engagements; however, the engagement authority for aircraft is normally at SADC or higher.

## Modes of Control

5-113. Two modes of control are centralized and decentralized. The mode of control selected will depend upon the capabilities of the C4I system, the

weapon systems being employed, and both the friendly and enemy air situations. The AADC's air defense plan will specify the modes of control, trigger events when they should be changed, and who has the authority to change them.

5-114. **Centralized Control Mode.** This mode is when a higher echelon authorizes target engagements to fire units. Permission to engage each track must be requested by the fire unit from that higher AD 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. Normally, centralized control is used for HIMAD aircraft engagements.

5-115. **Decentralized Control.** This mode is the normal wartime mode of control for air and missile defense. A higher echelon monitors unit actions, making direct target assignments on a management by exception basis to units only when necessary to ensure proper fire distribution, 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. Normally, SHORAD engagements are decentralized. Normally, HIMAD theater missile engagements are decentralized.

5-116. **Simultaneous Use of Both Modes.** Control of engagement operations during the air battle may be centralized at a higher headquarters FDC or decentralized to a subordinate FDC. Centralized control and decentralized control can be executed simultaneously. For instance, in a situation where battle management has been decentralized to the ADA brigade FDC, the ADA brigade commander exercises centralized control of subordinate units. At the same time, however, higher control echelons are continuously monitoring the actions of the brigade. These higher echelons are exercising decentralized control while the brigade commander exercises centralized control. Thus, centralized control and decentralized control are conducted simultaneously.

## Autonomous Operations

5-117. Autonomous is the mode of operation assumed by a unit 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. Promulgated changes to rules of engagement and supplemental fire control measures, with effective times after communications are lost, will be implemented as scheduled.

## Fire Control Orders

5-118. Fire control orders are commands that are used to control engagements on a case-by-case basis, regardless of the prevailing weapon control status. Higher control 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 shown below can or will be used by every type of ADA unit. Examples of fire control orders are explained in the following paragraphs.

5-119. **Engage** is used to order a unit to fire on a specific target. This order cancels any previous fire control order that may have been given on that target.

5-120. **Cease engagement** is used to stop tactical action against a specified target and is always followed by an engage command. This order may be used to change an ongoing engagement of one target to another of higher priority. Missiles in flight are allowed to continue to intercept. In NATO, this order may also be used to preclude simultaneous engagement of a target by more than one weapon system (does not apply to Patriot, see cease-fire).

5-121. **Hold fire** is an emergency fire control order used to stop firing. Missiles already in flight must be prevented from intercepting, if technically possible. This order may be used to protect friendly aircraft.

5-122. **Cease-fire** is given to 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 command is used to prevent simultaneous target engagement by manned fighters and ADA units, or multiple ADA units.

5-123. **Cover** is used to order a fire unit to assume a posture that will allow engagement of a target if directed. For radar-directed systems, this means achieving a radar lock on a specified target. This order can be used for targets that are presently being engaged by another fire unit or for targets that have yet to become a significant threat. Units that receive this command report tracking, lock on, and ready to fire to higher echelons (does not apply to Patriot configuration-2; applies to Patriot configuration-3).

5-124. **Engage hold (HIMAD only)** is used to temporarily restrain a fire unit from automatically engaging a target. If the fire unit has not fired, target tracking continues. Missiles in flight are allowed to continue to intercept.

5-125. **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 by given by anyone in the fire unit who detects an unsafe condition. The engagement continues after the unsafe condition has been corrected.

## SUPPLEMENTAL FIRE CONTROL MEASURES

5-126. Supplemental fire control measures are procedural management measures issued by competent military authority which delineate or modify hostile criteria, delegate identification authority, or which serve strictly as aids in fire distribution or airspace control. Army commanders request the establishment of supplemental fire control measures through the A2C2 system. The approval authority is normally the ACA, who promulgates the measures in the airspace control order (ACO) and special instructions (SPINS). Supplemental fire control measures are discussed in the following paragraphs.

## Air Defense Operations Area

5-127. Air defense operations area (ADOA) is an area and the airspace above it within which procedures are established to minimize mutual interference between air and missile defense and other operations. It can include designation of one or more of the following areas or zones.

5-128. **Air Defense Action Area**. This is an area and the airspace above it within which friendly aircraft or ADA weapons are normally given precedence in operations except under specified conditions. This type of ADOA is primarily 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.

5-129. **Air Defense Area**. This is a specifically defined airspace for which air and missile defense must be planned and provided. This type of ADOA is primarily used for airspace control, but may also be used to define any area within which ADA units are operating.

5-130. **Air Defense Identification Zone**. The air defense identification zone (ADIZ) is the airspace of defined dimensions within which the ready identification, location, and control of airborne vehicles are required. This type of area is normally used only for airspace control. Areas within an ADIZ will normally be characterized by extremely stringent hostile criteria and weapon control statuses.

## Weapon Engagement Zone

5-131. Weapon engagement zone (WEZ) identifies a volume of defined airspace within which a specific type of AD weapon is preferred for use in an engagement. Use of 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. For example, a manned aircraft WEZ can be established for fighters and ADA would still be able to engage missiles and UAVs.

5-132. ADA engagements within an activated WEZ can be conducted by the following regardless of the level of control, weapon control status, or hostile criteria in effect outside the activated WEZ:

- the echelon controlling engagements without further permission
- from the establishing authority of the WEZ if the targets meet specified hostile criteria

5-133. Thus, an activated WEZ supplements ADA hostile criteria and is used by FDCs and fire units to make target assignments and engagement decisions. Commonly used WEZ are discussed in the following paragraphs.

5-134. **Fighter Engagement Zone (FEZ)**. Established in an area where no effective surface-to-air capability is employed. The responsibility for engagement of air threats normally rests with fighter aircraft.

5-135. **Missile Engagement Zone (MEZ)**. Volume of airspace which establishes control over engagements by HIMAD. A MEZ defines the volume of airspace within which these weapons can conduct engagements without specific direction from the authority establishing the WEZ.

5-136. **Short-range Air Defense Engagement Zone (SHORADEZ)**. Area of SHORAD deployment that may fall within a MEZ. It is also possible that SHORAD assets may solely defend some areas. A SHORADEZ can be established to define the airspace within which these assets will operate. Because centralized control over short-range air defense weapons may not be possible, these areas must be clearly defined and promulgated so that friendly aircraft can avoid them.

5-137. **Joint Engagement Zone (JEZ)**. Airspace of specified 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.

## High-Density Airspace Control Zone

5-138. A high-density airspace control zone (HIDACZ) is airspace of defined dimensions in which there is a concentrated employment of numerous and varied airspace users. These can include aircraft; artillery, mortar, and naval gunfire; local AD weapons; UAVs; and surface-to-surface missiles. HIDACZ are established by the ACA upon request of ground commanders. A high-density airspace control zone is established when the level and intensity of airspace operations dictate the need for special airspace control measures. The number of such zones will vary depending on the combat situation and the complexities of airspace control in conjunction with fire support coordination. The establishment of a HIDACZ normally will increase temporary airspace restrictions within the volume of defined airspace. Additionally, establishment of a HIDACZ within a maneuver area will normally give that maneuver unit commander complete weapon control status authority within the activated HIDACZ.

## Weapons Free Zones

5-139. An air defense zone established for the protection of key assets. Units are at WEAPONS FREE and can fire at any air target not positively identified as friendly.

## Temporary Airspace Restrictions

5-140. 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. The promulgation of such restrictions will include the following:

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

5-141. Four common temporary airspace restrictions are: restricted operations areas, minimum risk routes, standard-use Army aircraft flight routes and air corridors, and sectors of fire and primary target lines. They are discussed in the following paragraphs.

5-142. **Restricted Operations Area**. Identifies airspace of defined dimensions within which the operation of one or more airspace users is restricted, generally for a short time. The airspace control authority establishes these areas in response to the requests of ground force commanders. Consequently, the maneuver unit commander will normally have complete weapon control status authority within an activated restricted operations area.

5-143. Restricted operations areas for air and missiles can be established to maximize ADA effectiveness. In such cases, the normal ADA weapon control status will be WEAPONS FREE.

5-144. Restricted operations areas for ADA can be established to maximize air effectiveness. In such cases, the normal ADA weapons control status will be WEAPONS HOLD.

5-145. **Minimum Risk Route (MRR)**. Temporary corridor of defined dimensions passing in either direction through ADA defenses, a HIDACZ, or through a restricted operations area. It is designated to reduce risk to high-speed aircraft transiting the tactical operations area at low altitudes. The weapon control status for MRR will normally be maintained at WEAPONS TIGHT. Such circumstances will exist where there is inadequate timely control capability to permit a more flexible method of air defense. In such eases where friendly air does not use MRR, it is recognized that established AD procedures will apply. Low-level transit routes are the NATO equivalent of MRR.

5-146. The weapon control status for ADA fire units whose engagement ranges intercept an activated MRR remains at WEAPONS TIGHT for that part of the route. Should it become necessary to change to WEAPONS FREE, the commander who established it will close that particular route.

5-147. **Standard-use Army Aircraft Flight Routes**. 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 missions. Air corridors are restricted routes of travel specified for use by friendly Army aircraft and established to prevent friendly forces from firing on friendly aircraft.

5-148. The weapon 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 will close that particular route. Procedures for deconfliction of friendly surface-to-surface missile firings and UAV operations can be found in Joint Pub 3-55.1 and FM 100-103-1.

5-149. **Sectors of Fire and Primary Target Lines (PTL)**. PTLs are established to assist in the distribution of ADA fires. Sectors of fire for HIMAD are normally designated at battalion after review of radar coverage diagrams. The battery commander or platoon leader normally designates sectors of fire or PTLs for SHORAD. These limits must be clearly defined by right and left azimuths. 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.

BLANK

**Chapter 6**

# Planning and Conducting
# Air and Missile Defense Operations

This chapter addresses integration of the air defense combat function into planning and operations at the strategic, operational, and tactical levels of war. ADA forces protect geopolitical assets and accomplish other missions assigned by the national command authority (NCA) at the strategic level. At the operational level, ADA forces protect the theater base, the ports of debarkation, and operational lines of communications. And at the tactical level of war, Army ADA supports the scheme of maneuver while protecting corps and division forces according to the maneuver commander's air and missile defense priorities.

## AIR AND MISSILE DEFENSE IN THEATER OPERATIONS

6-1. The Army plays a key role in joint counterair and theater missile defense operations at the strategic, operational, and tactical levels of war. Army AD contributes greatly to DCA, OCA, and TMD attack operations, and provides the majority of TMD active defense capabilities. The Army joins the other services to provide protection for the concentration of critical forces and assets in the theater base and in the combat zone. Unity of effort is achieved through integration and coordination of service component CA and TMD operations by the JFC. The AADC contributes through the development and promulgation of JFC approved ROE and air and missile defense procedures and measures. This joint approach to CA and TMD provide the synchronization necessary to obtain the synergism required for success.

6-2. Army air and missile defense requires the integrated application of all combined arms. For OCA and TMD attack operations, the Army uses deep operations, primarily by special operations forces, aviation and field artillery units, to attack the enemy's air and missile assets before they can be launched against the theater. Active DCA and TMD active defense operations conducted by Army forces are in response to immediate enemy air, missile, and surveillance threats. The Army's primary active DCA and TMD active defense force is ADA, which provides dedicated low-, medium-, and high-altitude air and missile defense systems. ADA and the other combined arms forces integrate their fires to protect the force and geopolitical assets and ensure freedom to maneuver.

### AIR AND MISSILE DEFENSE IN MATURE AND CONTINGENCY THEATERS

6-3. Army forces conduct air and missile defense operations in two greatly different types of theaters. Both mature and contingency theaters require integrated Army air and missile defense planning.

## Mature Theaters

6-4. Alliance commitments and in-place joint forces are characteristics of mature theaters. The theater typically contains a large number of high-value, fixed assets and a well-known threat. Because of the threat, counterair and theater missile defense forces are typically in place during peacetime for threat deterrence and wartime readiness.

## Contingency Theaters

6-5. Counterair and theater missile defense activities in contingency theaters differ markedly from those in established theaters. The contingency theater lacks the sophisticated command and control, logistics infrastructure, and in-place forces of the mature theater. In most contingency theaters, the sophistication and quantity of enemy weapon systems are generally less than that of a mature theater. However, without adequate air and missile defense, force-projection forces in the initial stages of an operation are susceptible to catastrophic damage from even an unsophisticated enemy.

6-6. Ground forces deploying in a force-projection operation may have little air support in the early entry stage of the operation. They may have to depend on the air and missile defense resources that deploy with the force. Force-projection operations are normally short-duration operations, but may transition to protracted war. In the initial stages of the force-projection operation, there will only be a few high-value assets. Counterair and theater missile defense forces must protect those assets to ensure the continued buildup and expansion of the lodgment area.

# AIR AND MISSILE DEFENSE OBJECTIVES

6-7. Air and missile defense objectives are similar at each level of war. Army air defense commanders plan their operations to support accomplishment of the supported commander's strategic, operational, or tactical objectives by protecting their priority forces and assets from air and missile attack and surveillance.

## STRATEGIC OBJECTIVES

6-8. Air Defense Artillery protects 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 requirement to protect strategic assets will be established by the NCA. Strategic missions can be assigned to air and missile defense units at every echelon of command. 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 US forces into the region, for basing privileges, or for the formation and maintenance of a friendly coalition. Other strategic assets could include production, processing, and transportation facilities for natural resources or other materials that are of vital interest to the United States.

## OPERATIONAL OBJECTIVES

6-9. Counterair and theater missile defense plans supports the joint force commander's intent and concept of the operation. The JFC employs counterair and theater missile defense forces to achieve two primary operational objectives: gain control of the air environment and protect the force and selected assets. Control of the air environment may change with time and range from limited local air superiority in a specific part of the battlefield to air supremacy over the entire AO or theater. At the operational level, the Army contributes to theater counterair operations and to theater missile defense. Army combined arms forces provide support for OCA, DCA, and TMD active defense and attack operations. ADA units conduct DCA and TMD active defense operations and help integrate contributions to CA and TMD by other members of the combined arms team. They protect priority forces and assets in the theater base according to the JFC's and JFLCC's counterair and theater missile defense priorities.

## TACTICAL OBJECTIVES

6-10. Objectives of air and missile defense operations at the tactical level are to protect corps and division forces as they plan and execute battles and engagements. ADA forces control the air environment over the corps and divisions, protect priority forces and assets from attack and surveillance, and provide freedom to maneuver, and destroy enemy aircraft and missiles in the flight. Every participant in Army air and missile defense operations, maneuver, fire support, aviation, and intelligence, has a role in achieving those objectives, as do the joint forces which support corps and division operations.

6-11. Air and missile defense objectives at the tactical level are an extension of the operational-level objectives, but are more specific. Tactical-level air and missile defense operations support the overall objectives of corps and divisions. The emphasis at the tactical level is on protecting the force rather than on gaining control of the air environment or protecting geopolitical assets. The following paragraphs discuss specific tactical objectives for ADA brigades and battalions:

- ensure freedom to maneuver
- win the information war
- right force at the right place at the right time
- sustain the battle
- kill enemy aircraft and missiles the first time

### Ensure Freedom to Maneuver

6-12. Freedom of friendly forces to maneuver is a fundamental part of Army doctrine. An objective of air and missile defense operations is to ensure that enemy air does not impede maneuver. To achieve this objective, ADA and other combined arms elements must provide integrated air and missile defense for the force. ADA provides protection by synchronizing the fires and operations of ADA units with the fires and operations of combined arms units as well as with the joint and multinational forces. Protection of the force from deployment through redeployment is a key to successful force-projection operations.

## Win the Information War

6-13. Timely information is of paramount importance to get the right force to the right place at the right time on the fast-paced, modern battlefield. 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. Denial of RSTA data to the enemy is equally important. By cutting the link between enemy commanders and their eyes, ADA forces the enemy to operate in the blind, to be reactive to US operational initiatives, and to lose offensive potential. In short, denial of RSTA data increases the probability of success of friendly operations and saves lives.

6-14. Information operations (IO) involve actions taken to affect adversary information and information technology systems while defending one's own information and information systems. They apply across all phases of an operation, the range of military operations, and at every level of war. Information operations capitalize on the growing sophistication, connectivity, and reliance on information technology. IO targets information or information systems in order to affect the information dependent process, whether human or automated. Such information dependent processes range from national command authorities-level decision making to the automated control of key commercial infrastructures such as telecommunications and electric power.

6-15. Many different capabilities and activities must be integrated to achieve a coherent IO strategy. Intelligence and communications support is critical to conducting offensive and defensive IO. These assigned and supporting capabilities and activities include operations security (OPSEC), military deception, psychological operations, electronic warfare (EW), physical attack and destruction, and may include computer network attack. Joint Publication 3-13 should be consulted for more information.

## Right Force at the Right Place at the Right Time

6-16. The ADA commander has a number of different systems and task force organizations that can be employed. In each operation, the commander tailors the ADA force to match the factors of METT-TC. ADA is deployed throughout the depth of the battlefield, but the ADA commander ensures that ADA is where it is needed and can make the biggest impact on operations. Taking advantage of the mobility of ADA systems, the commander employs the force at the critical time and place.

## Sustain the Battle

6-17. To sustain the battle and the force's ability to maneuver, ADA systems engaged in air and missile defense operations must protect vital assets and forces that perform sustainment functions. These include lines of communications, fixed and mobile facilities, and organizations that support the force in deep, close, and rear operations. In the forward areas of the battlefield, ADA protects combat trains, refueling, and rearming operations. Air and missile defense of rear sustainment facilities concentrates on POL, ammunition, and

maintenance areas. Sustaining the battle also includes ensuring continuous employment of ADA and other Army air and missile defense resources.

### Kill Enemy Aircraft and Missiles the First Time

6-18. Killing enemy aircraft and missiles the first time sustains friendly combat power by denying aerial RSTA and preventing the destruction of friendly forces and assets. Successful air and missile defense operations also destroy the enemy's will to fight early in the battle. The combination of losses and effective passive measures erodes the enemy's expectation of successful air operations. Deterring enemy air surveillance or attacks or simply nullifying their effectiveness is not enough. Air and missile defense operations must be so overmatching as to make the cost of air operations prohibitive to the enemy. Air and missile defense operations must achieve this objective early while ADA forces still have the capability to rearm, reorganize, and reconstitute. There can be tactical situations and operations in which commanders restrict weapon systems from engaging enemy air to conserve firepower, prevent fratricide, or support a deception. Such decisions are not arbitrary, but are a function of the assigned mission. However, killing enemy aircraft and missiles the first time remains a primary objective.

## AIR DEFENSE ARTILLERY ROLES AND FUNCTIONS

6-19. The JFLCC's theater army air and missile defense coordinator (TAAMDCOORD) is normally the commander of the highest echelon Army air defense command in the theater. The TAAMDCOORD serves as the JFLCC's principal advisor and coordinator for theater counterair and theater missile defense operations. The highest echelon AD command in the theater may be a battalion, corps brigade, EAC brigade, or the AAMDC, depending on the size of the theater of operations and the joint force. When the AAMDC is in theater the commander may also be designated the deputy area air defense commander (DAADC). The DAADC serves as the AADC's principal advisor and coordinator for theater land-based air defense and TMD operations.

6-20. 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 must participate directly. Logistics provides the means for all air and missile defense operations. Each participant has a specific role in tactical air and missile defense plans and operations. These integrated roles are mutually supporting.

### THE JOINT FORCE AND COMPONENT COMMANDERS

6-21. The JFC establishes campaign objectives, approves plans, and establishes air and missile defenses priorities, allocates forces, and apportions air power. He assigns overall responsibility for theater-wide and/or JOA-wide counterair operations to a JFACC, overall joint force defensive counterair (DCA) operations to an area air defense commander (AADC), and airspace control to an airspace control authority (ACA). The JFC commands his forces through component and functional commanders (figure 6-1, page 6-6).

### Joint Force Land Component Commander

6-22. 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. He commands land forces, including Army and Marine air and missile defense forces, and assigns missions.

### Joint Force Air Component Commander

6-23. The JFACC responsibilities are assigned by the JFC. Normally these 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 TMD attack operations. The JFC usually assigns the JFACC responsibilities as both airspace control authority and area air defense commander.
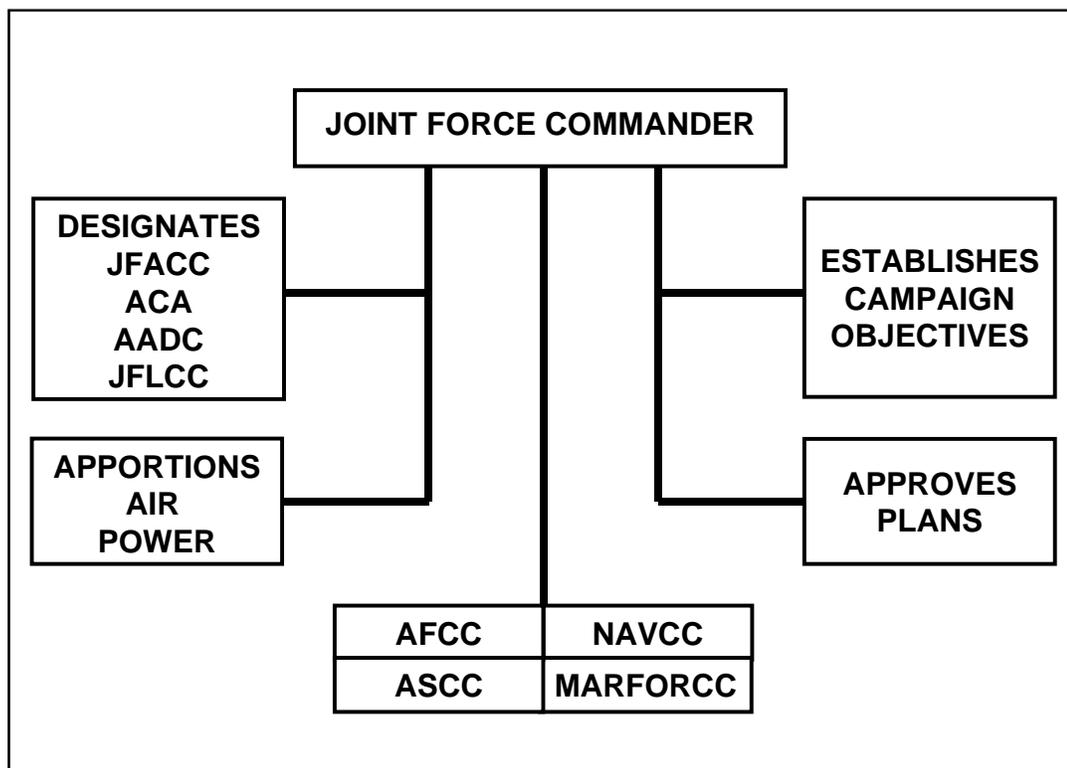
**Figure 6-1. Joint Force Commander's Air Defense Role**

### Joint Force Maritime Component Commander

6-24. The JFMCC is 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 his subordinates) may be designated as the JFACC. He may also be assigned responsibilities as the area air defense commander and the airspace control authority.

### Joint Force Special Operations Component Commander

6-25. The JFSOCC is 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 TMD attack operations through reconnaissance and direct action operations.

### Area Air Defense Commander

6-26. The JFC assigns overall responsibility for overall joint force defensive counterair operations to an area air defense commander. The AADC is normally the component commander with the preponderance of air defense capabilities and the command, control, and communications capability to plan and execute integrated air and missile defense operations. His responsibilities will be defined by the JFC. Normally, the AADC performs the following functions:

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

### Airspace Control Authority

6-27. The ACA assumes overall responsibility of the airspace control system in the airspace control area. The ACA coordinates and integrates the use of the airspace control area. He develops airspace control procedures and policies, establishes the airspace control system, and coordinates airspace user requirements. The ACA develops the airspace control plan and, after JFC approval, promulgates it throughout the area of operations. Normally, the AADC will also serve as the ACA.

### MANEUVER

6-28. Infantry and armor forces with an air defense capability increase the density and effectiveness of air and missile defense across the battlefield. However, the optimum role for these forces is ground combat. The maneuver commander must carefully consider 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. Although they have a limited capability to engage fixed-wing aircraft, missiles, and UAVs, combined arms members can effectively engage hovering or slow-moving helicopters within their weapon systems' ranges. Tank main guns, IFV, antitank weapons, and other direct-fire systems must engage these threat air platforms when possible. The force commander can assign combined arms resources to protect critical areas or assets from air attack. The AMDCOORD recommends to the ground force commander the use of other combat arms in an air defense role. The

AMDCOORD bases the recommendation on a careful target value analysis and estimate of the air threat.

## FIRE SUPPORT

6-29. Fire support enhances tactical-level air and missile defense. Indirect fire weapons can deny enemy helicopters the use of masked, standoff positions. Fire support systems can concentrate their fires on enemy landing zones, pickup zones, launch sites, command and control, assembly areas, and FARP. Surface-to-surface fire coordination for OCA operations takes place through the targeting process. Fire support elements coordinate targets for attack by joint air forces supporting corps and division operations.

6-30. The AMDCOORD works closely with the FSCOORD, G3, and G2 during the targeting process to prioritize OCA and TMD targets. The enemy's ability to disrupt friendly operations dictates target priority. The AMDCOORD makes target recommendations, weighing them against other requirements of the commander's plan competing for the same fire support. Many OCA and TMD targets fall into the category of deep targets. Therefore, long-range fire support assets are the optimal means to attack them.

## AVIATION

6-31. Army aviation contributes to air defense and joint counterair activities through air combat operations. Air combat provides aviation self-defense, combined arms maneuver forces protection, and air defense forces augmentation. Air combat operations support the force commander's overall concept of operations. The maneuver commander's decision to use aviation in other than a self-protection, air combat role must be weighed against its primary anti-armor mission. Air combat operations are planned to support the ground tactical plan and can be either offensive or defensive.

6-32. Aviation can conduct attacks against OCA and TMD targets that cannot be effectively engaged by indirect fire systems. Army aviation also participates in air assault operations against OCA and TMD targets. The force commander plans air security and SEAD missions to support Army aviation deep strike OCA and TMD operations.

6-33. Army aviation participates in DCA operations primarily by attacking aerial targets of opportunity and by engaging enemy air targets in self-defense. However, the force commander may give Army aviation forces the mission to screen the force against RSTA UAVs. Other DCA operations conducted by Army aviation occur in response to specific air threats. Army aviation DCA goals are to provide self-defense and augment the air defense capability of the combined arms team on the ground. Air cavalry squadrons and attack helicopter battalions can fill gaps in the force's air defense when ADA units are redistributing assets and adjusting forces. Helicopters in an air combat role also can provide air defense during screening missions. Early warning provided by screening or attack aviation assets must be integrated into ADA early warning and vice versa.

6-34. Coordination between the aviation and ADA commanders is particularly important, as aviation forces must operate in the airspace within the ADA engagement coverage. 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

6-35. Intelligence and electronic warfare (IEW) assets contribute to OCA, DCA, and TMD operations. Coordination for the use of IEW systems, including joint assets, against OCA and TMD targets is similar to coordination for fire support and involves the G3, G2, FSCOORD, and AMDCOORD. IEW 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 ADA greatly through early warning.

6-36. The AMDCOORD coordinates with the G2 or S2 to ensure air and missile defense requirements are met after the identification of all PIR and IR during the planning phase. The G2's collection manager then ensures specific orders and requests fully support those requirements. The collection manager also synchronizes collection and reporting to deliver relevant information on time. This process involves the prioritization of scarce resources to meet many intelligence requirements (IR). A request for intelligence information is generated when organic assets cannot satisfy an IR. The focus of tactical intelligence could include forward operating bases, FARP, missile and UAV capabilities, electronic warfare systems, logistics facilities, and command and control nodes. The interface between the AMDCOORD and G2 or S2 is essential for many reasons including a coordinated and accurate evaluation of enemy air and missile capabilities.

## COMBINED ARMS FOR AIR DEFENSE

6-37. Participants on the battlefield must be capable of firing in self-defense at enemy attack or surveillance aircraft. Small arms and crew-served weapons fire against rotary- and fixed-wing aircraft, UAVs, and cruise missiles thus providing a significant terminal defense. Individual and crew-served weapons can mass their fires against air threats. The massed use of guns in local air defense causes enemy air to increase their standoff range for surveillance and weapons delivery and increase altitude in transiting to and from targets. These reactions make enemy air more vulnerable to ADA. CAFAD training and tactical SOPs enable units to effectively prepare for self-defense against air attack.

# AIR AND MISSILE DEFENSE PLANNING

6-38. Joint operations planning is performed according to policies and procedures established in the Joint Operations Planning and Execution System (JOPES). JOPES supports and integrates joint operations planning activities at the national, theater, and supporting command levels. It interrelates with three other national systems: the National Security Council System; the Joint Strategic Planning System; and the Planning, Programming, and Budgeting System. JOPES is the principal system for translating decisions

into operation plans (OPLANs) and operation orders (OPORD) in support of national security objectives.

**JOPES FUNCTIONS**

6-39. JOPES consists of seven interrelated operational and supporting functions that provide a framework within which joint military planning and execution is done (figure 6-2). The operational functions are threat identification and assessment, strategy determination, course of action development, detailed planning, and implementation. The supporting functions are monitoring, and simulation and analysis.
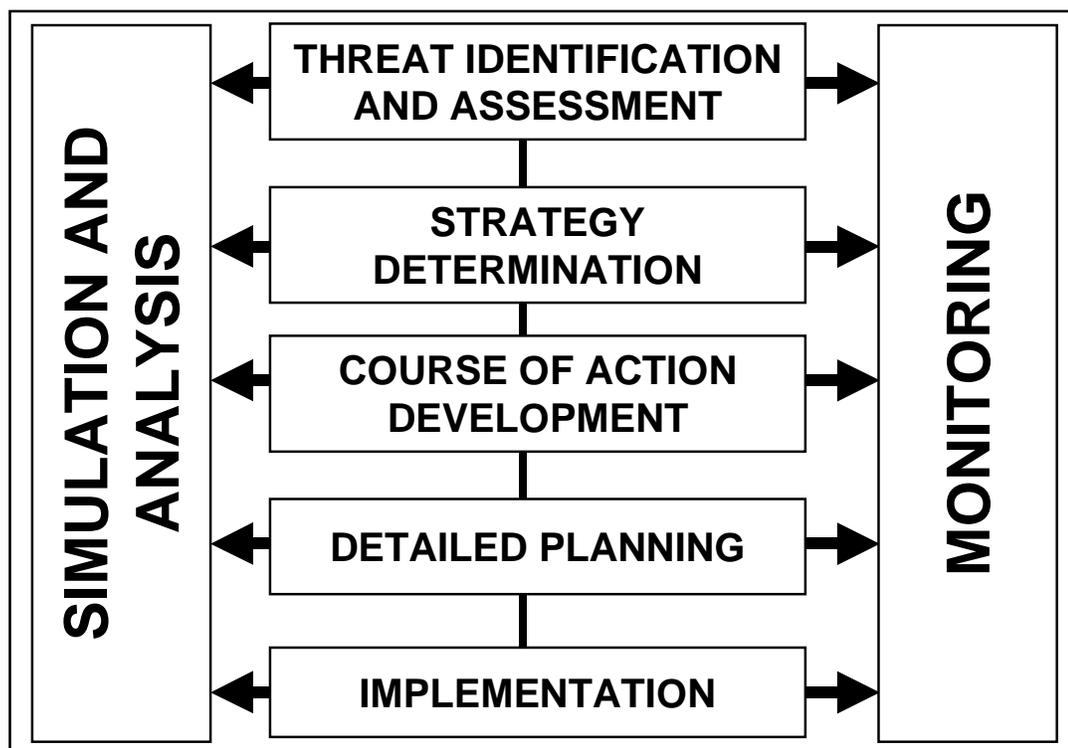


**Figure 6-2. JOPES Operational and Supporting Functions**

**Threat Identification and Assessment**

6-40. Involves detecting actual and potential threats to national security and alerting decision-makers. Defining enemy capabilities and intentions is emphasized using this function. All organizational levels are supported by this function during crisis action planning and execution.

**Strategy Determination**

6-41. Furnishes direction from the national level for developing courses of action and assists the NCA and Chairman, Joint Chiefs of Staff (CJCS), in formulating suitable and feasible options to counter the threat. This function is used in formulating politico-military assessments, developing and evaluating

military strategy and objectives, and developing planning guidance leading to the preparation of COAs, OPLANs, and OPORDs.

### Course of Action Development

6-42. Provides the CINC's staff help to develop and test alternative courses of action (COA) based upon NCA/CJCS task assignments, guidance, and force and resource allocation. This facilitates development of the CINC's strategic concept in deliberate planning or the commander's estimate in crisis action planning.

### Detailed Planning

6-43. This function supports rapid preparation of the approved concept of operations or COA for implementation. Detailed planning results in an CJCS-approved OPLAN or a National Command Authority-approved OPORD.

### Implementation

6-44. Function provides the decision-makers tools to monitor and analyze events and manage events during execution. Implementation begins with the CJCS execution order and usually ends with some type of planning effort, such as termination or redirection of operations.

### Monitoring

6-45. Function makes current and accurate information concerning friendly, enemy, and neutral forces and resources available to users. This function supports each of the other JOPES functions.

### Simulation and Analysis

6-46. Function includes automated techniques that support each of the other JOPES functions. Examples of simulation and analysis applications, when feasible, are force-on-force assessments, and generation of force requirements.

## THEATER STRATEGIC PLANNING

6-47. Theater-strategic planning during peacetime provides the framework for the wartime employment of forces. Combatant commanders or CINCs, through their planning staffs, develop a variety of peacetime assessments and contingency plans that ease transition to a crisis or war. Peacetime intelligence and logistics assessments are essential for rapid transition to force-projection operations.

6-48. Planners develop strategic end states tailored to the particular situation in war or conflict. The combatant commander modifies existing strategic and contingency plans and alters portions of the theater strategy using crisis-action planning. The theater strategy is written in terms of military objectives, military concepts, and resources. It provides guidance for a broad range of activities throughout the AO.

6-49. Commanders and staff conduct theater-strategic planning using the JOPES. The assigned planning requirements are formulated into a family of

OPLANs to meet strategic and contingency requirements in the theater. The JFLCC develops the supporting plan as part of the family of plans. The commander's OPLAN is a theater campaign plan that integrates air, land, and naval operations to accomplish a common objective. Theater OPLANs are designed to achieve strategic goals. The commander uses operational art in theater design to influence the strategic intent found in both the theater strategy and campaign plan.

## OPERATIONAL PLANNING

6-50. Air and missile defense planning is a distributed process occurring at all echelons. The JFC normally issues planning guidance by phase. The JFC, or if delegated, the JFACC or AADC will task components to develop detailed priorities. The components conduct war games to prioritize their defended assets based on phases. The AAMDC commander in the roles of TAAMDCOORD and DAADC is involved in this process by assisting the ARFOR and AADC in the planning and coordination of the defended asset list (DAL). The JFC or JFACC/AADC goes through a staffing process with the components to coalesce all priorities into a single list.

6-51. Planning and task organization occurs at all levels to ensure successful accomplishment of the mission once the DAL is published. 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 organizes to execute air and missile defense operations. Also, the TAAMDCOORD advises the COMARFOR/JFLCC on the employment of the corps ADA brigade to ensure integration into the theater air and missile defense plan. When necessary, corps commanders may be tasked to protect theater assets from the DAL located in the corps area using corps ADA forces.

6-52. Air and missile defense operations during deployment and entry operations are essential for force protection due to the vulnerability of deploying forces entering a theater. Forces are flowed into a theater based on the threat and the mission. The JFC may decide to initially deploy a robust air and missile defense capability into theater to protect the force prior to decisive operations. As operations progress the DAL is continually reassessed by all components and recommendations are forwarded to the JFC or JFACC/AADC.

### Operational Planning Process

6-53. Air and missile defense planning at the operational level is an iterative process. The same planning process will occur if the either the USN or the USMC is providing the majority of the air assets.

6-54. Using JFC guidance the AADC develops the air and missile defense concept for the theater. The DAADC assists the AADC with the air and missile defense plan development. In the role of TAAMDCOORD, the DAADC, 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 CA priorities, TMD priorities, and resource allocation to support the JFC's air and missile defense concept.

6-55. When the AAMDC is in theater the AAMDC commander will normally be designated the DAADC and will be the principal integrator for the JFLCC

to the AADC on air and missile defense plan development (figure 6-3). An AAMDC liaison team works closely with the AADC and his 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 AD 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). In the role of TAAMDCOORD the DAADC, with input from the fire support element, and Army airspace command and control cell, assists the JFLCC's staff (J3 and J5) in providing recommendations on Army CA priorities, TMD priorities, and resource allocation to support the JFC's air and missile defense concept.
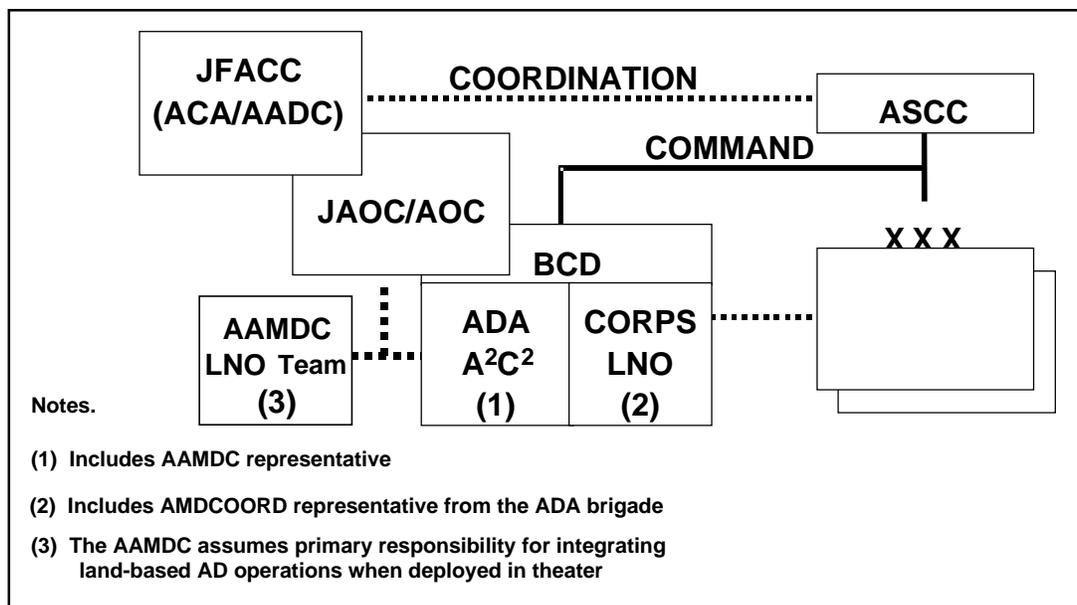


**Figure 6-3. AAMDC Integration with JAOC and BCD**

6-56. The JFLCC through the AAMDC commander in his DAADC 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's guidance, the JFACC in coordination with the JFLCC develops the air operations plan.

6-57. The BCD is the JFLCC's representation in the USAF joint air operations center (JAOC). The JFLCC will establish a similar liaison arrangement if the JFACC is from the USN or USMC. 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 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 and FM 100-13-1 for a more detailed discussion of the BCD.

6-58. The AADC develops the DCA portion of the plan and allocates assets for various missions. 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. In the absence of the DAADC when the AAMDC is not in theater, the senior ADA commander as the TAAMDCOORD integrates ADA units into the AADC's DCA planning process. However, this is normally a DAADC function because the AAMDC has the necessary personnel and equipment to deploy to the AADC's location to accomplish ADA integration.
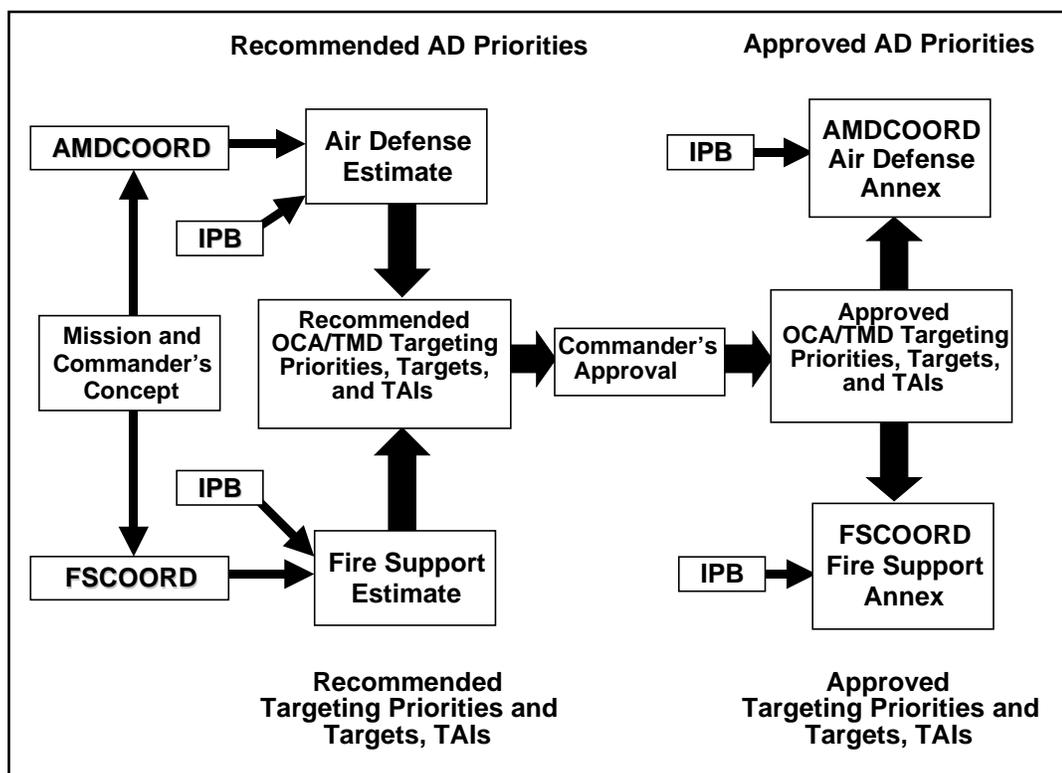


**Figure 6-4. Development of Air Defense and Fire Support Annexes**

6-59. The plan enables the JFLCC to finalize the air and missile defense and fire support portions of the land operation plan (figure 6-4). The JFLCC prioritizes the allocated CAS missions in coordination with fire support plans. 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.

6-60. 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 ma-

neuver plan. Within the G3 plans section, the AMDCOORD, with input from the G2, A2C2 cell, and FSE, incorporates the air and missile defense mission into this maneuver plan.

6-61. During the targeting process, the AMDCOORD, in conjunction with the G2, develops and recommends OCA and TMD targeting priorities and nominates OCA and TMD targets and target areas of interest (TAI). He then develops and recommends AD and TMD priorities to the commander for approval. The air liaison officer participates in this process by recommending SEAD targets to the FSCOORD.

6-62. 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 TMD targets, targeting priorities, and TAIs into the force's fire support plan. The AMDCOORD includes the DCA and TMD active defense priorities and associated IPB products in the development and coordination of the force's air and missile defense operation.

6-63. Coordination between AMDCOORD and FSCOORD ensures that the OCA, DCA, and TMD portions of the air and missile defense effort are complementary. The integration and synchronization of OCA and TMD attack operations by the AMDCOORD and FSCOORD prevents mutual interference and maximizes unity and economy of effort.

6-64. Coordination of OCA and TMD targets between the Army and the Air Force occurs at the AOC and the CRC. OCA, DCA, SEAD, and TMD plans are developed simultaneously and in concert, not as separate, isolated plans. The OCA, DCA, SEAD, and TMD plans are an integral part of the theater campaign plan and the maneuver plan at each Army echelon.

## Air and Missile Defense in OCA and TMD Attack Operations Planning

6-65. Operational-level counterair and TMD planning requires careful selection and prioritization of OCA and TMD targets. Effective planning enables each level to "decide-detect-deliver-assess" and accelerates the engagement of targets during combat. OCA and TMD attack operation plans should consider the use of all available assets including aircraft, surface-to-surface missiles, artillery, UAVs, SOF, and EW. The AAMDC has the necessary intelligence tools to provide focus to TMD attack operations for the COMARFOR, JFLCC, and the JFACC. The AAMDC recommends TM targets to the deep operations coordination cell (DOCC) for prosecution. The AAMDC provides liaison teams to the DOCC, analysis and control element (ACE), joint and special operations task force (JSOTF), battlefield coordination detachment (BCD), and joint air operations center (JAOC/AOC) to coordinate and assist TMD attack operations within the ARFOR and the joint force attack operations structure. AAMDC does not usurp the traditional mission of the DOCC, BCD, and AOC in prosecuting attack operations.

6-66. The AMDCOORD is a member of division and corps targeting boards and is represented in the deep operations coordination cell. He recommends OCA and TMD targets as fire support priorities and contributes to fire support planning. In addition, ADA contributes to TMD and OCA target location and identification through surveillance and back-plotting launch locations.

6-67. The force commander at each tactical echelon establishes OCA and TMD priorities in support of the concept. OCA and TMD targets are generally beyond the FLOT and include the following:

- Weapons. UAVs, rotary- and fixed-wing aircraft, ballistic missiles, cruise missiles, and launcher vehicles on the ground, before, during, and after launch.
- Enemy support facilities. Includes airfields, launch sites, logistics support facilities, technical support facilities, FARP, and navigational aids.
- Command and control facilities that the enemy depends upon to maintain centralized control of air and missile assets. Acquisition, tracking, and other air operation support systems are OCA and TMD targets. Targeting these facilities supports information warfare by interfering with the enemy's decision-making cycle and disrupting his ability to synchronize operations.
- EW systems. Destroying EW capabilities increases the operational effectiveness of friendly counterair, TMD, and battle command communications and intelligence systems. EW targets include air- and land-based jamming systems and their control elements. Attacking these systems supports information warfare operations.
- Air defense systems. Enemy air defense systems and forces possess the capability to thwart our attainment of air operations objectives. SEAD is an integral part of all friendly air operations and the Army participates in joint SEAD.

**Air and Missile Defense in Active Defense Planning**

6-68. Integration and prioritization permit Army ADA units the flexibility to support the commander's concept of the operation. The AADC integrates lower and upper-tier air and missile defense systems with airborne and sea-based counterair resources to make the defense effective.

6-69. Most Army DCA, and all Army TMD, active defense tasks are assigned to ADA units. Army ADA units will be positioned tactically 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 plan to the ARFOR or JFLCC plan. In the air and missile defense plan, EAC ADA brigades normally will protect priority assets from the CINC's defended asset list. Corps commanders may be tasked in the theater campaign plan to protect theater assets in the corps area using corps ADA forces. ADA commanders design defenses and task organize forces to protect designated priority assets. The air defense employment principles and guidelines in chapter 4 form the basis for the design of these defenses.

**Air and Missile Defense in Passive Measures Planning**

6-70. Passive measures is 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. Conducting passive operations is a critical task to the survival of

every unit. The AAMDC has a TMD passive defense cell with the necessary personnel and equipment to support the TAAMDCOORD in executing a TMD passive defense mission for the COMARFOR or JFLCC.

6-71. 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 hardened sites.

## INTEGRATION OF ADA INTO THEATER CA AND TMD

6-72. A majority of air and missile defense coordination of interest to ADA occurs between the AADC and the JFLCC in most theaters. The JFLCC integrates Army capabilities into joint air and missile defense efforts through close coordination with the AADC. When the AAMDC is in theater the AAMDC commander will normally be designated the DAADC and will be the principal integrator for the JFLCC to the AADC on air and missile defense. An AAMDC liaison team works closely with the AADC and his staff and the BCD to accomplish air and missile defense integration. The AAMDC liaison team may augment the BCD AD section as needed (figure 6-3, page 6-13). When the AAMDC is not in theater coordination is accomplished by the BCD, which will locate part of its staff with the AADC's operations center. If the AADC is from the USAF or USN, he plans and conducts operations from the air operations center. If the AADC is from the USMC, the tactical air command center conducts the joint operations. Each service component provides a liaison representative to the AADC. The component representative functions as the necessary interface among the service component headquarters.

6-73. The BCD is the JFLCC's representation in the USAF AOC. The JFLCC will establish a similar liaison arrangement if the JFACC is from the USN or USMC. The JFLCC organizes the BCD based on the type of theater and the AOC organization. In force projection operations involving only one corps, the corps commander will structure the BCD. The BCD provides 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.

### Joint Interface Control Officer

6-74. ARFOR or JFLCC coordination with the joint interface control officer (JICO) is essential to the successful integration of ADA forces into theater CA and TMD. The JICO is responsible for managing the multidata link network from the AOC. The JICO works for the AADC and does the following:

- Establishes the multidata link network.
- Ensures units comply with direction in the theater data link tasking documents, including the operations task link (OPTASKLINK) and tactical operations data (TACOPDAT).

- Monitors TADIL and interface unit (IU) status.
- Resolves joint connectivity and interoperability issues.

6-75. The JICO cell supports continuous operations. Each service normally contributes personnel or expertise to the JICO cell to plan and execute joint operations. The AAMDC normally would provide the ARFOR or JFLCC expertise to the JICO cell to ensure integration of ARFOR air and missile defense operations with joint or multinational operations.

## TACTICAL PLANNING

6-76. A successful execution of air and missile defense operations will result from an well-organized air and missile defense plan. The process is continuous. A detailed look at air and missile defense planning and the integrated staff planning process is contained in appendix B.

## METT-TC

6-77. METT-TC is the driving forces behind all ADA planning. The type of theater and 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.

6-78. The sophistication, lethality, and numerical strength of the enemy in the mature theater are generally greater in contingency theaters. Prepositioned in a mature theater is a vast array of combat, combat support, and combat service support forces, linked by an extensive battle command system. Depending on their location and echelon, these forces possess a wide variation in mobility and hardness. The enemy in a mature theater leaves little time for reaction. The rapid tempo of operations becomes the key factor in the analysis of time.

6-79. Contingency theaters may have no prepositioned forces. Contingency operations are generally of a smaller scale than operations in a mature theater. In contingency theaters, time is critical to the deployment and buildup of the forces. The time required to deploy, establish, and expand a lodgment affects the ability of the force to conduct operations.

6-80. METT-TC in close, deep, and rear operations is the foundation for ADA planning at the tactical level. This analysis is a function of position on the modern battlefield. The conduct of the analysis focuses on the type of operation to be conducted, the air threat expected, and the focus of the air threat.

6-81. Close operations involve forces that are extremely vulnerable to detection because of their proximity to the enemy. The primary air threat in this area is rotary-wing aircraft. ADA support of close operations focuses on the protection of the maneuver force by destroying enemy attack helicopters, UAVs, and CAS aircraft which penetrate the joint counterair force. Highly mobile and hardened systems best accomplish this mission.

6-82. Deep operations allow the force commander to shape the battlefield for future close operations. ADA planning for deep operations will be similar to that conducted for close operations. ADA forces are integrated into maneuver forces conducting deep operations and protect deep strike fire support assets.

Highly mobile and hardened assets with a self-sustaining capability will best accomplish this mission. A proper mix of systems will provide ADA coverage at all altitudes and allow the force conducting deep operations the maximum freedom to maneuver.

6-83. Rear area air threats are predominantly UAVs, fixed-wing aircraft, and theater missiles with missions to destroy soft, immobile, high-value targets. These assets, which include aviation, C2, deep strike artillery, and logistics, are critical to corps and division operations. ADA planners deploy systems in rear areas that are less mobile, but have greater ranges to allow for early and multiple engagements.

6-84. The objective of ADA planning is to establish low- to high-altitude air and missile defense coverage of the maneuver commander's defense priorities. The ADA commander must ensure horizontal and vertical integration throughout the operational area. ADA operations require synchronization with the supported force and coordination with higher and lower ADA echelons and adjacent ADA units. This often includes the integration of Army ADA plans with joint counterair and TMD operations. The METT-TC process influences integrated air and missile defense planning from theater through battalion level and permits reinforcement of the synchronization process.

## Scheme of Maneuver

6-85. Corps and division commanders approve a scheme of maneuver developed by their staffs. The approved scheme of maneuver is normally one of several maneuver courses of action. Analysis of METT-TC, IPB, and the commander's intent forms the foundation for the maneuver concept. The commander's intent is provided as general guidance and direction to the staff on how to accomplish the mission. IPB includes the evaluation of both the ground and air threat. ADA and maneuver planning incorporates possible threat courses of action. Appendix A describes the development of air IPB in greater detail. The AMDCOORD develops an estimate that includes air defense coverage for each maneuver course of action (appendix B).

## Air and missile defense Priorities

6-86. The ADA commander considers METT-TC, IPB, and the supported commander's intent and concept of operations as he develops AMD priorities. Priorities are based on the factors of criticality, vulnerability, recuperability, and the threat (CVRT). The ADA commander recommends these priorities to the maneuver commander for approval.

## ADA Concept of Operations

6-87. The purpose of the ADA concept of operations is to maximize protection of the force. The ADA commander assesses the factors of METT-TC, the force commander's intent, the IPB, and the approved air and missile defense priorities to determine the numbers and types of ADA resources necessary to protect those priorities. To design that defense, the commander must apply the air defense employment principles and guidelines, and the technical considerations of these resources. The ADA concept of operations is the basis of the air and missile defense plan and is synchronized with the higher and adjacent AD plans (figure 6-5). Major considerations that impact on the devel-

opment of the ADA concept of operations are theater characteristics, the type of operation (close, deep, and rear), and passive air defense measures available to the force.

6-88. The ADA concept of operation, by integrating active and passive air and missile defense into all operations, not only protects the force but also makes the enemy doubt his ability to conduct successful air operations. The concept of operation outlines the best mix, mass, mobility, and integration of ADA assets required for accomplishing each task.
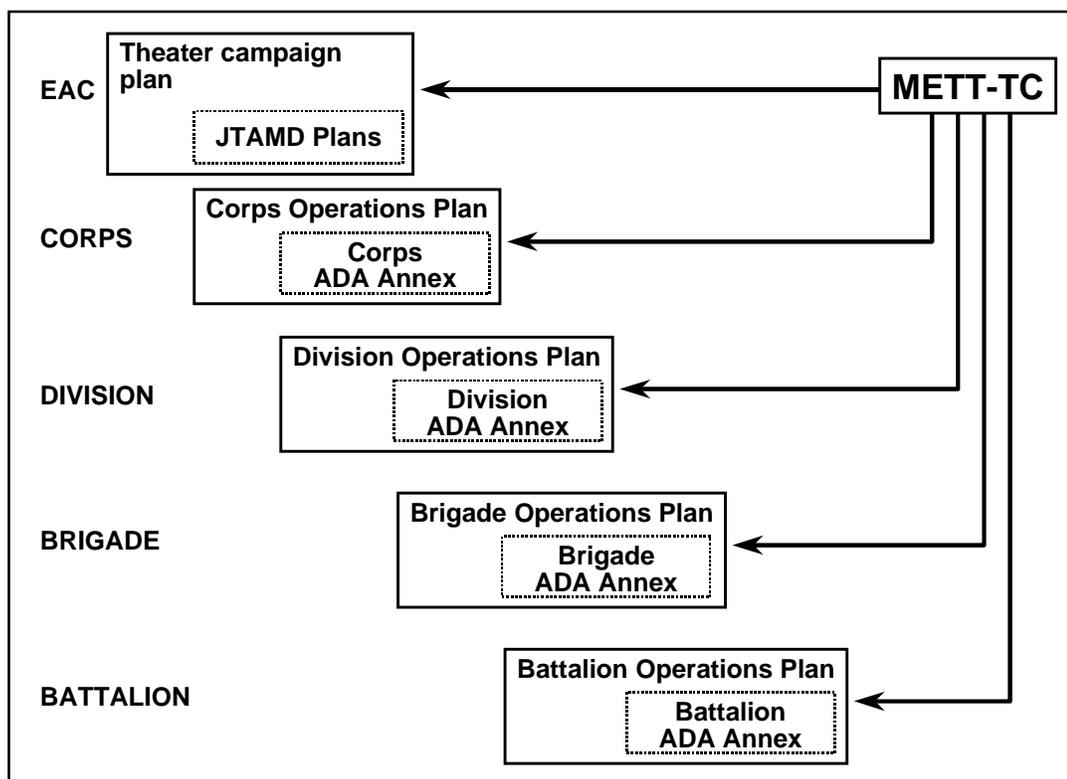


**Figure 6-5. Integrated Air and Missile Defense Planning**

6-89. Forces require all-altitude protection from enemy surveillance and attacks in mature theaters. Forces in the mature theater are not homogeneous. At the division level, forces tend to be highly mobile and hardened. Their mission requires a maneuver orientation and highly mobile air defense forces. Divisional forces are particularly vulnerable during offensive missions such as deep operations beyond the FLOT. In cross-FLOT operations, enemy air defense may preclude friendly close air support (CAS). Therefore, the forward deployed ground forces in the division must depend primarily on ADA. To support the division during offensive missions, the corps commander may reinforce the divisional ADA battalion with high-to medium-altitude systems and, possibly, additional low-altitude systems.

6-90. Contingency theaters require ADA coverage for each stage of the operation. During the pre-deployment activities, analysis of the air threat identifies the air and missile defense requirements. In the deployment stage, ADA

systems require lift to the area of operations to provide early air and missile defense protection of the POD, LOC, and lodgment area. ADA systems must deploy rapidly and in sufficient numbers to defeat the threat. During the entry stage, ADA counters enemy RSTA, air, and missile attack operations. Long-range DCA is normally the responsibility of Navy, Marine Corps, or Air Force air assets, but ADA provides the only protection against TMs, UAVs, and helicopters. This multiservice air and missile defense requires integration of the ADA concept of operations into the joint counterair and TMD plans.

6-91. ADA must accompany the force, particularly in regions where large distances are traversed in a short period of time, during expansion of the lodgment. ADA systems must be highly mobile to provide the force the low- and medium-altitude protection required during rapid movement. Counter-RSTA remains an imperative. Employment of additional ADA strengthens the air and missile defenses at the lodgment area and the logistics base.

6-92. ADA shifts emphasis from counter-RSTA to force protection during the operations stage. The operation either terminates successfully or escalates into operations similar to those of an established theater. If escalation occurs, additional ADA must deploy and integrate with the ADA resources previously deployed to sustain air and missile defense operations.

6-93. Whether supporting close, deep, or rear operations, the ADA commander at all levels develops and refines the ADA concept of operations to achieve the objectives of all tactical-level air and missile defense planning. The ADA commander's objective is to provide the force with sustained, low- to high-altitude air and missile defense of priority forces and assets throughout the battlefield. When developing the concept of operations, the ADA commander considers the specific characteristics of the operation and the approved air and missile defense priorities. The commander also assesses the potential contributions of joint counterair, TMD, and non-ADA Army resources. After considering the individual and combined capabilities of all available ADA resources, the ADA commander effects the necessary coordination to integrate and synchronize their contributions with the supported force's concept of operations.

6-94. The ADA concept of operations in close operations focuses on the protection of the maneuver force and reserves. ADA protection is weighted toward the main effort. In close operations, ADA and other members of the combined arms team focus their air defense efforts on defeating enemy attack helicopters and UAVs while retaining the tactical flexibility to destroy attacking fixed-wing aircraft. The combination of ADA and combined arms fires significantly increases friendly force effectiveness. A result of this synergistic effect is that the force kills more enemy air, loses fewer systems, and gains greater freedom to maneuver.

6-95. ADA must maneuver with the force to provide low-altitude protective fires in deep operations. Overwatch ADA fires may come from supporting longer-range ADA resources. As in close operations, maneuver elements may also engage air threats with their organic weapons systems. The ADA commander must integrate supporting Air Force and Army aviation fires whenever possible. Air and missile defense assets may consist of only SHORAD

systems and attack helicopters that the commander can employ rapidly against enemy air throughout the depth of operations. If enemy fixed-wing aircraft and helicopters are expected, then mobile ADA assets that can counter this mixed threat are crucial to the deep operation.

6-96. Rear area air and missile defense includes operations by both short range and high- to medium- altitude air defense systems throughout the battlefield. The size of the area, however, requires the weighting of ADA resources around those facilities and assets that the commander determines are most critical to the concept of operation. HIMAD forces protect priority forces and assets from attack by TMs and fixed-wing aircraft. Short range air defense is added to the highest priority forces and assets to screen against RSTA attempts, destroy cruise missiles or attacking fixed-wing aircraft, and to provide a mix of weapons systems. Major ports, railheads, airfields, assembly areas, and storage areas are assets normally requiring dedicated SHORAD protection. CAFAD employment is also a means of air defense protection in the rear where air defense systems are not available. In these areas, smoke screens can reduce the vulnerability of rear area facilities and might even be used for LZ and PZ denial.

6-97. Passive air defense actions reduce the effectiveness of the air threat. The extent of an asset's passive air defense efforts directly impacts on the vulnerability of that asset. Regardless of the type of theater or area of the battlefield, the ADA concept of operations always includes passive air defense measures. Based on the force commander's air and missile defense priorities, not all assets will receive dedicated ADA forces for protection. However, most assets will receive a degree of air and missile defense protection from coverage provided by higher echelon and adjacent ADA units. To enhance the protection available from this air and missile defense coverage, all elements must plan and employ passive air defense measures. Integrated active and passive air defense makes the air threat expend maximum resources with a minimum of success. Based on the threat and scheme of maneuver, assets may need support to enhance their passive air defense posture. All members of the combined arms team must integrate the support requirements for passive air defense into the prioritization of tasks for their forces.

6-98. Vulnerability of a friendly asset depends on the extent of signature reduction, concealment, hardening, and deception employed. Signature reduction makes the battle command asset difficult to locate and less subject to attack. Engineer units can increase the hardness of the battle command asset by constructing field fortifications. Even if the battle command asset is attacked, the site is less vulnerable. Establishing a decoy may result in enemy air threats attacking the wrong location.

## Task Organization and Command or Support Relationships

6-99. An ADA commander structures ADA forces unit by unit based on the concept of operations. The commander considers the status of unit leadership, personnel, equipment, experience, and training to determine the best ADA task organization. In determining task organization, the commander selects the appropriate command or support relationship for each unit.

6-100. Factors for assigning command or support relationships are battle command, unity of command, survivability, and sustainability. The appropriate command or support relationship provides ADA commanders the flexibility and authority to synchronize their forces vertically and horizontally. When determining command or support relationships, the ADA commander retains a unified internal chain of command. When considering the factor of survivability, the ADA commander analyzes the degree of risk to the ADA unit versus mission accomplishment. The final factor in determining the command or support relationship is sustainability of the ADA force. The commander must ensure each unit will receive all required logistical support. Failure to consider these four factors when assigning a unit's command or support relationship will degrade the integrated ADA coverage of the force and threaten freedom to maneuver. The finalized ADA plan integrates task organization and command or support relationships with the ADA concept of operations.

## EXECUTION OF TACTICAL OPERATIONS

6-101. Execution is the final and most critical stage of the decision-making process. Because of the importance of this stage, commanders and staffs must actively supervise the synchronized execution of the plan. During the operation, friendly ADA must have the flexibility to respond to changes in METT-TC. The ability to perform the battlefield tasks provides flexibility to execute the plan and to continuously provide ADA coverage to the force.

### Shoot

6-102. All combatants on the battlefield go through the same steps to deliver fire on a target. Combatants must detect, acquire, classify, identify, select, and engage targets to destroy them. A discussion of each step follows:

- **Detect.** ADA systems must discern the presence of an enemy air element that is or may become a threat, or the presence of facilities critical to the support of that enemy air element. Early detection demands continuous surveillance of the battlefield.
- **Acquire**. ADA systems must obtain data defining the position of the enemy air element. The data must be sufficiently accurate to provide targeting information.
- **Classify**. ADA systems must declare a target an air breathing object (ABO) or a ballistic missile (BM). Capabilities dictate that ADA units engage threatening ballistic missiles based on classification, not identification.
- **Identify**. ADA systems must determine if a potential air-breathing target is friendly or enemy. Ideally, the identification process would discriminate between real targets and decoys, and even identify the type of enemy target.
- **Select Target**. ADA systems must analyze each target to determine if and when it should be destroyed or engaged IAW the threat posed, the tactical benefit, and the commander's guidance. ADA systems must prioritize threat targets for engagement and destruction.

- **Select System**. The appropriate ADA system and weapon is selected to engage the threatening target.
- **Engage**. ADA systems must create firing orders for transmission to the selected systems for engagement of the selected targets. ADA systems must have the capability to attack enemy targets with ordnance or electronic warfare measures.
- **Destroy**. The immediate goal of every air and missile defense operation must be the destruction of enemy targets. If the target's destruction is not possible the operation must, as a minimum, prevent the enemy target from fulfilling its mission.

## Move

6-103. Tactical-level ADA units must have mobility equal to the mobility of the supported force. Movement ensures that tactical-level ADA forces can project their operation into any area required by the maneuver force or indicated by the threat. The ability to move also signifies that ADA weapons systems are not tied to a static support base.

## Communicate

6-104. The tactical-level ADA commander at each echelon must make the most effective use of the limited communications and intelligence assets available. The commander does this by integrating the tactical ADA battle command system into that of the maneuver force. Tactical ADA battle command must provide the means for collecting, processing, and disseminating information to conduct a continuous air battle. The communications system also provides the means by which the ADA commander conveys decisions and directives to subordinate units across the battlefield.

6-105. Communications systems interface tactical-level ADA units with higher, lower, adjacent, and joint headquarters. These link the detection, acquisition, identification, and destruction or disruption tasks at all echelons. In this manner, communications and intelligence systems enhance integration, decision-making, maneuver, and target engagement for ADA operations. The type of theater, location on the battlefield, and the concept of operations determines communications architecture. The total integration of ADA operations in support of close, deep, and rear operations requires timely battle command capable of rapidly collecting critical information and distributing it in concise, usable form to leaders, planners, and weapons systems.

## Sustain

6-106. Logistics and trained manpower increase in importance as warfare increases in complexity and intensity. Sustainment is vital to ADA operations. To meet the challenges of sustainment, ADA commanders require well-thought-out plans. ADA units require a streamlined logistics system. The system must provide continuous support over extended distances. Durable, reliable, and easily maintained weapons must complement the system. ADA commanders must anticipate the sustainment requirements for future operations and integrate those requirements with the corps or division sustainment plan. Sustainment must be continuous throughout the battlefield. Logistics must be responsive and provide quick reaction to ADA demands to

maintain combat effectiveness. Should the sustainment operation fall short, the ADA commander must improvise to meet unanticipated situations.

6-107. Planning for ADA operations must include six sustainment functions. They are manning, arming, fueling, fixing, moving, and sustaining soldiers and their systems. The functions center on the care, maintenance, and use of all personnel and equipment essential to the unit in accomplishing its combat mission. These functions include such diverse responsibilities as maintaining the strength and spirit of the fighting force and, when necessary, decontaminating personnel and equipment. Logistics packages integrated into the supported force logistics system is the most common approach to use. Chapter 7 has more detailed discussions on logistics.

**Survive**

6-108. ADA limits the freedom of action of enemy forces and, therefore, enhances friendly freedom to maneuver. In developing and executing air and missile defense missions, mission accomplishment is foremost in priority. The ADA commander makes an estimate of the situation and considers the factors of METT-TC. The ADA plan provides battlefield effectiveness and ensures the availability of ADA assets for subsequent operations. Protection of personnel and equipment is vital to preserving the combat power of the maneuver force. The loss of ADA units increases the force's vulnerability to air surveillance and attack.

6-109. ADA forces take advantage of rapid maneuver, terrain, cover, and concealment to increase their survivability in close and deep operations. ADA systems maneuvering with the force derive a certain degree of protection from the maneuver force.

6-110. Some ADA systems in the rear can be hardened to increase survivability. Others take advantage of mobility, cover, concealment, terrain features, and collective protection to enhance survivability.

# THEATER MISSILE DEFENSE

6-111. TMD encompasses all activities focused on the identification, integration, and employment of forces supported by theater and national capabilities to detect, acquire, classify, select, engage, and minimize the effects of, or destroy enemy TMs. This includes the destruction of TMs on the ground and in flight; their air, ground or sea-based launch platforms during pre- and post-launch operations; and their supporting infrastructure.

6-112. Due to the political and military aspects of the threat, TMD objectives are often strategic in nature. These include deployment for stability and support operations and defense of geopolitical assets. Defense of early entry forces and lodgments can also be strategic objectives since US forces are extremely vulnerable during these stages and US political support for operations must be kept at the highest levels possible.

6-113. All service components have the capability to make critical TMD contributions. The Army's contribution is derived from four specific Department of the Army functions contained in Department of Defense (DOD) Directive 5100.1.

6-114. The DA functions are as follows:

- Organize, train, and equip forces to seize, occupy, and defend land areas.
- Organize, train, equip, and provide forces for theater air and missile defense (TAMD).
- Organize, train, equip, and provide forces to operate land lines of communication (LOC).
- Develop doctrines and procedures, in coordination with the other military services, for organizing, equipping, training, and employing forces operating on land.

6-115. The Army Air and Missile Defense Command (AAMDC) is the Army's combat organization for planning, coordinating, integrating, and executing TMD operations in support of the army service component commander (ASCC), the Army forces (ARFOR) commander, the joint force land component commander (JFLCC), if designated, and the JFC's joint TMD fight. See FM 44-94 for detailed information on AAMDC organization and operations.

**Chapter 7**

# Combat Service Support

This chapter provides doctrine for sustainment of air and missile defense operations. Combat service support (CSS) is the process of planning and executing the sustainment of forces in support of military operations. It includes the functions of supply, transportation, field services, maintenance, health service support, personnel, and facilities.

## COMBAT SERVICE SUPPORT FUNDAMENTALS

7-1. Combat service support's objective is to ensure that combat operations succeed. In modern warfare and in stability and support operations, operations and logistics are totally interdependent. Current and future ADA systems require well-trained, motivated soldiers to operate them, and a flexible, responsive logistics system to sustain them. Combat service support provides the commander the means to initiate and sustain operations at all levels of war.

### STRATEGIC LOGISTICS

7-2. Strategic logistics is the link between the national industrial base and the nation's joint forces in the theater. It deals with mobilization, acquisition, force projection, strategic mobility, and the strategic concentration of logistics in the theater support base and COMMZ. The strategic logistics system includes activities under Department of the Army control and the national inventory control points (NICP), integrated material management centers (IMMC), and the depots, arsenals, data banks, plants, and factories associated with United States Army Materiel Command (AMC). Other organizations that provide strategic logistics include the Defense Logistics Agency (DLA), the US Transportation Command (USTRANSCOM), and the General Services Administration (GSA).

7-3. DLA, GSA, and AMC receive and fill requisitions from force-projection forces, forward presence forces, and CONUS-based forces. However, forward presence and force-projection forces receive priority of support. All classes of supply are delivered to the theater through inter-theater lines of communications (LOC). Strategic logistics functions are performed in CONUS within the theater base, or are coordinated through the theater support command (TSC) or logistics support element (LSE) in the COMMZ.

7-4. Logistics assistance representatives (LAR) from the US Army Aviation and Missile Command (AMCOM) are assigned to most ADA battalions and brigades. They serve as technical advisors on maintenance and supply, and provide a direct link to the AMC support base. ADA units also can expect to have direct contact with contractors on select systems to expedite maintenance, repair part identification, and resupply.

**Logistics Support Element**

7-5. The LSE concept evolved out of Desert Shield and Desert Storm. The Army and the Army Material Command (AMC) saw a need for a single logistics command and control element to centrally manage strategic logistics personnel, call forward elements as required, and integrate these elements into the theater. The LSE satisfied this need then and continues to do so. The LSE links specific strategic logistics in CONUS with operational and tactical logistics in a theater of operations. It links industrial bases with operational logistics units and, extending through the Logistics Assistance Program, into tactical logistics.

7-6. The LSE is a multifaceted organization that supports military operations. It is largely a civilian organization that deploys at the request of the supported operational commander to perform doctrinal AMC missions forward on the battlefield or area of operations. AMC mans the LSE headquarters with personnel possessing the required skills. It uses a flexible combination of military, DOD civilian, and contractor personnel that allow it to alter its mission and size based on METT-TC. In addition, Army wide volunteers, attached units, and HNS may augment the LSE.

7-7. The logistics support element's primary mission is to enhance readiness through unified and integrated application of USAMC's logistics power projection of CONUS-based technical capabilities to deployed units within any theater of operation. Primary capabilities are technical assistance, supply, and maintenance. The footprint that the LSE places in a theater is based on METT-TC and the desires of the CINC. With required augmentation and resources, the LSE can perform any logistical support mission assigned. Unique skills include depot maintenance, oil analysis, calibration of test equipment, ammunition surveillance, release of prepositioned strategic stocks, material fielding, technology insertion, and battle damage assessment.

7-8. The LSE operates as far forward as possible. Operating forward on the battlefield minimizes the evacuation of critical reparable parts from the theater of operations and reduces the flow of replacement material.

## OPERATIONAL CSS

7-9. Operational CSS encompasses those support activities required for sustaining campaigns and major operations. It enables success at the tactical level of war by linking strategic logistics to tactical CSS operations within the combat zone. It focuses on force reception, infrastructure development, establishment and maintenance of LOC, and the positioning of supply, maintenance, field service, and health service support activities. Assured logistics communications with depots and the national industrial base provides total asset visibility of critical materiel both in transit and within the theater. The use of DOD civilians, contractors, and host nation support is an integral part of operational CSS.

7-10. Normally, echelons-above-corps elements conduct operational activities. Commanders at the operational level establish and coordinate support functions to allow tactical commanders to focus on battles and engagements. The TAAMDCOORD exercises operational support responsibilities by

recommending priorities for allocation of logistics functions to all ADA units in the theater. He plans and coordinates the theater CSS support for ADA units, and ensures missiles and repair parts are allocated to the corps and EAC ADA brigades according to the JFLCC's priorities.

## TACTICAL CSS

7-11. Tactical CSS sustains the tactical commander's ability to fight battles and engagements. The objective of tactical CSS is to provide the right support at the right time and place. The focus of tactical logisticians is on manning and arming tactical units, fixing and fueling their equipment, moving soldiers and materiel, and sustaining soldiers and their systems.

## CSS CHARACTERISTICS

7-12. Successful CSS must be both effective and efficient. CSS operations are not successful unless they provide effective support. Scarce resources require CSS operations to be efficient. Effectiveness, however, cannot be handicapped by efficiency. These two aspects of CSS are balanced to provide the foundation of successful CSS operations. Five characteristics facilitate effective and efficient operations and enable operational success. These are anticipation, integration, continuity, responsiveness, and improvisation.

### Anticipation

7-13. Anticipation is identifying, accumulating, and maintaining the assets and information necessary to support future operations. The ability to estimate future CSS demands as accurately as possible ensures operations receive the right support at the right time and place. Accurate anticipation of requirements enhances the agility of the force and enhances the ability to seize and retain the initiative. Anticipation also means developing CSS capabilities that are versatile and mobile enough to accommodate likely operational or tactical events. Strategic and operational commanders and logisticians visualize the entire course of a major operation or campaign while planning in detail for the current phase.

7-14. CSS planners anticipate requirements to push forward the right support. This minimizes the need for improvisation. Anticipation requires constant coordination between the operations and CSS staffs.

### Integration

7-15. Tactical and operational success depends on fully integrated concepts of CSS and operations. Integration during planning ensures support of operations during execution. CSS capabilities often affect the feasibility of a course of action. Based on the theater strategic and operational concept, logisticians develop a CSS concept that gives commanders the greatest possible freedom of action and enhances the agility and versatility of an operation. Deception plans should incorporate CSS activities. The Army seeks opportunities for integration of combat service support throughout the planning and execution of operations.

## Continuity

7-16. Any interruption in CSS operations diminishes the combat power of a force. During operations, committed forces require continuous supply and service support to sustain their fighting strength and agility. Continuity of support is the lifeblood of combat operations at all levels.

7-17. Combat operations and support operations can vary in intensity. Combat operations may enter periods of relative inactivity but CSS operations are continuous in nature. Commanders use every opportunity to increase sustaining capabilities. When the pace of combat activity diminishes, units reconstitute their capabilities. Continuity of support with a responsive CSS system increases the probability of operational success.

## Responsiveness

7-18. The CSS system must react rapidly in a crisis. Seldom will all support requirements be known in advance. ADA commanders and staffs must adapt units to unanticipated requirements, often on short notice. ADA units will frequently be task-organized for force-projection operations. CSS requirements will be difficult to forecast with complete accuracy. Training CSS units to respond on short notice and surge their support for brief periods develops the ability to react quickly to increased demands. The mental and physical ability to cope with such requirements and the discipline to refocus in a crisis is built into the CSS system by effective organization, careful planning, solid training, and strong leadership. Supply discipline includes adhering to movement tables, declaring and distributing excess materials, and observing senior commander's CSS priorities. Supply discipline contributes to responsive logistics. Spares stock data will assist in parts redistribution and therefore improve operational availability.

## Improvisation

7-19. Improvisation is the ability to make, invent, arrange, or fabricate what is needed out of what is on hand. Successful CSS operations adapt to changing situations. Plans that are disrupted may require improvisation. Battle damage assessment and repair (BDAR) is one process used by soldiers to make the best use of what they have on-hand to fix equipment in the field. Units can order battle damage repair kits as Class IV that are used by maintenance teams to make quick fixes on the battlefield.

7-20. Commanders and planners continually review planning factors and consumption rates, maintain asset visibility in transit, and revise CSS planning estimates. The use of contracted services, and coalition or host nation assets to overcome CSS shortcomings can allow ADA units to continue operations in spite of austere CSS support. Logistical improvisation will often spell the difference between success and failure of operations.

## THEATER SUPPORT STRUCTURE

7-21. The CSS needs of the force determine the CSS structure. The JFC may designate a joint rear area (JRA) to facilitate protection and operation of installations and forces that provide logistics support to combat operations. The JFC may additionally organize the theater into a theater base, a

COMMZ, and a CZ. The CZ is an area required by the combat forces to conduct operations. It normally extends forward from the corps rear boundary. The COMMZ constitutes the rear portion of the theater and extends back to the CONUS base. It includes air and seaports of debarkation (APOD and SPOD) that support the flow of materiel and forces into the theater. The COMMZ is usually contiguous to the CZ but may be separate and linked only by tenuous air, land, or sea LOC (figure 7-1).
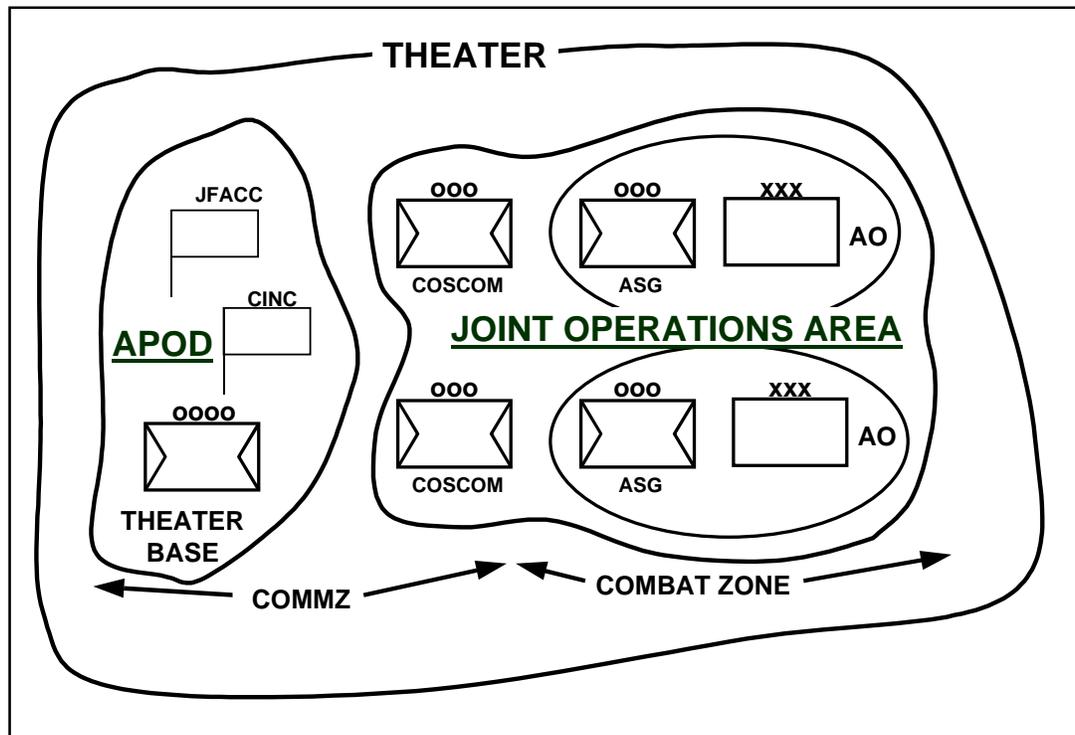


**Figure 7-1. Theater Support Structure**

7-22. The Army service component commander (ASCC) provides necessary CSS support capabilities for Army forces assigned to the joint force. The Army support structure is designed to provide flexibility through tailoring the support structure based upon METT-TC, strategic lift, prepositioned assets, and host nation support. Support "building blocks" or modules are assembled and tailored to meet the support requirements of the force. As the deployed force grows, the support structure expands accordingly.

7-23. Corps and below bring their own dedicated support structure to the theater. When support requirements exceed their capabilities, the ASCC augments them with selected operational-level CSS organizations. He may further organize these operational support organizations into an operational-level support command. It uses a materiel management center (MMC) to manage supply and maintenance and a movement control agency to provide theater-level movement management.

7-24. The ASCC will establish a theater logistics base within the COMMZ during most contingencies. The logistics base contains APOD, SPOD, and the

CSS facilities to support operations within the theater. Protection of the theater logistics base is usually a high priority for the EAC ADA brigades.

7-25. Within the COMMZ, the operational-level support command provides support to units within or passing through the AO on an area basis using area support groups (ASG). The ASG provides repair parts and GS maintenance support to the DS maintenance companies attached to each HIMAD battalion. Maintenance and supply management for the ASG is provided by the operational-level CSS material management center (MMC).

7-26. CSS in the early part of a force-projection operation will be packaged into the force itself. CSS for stability and support operations also require CSS packages integral to the ADA force.

7-27. A corps support command (COSCOM) provides CSS support in the corps area. Corps support groups provide CSS support on an area basis to units located in the corps rear area, and to non-divisional units operating in the division area. COSCOM units also provide GS and backup DS to divisional units. A COSCOM MMC supports each corps. The missile-munitions division of the MMC manages system peculiar maintenance and supply for ADA systems.

7-28. Division support command (DISCOM) is tasked to provide logistical support to all organic elements of the division. It may also provide support to non-divisional units operating in the division area. A main support battalion (MSB) provides logistics support in the division support area (DSA). Forward support battalions (FSB) support each maneuver brigade. These elements provide logistical support for units in the division rear and forward areas.

## COMBAT SERVICE SUPPORT PLANNING CONSIDERATIONS

7-29. CSS planning is conducted as an integral part of operational planning. Logisticians participate in all phases of the command plan development. Logistics preparation of the theater is just as important as IPB.

7-30. Logisticians anticipate requirements through development of a CSS estimate. They must be aware of the significant differences between the current logistics status and anticipated logistics status. Current and projected status can be identified using CSS estimates of higher headquarters.

7-31. The G4 or S4 and G1 or S1 gather data throughout the planning process to help anticipate CSS requirements they will need for sustaining the force for the next mission. The focus must remain on the following:

- What, how much, when, and where the force will need support applied to the sustaining functions (manning, arming, fueling, fixing, moving, and sustaining soldiers and their systems).
- The sources of support that will be used during all phases of the operation.
- The support distribution methods that will be used during all phases of the operation.
- Essential early and continuous coordination with supporting organizations and subordinate unit logisticians.

## LOGISTICS PREPARATION OF THE THEATER (LPT)

7-32. Logistics preparation of the theater base and the COMMZ is a key tool available to the ASCC and his planners in building a flexible theater strategic operational support plan. It consists of all the actions taken by logisticians at all echelons to optimize means of logistically supporting the ASCC's plan. Means include force structure, resources, and strategic lift. These actions focus on identifying the resources currently available in the theater for use by friendly forces and ensuring access to them. A detailed logistics estimate of requirements, tempered with logistics preparation of the theater, allows the command logistician to advise the ASCC and the CINC of the most effective method of providing support that will not overwhelm the force or fail to provide adequate and timely support.

## MANNING

7-33. The G1 or S1 is involved with courses of action analysis and operational planning during all phases of an operation. The G1 or S1 focuses on personnel service support functions and actions thus ensuring support during pre-deployment, deployment, and redeployment for war and stability and support operations.

7-34. The focus during planning is personnel readiness and maintenance of unit strength. The G3 or S3 provides the G1 or S1 an OPORD, OPLAN, and FRAGO that stipulates the task organization information necessary for identifying command and control relationships. This information is used to accomplish the following:

- Provide accurate strength accountability.
- Determine necessary modular personnel services support (PSS) packages required for each phase.
- Plan the employment scheme for corps PSS units.
- Determine location of replacement, postal, personnel, finance, legal, and chaplain units and teams.

7-35. The G1 or S1 consistently seeks personnel readiness information from subordinate units, maneuver brigade S1s, aid stations, higher headquarters special staff, and personnel systems reports. The G1 or S1 analyzes all available data and information and provides the commander a personnel estimate reflecting the unit's current combat capabilities, projected future capabilities, and requirements in terms of personnel service support. It starts with the comparison of an organization's personnel strength against its requirements or authorizations and ends with a personnel readiness assessment and appropriate recommendations to the commander. It must consider the impacts of present personnel strength; any critical military occupational specialty and skill level shortages; projected casualties; morale of soldiers; unique circumstances impacting on personnel readiness that may not be captured in data; and impact of commander's transportation or communications priorities. Personnel service support cannot be provided without transportation and communications.

## ARMING

7-36. Arming is providing the right mix and quantity of ammunition to the right place and time. Weapon systems must be armed as close to the point of employment as the tactical situation permits. During periods of intense combat, arming the force is extensive and time-sensitive. It begins with peacetime planning and covers all phases of force-projection operations. Arming the force requires detailed planning and coordination among the combat users and the ammunition and transportation logisticians at all levels. The key to arming soldiers in the field is planning for a flexible CSS distribution system. One of the significant challenges in arming ADA units is resupply of missiles. Organic transportation is not available; therefore, the S4 or G4 must coordinate with theater or corps.

7-37. AMC, through AMCOM, provides ADA missiles to the theater according to production and stock constraints, threat assessment, and priorities established by the theater commander. ADA units are authorized basic loads of ammunition, expressed in rounds per weapon, or numbers of missiles, to sustain them in combat until they can be resupplied. The ASCC normally establishes a unit's basic load based on mission, the types and numbers of weapon systems, transport capability, and the time necessary to effect resupply.

7-38. To determine the requirement for a specific operation, units develop a required supply rate (RSR) for each type of ammunition. The operations officer (G3 or S3) prepares the RSR during preparation of the command estimate. The RSR is expressed in rounds per weapon per day, or missiles per day.

7-39. Missile RSR are forwarded, reviewed, and consolidated at each level in the ADA unit's chain of command, and provided to the TAAMDCOORD. He develops a theater RSR for each type of ADA missile and provides that information to the ASCC headquarters. At ASCC headquarters level, the G3, G4, and the commander review the requirements and availability of ammunition. Based on this review, the commander establishes the controlled supply rate (CSR) which is the actual authorized rate for resupply. Once the theater commander establishes the CSR, it is forwarded to the TAAMDCOORD. The TAAMDCOORD, after consulting with the G3 and G4, allocates the CSR to the corps and EAC ADA brigades based upon the JFC's priorities. Those ammunition items for which the CSR is less than the RSR will normally be identified in the appropriate CSS annex.

## FUELING

7-40. Fueling is a critical sustainment function that keeps the force on the move. Clear priorities for fueling, estimating fuel consumption, and economizing assets whenever possible, contribute to ensuring adequate support of operations.

7-41. Initial allocation of fuel is based on estimates prepared and submitted by the ADA unit G4 or S4 using experience and standard planning factors. These estimates must consider special factors that include terrain, weather, and the unit's mission. The estimates are forwarded to higher headquarters where they are refined, consolidated, and forwarded to the next higher

headquarters. At corps ADA brigade or division level, they are forwarded to a COSCOM or DISCOM. At EAC level the estimates are forwarded to the operational support MMC.

## FIXING

7-42. Maintenance preparation for future operations include pre-execution actions to maximize readiness, and planning for maintenance and repair parts support throughout all phases of the operation. While developing the maintenance plan, the logistician must consider the current and projected status of the unit's equipment, repair parts stock, and the availability of key maintenance personnel.

7-43. Maintenance efforts to repair non-operational ADA systems are the focus of commanders and logisticians at all levels during the period preceding the planned operation. Battalions and brigades monitors repair activities of batteries and provide assistance as appropriate. Battalion and brigade commanders augment battery maintenance personnel by providing maintenance staff officers, contractor personnel, LAR, and DS or GS contact teams to assist with repair operations.

7-44. Logisticians maintain visibility of repair parts throughout the theater, and cross-level parts routinely to repair non-operational systems. In addition, LAR can assist in providing status of high-priority parts requisitions that have been passed to the NICP, and can coordinate to have the parts expeditiously shipped to the theater by ALOC. When maintenance personnel are unable to repair ADA systems expeditiously, commanders consider the use of operational readiness floats (ORF) to replace the faulty equipment. As a last resort, controlled substitution of parts and major assemblies can be used when authorized by the commander.

## MOVING

7-45. Movement is inherent in all battlefield operations and is not purely a CSS function. Therefore, movement planning and execution must be coordinated and synchronized between operations and CSS staffs. The G3 controls maneuver and tactical movement. Movement control units and staffs at each echelon coordinate movement over the air, land, and sea LOC. ADA units are primarily concerned with movement on land LOC, the MSR in their area of operations.

7-46. Components of transportation involve the physical modes of transportation; the process of planning, allocating, and controlling movement; and the operation of terminals. All units that require external transportation support must know their source of transportation support in the area they operate. In the division, it is the DISCOM movement control officer. In the corps and COMMZ, the source of support is a movement control team (MCT) collocated with a port, terminal, CSG, or ASG. They coordinate transportation mode support to ADA units, and obtain clearance for the move.

7-47. ADA units must evaluate their transportation posture on a continuous basis. Plans should identify requirements for external transportation and must be coordinated with the MCO or MCT in their geographical area.

Movement officers must be proficient in planning their support requirements and completing the necessary transportation support requests and movement bids. FM 55-10 provides detailed guidance on procedures for obtaining transportation support and conducting movement planning.

## SUSTAINING SOLDIERS AND THEIR SYSTEMS

7-48. The five elements of sustaining soldiers and their systems are personnel services, health services, field services, quality of life, and general supply support. During planning for future operations, the logistician identifies all the CSS organizations tasked to support subordinate units during the operation. Provisions should be made for buildup of medical and general supplies needed to sustain the force throughout the operation.

# COMBAT SERVICE SUPPORT OPERATIONS

7-49. CSS operations are planned and monitored by the G1 or S1 and G4 or S4 in the logistics readiness center (LRC). The S1 and S4 jointly man the LRC, which operates around the clock as a part of battalion and brigade TOCs. Within the LRC, CSS status of the force is maintained, as are the locations of all subordinate units and their supporting CSS units. Requisition and maintenance activities for critical materiel are closely monitored.

7-50. The S4 is the logistics officer. He maintains equipment status and coordinates with direct support units for contact team assistance and equipment repair or replacement. The logistics officer works closely with the battalion or brigade maintenance officer to coordinate maintenance of both system and conventional equipment. The S4 is also responsible for brigade or battalions supply actions. The logistics officer maintains status of all areas of supply, but focuses on the adequacy of missiles, ammunition, fuel, food, water, and repair parts.

## MANNING

7-51. Personnel readiness management (PRM), personnel accounting and strength reporting (PASR), casualty operations management (COM), and replacement management are all critical personnel systems and functions which focus on manning. The mission of the PRM system is to distribute soldiers and Army civilians to subordinate commands based on documented manpower requirements or authorization and the commander's priorities. Personnel readiness describes a state of wartime preparedness. PRM is a process for achieving and maintaining that state.

7-52. The S1 must ensure that expeditious and accurate casualty and strength reporting continues and personnel replacements are processed quickly and efficiently. He must also ensure all soldiers receive mail, postal and financial services, and MWR services, regardless of the unit dispersion and complex support relationships inherent to air defense artillery units.

7-53. The Army's PASR system accounts for soldiers and civilians; reports other strength-related information; and updates command databases at all levels. Information gained throughout PASR provides readiness and personnel managers the details necessary to analyze personnel strength as a component of combat power.

7-54. The casualty system focuses on recording, reporting, verifying, and processing casualty information from unit level to HQDA, notifying appropriate individuals, and providing casualty assistance to next of kin. Casualty operations include casualty reporting, casualty notification, casualty assistance, line-of-duty determination, reporting status of remains, and casualty mail coordination.

7-55. A replacement management system moves personnel from designated points of origin to ultimate destinations and coordinates individual training at each replacement center, company, or section as determined by METT-TC. Replacement management is the physical reception, accounting, processing, support, equipping, training, and delivery of military and civilian personnel. This includes replacement and return-to-duty (RTD) soldiers. It does not include the decision-making process associated with determining distribution and PRM. For the first 60 days of a contingency deployment, HQDA may push replacements to the theater based upon the strength of the deployed force and projected casualties. As ADA replacements arrive at the POD, the ASCC personnel operations center, with recommendations from an ADA personnel liaison team from the TAAMDCOORD, assigns them to either an EAC ADA brigade or to one of the corps for assignment to an ADA brigade or divisional ADA battalion. The replacements then move from a theater personnel replacement company to an appropriate personnel replacement company in the corps area for further processing and movement to the division replacement section and eventually to the appropriate ADA S1 section.

## ARMING

7-56. ADA units begin operations with their unit basic load of both conventional and missile ammunition. Based upon projected ammunition expenditures, the battalion S4 may requisition additional ammunition prior to the actual expenditure of any rounds. The amount of ammunition received as resupply may not exceed the CSR. Commanders at all levels may reallocate their CSR among ADA units assigned to their command if tactical conditions so warrant. The method of ammunition resupply varies depending upon the ADA battalion echelon of assignment.

7-57. The S4 submits a requisition, using DA Form 581, to the division ammunition officer (DAO) in a divisional ADA battalion. The DAO consolidates resupply requirements, and passes them to the corps MMC (CMMC). Corps ADA battalions submit their DA Forms 581 through the brigade S4 to the CMMC. The CMMC then directs the issue of the required ammunition from a supporting corps storage area (CSA) or ammunition supply point (ASP). The battalion S4 dispatches vehicles to the CSA or ASP to pick up the ammunition. Unit distribution is used by the S4 to resupply the batteries.

7-58. In EAC battalions, the S4 submits the DA Forms 581 to the brigade S4. Requests are consolidated by brigade and forwarded to the operational-level support command MMC. The MMC then directs issue of the required ammunition by a supporting theater storage area (TSA). As in the corps area, supply point distribution from the TSA using organic ADA battalion vehicles is the normal method of supply. A battalion uses unit distribution to resupply

firing batteries. ADA units must plan for ammunition transfer points within the immediate vicinity of current and proposed unit positions.

7-59. The CMMC or operational-level MMC can coordinate throughput of ammunition from the TSA or CSA to the firing battery using theater or corps aviation or truck transport in an emergency. The brigade or battalion commander may also direct cross leveling of ammunition between subordinate units to quickly resupply a battery that has unexpectedly expended its basic load.

## FUELING

7-60. A fuel distribution system is an automatic resupply system based upon fuels forecasts and status reports. It relies on the routine rapid push of bulk fuel, with distribution both lateral and forward. Unit requirements for supplies flow from MMC and Class III supply points. S4s forecast requirements for the next 72-hour period. They base their forecasts on projected consumption data for the probable level of activity. The frequency of forecast submission varies, depending upon the intensity of operations.

7-61. The ASCC petroleum group and its subordinate units move bulk fuel, either by pipeline or bulk carriers, to corps and EAC petroleum supply-companies. Medium truck companies (petroleum) then transport bulk fuel to an ASG, CSG, or a divisional supply company, which then provides fuel on an area basis.

7-62. Issue of bulk fuel to battalions and batteries is normally on a supply point distribution basis. Unit fuel tankers receive fuel from the nearest Class III supply point established by an ASG, CSG, MSB, or FSB. In case of an emergency, the MMC can direct that fuel be throughput directly to the requesting battery using aviation or petroleum transportation assets.

## FIXING

7-63. Fixing is the function of sustaining materiel and equipment in an operational status, restoring it to serviceable condition, and upgrading its functional abilities through modification. These functions are performed at unit, DS, GS, and depot levels. The objective of maintenance is to repair equipment quickly and as far forward on the battlefield as possible.

7-64. Maintenance in ADA units begins with the operator and supervisor. Operators perform preventive maintenance checks and services (PMCS) and monitor equipment status during operations. When faults are discovered, operators use embedded self-diagnostic aids to isolate the fault. Operators and organizational maintainers perform replacement of line replaceable units (LRU) or printed circuit boards, and perform adjustments as authorized by the equipment's maintenance allocation chart.

7-65. When the operators or organizational maintainers identify an LRU or circuit board as unserviceable, they obtain a replacement from the unit prescribed load list (PLL) and install it into the major end item. They then perform diagnostic or operational checks to ensure proper system operation. Unserviceable LRU and circuit boards are job ordered to the supporting DS maintenance company's repairable exchange activity. The DSU sends the

items to corps assets to be diagnosed by the IFFTE system and repaired. The DSU then receives the repaired items back for repairable exchange (RX). The supply support activity of the DS Maintenance Company provides repair parts supply support using supply point distribution.

7-66. A maintenance company (DS) will be attached to HIMAD battalions to provide dedicated conventional and missile maintenance and supply support. A missile system DS and GS maintenance section will either be organic to the battalion direct support maintenance company or will be attached from a DS and GS missile maintenance company assigned to an ASG or COSCOM. SHORAD batteries receive conventional DS maintenance and supply support from a DS maintenance company assigned to an ASG, CSG, or DISCOM. A missile support company attached to an ASG, CSG, or MSB provides DS and GS missile maintenance and supply support.

7-67. The ADA battalion LRC monitors equipment status and repair actions. It coordinates cross leveling of repair parts and tracks the status of high-priority repair parts requisitions. When battery maintainers are unable to isolate an equipment fault, or when higher echelon maintenance is called for, the LRC coordinates for DS or GS, LAR, or contractor support. When projected equipment downtime is excessive due to lack of repair parts or the need to evacuate the equipment for higher echelon maintenance, the LRC recommends the use of ORF, controlled substitution, or cross leveling to restore operational capability. The decision to use any of these three measures must be made by the commander.

## MOVING

7-68. Unit transportation is generally sufficient to move ADA units and their support throughout the theater. As stated earlier, there is, however, a shortfall for moving missiles for resupply. When external movement support is required, the LRC submits a request for transportation to the supporting MCT. The MCT issues a transportation movement release to the ASG, CSG, or transportation unit tasked to support the move.

7-69. Motor transport is normally the primary transportation means used to support the force. However, airlift can be an important mode of transportation for emergency resupply of fuel and ammunition, and movement of high-priority repair parts or maintenance teams. Within the corps, immediate requests for air movement are passed through command channels to the division or corps G3. At EAC, requests are forwarded to the operational-level support command G3, which passes them to the ASCC movement control center.

## SUSTAINING SOLDIERS AND THEIR SYSTEMS

7-70. Sustaining soldiers and their systems include personnel service support, health services support, field services support, quality of life, and general supply support. The brigade and battalion S1 and S4 are responsible for coordinating these five elements in the LRC.

## Personnel Service Support

7-71. Personnel service support (PSS) is the management and execution of personnel services, resource management, chaplain activities, command information services, legal service support, and finance services. These functions in war and stability and support operations are usually within the purview of the ADA brigade and battalion S1, although the higher the echelon the more they are represented by different staff officers and unit commanders.

## Personnel Services

7-72. The S1 for a brigade and battalion are the commander's principal staff officers for coordinating all aspects of personnel services. Personnel services include personnel readiness management (PRM); personnel accounting and strength reporting; casualty operations management; replacement management; personnel information management; postal operations management; morale, welfare, and recreation and community support, and essential personnel services. Essential personnel services are awards and decorations, noncommissioned officer and officer evaluations, enlisted promotions and reductions, officer promotions, enlisted and officer transfers and discharges, identification documents, leaves and passes, line of duty investigations, officer procurement, retention, recruiting, and reclassification. Doctrinal requirements, principles of support, and responsibilities and standards are addressed in FM 12-6.

## Resource Management

7-73. Success of personnel services is impacted mostly by the commander's transportation and communications priorities. The brigade and battalion S1 must closely coordinate transportation for mail, replacements, chaplain activities, medical evacuation, and essential personnel services with the S4 and higher echelons. Transportation support is METT-TC dependent. ADA soldiers are often task-organized in complex command and control relationships. The movement of replacements, mail, and soldiers for essential services may require daily coordination between the ADA brigade and battalion S1 or S4, the supported maneuver brigade and battalion S1 or S4, and higher echelon transportation support.

## Chaplain Activities

7-74. A unit ministry team is assigned to each brigade and battalion. The team serves the spiritual needs of soldiers, provides personal counseling, and advises the commander on issues of religion, morals, morale, and ethics. Chaplain activities include providing worship services, and other religious sacraments, rites, and ordinances. The chaplain coordinates programs with the S1 and keeps the supervising chaplain informed about unit ministry issues.

## Legal Service Support

7-75. EAC corps, corps, division, or brigade staff judge advocates coordinate legal service support. The SJA supports the unit and its soldiers with legal assistance and provides advice to the commander on all matters of military, civil, and international law. The SJA also provides the command with assets

to dispose of courts-martial and other adversarial proceedings against a soldier.

## Command Information Services

7-76. Good public affairs operations can be a great combat multiplier. While the ADA brigade and division public affairs officers provide information support for soldiers and commanders, active command emphasis on public affairs will produce motivated soldiers and a supportive public.

7-77. Public affairs officers plan and conduct proactive command information programs to keep soldiers informed of events in their AO as well as at home. PAO also plan and conduct aggressive media relations that help tell the Army story and build public support for Army operations.

## Finance Services

7-78. Finance support teams (FST) provide military pay support in the form of pay inquiries, pay change input, casual pay, and check cashing. They also support local procurement by providing cash for Class-A agents and imprest fund cashiers.

## Combat Health Support

7-79. Combat health support (CHS) at the battalion level is provided by the battalion surgeon and the medical section. The battalion aid station (BAS) provides echelon I (unit level) health service support (HSS). The BAS performs triage and treats, stabilizes, and evacuates injured, ill, or wounded soldiers. Combat medics perform emergency medical treatment and arrange evacuation of casualties at battery level.

7-80. Echelon II care is provided by area support medical companies in the corps and EAC. Care at this level consists of evaluation of patients' status and establishment of priority for continued evacuation. Emergency care, to include resuscitation, is continued, and additional emergency treatment is initiated, if necessary.

7-81. Echelon III care is provided by combat support hospitals in the corps. These hospitals are staffed and equipped to provide resuscitation, initial wound surgery, and postoperative treatment.

7-82. Echelon IV care is provided by general and field hospitals at EAC. These hospitals are staffed and equipped for general and specialized medical and surgical care and reconditioning rehabilitation to quickly return soldiers to duty.

## Field Services

7-83. An ASG or CSG provides field-services on an area support basis. The battalion and brigade LRCs coordinate for field services as required, when the tactical situation allows. Field services serve to preserve the health and welfare of the soldier. They include food preparation, water purification, clothing and light textile repair, laundry and shower, Post Exchange sales, aerial delivery, and mortuary affairs.

**Quality of Life**

> 7-84. Maintaining quality of life is a command responsibility. Quality of life operations include effective, efficient personnel and health services for the soldier, and proper family support for dependents.

**General Supply Support**

> 7-85. General supply support encompasses the provisioning of food, clothing, water, barrier material, and major end items. The battalion requests, receives, and distributes these supplies through supply point distribution from a supporting supply company of the ASG, CSG, or DISCOM.

# RECONSTITUTION OPERATIONS

> 7-86. Reconstitution consists of the reorganization or regeneration of people and equipment to restore combat capability. Reconstitution planning and preparation cannot be reactive. A reconstitution plan must exist which can then be adapted to the situation. Timely execution of the reconstitution plan maintains momentum.

> 7-87. Reconstitution plans must take into account the situation, degraded units' conditions and missions, and the expected intensity of future operations. Reconstitution plans should cover the following:
> - information requirements
> - reporting procedures
> - assessment procedures
> - staff reconstitution responsibilities
> - function, composition, and equipment of damage assessment teams
> - procedures to reestablish command
> - techniques to maintain cohesiveness
> - a procedure for acquiring assistance from supporting commands

## REORGANIZATION

> 7-88. Reorganization is the process of restoring combat effectiveness by cross-leveling assets within a unit or by forming a composite unit. For example, a battalion whose strength has been reduced by combat could be reorganized into a headquarters and two full-strength batteries. Reorganization provides a means to maintain a level of continuous combat effectiveness.

> 7-89. Commanders continually assess the ability of their unit to perform assigned missions. Their staff officers keep the commander and their next higher level of command informed on the following:
> - equipment status
> - current supply status
> - maintenance status
> - soldier and unit morale status
> - availability of combat and combat-support assets

7-90. Normally, the commander one echelon above approves reorganization. Brigade commanders approve the reorganization of their battalions. Subordinate battalion commanders approve the reorganization of their batteries. If the battle command of the unit undergoing reorganization remains viable, command lines remain the same.

## REGENERATION

7-91. Regeneration transcends normal day-to-day CSS support actions. It consists of the extraordinary actions planned to restore units to a desired level of combat or mission effectiveness. Regeneration is the rebuilding of a unit in which the mission capability has been reduced or degraded. Normally, the headquarters two levels higher are responsible for regeneration. It is accomplished through replacement of personnel and equipment, reestablishment of effective battle command, and conduct of essential training. During regeneration, consideration should be given to maintaining the integrity of the remaining effective squads, teams, or crews. Regenerated units need training before being reintroduced into combat.

# SELF DEFENSE MEASURES

7-92. Since ADA forces will not be able to provide dedicated air and missile defense for all CSS forces and assets in the area of operations, CSS organizations should be positioned to take advantage of the coverage that available air and missile defense forces provide. Using base clusters makes it possible for ADA units to cover more CSS assets than would be possible when units are dispersed throughout the AO. CSS assets identified as air and missile defense priorities that do not receive dedicated support should be positioned to take advantage of the coverage provided by ADA units protecting higher priority assets. CSS units also use passive defense measures to the maximum extent possible for self-defense.

7-93. CSS personnel and air defenders share responsibility for force protection of CSS complexes. The CSS commander develops air and missile priorities, which are integrated into the theater's priorities. The AMDCOORD coordinates the employment of available air and missile defense assets to protect the maximum number of priority assets. Defensive fires provided by ADA, along with the self-defense measures employed by CSS units, combine to defeat enemy air and missile attacks directed against theater CSS.

BLANK

**Chapter 8**

# Stability and Support Operations

This chapter describes stability and support operations. It also addresses the contributions to stability and support operations by ADA units.

## ENVIRONMENT

8-1. The Army develops the leadership, organizations, equipment, discipline, and skills useful for a variety of stability and support operations in preparing to fight our nation's wars. Doctrine for war complements that for stability and 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 stability and support operations.

8-2. Assessments of which stability and 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 must be capable of participating in stability and support operations as required.

8-3. The armed forces of the United States are performing stability and support operations on a global scale. ADA units, as contributors of purely defensive capabilities, have become the units of choice for several types of stability and support operations missions in support of national interests. As regional conflicts and instability increase around the world, the armed forces and specifically Army ADA must remain prepared to perform the entire spectrum of global missions when and where required.

8-4. Activities during stability and support operations occur unilaterally or in conjunction with other military operations. These actions take place at different times or simultaneously in different places. ADA units perform the planning and support function for conducting all types of stability and support operations in coordination with the force commander. The civil affairs officer, if authorized, is trained in the special actions to support local United States and foreign governments.

8-5. Each specific activity has different requirements. Some basic planning questions that apply to each operation are as follows:

- 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, which 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 play in the activity?

# PRINCIPLES

8-6. Stability and support operations that involve our forces in direct combat adhere to the well-established principles of war. Some, such as the principles of objective and security, apply equally to non-combat operations. The Army has supplemented the principles of objective, security, and unity of command with the principles of legitimacy, perseverance, and restraint, which are more suited to non-combat operations.

8-7. Application of each principle will vary depending on the specific operation. ADA commanders must balance these principles against the specific requirements of their mission and the nature of the operation.

## OBJECTIVE

8-8. Operations must be integrated with each other to contribute to the ultimate strategic aim. Leaders of ADA units must understand the strategic aims, set appropriate objectives, and ensure that they contribute to unity of effort with other agencies.

## SECURITY

8-9. ADA commanders must protect their forces at all times. They should never be lulled into believing that the non-hostile intent of their mission does not put their forces at risk. ADA commanders should never be misled about risks to their forces. The inherent right of self-defense always applies.

## UNITY OF EFFORT

8-10. Government agencies other than the Army will often have the lead in stability and support operations. ADA commanders may answer to a civilian chief, such as an ambassador, 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.

## LEGITIMACY

8-11. Committed ADA forces must sustain the acceptance of the operation and of the host government. Legitimacy derives from the perception that authority is genuine, effective, and employs appropriate means. ADA commanders must realize that their actions solve near-term problems and also support long-term strategic aims and legitimacy of the government.

## PERSEVERANCE

8-12. Stability and support operations may be of short duration or long duration. Peacetime operations may require years to achieve the objectives. ADA commanders assess quick-reaction options against their long-term contributions. They still take decisive military action but must make a careful, informed analysis to choose the right time and place for such action. ADA commanders balance attainment of short-term objectives with sensitivity for the long-term strategic aims and the restraints placed on operations.

## RESTRAINT

8-13. Actions of ADA units and soldiers are framed by the disciplined application of force. In stability and support operations, rules of engagement will be more restrictive, detailed, and sensitive to political concerns than in war. These rules may change frequently. Restraints on weapons, tactics, and lethality typify the situation. An understanding of the rules of engagement by all units requires follow-through and rehearsals.

# NONCOMBATANT EVACUATION OPERATIONS

8-14. Noncombatant evacuation operations (NEO) relocate threatened civilian noncombatants from locations in a foreign country to regions of safety. These operations may involve US citizens abroad whose lives are in danger. It could also include selected host nation citizens, third country nationals, or members of non-government organizations (NGO) who may be conducting operations in the area. NEO normally occurs in a peaceful, orderly fashion but may require forcible means. The Army may conduct NEO in environments of stability and support operations or war.

8-15. ADA will support NEO by providing protection of collection points, evacuation routes, and embarkation ports. ADA also may be tasked to perform ground transportation of noncombatants using organic vehicles.

# ARMS CONTROL

8-16. Arms control focuses on promoting strategic military stability. It encompasses any plan, arrangement, or process regarding control over the number, types, and performance characteristics of weapon systems. This extends not only to weapons themselves, but also to battle command, logistics support, and intelligence-gathering mechanisms. Selected Army units provide assistance in monitoring the proliferation of weapons and technology, in verifying the status of arms control agreements, and in demilitarizing munitions and hardware. ADA units do not normally play a role in these types of operations. However, ADA soldiers may be selected to serve on arms control teams.

# SUPPORT TO DOMESTIC CIVIL AUTHORITIES

8-17. If a government authority directs the armed forces to assist in domestic emergencies in the US, the Army has primary responsibility. Army units support disaster relief, humanitarian assistance, and similar operations. Federal law also authorizes the domestic use of military force to suppress

domestic violence or insurrection, but the Constitution and federal law impose restrictions on the use of the military in this manner.

## HUMANITARIAN ASSISTANCE AND DISASTER RELIEF

8-18. 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.

8-19. Army elements involved in international disaster relief operations is often responsible for supporting the implementation of assistance programs developed by the Office of Foreign Disaster Assistance within the Department of State. Domestic disaster relief efforts are generally under the direction of the Federal Emergency Management Agency, although immediate response is permitted to prevent loss of life and property. The Army's global reach, its ability to rapidly deploy, and its capability to operate in the most austere environment make it ideally suited for these missions.

8-20. ADA units may be tasked to participate in this type of operation; however, they are not particularly suited to perform these tasks due to specialization of authorized equipment. Some examples of an ADA unit providing humanitarian assistance and disaster relief are the firefighting teams provided by 1-3 ADA and 1-52 ADA during the Yellowstone fires in 1988 and the use of transportation assets of 3-62 ADA during Hurricane Andrew relief.

## SECURITY ASSISTANCE

8-21. Security assistance consists of the group of programs authorized by the Foreign Assistance Act, the Arms Export Act, and other related statutes. Through security assistance programs, the United States provides materiel, military training, and defense-related services by grant, loan, credit, or cash sales to further its national policies and objectives. A predominant interface of the US Army with host nations occurs through the Security Assistance Training Program. This program has two primary sub-components: the International Military Education and Training Program and the Foreign Military Sales Program.

### INTERNATIONAL MILITARY EDUCATION AND TRAINING PROGRAM

8-22. This program is designed to enhance the proficiency, professional performance, and readiness of foreign armed forces. The US Army conducts international education and training in CONUS as well as in the host nation.

This typically takes the form of formal courses, orientation tours, and on-the-job training.

8-23. The Air Defense Artillery School plays a major role in training allied soldiers on the use of ADA systems. Allied soldiers learn how to use, employ, and maintain the equipment. ADA units may be tasked to provide on-the-job training.

### FOREIGN MILITARY SALES PROGRAM

8-24. The FMS program allows designated governments to purchase military equipment, services, and training. The sale of defense items may require training on the operation and maintenance of military equipment. Mobile training teams, resident instruction in US Army schools, and similar methods are used to conduct this training. The ADA School participates in the program; however, ADA units do not participate.

## NATION ASSISTANCE

8-25. Nation assistance supports host nation's efforts to promote development, ideally through the use of host nation resources. The interagency orchestration of all the elements of national power is essential for success. It must be supportive of both the ambassador's country plan and the CINC's regional plans. The goals of nation assistance are as follows:

- Promote long-term stability.
- Develop sound and responsive democratic institutions.
- Develop supportive infrastructure.
- Promote strong free-market economies.
- Provide an environment that allows for orderly political change and economic progress.

8-26. These can only be accomplished through education and the transfer of essential skills to the host nation, which will enable it to meet its own needs independent of external support. Nation assistance missions may occur in any environment.

8-27. Air defense artillery units usually do not participate in nation assistance operations. However, due to the general nature of tasks and the versatility of ADA units, participation on a limited basis in non-ADA areas is a possibility.

## SUPPORT TO COUNTER DRUG OPERATIONS

8-28. Military efforts support and complement, rather than replace, the counterdrug efforts of other US 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.

8-29. 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. US forces may well assist host nation forces at war while they are in stability and support operations postures.

8-30. 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.

8-31. 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. Although new sensors are being fielded to SHORAD battalions, this type of tasking typically is given to HIMAD units. This support will normally be provided to US Customs and Border Patrol organizations along the US border.

## COMBATING TERRORISM

8-32. The Department of State is the lead US agency in combating terrorism overseas or on the high seas. The Department of Justice (the Federal Bureau of Investigation) has this responsibility within the US. The Department of Transportation (Federal Aviation Administration) combats terrorism related to aircraft in flight within the territories of the US. The Department of Defense supports each of these agencies in these operations.

8-33. Combating terrorism has two major sub-components: antiterrorism and counter-terrorism. During peacetime, the Army combats terrorism primarily through antiterrorism--passive defensive measures taken to minimize vulnerability to terrorism. Antiterrorism 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.

8-34. ADA units may face a terrorist threat during stability and support 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 or missiles, ADA units may be deployed to protect US or host nation forces and facilities.

## PEACE OPERATIONS

8-35. Peace operations encompass three types of activities: support to diplomacy, peacekeeping operations, and peace enforcement. The environment of peace operations and related concepts, principles, and fundamentals are described in FM 100-23.

## SUPPORT TO DIPLOMACY

8-36. The components to support to diplomacy include peacemaking, peace building, and preventive diplomacy. Support to diplomacy takes place in peace or conflict and is conducted to prevent conflict. Military actions contribute to, and are subordinate to, the diplomatic peacemaking process. Many of these actions are the typical, day-to-day operations conducted by the military as part of its peacetime mission.

### Peacemaking

8-37. Peacemaking is a process of diplomacy, mediation, negotiation, or other forms of peaceful settlement that end disputes and resolve the issues that led to conflict. Military activities that support peacemaking include military-to-military relations and security assistance operations. Other military activities, such as exercises and peacetime deployment, may enhance the diplomatic process by demonstrating the commitment of the US abroad.

### Peace Building

8-38. Peace building consists of post conflict actions, primarily diplomatic, that strengthen and rebuild civil infrastructures and institutions in order to avoid a return to conflict. It also includes mechanisms that advance a sense of confidence and well-being and support economic reconstruction. Military, as well as civilian, involvement is normally required. Peace building activities include restoring civil authority, rebuilding physical infrastructures, and reestablishing commerce, schools, and medical facilities.

### Preventive Diplomacy

8-39. Preventive diplomacy involves diplomatic actions taken in advance of a predictable crisis to prevent or limit violence. In more tense situations, military activities may support preventive diplomacy. Such support may include preventive deployments of Patriot, other shows of force, or higher levels of readiness. The objective is to demonstrate resolve and commitment to a peaceful resolution while underlining the readiness and ability of the US to use force if required.

## PEACEKEEPING OPERATIONS

8-40. Peacekeeping operations support diplomatic efforts to maintain peace in areas of potential conflict. They stabilize conflict between two or more belligerent nations, and as such, require the consent of all parties involved in the dispute.

8-41. The US may participate in peacekeeping operations when requested by the United Nations, with a regional affiliation of nations, with other unaffiliated countries, or unilaterally. US personnel may function as impartial observers, as part of an internal peacekeeping force, or in a supervisory and assistance role.

8-42. Peacekeeping often involves ambiguous situations requiring the peacekeeping force to deal with extreme tension and violence without becoming a participant. These operations follow diplomatic negotiations that establish the mandate for the peacekeeping force. The mandate describes the

scope of the peacekeeping operation in detail. It typically determines the size and type of force each participating nation will contribute. It also specifies the terms or conditions the host nation intends to impose on the presence of the force or mission and a clear statement of the functions the peacekeeping force is to perform.

8-43. A peacekeeping force deters violent acts by its physical presence at violence-prone locations. It collects information through means such as observation posts, patrols, and aerial reconnaissance.

8-44. ADA may play a major role in this operation. ADA units will be used to deter the threat from using missiles, aircraft, and UAVs. HIMAD units will be key systems in support of this operation, especially considering the proliferation of offensive missiles. Historical examples of this type of operation are the support to NATO and the Republic of Korea. The continuing presence of Patriot units in southwest Asia provides a current example of peacekeeping operations. Special rules of engagement apply to this type of operation and are usually very restrictive.

8-45. ADA provides capabilities that are critical for other types of peacekeeping operations as well. HIMAD units are integrated into the joint counterair campaign to enforce no-fly zones and safe havens established by the United Nations. In these types of operations, the establishment of ROE, air and missile defense procedures and measures, and a fully capable BM/C4I system is critical. Of major concern in peacekeeping air and missile defense operations, is the identification of friendly aircraft operating in the no-fly zone or safe haven. Participation in these operations by nations with different types of aircraft with diverse IFF and communications capabilities makes discrimination of friendly aircraft difficult.

## PEACE ENFORCEMENT

8-46. Peace enforcement operations are military operations in support of diplomatic efforts to restore peace between hostile factions that may not be consenting to intervention and may be engaged in combat activities. 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 elements of combat power to restore order, separate warring factions, and return the environment to conditions more conducive to civil order and discipline.

8-47. 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 established quicker. An area where ADA may see increasing participation is the enforcement of no-fly zones.

# SHOW OF FORCE

8-48. A show of force is a mission carried out to demonstrate US resolve in which US forces deploy to defuse a situation that may be detrimental to US interests or national objectives. Shows of force lend credibility to the nation's commitments, increase regional influence, and demonstrate resolve. These

operations can influence other governments or politico-military organizations to respect US interests and international law. They can take the form of combined training exercises, rehearsals, forward deployment of military forces, or introduction and buildup of military forces in a region. The appearance of a credible military force can underscore national policy interests and commitment, improve host-nation military readiness and morale, and provide an insight into US values.

8-49. ADA units are ideally suited for this role. ADA provides purely defensive weapons, so the introduction of ADA forces does not lead to further escalation of tensions. A belligerent nation will not consider deployment of an ADA unit as threatening as the deployment of a unit with offensive capabilities. Early deployment of ADA shows US national resolve. It positions the unit in country to support follow-on force-projection operations. ADA will provide a forward presence and defend APODs and SPODs that support protecting the force in the deployment phase of a contingency operation. Patriot batteries deployed to Kuwait, Saudi Arabia and Bahrain after the Persian Gulf War are examples of shows of force.

## SUPPORT FOR INSURGENCIES AND COUNTERINSURGENCIES

8-50. US military forces may assist either insurgent movements or host nation governments opposing the insurgency at the direction of the National Command Authority. In both instances, the military instrument of US national power predominantly supports political, economic, and informational objectives.

8-51. The US will use its military resources to provide assistance to a host nation's counterinsurgency operations in the context of foreign internal defense (FID) through logistical and training support measures. FID is the participation by civilian and military agencies in any of the action programs another government takes to free and protect its society from subversion, lawlessness, and insurgency. The US ambassador, through the country team, provides the focal point for interagency coordination and supervision of FID. Military support to FID is provided through the unified CINC.

8-52. Depending on the threat, all types of ADA units may support this type of operation. However, it is most probable that light ADA units such as Stinger and Avenger will play a major role.

## ATTACKS AND RAIDS

8-53. The Army conducts attacks and raids to create situations that permit seizing and maintaining political and military initiative. Normally, the US executes attacks and raids to achieve specific objectives other than gaining or holding terrain. Attacks by conventional ground, air, or special operations forces acting independently or in concert are used to damage or destroy high-value targets or to demonstrate US capability and resolve to achieve a favorable result. Raids are usually small-scale operations involving swift penetration of hostile territory to secure information, temporarily seize an objective, or destroy a target. Raids are followed by a rapid, preplanned withdrawal. These operations also occur in war. Stinger units are ideally suited to this type of operation. ADA provides force protection and defense of

critical assets that support the deployment of the raiding or attack party. Just Cause and Desert One are two historical examples of this type of operation. In each operation, Stinger units were used. However, Avenger might be used if the threat is significant and sufficient lift assets are available.

# RESOURCE ALLOCATION

8-54. The ADA commander manages the resources in the command. These resources consist of personnel, equipment, funds, and time.

## PERSONNEL

8-55. The personnel assigned to ADA organizations have very complex, specific skills. Some of these skills can be directly applied to stability and support operations. Some personnel may be requested for liaison, although this places a burden on each unit. The applicable modified table of organization and equipment (MTOE) fixes the number of people available to the ADA commander.

## EQUIPMENT

8-56. Equipment assigned to ADA organizations has very specific purposes. Some of this equipment can be used to support stability and support operations. The number and types of equipment available to the ADA commander are also fixed by the applicable MTOE. Special equipment and logistics support requirements to support stability and support operations will have to be identified, received, made operational, and trained upon by the personnel.

## FUNDS

8-57. The funding for stability and support operations will be made available to support these activities. This funding should be provided to pre-selected organizations and units. This would allow for the personnel of these units to train for a specific mission or set of missions to support stability and support operations. It would reduce costs in purchasing special equipment for all ADA units by selecting certain units to handle one or more of the stability and support operations activities. Expenditures of funds in this manner would provide cost benefits for manpower and personnel use, special stability and support operations equipment requirements, and better use of time.

## TIME

8-58. The proper use of time to service tactical mission requirements, and stability and support operations will result in clearer focus of resources. The assignments of the specific units to specific operations will result in a better use of time by not requiring units to train and equip for all stability and support operations. It would allow for a more equitable use of time to train for the tactical missions to include force-protection operations.

**Appendix A**

# Air Intelligence Preparation of the Battlefield

This appendix describes the IPB process as it applies to AD operations. The breakup of the former Soviet Union has caused the Army to shift its focus from the Soviet threat to regional threats. 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 battlefield 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 his 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 three 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 UAVs, ballistic missiles, cruise missiles, ASMs, and rotary- and fixed-wing aircraft. The G2 and S2 have overall staff responsibility for IPB. ADA and aviation officers must provide input to the G2 and S2 when integrating air aspects into the IPB process.

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

A-3. Since terrain, weather, and other characteristics of the battlefield 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 UAVs, 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 BATTLEFIELD ENVIRONMENT

A-4. The battlefield includes aerial dimensions in an area of operations, battlespace, and an area of interest. Because of the aerial dimension, each of these parts of the battlefield 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.

## BATTLESPACE

A-6. Battlespace 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. Battlespace 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 battlespace 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, UAVs, and missile systems. Horizontally, it will extend to cover the maximum range of aircraft, UAVs, and missiles, plus 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 BATTLEFIELD'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 ADA 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, cover and concealment, obstacles, key terrain, and avenues of approach (OCOKA).

### 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.

### Cover and Concealment

A-11. 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.** Using terrain to protect an air system from visual and electronic observation or detection. Electronic warfare supplements natural masking.
- **Cover**. Using terrain to provide protection from direct-fire weapon systems.
- **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-12. Fixed and rotary wing aircraft, cruise missiles, and possibly even UAVs 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.

### Obstacles

A-13. Obstacles are broken down into three primary types:

- Those which 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 or route, or to gain excessive altitude.

A-14. 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 (MCOO).

**Key Terrain**

A-15. 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.

**Air Avenues of Approach**

A-16. 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-17. **Type of Air Threat.** UAVs 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-18. **Point of Origin**. Staff looks at the commander's entire area of interest when determining air avenues. Analysis begins at the enemy airfield, UAV, 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-19. **Probable Enemy Objective**. Each avenue of approach must end at a target, drop zone, or landing zone; or within reconnaissance, intelligence,

surveillance, or target acquisition range of a target. Reverse IPB is used to pick enemy objectives. Potential to support maneuver forces. 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 UAVs.

A-20. 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-21. 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 defense weapon systems and tactical air support?
- Provide a standoff orbit location?
- Provide a standoff orbit?

A-22. 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?

## WEATHER ANALYSIS

A-23. Air operations are especially susceptible to the effects of weather. Weather analysis for air and 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 G2 or S2 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 UAVs will be adversely affected in performance and accuracy.
- Precipitation affects aircraft, missile, and UAV 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 UAVs 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 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. What is the size of his ballistic missile brigade, battalion, and battery? Does it fire as a unit? Does the enemy have mobile, fixed, or both types of launchers?
- Who has tactical control of aircraft at the point of attack?
- How will UAVs 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?

- Where are previously reported missile launch positions? What are the likely targets? What are the range, endurance, and profile of these systems?
- 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 NBC threats.
- How does the enemy employ reconnaissance assets?
- How has the enemy historically fought?
- Consider asymmetrical threat operations.

## 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.

### Aircraft

A-28. 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)?
- Combat personnel load?
- 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 UAVs, or aircraft degrade friendly air and missile defense systems?
- Type, quantity, and quality of training the pilots have received?
- 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 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 submunitions. What is the release altitude?
    - Guidance modes: how does the pilot acquire and engage?

**Unmanned aerial vehicles**

A-29. Capabilities of threat UAVs:
- 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 UAV 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?

**Ballistic missiles**

A-30. Capabilities of threat ballistic missile systems:
- Performances (missile flight time, speed, trajectory, and launch restrictions)?
- 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?

- Location of surveyed launch sites?

**Cruise missiles**

A-31. 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?

## 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 his 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 G2 or S2 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.

## 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 G2 and G3. However, the G2 or S2 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. See FM 34-130 for detailed information on preparing a situation template.

## 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 G2 or S2 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. See FM 34-130 for detailed information on preparing an event template and matrix.

## 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.
- Ranges of threat systems.
- Ranges 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 his 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**

# Army Air Defense Planning

This appendix describes the specific requirements of the AD estimate and AD annex. The estimate process assists the force commander in decision making. The end result of the planning process is the air defense annex detailing air defense support for the concept of the operation.

## AIR DEFENSE ESTIMATE AND ANNEX PROCESS

B-1. 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.

B-2. Once a mission is received, the estimate process begins. The ADA commander develops the air defense estimate in concert with the force S3 or G3. The ADA commander uses the IPB during the estimate process. The ADA commander gathers and analyzes facts and makes assumptions. He 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.

B-3. After the force commander selects a course of action, the air defense planning process continues. The result of this process is the air defense annex detailing air defense support for the concept of the operation.

## AIR DEFENSE ESTIMATE FORMAT

B-4. 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 air defense plan and is presented in the air defense annex. See figure B-1, pages B-3 through B-5, for an AD estimate general format.

B-5. The estimate must be constantly reevaluated to keep it current. The factors of METT-TC, OCOKA, 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.

## AIR DEFENSE ANNEX FORMAT

B-6. 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.

B-7. 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.

B-8. 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 B-2, pages B-6 and B-7 for an Annex G (Air defense) to OPORD general format.

---

**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 UAVs; 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 NBC 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 hydrography, environment, communications, science, technology, materiel, transportation, safety and accident prevention, and manpower). Include deduction about their effects on friendly and threat operations.

   **(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 how many sorties and missiles are expected to be flown per day, and possible composition of those sorties.

**Figure B-1. AD Estimate General Format**

**AIR DEFENSE ESTIMATE NUMBER____**

**3. Strength.** Numbers and 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.** Summary of recent threat activities that were both successful and unsuccessful. 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.** 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 other resources that affect ADA area of responsibility**.

**4. Comparison of requirements versus capabilities and recommended solutions.**

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

**(d) Assumptions.**

**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. Rank order COAs for each key consideration. A decision matrix should visually support comparison. Present an air defense course of action for each of the supported force courses of action. Each ADA course of action presented should include the following aspects:

- Air defense mission.
- Air defense priorities.
- Air defense fires.
- Air defense scheme of maneuver.
- ADA task organization.
- Command and support relationships.

**Figure B-1. AD Estimate General Format (continued)**

**AIR DEFENSE ESTIMATE NUMBER____**

- Key passive air defense 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 COA based on the comparison

- Indicate which course or courses of action ADA can best support (using the elements of who, what, when, where, how, and why).
- Recommend a list of air defense priorities.
- State the recommended ADA 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 B-1. AD Estimate General Format (continued)**

(Classification)

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 Intelligence Annex. 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.** ADA missions at all applicable levels. Describe how the air defense plan integrates with higher echelon plans.

        **(1) Higher units.** Outline higher AD unit intent and plans.
        **(2) Adjacent units.** Outline adjacent AD 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**
    Who, what, when, where, how, and why statement of the mission for the air defense artillery unit.

**3. EXECUTION**
    **a. Scheme of ADA support.** Commanders overall ADA plan to include the intent, objectives, and priorities.

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

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

        **(1) ADW and ADW authority.** LADW and LADW authority also.

        **(3) Hostile criteria.** Basic rules the commander has established to assist in the identification of friendly or

**Figure B-2. AD Annex General Format**

**ANNEX G (AIR DEFENSE) TO OPERATION ORDER NO _____**

**(2) WCS and 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.** 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) ADA 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 B-2. AD Annex General Format (continued)**

BLANK

**Appendix C**

# Space Support

This appendix gives a summary of space support to air and missile defense operations. It is not intended as a comprehensive guide. FM 100-18 establishes doctrine for the Army's use of space, describes current space system capabilities, and provides guidance for the use and application of space-based assets in support of Army operations.

## SPACE FUNDAMENTALS

C-1. Understanding space fundamentals will aid the user in selecting the best space support. Orbital characteristics and space system limitations are two of the fundamentals.

### ORBITAL CHARACTERISTICS

C-2. Generally, the orbital characteristics of a space system are related to the function of the satellite. Satellites may be in circular or elliptical orbits that vary in altitude from 200 miles to over 22,500 miles from the earth's surface. Low orbits, being closer to the earth, best support-sensing requirements. The disadvantages of a low orbit are a limited field of view of the earth and a short station time over any given earth area. As altitude increases, so do the field of view and station time, but the ability to resolve a small object decreases at higher altitudes.

C-3. The time it takes to complete one complete revolution of the earth is known as the orbital period. The period relates directly to the orbit's average distance from earth and is a function of the satellite's velocity. The greater the velocity imparted to the satellite during orbital insertion, the greater the orbital period and average distance from earth. Orbital periods range from 90 minutes for the lowest orbits to 24 hours or more for deep space orbits.

C-4. Another element of a satellite's orbit is its inclination, which is the angle at which the satellite's orbital plane crosses the equator. A higher inclination generally means that more of the earth's surface is covered. A polar orbit, with an inclination of 90 degrees, crosses all latitudes, while lesser or greater inclinations only provide coverage for increasingly higher latitudes, particularly for satellites in low earth orbits.

C-5. The length of time between satellite coverage of a particular earth location, that is, the satellite's revisit time, depends upon a number of factors. For any given satellite, revisit time depends upon both orbital period and inclination. For earth coverage by like systems, revisit time also depends upon the number of satellites in the constellation, the capabilities of the satellites' payloads, and the footprints of the various onboard sensors.

C-6. One type orbit that is particularly useful for wide area-continuous observation has a period of 24 hours and an inclination of 0 degrees. In this orbit, which is referred to as geosynchronous, a satellite orbits the earth around the equator at the same rate that the earth rotates below the satellite. While the satellite orbits at very high speed at an altitude of 22,500 miles, it appears to remain stationary over the same point on the earth's surface. Satellites in geosynchronous orbit provide continuous observation of most of a global hemisphere.

## SPACE SYSTEM LIMITATIONS

C-7. While satellites can provide the Army many valuable capabilities, planners and users must understand some of their general limitations. Though not all-inclusive, the following limitations represent areas that must be considered when planning and requesting space support.

### Access

C-8. Satellites, and the launch operations which support them, are extremely expensive and manpower intensive. For these reasons, military satellites are national resources, supporting the NCA, CINCs, other services and government agencies, and other tactical users. As a result, requirements can frequently exceed capacity and the system's capabilities. A validation process to determine what requirements will be satisfied is based upon priority and system availability. The NCA, through the JCS, allocates satellite resources to the joint force commander who allocates those resources to users within the theater according to the JFC's priorities.

### Vulnerability

C-9. Satellite systems are vulnerable to environmental conditions in space such as temperature extremes, radiation, meteoroids, and space debris. Atmospheric disturbances and solar activity such as solar flares also can affect satellite systems. Clouds, fog, and smoke affect the ability of imaging systems to see, and rain may degrade some radio signal frequencies. Solar flare and glare can blank out areas of the earth's surface from infrared observation for hours each day during the vernal and autumnal equinox period. Since blanked out areas differ for satellites in different orbits, redundant coverage of crisis areas by two or more satellites mitigates the effects of solar flare and glare and ensures continuous coverage of the entire theater.

### Utility

C-10. Operationally, the Army is dependent upon systems currently on orbit, although these systems may or may not be suited to a particular Army mission. Satellites do not provide continual coverage; for example, LANDSAT sensors revisit a point on the earth approximately every 16 to 18 days. Moving a satellite to a more advantageous orbit or position takes time and is limited to the amount of fuel on board since satellites cannot be refueled. As satellites age, components become degraded or fail, decreasing the satellite's utility and reliability. Satellites in geosynchronous orbit have poor viewing geometry towards the edge of their coverage along the limb of the earth.

Though overlapping coverage mitigates the effect in the higher latitudes, coverage of the Polar Regions is poor.

## SPACE SYSTEMS

C-11. The space systems discussed are divided into five major functional areas as follows:

- communications
- intelligence, surveillance and reconnaissance (ISR)
- weather, terrain and environmental monitoring (WTEM)
- position and navigation
- missile warning

### COMMUNICATIONS

C-12. Communications satellites receive signals from user terminals and retransmit them to other ground, shipboard, or airborne stations. They provide direct line-of-sight communications and eliminate the need for miles of cables or numerous ground relay stations. The Army uses military and commercial communications satellites to provide a significant capability. Satellite communications carry a large portion of intercontinental, inter-theater, and a significant portion of intra-theater traffic at division level and above. Some tactical intra-theater users are also supported. Deploying forces can quickly establish communications within the theater of operations and back to their deployment base, even in areas where there is no established communications infrastructure. During a crisis, demand for satellite communications does, however, exceed current capabilities. Communications satellites operate in a variety of radio frequency bands. The most common are UHF, SHF, EHF, and commercial C-band and Ku-bands.

### Fleet Satellite Communications

C-13. The Fleet Satellite Communications (FLTSATCOM) system provides worldwide communications for DOD mobile forces, including fleet broadcast services and command and control to surface ships, aircraft, and submarines. FLTSATCOM operates in the UHF band. The FLTSATCOM system consists of a mix of FLTSAT and dedicated, leased satellites. The FLTSATs are being replaced by the UHF follow on (UFO) satellites. All are positioned in geosynchronous orbits over the equator, spaced around the world at an altitude of 35,800 kilometers (22,250 miles). Each satellite can be repositioned to support specific mission requirements. Each FLTSATCOM satellite can relay 11 separate channels. FLTSATCOM satellites are controlled by the Naval Space Command. Channel capacity and access are allocated to the unified and specified CINCs by the JCS. The Navy has dedicated use of the ten 25-kilohertz channels on FLTSAT. Army users may request access; however, it is usually difficult to obtain. The CINCs apportion their assigned channels among their assigned forces.

### Defense Satellite Communications System

C-14. The Defense Satellite Communications System (DSCS) provides high-capacity, wideband, jam-resistant super-high frequency for worldwide long-

haul communications between fixed stations and critical mobile users. DSCS is essential for the transmission of the large volume of information required to operate and support deployed units. The current space segment consists of ten DSCS III satellites in geosynchronous orbit. DSCS satellites are a critical part of the Defense Communications System. Some of the satellites are on-orbit spares that can be activated to provide additional capabilities when needed.

C-15. Each DSCS III satellite has six transponders providing six channels through earth coverage antennas, narrow beam antennas, and multi-beam antennas. The DSCS satellites provide worldwide coverage from 70 degrees north to 70 degrees south latitude. Additional DSCS III satellites are available for launch.

C-16. Operational command of DSCS is provided by the US Space Command. Management of user traffic and network configuration is a function of the Defense Information Systems Command. Payload control on DSCS III satellites is accomplished through DSCS operation centers (DSCSOC). The Army Space Command operates all five of the DSCSOC. Platform control of DSCS III satellites and both payload and platform control of DSCS II satellites is provided by the Air Force Space Command. Users include the Defense Information Systems Agency that supports many government agencies, US Air Force, US Navy, US Marine Corps, and US Army. DSCS supports the Worldwide Military Command and Control System, the Defense Data Network, and the Defense Switched Network. Channel capacity is allocated to the unified and specified CINCs by the JCS through coordination with regional space support centers. The CINCs further allocate their channels within their command.

C-17. DSCS supports tactical communications through the Ground Mobile Forces Satellite Communications (GMFSC) program. The GMFSC program provides critical communications support for critical command, control, communications, computer, and intelligence requirements. The Army has about 200 GMFSC terminals. These terminals connect other Army communications systems, such as mobile subscriber equipment, to provide connectivity between the dispersed units and to deployment and support bases in CONUS and other theaters.

## INTELLIGENCE, SURVEILLANCE, AND RECONNAISSANCE

C-18. Satellites have unique capabilities that can be used for ISR. Space-based sensors have the advantage of unrestricted access over battlefields and denied areas. They can be used to observe threat weapons development, verify compliance to treaties, determine the deployment of land, sea, and air forces, and provide weather data. If hostilities begin, space systems can provide targeting information, attack warning, battle damage assessment, and technical intelligence on threat capabilities. When the information provided through space systems is integrated with that gathered by other systems, a more complete IPB is attained.

C-19. The Army tactical exploitation of national capabilities program (TENCAP) provides Army commands with equipment that can receive and process data provided by the national space systems. Initially, ground

terminals were developed for use at corps and higher headquarters. The evolution of the TENCAP systems has made it feasible to deploy certain systems to echelons below corps also. The request and dissemination process, system capabilities, and specific applications can be found in the Joint Tactical Exploitation of National Capabilities (J-TENS) manual.

## WEATHER, TERRAIN AND ENVIRONMENTAL MONITORING

C-20. Environmental monitoring consists of gathering weather and terrain data. Three satellite systems are the primary contributors.

### Weather

C-21. Weather has a significant impact on the conduct of tactical operations in terms of visibility, temperature, and maneuverability. Electro-optically guided weapons and other weapons are particularly sensitive to weather conditions along their flight path. Space systems provide detailed information on the current atmospheric conditions over a wide area, to include areas where there are few weather sensors or where political and military considerations restrict the gathering of weather data. Satellite imagery and data also support the preparation of accurate weather forecasts. The Army requires both imagery and vertical profile data; for example, atmospheric conditions from both military and civil weather satellites.

### Defense Meterological Satellite Program

C-22. The Defense Meteorological Satellite Program (DMSP) provides worldwide visible and infrared cloud imagery and other meteorological, oceanographic, and space environmental data for the Department of Defense. Normally, two DMSP satellites are maintained in sun-synchronous, near polar, 833 kilometers (518 miles) high circular orbit. Each satellite provides coverage of the entire earth every 12 hours. With two satellites, a specific area is observed once every four to eight hours. DMSP satellites carry a variety of sensors which collect data of an area up to 2,960 kilometers (1,839 miles) wide. The primary sensor is the Operational Linescan System (OLS) which provides cloud imagery in visible and infrared bands. In the fine mode, resolution of images of areas designated by DMSP control can be 0.6 kilometers. All other areas are imaged in the smooth mode, which provides a resolution of 2.8 kilometers in daylight or 3.5 kilometers at night. In addition to the OLS, DMSP satellites have a microwave sensor that provides a vertical temperature profile of the atmosphere. Each satellite also has sensors to measure the space environment and the upper reaches of the ionosphere. Data transmitted by the DMSP satellites is encrypted. DMSP is controlled by the Air Force Space Command.

### Terrain

C-23. The human eye sees light across a region of the electromagnetic spectrum known as the "visible" region. Human vision presents an image as a color rendition of the world, visible under typical conditions. A spectral imaging system can be designed to receive in narrow bands, for example, only green. A multispectral imager is one that "sees" in several specific bands (wavelengths) simultaneously and stores the information as separate images.

If this is done in the "visible" spectral region, the result is not a color image, but may be a band of green, a band of blue, and a band of red information. If used in other regions of the spectrum, the resultant increase in detail can be dramatic.

C-24. Multispectral imagery (MSI) from space has proven invaluable for mapping, geology, agriculture, earth resources, oceanography, and environmental monitoring. The information available through multispectral imagery can be obtained by a satellite in about 25 seconds or through a ground survey taking months, many people, at great expense, and often without the same amount of detail. Many areas cannot be easily surveyed from the ground or by aircraft because they are too heavily congested, too remote, or access is restricted for military or political reasons. There are seven satellite systems collecting MSI. Each provides data with a unique combination of bands, resolution, and times of coverage.

## Land satellite (LANDSAT)

C-25. Land satellite (LANDSAT) is a US civil satellite system used to provide worldwide land surface data and some ocean data. LANDSAT are launched into a 705-kilometer high, sun-synchronous, near polar, (98.2-degree inclination) orbit that repeats its ground trace every 16 to 18 days. The primary multispectral sensor is the Thematic Mapper that has 7 different bands. The maximum multi-spectral resolution is 30 meters. With processing at a ground station, the effective resolution can be enhanced to about 15 meters. The Earth Observation Satellite (EOSAT) Company is under contract to operate the LANDSAT spacecraft. Data from LANDSAT is received at ground-processing stations that have been licensed to process the data. There are more than 30 LANDSAT ground-processing centers around the world. In the US, the EROS Data Center in Sioux Falls, South Dakota, processes and stores LANDSAT data.

## Systeme Probatoire d'Observation de la Terre (SPOT)

C-26. Systeme Probatoire d'Observation de la Terre (SPOT) satellites have the same mission as LANDSAT with slightly different capabilities. They are launched into a sun-synchronous, 832-kilometer high orbit with an inclination of 98.7 degrees and a period of 100 minutes. This orbit repeats its ground trace every 26 days. The two high-resolution visible (HRV) range instruments have one panchromatic band with a resolution of 10 meters and three multi-spectral (visible wavelength) bands with a resolution of 20 meters. The HRV operate independently from one another and can image at an angle within 27 degrees either side of vertical. This off-nadir viewing allows the satellite to see a 950-kilometer wide corridor. It also permits the development of stereo views by imaging the same area on different passes at different angles. If only vertical viewing is used, the swath is 60 kilometers wide. The European Space Agency with France as the executive agent controls SPOT. Customers submit coverage requests and payment to SPOT marketing offices located around the world.

## POSITION AND NAVIGATION

C-27. The Global Positioning System (GPS) is a satellite-based system developed by DOD to provide continuous, all weather, global position, navigation, velocity, and precision time information. GPS consists of 24 operational satellites in 20,260 kilometers (10,950 nautical miles) altitude, semi-synchronous, circular orbits, evenly spaced in 6 orbital planes. A minimum of 5 satellites is always within view of any ground user, thus providing continuous three-dimensional capability. Satellite life expectancy is 6 to 7 years each. Replacement satellites will be launched to maintain the constellation of 24 GPS satellites.

C-28. Satellite control is performed by the US Air Force Space Command assisted by Army personnel assigned to US Army Space Command. All US military services along with some allied military services, and certain other designated users have access to Precise Positioning Service (PPS), if equipped with terminals capable of loading a COMSEC code. GPS receivers provide a degree of accuracy for position determination, navigation, velocity, and time synchronization never before possible. GPS receivers are passive, therefore, they cannot be detected by electronic means and there can be an unlimited number of users. Signals from three GPS satellites are required for two-dimensional position determination (user provides altitude). Signals from 4 satellites are required for three-dimensional position determination (no user input required). PPS provides three-dimensional positioning accuracy of 16 meters spherical error probable (SEP) and two-dimensional position accuracy of 10 meters circular error probable (CEP). Depending on the type of receiver used, the time accuracy can be as good as 48 nanoseconds. Velocity accuracy is 0.2 meters per second.

## MISSILE WARNING

C-29. The Defense Support Program (DSP) was initiated as a space-based strategic surveillance system to detect the launch of ICBM and SLBM. Its utility has expanded to support theater missile defense operations. DSP satellites are located in geosynchronous orbits to provide continuous coverage over the eastern and western hemispheres. DSP satellites can detect the launch of ICBM, SLBM, SRBM, satellite booster rockets, and certain other rockets. USSPACECOM exercises authority over DSP through the Air Force Space Command that operates and controls the satellites. Data is centrally processed and transmitted to users. The principal users are the National Command Authority, United States Space Command, Strategic Command, North American Aerospace Defense Command (NORAD), and unified and specified CINCs.

C-30. The Tactical Event Reporting System (TERS) is a worldwide distribution system currently made up of the Tactical Receive Equipment and Related Applications (TRAP) system, the Tactical Information Broadcast System (TIBS), and the Joint Operation Tactical System (JOTS). 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, type missile, 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.

C-31. TERS will transition into the Tactical Event System (TES) in the near future. TES will use the same communications architecture currently used by TERS, but will provide more timely and more reliable missile launch warning. TES warning messages will originate at different ground segments which each contribute different but complementary detection and processing capabilities. The components of TES are the Attack and Launch Early Reporting to Theater (ALERT) system, the Tactical Detection and Reporting (TACDAR) system, and the Joint Tactical Ground Station (JTAGS).

C-32. JTAGS is a satellite receiver that allows direct downlinks of missile and other warning data into the theater. Data is processed and disseminated in theater via the TRAP and TIBS networks. JTAGS will also disseminate voice warning to forces in the theater. Within 2 minutes of missile launch, tactical parameters, to include estimated impact area, are available to support tactical missile defense operations. USSPACECOM executes its control of JTAGS through the Army Space Command (ARSPACE).

## HISTORICAL PERSPECTIVE

C-33. The Army has been actively involved in space operations since Dr. Wernher von Braun and other German scientists joined the Army's program to develop militarily useful missiles and rockets in 1945. The efforts of Army scientists working at White Sands Missile Range in New Mexico and at Redstone Arsenal and the Marshall Space Flight Center in Alabama resulted in the birth of the United States space program. In 1958, the Army space program became the nucleus of the newly created National Aeronautics and Space Administration (NASA), which assumed responsibility for all civilian space operations. That same year, NASA launched the nation's first satellite into orbit using an Army Redstone rocket. The Redstone was also used to launch a Mercury capsule carrying Commander Alan B. Shepard into space in 1961, marking the beginning of the nation's manned space flight program.

C-34. As NASA and the newly created United States Air Force assumed greater responsibility for civilian and military space operations, the Army's role in space declined proportionately. The Army's space interests were limited to development of air and strategic ballistic missile defense capabilities, and to exploitation of national space capabilities for support of tactical operations.

C-35. In 1973, the Army Space Program Office (ASPO) was established to improve support by national capabilities to tactical commanders. The Joint Tactical Exploitation of National Capabilities Program has fielded a number of systems for use by Army commanders. The Strategic Defense Command (SDC) has led Army efforts to develop defenses against both strategic and tactical ballistic missiles.

C-36. In 1985, DOD established the United States Space Command (USSPACECOM) to exercise combatant command over the service's space operations. The Commander in Chief, USSPACECOM, provides space support to other theater commanders as a supporting CINC. The Army's Space and Strategic Defense Command (SSDC) consists of ARSPACE and SDC and is the Army component of USSPACECOM. ARSPACE is the Army

operational component of USSPACECOM, and SDC continues as the lead agency for missile defense systems development.

C-37. The development of the Army's Air-Land Battle Doctrine in the 1980s focused on a battlefield that was expanding in time, depth, and lethality. Space offers the Army unique and enhanced capabilities to achieve land dominance. Space systems provide communications, positioning and navigation data, early warning, weather, environmental, and ISR capabilities that are essential for the successful prosecution of land warfare. FM 100-5 incorporates space support to Army operations. Under this evolving doctrine, space systems are fully exploited to enhance execution of the Army's mission during all phases of force-projection operations.

C-38. In the past, space assets were used for support of echelons above corps only. Today, as a result of programs initiated by USSPACECOM, SSDC, and the ASPO, every soldier on the battlefield exploits space capabilities. Units involved in counterair operations benefit from the entire suite of national space systems. In addition to intelligence, weather, and terrain support, Army ADA units use space-based communications and early warning of missile attack to significantly enhance air and missile defense operations.

BLANK

## Appendix D

# Classes of Supply

| SUPPLY | CLASS |
|---|:---:|
| Subsistence | I |
| Clothing, individual equipment, tentage, organizational tool sets and tool kits, hand tools, maps, and administrative and housekeeping supplies and equipment | II |
| POL (package and bulk): petroleum fuels; lubricants; hydraulic and insulating oils; preservatives; liquid and compressed gasses; bulk chemical products; coolants; deicing and antifreeze compounds, together with components and additives of such products; and coal | III |
| Construction materials, including installed equipment and all fortification and barrier materials | IV |
| Ammunition of all types, chemical and special weapons, bombs explosives, mines, fuses, detonators, pyrotechnics, missiles, rockets, propellants, and other associated items | V |
| Personal demand items (nonmilitary sales items) | VI |
| Major end items: a final combination of end products that are ready for their intended use, for example, tanks, launchers, mobile machine shops, and vehicles | VII |
| Medical material, including medical-peculiar repair parts | VIII |
| Repair parts (less medical-peculiar repair parts): all repair parts and components, to include kits, assemblies, and subassemblies – repairable and nonrepairable – required for maintenance support of all equipment | IX |
| Material to support nonmilitary programs, such as agricultural economic development, not included in classes I through IX | X |

BLANK

# Glossary

| | |
|---|---|
| A2C2 | Army airspace command and control |
| AAA | antiaircraft artillery |
| AADC | area air defense commander |
| AAMDC | army air and missile defense command |
| AAN | army after next |
| AAR | after action review |
| ABCS | army battle command system |
| ABMOC | air battle management operations center |
| ABT | air breathing threat |
| AC | active component |
| ACA | airspace control authority |
| ACC | air component commander |
| ACE | analysis and collection element |
| ACO | airspace control order |
| ACR | armored cavalry regiment |
| Active Air Defense | Direct defensive action taken to nullify or reduce the effectiveness of hostile air action. It includes such measures as the use of aircraft, air defense weapons, weapons not used primarily in the air defense role, and electronic warfare. |
| Active missile defense | Operations that protect selected assets and forces from attack by destroying theater missile (TM) airborne launch platforms and/or TMs in flight. |
| ACV | antenna cable vehicle |
| AD | air defense |
| ADA | air defense artillery |
| ADAFCO | air defense artillery fire control officer |
| ADCN | air defense coordination net |
| ADCS | air defense coordination section |
| ADI | air defense interface |
| ADIZ | air defense identification zone |
| ADLNO | air defense liaison officer |
| ADOA | air defense operations area |
| ADSAM | air directed surface to air missile |
| ADSI | air defense systems integrator |
| ADW | air defense warning |
| AE | antenna element |

| | |
|---|---|
| AGCCS | army global command and control system |
| AGL | above ground level |
| AGTS | advanced gunnery training system |
| AI | air interdiction |
| Air defense | All defensive measures designed to destroy attacking enemy aircraft or missiles in the Earth's envelope of atmosphere, or to nullify or reduce the effectiveness of such attack. |
| Air Defense Artillery | Ground based surface-to-air weapons for engaging air and missile targets. |
| Air Defense Operations Area | An area and the airspace above it within which procedures are established to minimize mutual interference between air defense and other operations. |
| Air interdiction | Air operations conducted to destroy, neutralize, or delay the enemy's military potential before it can be brought to bear effectively against friendly forces. |
| Air superiority | That degree of dominance in the air battle of one force over another that 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. |
| Air supremacy | That degree of air superiority wherein the opposing Air Force is incapable of effective interference. |
| Airspace control authority | The commander designated to assume overall responsibility for the operation of the airspace control system in the airspace control area. |
| Airspace control order | 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 | The document approved by the joint force commander that provides specific planning guidance and procedures for the airspace control system for the joint force AOR/JOA. |
| Airspace management | The coordination, integration, and regulation of the use of airspace of defined dimensions. |
| ALERT | attack and launch early reporting to theater |
| ALOC | air lines of communications |
| AMC | united states army materiel 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 |
| AMG | antenna mast group |
| AMT | avenger maintenance trainer |

| | |
|---|---|
| ANBACIS | army nuclear, biological and chemical information system |
| AO | area of operations |
| AOC | air operations center |
| AOI | area of interest |
| AOR | area of responsibility |
| APC | armored personnel carrier |
| APDS-T | armor piercing discarding sabot-tracer |
| APOD | aerial port of debarkation |
| APU | auxiliary power unit |
| AR | armor |
| Area air defense commander | 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 C4 capability to plan and execute integrated air defense operations. Representation from the other components involved will be provided, as appropriate, to the AADC's headquarters. |
| Area of influence | (DOD, NATO) A geographical area wherein a commander is directly capable of influencing operations by maneuver or fire support systems normally under the commander's command or control. |
| Area of interest | That area of concern to the commander, including the area of influence, areas adjacent thereto, and extending into enemy territory to the objectives of current or planned operations. This area also includes areas occupied by enemy forces that could jeopardize the accomplishment of the mission. The AOI for ADA commanders includes all areas from which the enemy could launch aircraft or missiles against the protected force. Also called AOI. See also area of influence. |
| Area of operations | An operational area defined by the joint force commander for land and naval forces. Areas of operation do not typically encompass the entire operational area of the joint force commander, but should be large enough for component commanders to accomplish their missions and protect their forces. Also called AO. |
| | ADA units are typically assigned an AO also. This area is actually three-dimensional as it encompasses the airspace above. The AO may be called a missile, joint, or SHORAD engagement zone (MEZ, JEZ, SHORADEZ). It may not exactly correspond to the supported unit AO. |
| Area of responsibility | The geographical area associated with a combatant command within which a combatant commander has authority to plan and conduct operations. 2. In naval usage, a predefined area of enemy terrain for which supporting ships are responsible for covering by fire on known targets or targets of opportunity and by observation. Also called AOR. |
| ARFOR | army forces |

| | |
|---|---|
| ARM | antiradiation missile |
| ARNG | army national guard |
| ARSPACE | army space command |
| ASAS | all source analysis system |
| ASAT | antisatellite system |
| ASCC | army service component commander |
| ASCM | anti-ship cruise missile |
| ASG | area support group |
| ASM | air to surface missile |
| ASP | ammunition supply point |
| ASPO | army space program office |
| ATACMS | army tactical missile system |
| ATCCS | army tactical command and control system |
| ATDL | army tactical data link |
| ATG | antenna/transceiver group |
| ATGM | anti-tank guided missile |
| ATMDE | army theater missile defense element |
| ATO | air tasking order |
| ATP | allied tactical publication |
| Attack operations | Offensive operations intended to destroy and disrupt enemy TM capabilities before, during, and after launch. The objective of these operations is to prevent the launch of TMs by attacking each element of the overall system, including such actions as destroying launch platforms, RSTA platforms, C2 nodes, and missile stocks and infrastructure. |
| AV | aviation |
| AVT | automatic video tracker |
| AWACS | airborne warning and control system |
| Ballistic missile | Any missile that does not rely upon aerodynamic surfaces to produce lift and consequently follows a ballistic trajectory when thrust is terminated. |
| BAS | Battalion aid station |
| BATS | ballistic aerial target system |
| BCD | battlefield control detachment |
| BCE | bradley control electronics |
| BCIS | battlefield combat identification system |
| BCU | battery coolant unit |
| BDE | brigade |

| | |
|---|---|
| BFV | bradley fighting vehicle |
| BIT | built-in test |
| BITE | built-in test equipment |
| BM | battle management/ballistic missile |
| BMMO | battalion motor maintenance officer |
| BM/C3I | battle management and command, control, communications and intelligence |
| BM/C4I | battle management and command, control, communications, computers and intelligence |
| BME | battalion maintenance equipment |
| BMG | battery maintenance group |
| BN | battalion |
| BRU | battery replaceable unit |
| BSA | brigade support area |
| BSFV | bradley stinger fighting vehicle |
| BSG | beam steering generator |
| BTOC | battalion tactical operation center |
| C2 | command and control |
| C2W | command and control warfare |
| C3I | command, control, communications and intelligence |
| C4I | command, control, communications, computers, and intelligence |
| CA | counter air |
| CADCI | common air defense communications interface |
| CAFAD | combined arms for air defense |
| CAP | crises action procedures |
| CAS | close air support |
| CAU | crew access unit |
| CCIR | commander's critical information requirements |
| CDI | classification, discrimination and identification |
| CDOPS | coherent doppler scorer |
| CDR | commander |
| CDRUSELM-NORAD | commander, united states element-north american |
| CDT | control display terminal |
| CEP | circular error probable |
| CEU | cooling equipment unit |
| CFT | captive flight trainer |

| | |
|---|---|
| CHS | common hardware software; combat health service |
| CINC | commander in chief |
| CINCNORAD | commander in chief, north american aerospace defense command |
| CIU | control interface unit/communications interface unit |
| CJCS | chairman, joint chiefs of staff |
| Classify | The capability to declare a target a ballistic missile (BM) or air breathing object. As technology enables accurate target classification as manned or unmanned, future doctrine and established ROE should allow for the authority to engage on classification as an unmanned platform. |
| CLET | cooling liquid electronic tube |
| Close air support | Air action against hostile targets that are in close proximity to friendly forces. |
| CM | cruise missile |
| CMMC | corps materiel management center |
| CNR | combat net radio |
| COA | course of action |
| COCOM | combatant command |
| COFA | correlation of forces-air |
| COFT | conduct of fire trainer |
| COM | casualty operations management |
| COMARSPACE | commander, united states army space command |
| COMM | communications van |
| COMMZ | communications zone |
| COMSEC | communications security |
| CONUS | continental united states |
| Coordinating authority | A commander or individual assigned responsibility for coordinating specific functions or activities involving forces of two or more military departments or two or more forces of the same service. The commander or individual has the authority to require consultation between the agencies involved, but does not have the authority to compel agreement. In the event that essential agreement cannot be obtained, the matter shall be referred to the appointing authority. Coordinating authority is a consultation relationship, not an authority through which command may be exercised. Coordinating authority is more applicable to planning and similar activities than to operations. (JP 1-02) |
| COSCOM | corps support command |
| Counterair | 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. |

| | |
|---|---|
| CP | command post |
| CPU | control processing unit |
| CRC | control and reporting center |
| CRG | communications relay group |
| CRP | control and reporting post |
| CSA | corps storage area |
| CSG | corps support group |
| CSR | control supply rate |
| CSS | combat service support |
| CSSCS | combat service support control system |
| CST | crew station trainer |
| CTC | combined training center |
| Cueing | Providing timely position data and tentative identification of aircraft within a designated range of a fire unit. |
| CZ | combat zone |
| DA | department of the army |
| DAADC | deputy area air defense commander |
| DAL | defended asset list |
| DAM | display aided maintenance |
| DAO | division ammunition officer |
| DCA | defensive counter air |
| DCSOPS | deputy chief of staff for operations and plans |
| DEFCON | defense readiness condition |
| Defensive counterair | All defensive measures designed to detect, identify, intercept, and destroy or negate enemy forces attempting to attack or penetrate the friendly air environment. |
| DEM/VAL | demonstration and validation |
| DIS | distributive interactive simulation |
| DISCOM | division support command |
| DISE | deployable intelligence support element |
| DLA | defense logistics agency |
| DLT | data link terminal |
| DLU | data link unit |
| DMSP | defense meteorological satellite program |
| DOCC | deep operations coordination cell |
| DOD | department of defense |
| DP | decision point |

| | |
|---|---|
| DS | direct support |
| DSA | division support area |
| DSCS | defense satellite communications system |
| DSCSOC | defense satellite communications system operation center |
| DSMC | direct support maintenance company |
| DSP | defense support program/direct support platoon |
| DSS-1 | digital small switch |
| DSVT | digital secure voice terminal |
| DNVT | digital non-secure voice terminal |
| E | east |
| E3A | Navy AWACS aircraft |
| EA | electronic attack |
| EAC | echelons above corps |
| ECM | electronic countermeasures |
| ECCM | electronic counter countermeasures |
| ECS | engagement control station |
| ECU | equipment coolant unit |
| EDR | embedded data recorder |
| EEFI | essential elements of friendly information |
| EEU | electronic equipment unit |
| EHF | extremely high frequency |
| EIU | external interface unit |
| EMCON | emissions control |
| EMI | electromagnetic interference |
| EMP | electromagnetic pulse |
| EN | corps of engineers |
| EO | engagement operations |
| EOD | explosive ordnance disposal |
| EOSAT | earth observation satellite |
| EP | electronic protection |
| EPLRS | enhanced position location reporting system |
| EPP | electrical power plant |
| EPU | electrical power unit |
| ERINT | extended range interceptor |
| EROS | earth resources observation system |
| ERT | empty round trainer |

| | |
|---|---|
| ES | electronic warfare support |
| ET | embedded trainer |
| ETPT | embedded troop proficiency trainer |
| EW | electronic warfare; early warning |
| EWCC | expanded weapons control computer |
| EWOPS | electronic warfare operations |
| FA | field artillery |
| FAAD | forward area air defense |
| FAADEZ | forward area air defense engagement zone |
| FARP | forward area rearm/refuel point |
| FAX | facsimile |
| FCC | flight control center |
| FDC | fire direction center |
| FEBA | forward edge of the battle area |
| FEZ | fighter engagement zone |
| FFIR | friendly forces information requirements |
| FHT | field handling trainer |
| FID | foreign internal defense |
| FLIR | forward-looking infrared receiver |
| FLOT | forward line of own troops |
| FLTSAT | fleet satellite |
| FLTSATCOM | fleet satellite communication system |
| FM | field manual |
| FO | force operations |
| FOC | flight operations center |
| FOFT | force-on-force trainer |
| FOPS | future operations van |
| FOS | fiber optic system |
| FOV | field of view |
| FRAGO | fragmentary order |
| FROG | free rocket over ground |
| FS | fire support |
| FSB | forward support battalion |
| FSCOORD | fire support coordinator |
| FSE | fire support element |
| FST | finance support team |

| | |
|---|---|
| FU | fire unit |
| FW | fixed wing |
| G1 | assistant chief-of-staff, personnel |
| G2 | assistant chief-of-staff, intelligence |
| G3 | assistant chief-of-staff, operations and plans |
| G4 | assistant chief-of-staff, logistics |
| GCI | ground control interception |
| GEM | guidance enhanced missile |
| GEOREF | geographic reference |
| GFE | government furnished equipment |
| GMFSC | ground mobile forces satellite communications |
| GMT | guided missile transporter/greenwich mean time |
| GPFU | gas particulate filter unit |
| GPS | global positioning system |
| GS | general support |
| GS-R | general support-reinforcing |
| GSA | general services administration |
| HE | high explosive |
| HEI-T | high explosive incendiary-tracer |
| HEMTT | heavy expanded mobility tactical truck |
| HF | high frequency |
| HHB | headquarters and headquarters battery |
| HIDACZ | high-density airspace control zone |
| HIMAD | high- to medium-altitude air defense |
| HMMWV | high mobility multipurpose wheeled vehicle |
| Home station | (DOD) The permanent location of active duty units and Reserve Component units (e.g., location of armory or reserve center). |
| HQDA | Headquarters, Department of the Army |
| HRV | high resolution visible |
| HSS | health service support |
| HZ | hertz |
| IBS | intelligence broadcast system |
| ICBM | intercontinental ballistic missile |
| ICC | information and coordination central |
| ICOFT | institutional conduct of fire trainer |
| ICOMS | integrated communications security |

| | |
|---|---|
| ICS | intercommunication system |
| ID | identification |
| IEA | interface electronic assembly |
| IEW | intelligence and electronic warfare |
| IFF | identification, friend or foe |
| IFV | infantry fighting vehicle |
| IJIMS | interim joint information message standard |
| ILS | integrated logistics support |
| IMETS | integrated meteorological system |
| IMMC | integrated material management center |
| IMT | institutional maintenance trainer |
| IMTS | improved moving target  simulator |
| IN | infantry |
| Information environment | (DOD) The aggregates of individuals, organizations, or systems that collect, process, or disseminate information; also included is the information itself. |
| Information operations | Actions taken to affect adversary information and information systems while defending one's own information and information systems. |
| INTEL | intelligence |
| Intelligence preparation of the battlefield | A continuous, integrated, and comprehensive analysis of the effects of terrain, weather, and enemy capabilities on operations. |
| INTERCOM | intercommunications |
| IOS | instructor operator station |
| IOT&E | initial operational test and evaluation |
| IPB | intelligence preparation of the battlefield |
| IR | infrared radiation/intelligence requirement |
| IRBM | intermediate-range ballistic missile |
| ISR | intelligence, surveillance and reconnaissance |
| ISU | integrated sight unit |
| J3 | operations directorate |
| JAOC | joint air operations center |
| JCS | joint chiefs of staff |
| JDN | joint data net |
| 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 |
| JFSOCC | joint force special operations component commander |
| JICO | joint interface control officer |
| JOA | joint operations area |
| Joint force air component commander | The JFACC derives authority from the JFC who has the authority to exercise operational control, assign missions, direct coordination among subordinate commanders, redirect and organize forces to ensure unity of effort in the accomplishment of the overall mission. The JFC will normally designate a JFACC. |
| Joint force commander | A general term applied to a combatant commander, subunified commander, or joint task force commander authorized to exercise combatant command (command authority) or operational control over a joint force. |
| Joint force land component commander | If designated by the JFC, the senior land commander in a joint force who exercises command and control of all assigned land forces. |
| Joint targeting coordination board | A group formed by the JFC to accomplish broad targeting oversight functions that may include but are not limited to coordinating target information, providing targeting guidance and priorities, and preparing and/or refining joint target lists. The board is normally comprised of representatives from the joint staff, all components, and if required, component subordinate units. |
| Joint theater missile defense | The integration of joint force capabilities to destroy enemy theater missiles in flight or prior to launch or to otherwise disrupt the enemy's theater missile operations through an appropriate mix of mutually supportive passive missile defense, active missile defense, attack operations, and supporting C4I measures. Enemy theater missiles are those that are aimed at targets outside the continental United States. |
| JOPES | joint operations planning and execution system |
| JOTS | joint operations tactical system |
| JRA | joint rear area |
| JSN | joint surveillance net |
| JSOA | joint special operations area |
| JSOTF | joint special operations task force |
| JSTARS | joint surveillance and target attack radar system |
| JTADS | joint TADIL-A distribution system |
| JTAGS | joint tactical ground station |
| JTAMD | joint theater air and missile defense |
| JTAMDO | joint theater air and missile defense organization |
| JTAR | joint tactical air request |
| J-TENS | joint-tactical exploitation of national capabilities |

| | |
|---|---|
| JTF | joint task force |
| JTIDS | joint tactical information distribution system |
| JTMD | joint theater missile defense |
| JTOC | jump tactical operations center |
| JTT | joint tactical terminal |
| JZ | joint zone |
| KG | kilogram |
| kW | kilowatt |
| KM | kilometer |
| kV | kill vehicle/kilovolts |
| L | liter |
| LACM | low altitude cruise missile |
| LADW | local air defense warning |
| LAN | local area network |
| LANDSAT | land satellite |
| LAR | logistics assistance representative |
| LAT | live air trainer |
| LAW | light antitank weapon |
| LB | pound |
| LCC | land component commander |
| LCD | liquid crystal display |
| LCR | large caliber rocket |
| LCS | launcher control station |
| LCU | lightweight computer unit |
| LEA | launcher electronic assembly |
| LED | light emitting diode |
| LID | light infantry division |
| LNO | liaison officer |
| LOC | lines of communications (logistic routes) |
| LOG | logistics |
| LOS | line of sight |
| LOS-R | line of sight rear |
| LRC | logistics readiness center |
| LRF | laser range finder |
| LRPT | large repair parts transporter |
| LRU | line replaceable unit |

| | |
|---|---|
| LS | launching station |
| LSA | logistics support analysis |
| LSDIS | light and special division interim sensor |
| LSMU | launcher and sensor mockup |
| LZ | landing zone |
| MAGTF | marine air ground task force |
| MANPADS | manportable air defense system |
| MAP | mission application program |
| MARFORCC | marine force component commander |
| MC | maintenance center |
| MCD | missile countermeasure device |
| MCO | movement control officer |
| MCOO | modified combined obstacles overlay |
| MCS | maneuver control system |
| MCT | movement control team |
| MDMP | military decision making process |
| MEF | marine expeditionary force |
| MEI | major end items |
| METT-TC | mission, enemy, terrain and weather, troops, time and civil considerations |
| MEZ | missile engagement zone |
| MHz | megahertz |
| MICC | master information and coordination central |
| MICOM | missile command |
| MILES | multiple integrated laser engagement simulator |
| MILSATCOM | military satellite communications |
| MLRS | multiple-launch rocket system |
| MMC | materiel management center |
| MOET | march order and emplacement trainer |
| MOPP | mission oriented protective posture |
| MOS | military occupational specialty |
| MPC | message processing center |
| MPH | miles per hour |
| MPN | MSE packet switch network |
| MRBM | medium range ballistic missile |
| MRE | meals ready to eat |

| | |
|---|---|
| MRL | multiple rocket launcher |
| MRP | missile round pallet |
| MRR | minimum risk route |
| MRT | missile round trainer |
| MSB | main support battalion |
| MSE | mobile subscriber equipment |
| MSI | multispectral imagery |
| MSR | main supply route/missile simulation round |
| MTOE | modified table of organization and equipment |
| MWR | morale, welfare, and recreation |
| N | north |
| NAI | named area of interest |
| NASA | national aeronautics and space administration |
| NATO | North Atlantic Treaty Organization |
| NAVCC | navy component commander |
| NBC | nuclear, biological, and chemical |
| NCA | national command authority |
| NEO | noncombatant evacuation operations |
| NGO | non-government organization |
| NICP | national inventory control point |
| NMD | national missile defense |
| NORAD | north american aerospace defense command |
| NTC | national training center |
| NTDS | naval tactical data system |
| OAC | officers advanced course |
| OB | order of battle |
| OBC | officers basic course |
| OCA | offensive counterair |
| OCOKA | observation, cover and concealment, obstacles, key terrain, and avenues of approach |
| OCU | operator control unit |
| OCWA | operations center work area |
| ODD | optical disk drive |
| Offensive counterair | Offensive operations to destroy, disrupt, or neutralize enemy aircraft, missiles, launch platforms and supporting structures and systems both before and after launch, but as close to their source as possible. OCA operations range throughout enemy territory and are generally conducted at the initiative of friendly forces. OCA |

operations include attack operations, fighter sweep, escort, and suppression of enemy air defenses.

| | |
|---|---|
| OIC | officer in charge |
| OLS | operational linescan system |
| OOTW | operations other than war |
| OP | observation post |
| OPCON | operational control |
| OPLAN | operation plan |
| OPORD | operation order |
| OPSEC | operations security |
| OPTASKLINK | operations task link |
| ORF | operational readiness float |
| OSI | operator system interface |
| PAC | patriot advanced capabilities |
| PADIL | patriot digital information link |
| PADS | position and azimuth determining system |
| PAO | public affairs officer |
| PASR | personnel accounting and strength reporting |
| Passive air defense | 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. |
| PATRIOT | phased array tracking radar intercept on target |
| PCOFT | patriot conduct of fire trainer |
| PDU | power distribution unit |
| PGS | precision gunnery system |
| PIMIT | patriot intermediate maintenance instructional trainer |
| PIR | priority intelligence requirement |
| PJHI | PLGR/JTIDS hybrid interface |
| PLGR | precision lightweight global positioning system receiver |
| PLL | prescribed load list |
| PLS | palletized load system |
| PMCS | preventive maintenance checks and services |
| POD | port of debarkation |
| POI | program of instruction |
| POL | petroleum, oils and lubricants |

| | |
|---|---|
| POMT | patriot organizational maintenance trainer |
| PPI | planned position indicator |
| PPS | precision positioning system |
| PPU | primary power unit |
| PRM | personnel readiness management |
| PSS | personnel service support |
| PTL | primary target line |
| PUB | publication |
| PZ | pick-up zone |
| R | reinforcing |
| R&S | reconnaissance and surveillance |
| RADC | region air defense commander |
| RC | reserve component |
| RCMAT | radio controlled miniature aerial target |
| RCS | radar cross section |
| RCT | remote control terminal |
| RCU | remote control unit |
| RF | radio frequency |
| RFI | radio frequency interface |
| RLRIU | routing logic radio interface unit |
| RMP | reprogrammable microprocessor |
| ROE | rules of engagement |
| ROTC | Reserve Officer Training Corp |
| ROW | rest of world |
| RPM | revolutions per minute |
| RPV | remotely piloted vehicle |
| RPVTS | remotely piloted vehicle trainer station |
| RRT | radio relay terminal |
| RS | radar set |
| RSI | radio subsystem interface |
| RSOP | reconnaissance, selection, and occupation of position |
| RSOI | reception, staging, onward-movement and integration |
| RSR | required supply rate |
| RSTA | reconnaissance, surveillance, and target acquisition |
| RT | return to duty; radio terminal |
| RTD | return to duty |

| | |
|---|---|
| RTO | radiotelephone operator |
| RW | rotary wing |
| RWCIU | radar weapons control interface unit |
| RWR | radar warning receiver |
| RWS | rigid wall shelter |
| S | secret/south |
| S1 | adjutant |
| S2 | intelligence officer |
| S3 | operations and training officer |
| S4 | logistics officer |
| SADC | sector air defense commander |
| SAM | surface to air missile |
| SATCOM | satellite communications |
| SCB | stinger control box |
| SDC | strategic defense command |
| SDI | strategic defense initiative |
| SDP | signal data processor |
| SDU | stinger distribution unit |
| SEAD | suppression of enemy air defenses |
| SEN | small extension node |
| SEP | spherical error probable |
| SHF | super high frequency |
| SHORAD | short-range air defense |
| SHORADEZ | short-range air defense engagement zone |
| SHTU | simplified hand held terminal unit |
| SIAP | single integrated air picture |
| SICC | subordinate information and coordination central |
| SICPS | standardized integrated command post system |
| SIGO | signal officer |
| SIMT | sentinel institutional maintenance trainer |
| SINCGARS | single channel ground and airborne radio system |
| SJA | staff judge advocate |
| SLBM | sea-launched ballistic missile |
| SLC | side lobe canceller |
| SMDC | space and missile defense command |
| SOC | sector operations center |

| | |
|---|---|
| SOE | state of emissions |
| SOF | special operation forces |
| SOJ | stand off jammer |
| SOJC | stand off jammer countermeasures |
| SOP | standing operating procedure |
| SOR | state of readiness |
| SPACECOM | space command |
| SPOD | sea port of debarkation |
| SPOT | systeme probatoire d'observation de la terre |
| SPINS | special instructions |
| SRBM | short range ballistic missile |
| SRPT | small repair parts transporter |
| SSDC | space and strategic defense command |
| SSI | sensor system interface |
| STANAG | standardization agreement |
| STL | secondary target line |
| STPT | stinger troop proficiency trainer |
| STS | sentinel training system |
| STU | secure telephone unit |
| Supply point distribution | A method of distributing supplies to the receiving units at a supply point, railhead, or truckhead. The unit picks up supplies using its own transportation and then moves the supplies to its own area. |
| Suppression of enemy air defenses | That activity which neutralizes, destroys, or temporarily degrades surface-based enemy air defenses by destructive and/or disruptive means. |
| SVM | stinger vision module |
| SVML | standard vehicle missile launcher |
| TAA | tactical assembly area |
| TAAMDCOORD | theater army air and missile defense coordinator |
| TACC | tactical air control center |
| TACDAR | tactical detection and reporting |
| TACON | tactical control |
| TACOPDAT | tactical operations data |
| TADIL | tactical digital information link |
| TADSS | training aids, devices, simulators and simulations |
| TAI | target area of interest |
| TAMD | theater air and missile defense |

| | |
|---|---|
| TASM | tactical air-to-surface missile |
| TBM | tactical ballistic missile |
| TCA | tactical control assistant |
| TCO | tactical control officer |
| TCS | tactical command system |
| TD | tactical director |
| TDA | tactical director assistant |
| TDDS | tactical data distribution system |
| TEL | transporter erector launcher |
| TENCAP | tactical exploitation of national capabilities |
| TERCOM | terrain contour matching |
| TERS | tactical event reporting system |
| TES | tactical event system |
| TF | task force |
| THAAD | theater high altitude area defense |
| Theater air and missile defense operations | All activities focused on the identification, integration, and employment of forces supported by theater and national capabilities to detect, identify, classify, locate, track, discriminate, minimize the effects of, and destroy air and theater missile threats (to include large caliber rockets). The preferred method to destroy air and theater missile threat is to destroy or disrupt operations prior to launch. The next most desired option is to intercept and destroy the threat in flight. TAMD must also apply measures to reduce vulnerability and minimize damage in the event attack operations and active defense measures are ineffective. |
| Theater missile | 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 such as Maverick or wire-guided missiles), whose target is within a given theater of operation. |
| Throughput distribution | Shipments that bypass intermediate level activities and go directly to the user in the supply system, avoiding multiple handling. |
| THT | tracking head trainer |
| TIBS | tactical information broadcast system |
| TM | technical manual; theater missile |
| TMD | theater missile defense |
| TMDE | test, measuring and diagnostic equipment |
| TNT | troop netted trainer |
| TOC | tactical operations center |
| TOW | tube-launched, optically-tracked, wire guided (missile) |
| TP | tactical planner |

| | |
|---|---|
| TPT | troop proficiency trainer |
| TRANSCOM | transportation command |
| TRAP | tactical receive equipment and related applications |
| TSA | theater storage area |
| TSG | tactical shelter group |
| TST | troop subordinate trainer |
| TSVC | through sight video camera |
| TTT | table top trainer |
| TTY | teletype |
| TVM | track via missile |
| TWA | tentage work area |
| UAV | unmanned aerial vehicle |
| UCOFT | unit conduct of fire trainer |
| UHF | ultrahigh frequency |
| Unit distribution | A method whereby supplies are delivered directly to the requesting unit by the support battalion using support battalion vehicle and manpower assets. The support battalion normally uses this method for emergency resupply to units and delivery of barrier materials to emplacement sites. |
| UPS | uninterruptible power supply |
| US | United States |
| USA | United States Army |
| USAADASCH | United States Army Air Defense Artillery School |
| USAF | United States Air Force |
| USASMDC | United states army space and missile defense command |
| USEUCOM | United States European Command |
| USCINCSPACE | United States Commander In Chief, Space Command |
| USMC | United States Marine Corps |
| USMTF | United States Marine Task Force |
| USN | United States Navy |
| USPACOM | US Pacific Command |
| USSPACECOM | United States Space Command |
| USTRANSCOM | United States Transportation Command |
| UTM/MGRS | universal transmercator/military grid reference system |
| UV | ultraviolet |
| VHF | very high frequency |
| VSTT | variable speed training target |

| | |
|---|---|
| W | west |
| WAD | weapons alert designator |
| WAN | wide area network |
| WCS | weapon control status |
| WEZ | weapon engagement zone |
| WMD | weapons of mass destruction |
| XO | executive officer |

# Bibliography

CJCSM 3500.04B. *Universal Joint Task List* Version 4.0. 1 October 1999.

Department of Defense Directive Number 5100.1. *Functions of the Department of Defense and Its Major Components.* 25 September 1987.

FM 34-1. *Intelligence and Electronic Warfare Operations.* 27 September 1994.

FM 34-130. *Intelligence Preparation of the Battlefield.* 8 July 1994.

FM 63-11. *Logistics Support Element Tactics, Techniques, and Procedures.* 8 October 1996.

FM 100-5. *Operations.* 14 June 1993.

FM 100-7. *Decisive Force: the Army in Theater Operations.* 31 May 1995.

FM 100-13. *Battlefield Coordination Detachment (BCD).* 5 September 1996.

FM 100-17-3. *Reception, Staging, Onward Movement, and Integration.* 17 March 1999.

FM 100-18. *Space Support to Army Operations.* 1 June 1995.

FM 100-103. *Army Airspace Command and Control in a Combat Zone.* 7 October 1987.

FM 101-3-1. *(ICAC2) Multi-service Procedures for Integrated Combat Airspace Command and Control.* 3 October 1994.

FM 101-5. *Staff Organization and Operations.* 31 May 1997.

FM 101-5-1. *Operational Terms and Graphics.* 30 September 1997.

Joint Publication 1-02. *Department of Defense Dictionary of Military and Associated Terms.* 23 March 1994 (as amended through 29 June 1999).

Joint Publication 3-0. *Doctrine for Joint Operations.* 1 February 1995.

Joint Publication 3-01. *Joint Doctrine for Countering Air and Missile Threats.* 19 October 1999.

Joint Publication 3-01.5. *Doctrine for Joint Theater Missile Defense.* 22 February 1996.

TRADOC Pamphlet 525-91. *Military Operations Theater Missile Defense (TMD) Warfighting Concept of Operations.* 1 October 1999.

BLANK

Bibliography-2

# Index

**By Order of the Secretary of the Army:**

ERIC K. SHINSEKI
*General, United States Army*
*Chief Of Staff*

Official:
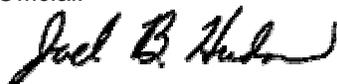
JOEL B. HUDSON
*Administrative Assistant to the*
*Secretary of the Army*
0007501

**DISTRIBUTION:**

*Active Army, Army National Guard, and U. S. Army Reserve:* To be distributed in accordance with the initial distribution number 114320, requirements for FM 44-100.