FIELD MANUAL
44-100

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Department of the Army
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FM 44-100

US ARMY AIR DEFENSE OPERATIONS

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PREFACE

FM 44-100 is the capstone doctrinal manual for the air defense battlefield operating system. It explains the Army's contributions to joint and multinational counterair and theater missile defense operations. It also addresses the full range of offensive and defensive actions to counter the air threat. This manual provides the doctrinal basis for integrating the air defense battlefield operating system 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 3-01.2 and 3-01.5. The contents apply to Army forces worldwide. These Army forces must adapt the doctrine to the specific requirements of each theater.

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

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3805	Doctrine and Procedures for Airspace Control in Time of Crisis and War--ATP-40(A)	4
3880	Counter Air Operations--ATP-42(B	2

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

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CHAPTER 1

INTRODUCTION

This chapter describes the air defense (AD) combat function, relates the tenets of Army operations to air defense, and defines the mission of air defense artillery (ADA). It also presents an overview of the manual and summarizes two successful air defense operations.

AIR DEFENSE IN THE THREE-DIMENSIONAL BATTLE

This field manual provides the doctrinal foundation for Army air defense operations in joint and multinational operations. Air defense is one of the seven combat functions, which also include intelligence, maneuver, fire support, mobility and survivability, logistics, and battle command. Air defense operations provide the force with 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.

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 enemy 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 tactical air-to-surface missiles (TASMs). Air defense includes both offensive and defensive actions.

The airspace of a theater is as important a dimension of joint operations as the terrain itself. 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 defense operations contribute to gaining and maintaining the desired degree of air superiority, provide force protection, and help win the information war.

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.

The Army's part in the theater campaign is diverse and requires a combined arms force. Air 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

The mission of US Army ADA is to protect the force and selected geopolitical assets from aerial attack, missile attack, and surveillance. This mission statement expands both the types of elements which require protection and the types of aerial threats air defense forces must destroy.

FORCES

While past ADA doctrine specified which forces and assets would receive air defense protection, the

current mission statement is not so restrictive. ADA commanders allocate assets 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

Geopolitical assets are nonmilitary assets that US, allied, or host nation civil authorities nominate for air 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 defense priorities list must be done at the highest levels. Geopolitical assets may include the territory of the USA.

THREAT

The threat is not limited to attack aircraft, helicopters, and tactical ballistic missiles. The threat includes all aircraft, indirect fire surface-launched missiles, aerial surveillance platforms, and theater missiles. An expanded list of threats driven by technological advances and proliferation now includes unmanned aerial vehicles, cruise missiles, intercontinental ballistic missiles, and satellites. Chapter 2 provides more detail and information on the threat.

CONSEQUENCES

The new mission statement greatly expands the range of possible ADA operations. Successful air and missile defense is key to generating and sustaining combat power in force-projection operations. The AD contribution to friendly efforts to counter enemy reconnaissance, intelligence surveillance, and target acquisition efforts has gained greater emphasis. Current and future Army ADA capabilities must synergistically combine with the AD assets of other services to defeat the new multifaceted threat. Army ADA forces participate in operations at all levels of war. At the strategic level, the future national missile defense system will provide protection against accidental, unauthorized, or limited launch of ballistic missiles against the United States. While capabilities do not currently exist to meet the full spectrum of ADA mission requirements, the mission statement provides ADA a clear vision for the 21st century.

AIR DEFENSE IN RELATION TO ARMY TENETS

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

INITIATIVE

ADA units take the initiative by participating in planning for both offensive and defensive counterair and theater missile defense operations. Air defense 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 enemy aerial reconnaissance platforms. ADA units engage air threats from directions and in ways that the enemy does not expect.

AGILITY

ADA units anticipate and counter enemy actions and react rapidly to changes in the situation. They quickly change from offense to defense, entry 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

ADA units are among the first units to deploy during force-projection operations and the last units to depart during redeployment operations. They conduct operations throughout the width and depth of the theater. ADA units achieve defense in depth using a system of systems approach, which gives multiple opportunities to defeat the enemy aerial threat. ADA systems see deep into enemy airspace to contribute to the commander's situational awareness and defeat air, missile, and surveillance threats at maximum range. Army air defense includes contributions from all battlefield operating systems and units.

SYNCHRONIZATION

Air defense units see beyond their immediate tasks and objectives to recognize how their efforts fit within the concept of the operation. They counter the entire aerial threat spectrum by integrating a system of systems. Air defense commanders integrate their operations horizontally with all battlefield operating systems and vertically with both higher and lower echelon air and missile defense units. Deep, close, and rear operations require simultaneous support.

VERSATILITY

ADA units meet diverse mission requirements. Commanders can 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.

AIR DEFENSE IN FORCE PROTECTION

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.

While contributing to all four elements of combat power, air defense 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 all the active and passive actions units take to preserve combat power and deny the enemy the ability to successfully attack the force.

Air and missile defense operations are important active force protection measures. Offensive counterair and 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. Besides air and missile defense, force protection has four components.

The first 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, counterreconnaissance, security operations, and fortified fighting positions. Air defense contributes to counterreconnaissance by destroying UAVs and aircraft conducting reconnaissance, intelligence, surveillance, and target acquisition (RISTA) operations against the force. Frequent moves disrupt the enemy command and control cycle. These measures help commanders protect their force from enemy observation throughout the conduct of operations. The

second component of protection keeps soldiers healthy and maintains their fighting morale. Commanders and leaders at all levels take care of their soldiers' basic health needs. They consider the welfare, morale, and spirit of soldiers as they build cohesion and unit esprit de corps.

Safety is the third component of protection and is 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 successful operations and the preservation of combat power.

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

AIR DEFENSE COMBAT FUNCTION

Air defense is one of the seven combat functions. The combat functions--intelligence, maneuver, fire support, air defense, mobility and survivability, logistics, and battle command--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 combat functions exist at all echelons of command from echelons above corps through battalion. 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. Air defense commanders synchronize their operations by integrating them horizontally with other combat functions and vertically within the air defense combat function.

RELATIONSHIP OF AIR AND MISSILE DEFENSE

Theater missile defense and theater counterair (theater air defense) operations are separate but highly related mission areas. As discussed earlier, counterair targets are manned aircraft and UAVs, while TMD targets are comprised of ballistic, cruise, and air-to-surface missiles. Operations to protect the force from theater missiles differ fundamentally from those actions taken to defend against the counterair threat.

Manned 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.

The aircraft threat is relatively cooperative when compared to missile threats. In addition to the fixed nature of aircraft-related support facilities, the operational battlespace (opportunities to engage) is much greater. While aircraft conducting operations against the force are exposed to defensive fires for tens of minutes, missile engagement opportunities are measured in seconds.

Though there are some areas where counterair and TMD operations overlap (for example, sensors, weapons, communications, et cetera), TMD and counterair command and control (C2) relationships differ. The unique challenges posed by theater missiles 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 counterair engagement operations. As a result of these conflicting demands, the joint force adopts separate C2 approaches which optimize TMD and counterair operations to best protect the force from each type of threat.

OVERVIEW OF MANUAL

The Army must be ready to fight enemies whose air, missile, and surveillance capabilities vary widely throughout the range of military operations. Successful air defense operations begin with a thorough understanding of the enemy's air capabilities, doctrine, and operations. Chapter 2 provides an overview of existing and future air threats.

Air superiority is crucial for success on the battlefield. Army air defense operations contribute to joint counterair and TMD operations. They protect the force from air and missile attack, aerial surveillance, and support the attainment of air superiority. Chapter 3 establishes the doctrinal foundation for discussion of Army air defense operations and their relationship to joint and multinational theater missile defense and counterair operations.

Chapter 4 describes the fundamental principles for the employment of Army air defense to include contributions from all battlefield operating systems. Battle command is the art of decision making, leading, and motivating soldiers and their organizations into action to accomplish missions. As with every component of combat power, the direction and control of ADA operations maximize their contribution to the effectiveness of the force. Chapter 5 details Army air defense battle command doctrine and tactics.

Army air defense plans and conducts operations at the strategic, operational, and tactical levels of war. Chapter 6 addresses ADA planning and execution at each echelon of command.

Chapter 7 addresses ADA logistics. The main theme is that ADA logistics follow standard Army doctrine, procedures, and organization.

Chapter 8 covers ADA's role in operations other than war (OOTW). Special emphasis is placed on the versatility of ADA forces and those circumstances where successful operations other than war require the contributions of air defense forces.

HISTORICAL PERSPECTIVE

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.

The Normandy campaign of June 1944, and the subsequent breakout, provide 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.

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 pilotless 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.

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.

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 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.

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.

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 tactical ballistic missile in combat. As indicated by the debris from the TBM which 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.

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 Hawkbatteries 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.

CHAPTER 2

THREAT

This chapter outlines the new global air and missile threats facing US forces. To counter the threat, it is first necessary to understand it. By focusing on an enemy's capabilities and methods of operations, air defense commanders can best employ their resources to protect the force and selected geopolitical assets.

CHANGING THREAT

Dissolution of the Warsaw Pact and the fall of the Soviet Union have resulted in changes to the worldwide geopolitical structure. The US no longer faces a communist block that poses a major threat to its security. The focus on internal political and economic reconfiguration in the former Soviet Union and the elimination of the Soviet troop presence in central Europe have reduced the likelihood of a super power confrontation. However, the world is now even more unstable due to increased nationalism and religious fundamentalism along with changing political affiliations. Regional conflicts and the proliferation of modern military technology mean that the Army must be prepared to face the full range of threat capabilities anywhere in the world with little notice. Potential force-projection missions range from operations other than war to full combat operations. Lack of a single, concrete threat doctrine and structure require an Army with operational flexibility and versatility.

It is difficult to determine which regional situations will require US force intervention. Rational and clearly recognized national goals and objectives are no longer the primary sources of conflict between nations. In addition, potential threat capabilities differ greatly in training, organization, and equipment.

These new threats in regional conflicts will pose a serious challenge to US military planners and intelligence personnel. We can expect to see future adversaries armed with the full spectrum of military hardware from pre-World War II vintage equipment to the most technologically advanced systems. Future adversaries will also differ in their dedication, competence, and ability to employ their weapons effectively. In the face of unpredictable and varied threats, a versatile, deployable, and lethal Army remains essential.

The air defense commander and staff must consider the broad spectrum of potential air and missile threats to successfully protect the force and geopolitical assets. The future air threat has changed greatly since the demise of the Warsaw Pact. Though still potentially dangerous, the manned fixed-wing aircraft is no longer the only threat to US ground forces.

Air defense commanders will no longer consider fixed-wing aircraft to be the principal threat to ground forces because US, allied, or coalition air forces will protect the force from most of the fixed-wing aircraft threat. However, there are a variety of other air and missile systems that can perform a wide range of missions against the joint force.

RECONNAISSANCE, INTELLIGENCE, SURVEILLANCE, AND TARGET ACQUISITION

Many countries worldwide are employing reconnaissance, intelligence, surveillance, and target acquisition (RISTA) systems for the detection and location of ground targets. These RISTA systems include imagery, signal, human, and measurement and signature intelligence sensors. RISTA is an essential combat-support function. Timely, accurate intelligence on the disposition and location of forces is a prerequisite for success in any military operation.

Conflicts in regions such as the Middle East, Eastern Europe, the Far East, Africa, Latin America, and South Central Asia represent potential threats to US interests. Countries in these areas have a wide range of RISTA capabilities. However, even with limited RISTA resources, most nations present a significant RISTA threat to US and allied or coalition forces.

All ground maneuver forces require protection from enemy ground, air, and naval attack. Successful counterreconnaissance operations prevent the targeting and attack of friendly forces. Threat reconnaissance efforts will be directed toward specific targets that reveal information on US force operations and intentions. This information, when passed to fire support systems, enables the threat commander to accurately engage high-value US targets and inflict heavy casualties.

Threat reconnaissance systems include unmanned aerial vehicles (UAVs), fixed- and rotary-wing aircraft, and satellites. Each of these systems will operate against particular type targets. Helicopters equipped for optical reconnaissance will operate against corps and division forces. UAVs will conduct RISTA against tactical and operational targets throughout the theater. These systems will provide rapid downlink of collected information to artillery and TBM fire control centers and maneuver forces. Fixed-wing reconnaissance aircraft will normally operate against corps or theater targets. The information they collect may take much longer to process and disseminate and will normally support targeting of deep attack assets, such as airfields or missile sites. Satellites can collect information on theater and strategic targets. Threat nations will use the information collected by satellites for national planning and strategic targeting. Denial of the enemy's RISTA efforts is essential for force protection.

HELICOPTERS

The versatility and survivability of helicopters make them ideal air assets for use in division and corps areas. There is great potential for their use in certain regions of the world. They were among the first platforms used by Iraq in its invasion of Kuwait.

Today, it is difficult to predict the helicopter tactics peculiar to a region or country. However, tactics employed will depend upon pilot training and the capability of the platform. Adequately trained, these forces can employ tactics that will make them very difficult to engage. Specifically, low-flying helicopters are difficult to acquire and target. Air defenders can usually expect enemy helicopters to attack in pairs, taking advantage of terrain-masking techniques. As system capabilities and doctrine change, air defenders can expect corresponding changes in tactics.

The armed utility helicopter offers a cheaper but very effective alternative to the attack helicopter. Armed utility and attack helicopters will probably serve as the principal close air support weapon system for most potential threat countries. They will pose a major threat to combat arms units in close operations.

Additionally, many potential threat countries actively train to conduct helicopter operations in

support of national or military objectives. Frequently, helicopters will insert special operations forces in enemy rear areas to disrupt command and control, and attack high-value targets. These troops are usually highly trained, extremely motivated, and highly survivable once on the ground. Therefore, it is advantageous to engage these forces before they land.

UNMANNED AERIAL VEHICLES

UAVs include powered and unpowered aerodynamic vehicles such as remotely piloted vehicles and drones. Comparatively, they are inexpensive, easily procured or manufactured, and extremely versatile. They have emerged as a new multifaceted threat. Their small size and radar cross-section and ability to fly low and slowly make them difficult to detect and track. The air defense focus on the UAV threat is increasing for several reasons. First, UAV technology is readily available to many countries.

Second, countries can procure them in large numbers. This is because UAV systems cost less than alternate systems with similar capabilities. Third, UAV systems are versatile and can perform multiple missions for the operational commander. UAVs can accomplish RISTA, attack, and deception or electronic attack missions. Fourth, UAV operators require much less training than pilots of manned aircraft, and a UAV's use does not place a pilot's life at risk. This is particularly important in cross-FLOT operations.

RISTA

RISTA UAV technological advancements will allow basing of RISTA UAVs to support the tactical and operational commanders. They can satisfy many of the commander's real-time collection requirements. UAVs give the enemy commander the ability to look over the next hill and see the adversary like few other intelligence collection systems. This can be done without risk to human life or high-value assets. Their varying operational altitudes and small size make them difficult to acquire and target. Information collected, if data linked to a fire control capability, can be used to conduct deep strikes by using long-range artillery and TBMs. UAVs are readily deployable and can effectively support the lowest levels of command. Properly employed, UAVs can pose a critical threat to US forces throughout the theater of operations.

Flight profiles for UAVs collecting information for RISTA purposes vary according to the mission. For example, surveillance missions require that the UAV remain on station for extended periods that require the use of figure eight or racetrack flight profiles. Deep reconnaissance and battle damage assessment missions require coverage over a specific area beyond the forward area. A jinking flight path is usually flown for this mission. Operators can modify the flight paths at their discretion.

ATTACK

Threat forces may use attack UAVs to fulfill many important tactical requirements. They can provide the threat commander the ability to conduct deep penetration and accurate attacks against well-defended targets without placing a pilot and a more expensive aircraft at risk. These systems are very survivable. Their small size, construction, and methods of propulsion all work together to make them difficult to detect and engage. Besides their ability to rapidly deploy, their low production, operations, and maintenance costs make them ideal for many nations. Attack UAVs are efficient, low-cost systems that can provide any nation with a cheap, state-of-the-art attack air force.

Several nations are developing and fielding antiradiation UAVs with the primary mission of attacking battlefield emitters. These platforms have many launch options and are usually fire-and-forget systems. Although they can perform many other missions, a primary function will be to attack enemy radars. Other UAV attack systems under development are infrared attack systems designed to kill vehicles and systems to replace attack aircraft for close air support or interdiction.

Attack UAVs fly at different altitudes and profiles according to the mission. They usually fly a straight path until they get to the target area. Then they will go into a programmable search or loiter mode to look for targets. Once the UAV detects the target, it will go into a terminal dive to destroy it. However, the UAV could use a reconnaissance flight path as a deception technique.

DECEPTION AND ELECTRONIC ATTACK

Deception UAVs have proven their worth and utility in combat. These UAVs can simulate combat formations and lure surface-to-air missiles away from attacking aircraft. Glider decoys can also trick air defense units into revealing their positions, making radars easy targets for air or antiradiation missile attacks. The ability to use decoy UAVs in support of aircraft and missile attack is becoming an attractive option for many threat commanders. The emergence of low observable technologies and advances in sensor, system control, and dispenser technology all contribute to the trend toward greater use of decoy-based countermeasures.

Another option for the operational use of UAVs is as electronic attack jammers. Some countries have produced communications jammer payloads for their UAVs. These electronic attack jammers combine the benefits of aerial electronic attack operations with the low cost and high survivability of UAVs.

THEATER MISSILES

Operation Desert Storm offers important lessons for both the US and potential adversaries. The dismal performance of Iraqi-manned aircraft in the face of US and coalition airpower, combined with the successful use of tactical ballistic missiles and land-attack cruise missiles mark a major shift in the nature of future air threats to US operatins. Theater missiles, in the form of tactical ballistic missiles, cruise missiles, and tactical air-to-surface missiles have become the major threats to US forces during all phases of force-projection operations.

CRUISE MISSILES

Cruise missiles are unmanned, powered, typically self-guided vehicles that fly at one or more predetermined constant (cruise) altitudes and carry a lethal payload. Cruise missiles present a formidable challenge to the air defender. They may be ground-, ship-, or air-launched; fly at low attitudes and provide high accuracy at long range. Their small radar cross-section and low infrared signature make them difficult to acquire and track. These attributes can provide the threat commander with more options to vary launch locations.

Cruise missiles come in a wide assortment of sizes and shapes with ranges varying from 50 to over 2,500 kilometers. To date, the shorter range antiship variants have proliferated extensively. Several countries are now developing land attack cruise missiles that employ new guidance technologies such

as imaging infrared, millimeter wavelength, and global positioning satellite. Future development of cruise missile technology will increase ranges, improve accuracy, and make them less expensive and more attractive to developing countries. These systems would most likely be used in a ground role against high-payoff, fixed, strategic, and theater targets.

TACTICAL AIR-TO-SURFACE MISSILES

Tactical air-to-surface missiles (TASMs) are closely related to cruise missiles. They are air-launched, and usually have a range of less than 150 kilometers. They employ command to line-of-sight, semiactive laser, electro-optical, and antiradiation homing seeker options. Because of their high speed and low radar cross-section, they also will be difficult to detect, track, and engage.

The antiradiation missile (ARM) TASM poses a significant threat to the air defender as an ARM can attack a radar from beyond the lethal range of the ADA system. ARMs are especially lethal when employed with decoy UAVs used to activate radars under attack.

Aircraft delivering laser type TASMs are particularly vulnerable because these missiles are very short-range, and the launch aircraft must continue its dive toward the target until missile impact. The electro-optically guided systems provide better aircraft survivability because this type of missile possesses significantly greater range, and consequently provides a greater standoff capability to the launch aircraft. The use of any of the TASMs requires some degree of air superiority of the airspace over the battlefield.

BALLISTIC MISSILES

The Persian Gulf War brought home the threat of missile proliferation with the use, by Iraq, of ballistic missiles. These systems forced the theater commander to dedicate considerable resources to counter this threat. High costs associated with fixed-wing aircraft and high-attrition rates against Western air forces make acquisition of ballistic missiles highly attractive to potential threat countries. By targeting population centers and using unconventional payloads, missiles can inflict unacceptable levels of damage on friendly countries. Ballistic missiles can be used as first strike assets or for retaliatory attack. Their speed of delivery and versatility of launch make them suitable weapons for surprise attacks. In addition, the expanding use of submunition warheads and intentional or unintentional penetration aids make them difficult targets for antiballistic missile systems to counter.

The primary motivations for a country to acquire ballistic missile technology are to change the regional balance of power and to increase the prestige of the country's armed forces. Development of ballistic missiles is an indicator of technological advancement of a nation's military industry. Acquisition of even a few missiles with mass destruction payloads commands the recognition of other countries in world affairs. The capability to inflict massive damage on neighboring countries could lead to regional instability, even if the intention to initiate conflict is absent.

Strategic

Strategic ballistic missiles are intercontinental ballistic missiles (ICBMs) and submarine-launched ballistic missiles (SLBMs). These weapon systems represent a threat to the continental US.

Despite the end of the cold war, there still exists the threat of accidental, unauthorized, or limited strategic strikes against the United States. These systems may carry a multitude of warheads: nuclear, biological, chemical (NBC); high explosive (HE), or submunitions. They can employ a variety of penetration aids, and their long ranges make them difficult to defeat.

Currently, the only producers of ICBMs are the United States, Russia, and China. Ukraine, Belarus, and Kazakhstan still have an ICBM capability leftover after the breakup of the union. These former Soviet Union states could potentially incorporate ICBMs into their own arsenals or make them available to other nations. Fixed ICBM launch facilities are easily targetable, but hard to destroy. Once launched, ICBMs are difficult to stop. They will target strategic political, civilian, or military assets, and will most likely carry unconventional warheads.

SLBMs are currently produced by the United States, United Kingdom, France, Russia, and China. The mobility of the submarine provides the commander launch location options unavailable to ICBM forces, which makes detection difficult. Targeting priority for SLBMs will be the same as for ICBMs.

Tactical

The psychological effect of tactical ballistic missiles (TBMs) was proven during Operation Desert Storm. Despite the inaccuracy of the Iraqi versions of the Scud missile, they caused the theater commander to divert limited air defense resources to defense of civilian targets in allied countries.

TBMs lack the range of ICBMs or IRBMs and the launch options of SLBMs. Yet they give many countries the ability to conduct military operations on a scale previously only engaged in by the super powers. With TBMs, countries can apply military force far beyond their national borders. These factors have caused TBMs to be the most proliferated air threat system.

The potential expansion of the battlefield by use of TBMs will compound planning and execution problems for the friendly commander. Due to the TBM's capability to hit targets far removed from the front, the commander must consider the security of widely dispersed assets. He may be hard pressed to offer adequate protection in all areas. Current enemy targeting capability limitations may not support the targeting of all mobile targets. However, fixed installations such as airfields, seaports, logistics sites, and battle command facilities are vulnerable to attack. Some threat nations can coordinate TBM attacks by conducting simultaneous, multiple launches against one or more targets. Most threat nations with TBMs also possess weapons of mass destruction. TBM development and fielding continue to produce faster, more accurate delivery systems.

TBM launchers are highly survivable, especially if used during periods of darkness or low visibility. Highly mobile launchers can move to hide positions within minutes of missile launch, making them extremely difficult to target by deep attack assets. The survivability of TBM launchers means most threat nations can sustain TBM attacks throughout the duration of US military operations in spite of joint operations to neutralize the threat.

FIXED-WING AIRCRAFT

The categories of threat aircraft include bombers, such as the Backfire; fighters, such as the Fulcrum and the Mirage III; fighter-bombers, such as the Fencer and the Flogger; ground attack fighters, such as

the Frogfoot; and reconnaissance aircraft, such as the Brewer. The trend among potential threat nations is toward smaller air forces and multirole aircraft due to escalating costs of fixed-wing aircraft. Multirole aircraft, such as the improved Flanker, Mirage F-1, and F/A-18 Hornet, will eventually replace many single-mission aircraft that are currently in operation. Missions can include strategic attack, air interdiction, close air support, electronic combat, and reconnaissance.

Air defenders can expect threat fixed-wing aircraft to attack high-payoff targets, such as seaports, airports, troop concentrations, ADA units, battle command nodes, and logistics sites. They will also attack targets of opportunity.

In most of the major regional contingency operations in which US forces are likely to participate in the near future, US forces can expect to find fewer threat aircraft dedicated to support ground attack and reconnaissance operations. This does not mean that the manned fixed-wing threat is gone. The threat may be able to peak in the beginning of a conflict, especially in conjunction with a preemptive strike. The enemy probably will not maintain that level of operations very long because of US and alliance or coalition counterair operations. However, US Army forces can expect to see a few aircraft that will survive US and allied or coalition offensive counterair operations. These aircraft would then become targets for air defense artillery.

ELECTRONIC WARFARE

A potential adversary can use electronic warfare (EW) as we do; that is, as an essential component of command and control warfare (C2W). As part of C2, EW can be used in conjunction with the enemy's counterintelligence to protect their C2 while attacking ours. Effective use of enemy EW as a decisive element of combat power requires coordination and integration of EW operations with the enemy commander's scheme of maneuver and fire support plan. The integrated use of EW throughout the battlefield can support the synergy needed to locate, identify, damage, and possibly destroy our C2 structure.

EW is an overarching term that includes three major components: electronic attack (EA), electronic warfare support (ES), and electronic protection (EP). The following paragraphs discuss each in more detail.

ELECTRONIC ATTACK

Electronic attack focuses on offensive use of electromagnetic or directed energy to attack friendly combat capability. It combines nondestructive actions to degrade or neutralize, such as electromagnetic interference, electromagnetic intrusion, electromagnetic jamming, electromagnetic deception, and nondestructive directed energy, with the destructive capabilities of antiradiation missiles and directed-energy weapon systems.

ELECTRONIC WARFARE SUPPORT

Electronic warfare support focuses on surveillance of the electromagnetic spectrum that directly supports a commander's electromagnetic information needs. This, in turn, supports immediate decision making for employment of EA, EP, targeting, or other actions such as threat avoidance, targeting, or homing. The commander could be the theater commander using EW data provided by national

collection resources or an ADA commander responding to a tactical ARM launch warning.

ELECTRONIC PROTECTION

Electronic protection focuses on protection of friendly forces against enemy employment of EW and against any undesirable effects of friendly employment of EW. This includes the protection of personnel, facilities, and equipment from destructive and nondestructive effects of electromagnetic and directed-energy warfare systems.

WEAPONS OF MASS DESTRUCTION

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.

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.

The 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 TBMs, aircraft bombs or rockets and spray, multiple rocket launchers, mortars, conventional artillery, CMs, UAVs, and or special forces.

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. Enemy forces will employ chemical agents to expose soldiers to a respiratory and a percutaneous agent threat by attacking with nonpersistent 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.

Insurgent or terrorist groups could manufacture or acquire chemical and biological weapons to attack ADA 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.

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.

SPACE

Space has become the new high ground for operations. Historically, military operations have focused on controlling key pieces of terrain, usually high ground. From this key terrain, one force could observe the other. In addition, the force occupying the high ground can use heavy weapons to destroy or disrupt enemy forces operating below them. The value of such high ground becomes critical not only to a tactical battle, but to the operational and eventually the strategic level of warfighting.

The use of satellites has become a major combat multiplier for any potential threat that has access to such systems. Many countries already have well established space programs to support their military forces. Several nations have taken steps to sell or share military and civil satellite capabilities to other nations. This means that many potential threat nations will have organic space assets to support operations. They may be able to acquire intelligence information or rent satellite space to enhance operations. Satellite operations will normally support threat theater and strategic level planning and operations.

GROUND THREAT

ADA units can also expect to face a significant ground threat that can influence operations. Divisional ADA units can expect to face the same levels of threat that the rest of the division will face from direct and indirect fire. However, air defenders operating in the forward area can also expect to face the enemy's attempt to deliberately suppress his operations with indirect fire in conjunction with air operations. Corps and theater air defense artillery assets, especially radars, are high-value targets for special operations forces and insurgent groups. These groups will attempt to conduct operations against air defense artillery units primarily to limit or shut down operations, or make a political statement. Characteristics of special operations forces and insurgent groups will differ from theater-to-theater or country-to-country. The air defense artillery unit commander must understand the ground force threat to the unit and tailor the plans and security to reduce the impact of this threat.

THREAT APPLICATION

During specific phases of US operations, different air threat weapons will be used against various US echelons and targets (see the Threat Laydown illustration). This air threat employment will vary from country-to-country and by operation, driven by threat equipment, capability, organizational structure, and military-political goals. By understanding air threat proliferation and equipment, we can make assumptions on how a threat may employ air assets to interdict US operations.

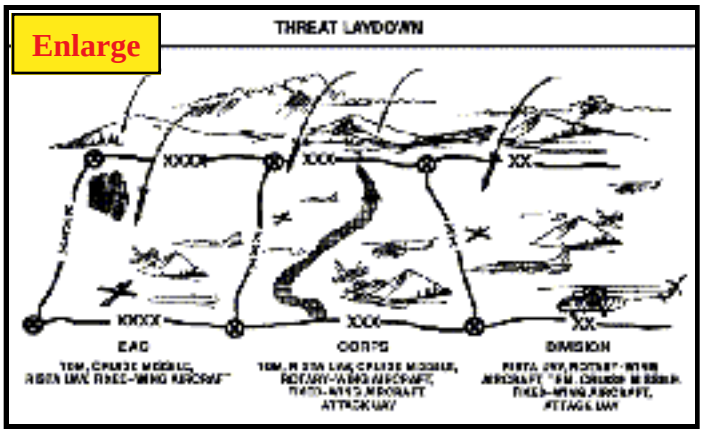

Figure 2-1. Threat Laydown

ENTRY PHASE

During entry operations, threat forces will conduct reconnaissance operations to monitor US force buildup and conduct target planning. Usually, threat forces will use fixed-wing assets due to the distance involved to the targeted area. Threat forces may also employ UAV systems, depending upon target distance and equipment inventory and capability.

Threat forces may launch an air campaign during this phase. Their primary objectives will be to slow the flow of US personnel and equipment into the area of operations and cause enough casualties to influence US public opinion. TBMs, fixed-wing aircraft, TASMs, long-range RISTA UAVs, and cruise missiles will attack known high-value targets, such as airports, seaports, logistics sites, ADA units, utilities, and political targets.

Fixed-wing operations could peak during this phase especially if threat forces launch a preemptive strike. Although the joint forces will protect the lodgment from air attack, small numbers of fixed-wing aircraft will continue to threaten the force throughout this phase. Suppression of enemy air defense (SEAD) aircraft escorting attack packages will attempt to suppress ADA units with TASMs. Whenever possible, attacking aircraft will launch TASMs before entering the engagement envelope of the ADA systems they are attacking.

Cruise missile attacks, if conducted, will be limited but very exacting. These systems will attack airports and seaports, and other fixed assets. They may employ weapons of mass destruction, but will usually conduct precision attacks against high-payoff targets using conventional munitions. TBMs will probably be the weapon system of choice during this phase. Their high survivability, range, penetration, and warhead options make them ideal during this phase of the operation. Their improving accuracy allows them to attack population centers and to close airports and seaports.

EXPANSION AND BUILDUP

The same weapon systems that were active in the initial entry phase will also be active during expansion and buildup. Their target types will expand to include assembly areas and choke points. NBC weapons can disrupt and delay the expansion phase. Threat use of UAVs conducting RISTA

operations will expand during this phase. Threat forces will be attempting to determine US intentions and use the information gathered by these sensors to interdict those operations. These RISTA missions will primarily target divisions and corps.

OPERATIONS PHASE

Threat air operations during this phase will continue as in the earlier phases and will include the use of helicopters. Helicopters will conduct air assault operations and close air support. The bulk of the threat manned and UAV air assets will operate primarily in the division and corps areas.

RECONSTITUTION PHASE

Most threat air assets will probably be unavailable by this phase. Further use of attack air systems will only reinitiate a decisive operations phase. Threat forces will still be interested in collecting intelligence on US forces. Any air reconnaissance assets left may continue operations during this phase.

CHAPTER 3

JOINT COUNTERAIR AND

THEATER MISSILE DEFENSE DOCTRINE

This chapter addresses joint doctrine for theater counterair and theater missile defense. It is based on joint publications. Unless stated otherwise, multinational procedures for alliances, such as the North Atlantic Treaty Organization (NATO), are the same as provided in joint doctrine. Multinational procedures for coalitions and interagency operations are developed on an ad hoc basis, but should be based upon joint doctrine.

ADA contributes unique capabilities for sustained operations as part of a joint, multinational, or interagency team. ADA will not operate alone. As part of the team, ADA protects the force by performing both theater counterair and theater missile defense operations.

Joint operations are the integrated military activities of two or more service components of the US military. Joint operations pose a dilemma to the enemy. As the enemy attempts to avoid the efforts of one service component, it becomes vulnerable to attack by another.

Multinational operations involve the military forces of two or more cooperating nations. If the relationship is long-standing and formalized, it is referred to as an alliance. If the relationship is short-term, ad hoc, and less formal, it is referred to as a coalition. The US will often pursue its objectives through coalitions and alliances. Regional conflicts may involve coalitions that could be different from long-standing, familiar alliance structures. This implies the need for flexible interoperability, accommodation of allied or coalition objectives and capabilities, and policy constraints. Maintaining cohesion and unity of effort requires understanding and adjustment to the capabilities, perceptions, and objectives of coalition members.

In an environment of joint and multinational operations, ADA units may also operate with other agencies of the US government. This is true not only during war when the military is the primary instrument of national power, but also when the military is in a supporting role.

JOINT COUNTERAIR DOCTRINE

This section outlines the doctrine to be used in joint counterair operations. A more detailed discussion is provided by Joint Pub 3-01.2. Counterair includes all measures and means designed to nullify or reduce the effectiveness of surveillance and attacks against the joint force by hostile fixed- and rotary-wing aircraft and UAVs. Air defense operations represent the Army's contribution to counterair operations.

Counterair operations are those operations conducted to attain and maintain a desired degree of air superiority by the destruction or neutralization of enemy air forces. Counterair operations include such measures as the use of interceptors, bombers, antiaircraft guns, surface-to-air missiles, and electronic countermeasures to destroy the air threat both before and after it is launched. 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.

OBJECTIVES

The objectives of counterair operations are to gain control of the air environment and to protect the 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 counterair must be a major consideration in the joint planning for those operations.

Counterair operations are conducted to protect the force and achieve air superiority. Air superiority, at the critical time and place, provides friendly forces a more favorable environment in which to perform air, land, and sea operations. Limiting the enemy's use of its air power increases our potential for success. Protection conserves the fighting force so that 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 counterair operations will depend on the overall situation and the joint force commander's concept of operations. Counterair operations affect air, land, and maritime battles, and often cross the boundaries between them. Thus, counterair operations are joint, and forces of all components may be used.

FUNDAMENTAL PRINCIPLES

Counterair operations should consider, as a minimum, the following five fundamental principles. These principles are similar to the principles of war but are adapted to the aerial dimension.

CONCENTRATION OF FORCE

The effective application of combat power requires that sufficient force or effects be concentrated at the critical time and place. This will ensure achievement of the joint force commander's aim.

ECONOMY OF EFFORT

Economy of effort is achieved through the correct selection and use of weapon systems, sound distribution of forces, and careful balance in the allocation of tasks. Economy of effort allows commanders to achieve effective concentration at the critical time and place and to conserve weapons for countering all enemy attacks.

UNITY OF EFFORT

Unity of effort in counterair operations is accomplished through the exercise of command by a single joint force commander over all assigned forces. The various types of operations conducted in support of the concept of operations should be complementary and aimed at fulfilling the overall mission. See the following illustration.

USE OF ALL APPROPRIATE FORCES

The unique capabilities of forces from all service components of the joint force should be considered in developing the joint force concept of operations. Army ADA forces provide capabilities which other service components do not possess such as the ability to protect the force from UAVs and rotary-wing

aircraft.

RESPONSIVE FORCE READINESS POSTURE

Potential aggressors will try to use surprise to their advantage. The readiness posture of forces must permit the joint force commander to counter an attack quickly and take full advantage of friendly force flexibility.

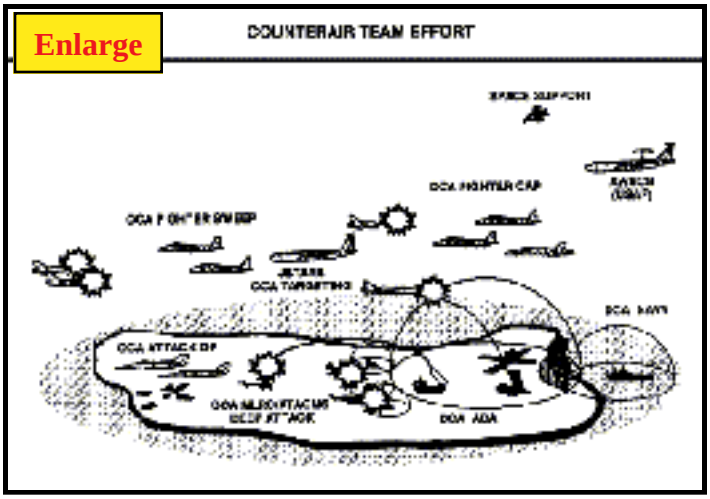

Figure 3-1. Counterair Team Effort

OPERATIONAL ELEMENTS

The ultimate goal of counterair operations is to control the airspace to allow commanders to execute their plans. The three types of complementary and mutually supportive operations that establish and maintain air superiority are offensive counterair, defensive counterair, and suppression of enemy air defenses. Offensive counterair (OCA) operations are mounted to destroy, disrupt, or limit enemy air power as close to its source as possible. They are conducted at a time and place of friendly force choosing rather than in reaction to enemy initiatives. Defensive counterair (DCA) operations are conducted primarily in reaction to enemy air offensive initiatives and include all measures and means designed to nullify or reduce the effectiveness of hostile air attacks against the joint force. Suppression of enemy air defenses (SEAD) is that activity that neutralizes, destroys, or temporarily degrades enemy air defense systems in a specific area by physical attack and or electronic warfare

CONDUCT OF OFFENSIVE COUNTERAIR OPERATIONS

Whenever hostile air power has the potential to threaten friendly operations, OCA operations must be considered for integration into tactical operations at all echelons. Allocation of forces to theater-level OCA 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 OCA targets into their fire support priorities. Though detailed planning and execution of theater-level OCA operations may be delegated to the joint force air component commander (JFACC), the overall direction will be established by the joint force commander.

TYPES OF TARGETS

OCA operations will attack enemy targets, in the air and on the surface, both offensive and defensive, and as close to their sources as possible. The following potential OCA targets should be considered in the conduct of OCA operations:

- Aerial vehicles (fixed- and rotary-wing aircraft and UAVs) on the ground, in flight, and at sea.
- Airfields and operating bases.
- Electronic warfare systems.
- C3 facilities and installations.
- Surveillance and control systems.
- Logistics and infrastructure which support air operations.

FORCES AVAILABLE FOR OCA OPERATIONS

The manner in which the OCA battle is prosecuted will depend on the forces and systems available and on their general capabilities, as discussed below. OCA in the joint area of operations may require contributions by all forces.

Aircraft

Aircraft conduct attack-strike operations against OCA targets on the ground or at sea. They also conduct fighter sweeps and air escort missions to destroy enemy aircraft in flight. Aircraft equipped for electronic warfare; aerial refueling; and surveillance, warning, and control also support OCA operations.

Missiles and Rockets

Surface-to-surface guided missiles, cruise missiles, and unguided rockets, such as ATACMS and MLRS, may be used in OCA operations.

Unmanned Aerial Vehicles

UAVs may be used for attack, surveillance, deception, jamming, decoy, or harassment operations against OCA targets or in support of other forces conducting OCA operations.

Surface Firepower

Artillery and naval gunfire may be employed against OCA targets. In addition, land-attack cruise missiles may be effective against stationary, soft targets such as unsheltered aircraft, or command and control facilities.

Special Operations Forces

Special operations forces (SOF) can conduct direct action strikes, collect intelligence, and provide terminal guidance for air attacks against enemy airfields, operating bases, and other facilities which support enemy air operations.

Maneuver

Though the majority of OCA tasks require the use of air and fire support assets, maneuver forces may also contribute to OCA operations. 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 OCA targets.

CONDUCT OF DEFENSIVE COUNTERAIR OPERATIONS

DCA operations provide a secure area from which all elements of the joint force can operate effectively. To accomplish this, DCA 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. DCA operations consist of both passive and active measures.

PASSIVE AIR DEFENSE

Passive air defense is a subset of defensive counterair operations. It 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 does not involve the employment of lethal weapons. Passive air defense measures by all elements of the joint force are essential to force protection. 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 air defense posture. These actions include--

Hardening of assets, including protection against electromagnetic pulse and transient radiation early effects.

- Providing a capability for rapid battle damage repair.
- Providing nuclear, biological, chemical defensive equipment and facilities. Providing sufficient assets to allow redundancy of systems and equipment. Providing alert, 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.
- Providing camouflage, concealment, cover, dispersal, and deception.
- Repositioning electromagnetic emitters to prevent targeting.
- Providing operations and communications security.
- Using limited visibility or hours of darkness for movement, resupply, and supporting operations.

ACTIVE AIR DEFENSE

Active air defense protects friendly forces and geopolitical assets by destroying attacking aircraft. 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, identify, track, intercept, engage, and destroy hostile or potentially hostile airborne targets. Integrated employment of air-to-air and surface-to-air systems through coordinated detection, 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 defense. Positive control and procedural measures may be implemented to ensure that friendly aircraft can safely transit the airspace without inhibiting air defense or other friendly operations. Regardless of other controls and measures imposed within defended airspace, all air 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

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

Weapon Systems

All systems have limitations such as reaction time, range, identification capability, and flexibility of operation. However, vulnerability or disadvantages of one type system are often offset or mitigated by the capabilities of another type system. Therefore, an effective active air defense requires a mix of weapon types and systems. This balance is required not only between aircraft and surface-to-air weapons, but also among the specific types of aircraft, missiles, and guns.

Command and Control Systems

All air defense operations are integrated through weapon 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 defense requires the provision and exchange of essential 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 real-time information requires the provision of adequate track capacity within systems and the cross-telling of tracks using data processing systems, and both 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 nonsecure data or voice broadcast. In addition, the command and control system should be survivable and have redundancy.

Air defense sensors are normally optimized to perform specific surveillance or control functions. To provide the spectrum of coverage required for air defense operations, a number of complementary systems are necessary. These 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 AD forces under all operational conditions. The command and control system may include--

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

Additional Contributing Systems

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

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.

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.

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.

Logistics and support agencies. These provide the continuity and sustainability required to enable the air defense force to accomplish its mission. Adequate and timely support must be planned, coordinated, and executed.

Civilian and military air control facilities. Air traffic control facilities in the area of operations may contribute vital information to air defense forces. These capabilities are exploited and, where possible, netted into the command and control system.

EXECUTION OF DEFENSIVE COUNTERAIR OPERATIONS

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

Hostile Criteria and Rules of Engagement

To avoid fratricide and to ensure the force is protected by a seamless air defense, engagement operations must be tightly controlled. This requires the delegation of engagement authority to the appropriate AD commanders, and the establishment of weapon control procedures and rules of engagement (ROE) by the area air defense commander (AADC). 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.

Employment of Air Defense

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 enemy 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.

Fighter-interceptor. Fighters may fly three basic missions. These missions, are explained in the following paragraphs:

- **Interception.** Intercept missions may involve three uses of aircraft. The scramble of aircraft from ground alert status, direction of aircraft from combat air patrols, or redirection of aircraft from other missions, are all possibilities.
- **Combat air patrol.** These missions enable rapid reaction to enemy intrusion and may be positioned well forward of areas to be defended. Patrols may also be conducted over a specific area; in support of friendly air or surface forces; over critical areas of a combat zone; and over air, land, and sea corridors.
- **Air escort.** Air defense aircraft may conduct air escort missions in support of other aircraft. Unescorted aircraft normally carry self-defense weapons.

Armed Helicopters. Air 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.

Surface-to-Air Weapons. Surface-to-air weapons are employed to protect the force as point defense weapons. These weapons potentially 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. 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 or coordination ensures both the minimum-risk passage for friendly aircraft and the means to deconflict employment of surface-to-air weapons and fighters.

COMMAND, CONTROL, AND COMMUNICATIONS

General requirements for command, control, and communications 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

Command relationships for all operations shall be per Joint Pub 0-2. The joint force commander (JFC) normally assigns responsibility for theater DCA operations to a single area air defense commander (AADC). Although detailed planning and execution of OCA operations may be delegated to the joint force air component commander (JFACC), the overall direction will be established by the joint force commander. With respect to the conduct of counterair operations, the following principles normally apply.

Exercise of Operational Control

The joint force commander exercises operational control of all assigned forces to ensure unity of effort. Normally, this authority is exercised through his component commanders. The counterair operation is conducted under the guidance of, and to achieve the objectives of, the joint force commander.

Command

Special operations forces; elements of service aviation, surface air defense, fire support; and electronic warfare forces that may be committed to counterair operations remain under the command of their respective components. Air 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 defense priorities of the joint force commander and his component and intermediate commanders. When conducting counterair operations (and or active missile defense operations) all air defense forces operate under the rules of engagement and weapon control procedures approved by the JFC and promulgated by the AADC.

COORDINATION AND INTEGRATION OF LAND-BASED AND MARITIME AIR DEFENSE

Land-based and maritime air defense resources are integrated into the joint force commander's defensive counterair concept of operations. Maritime air defense resources are coordinated with the appropriate land-based or airborne air defense command and control network. Similarly, land-based air defense resources employed in littoral operational areas are coordinated with the appropriate maritime air defense command and control network.

COMMUNICATIONS

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 countermeasures resistance, and flexibility to accommodate information exchange among levels of command, even when an intermediate level has been disabled.

To speed the exchange of essential information, it may be necessary to delineate the extent and type of information to be passed to specific command and control levels. Data transferred between command and control levels to exercise counterair 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.

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) who coordinates and integrates 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 noncombat 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 and missile threats.

RULES OF ENGAGEMENT

The effective use of counterair forces requires the establishment and understanding of common ROE. Unless already established by higher authority or an existing plan, the joint force commander shall establish the rules of engagement. The component and supporting commanders are responsible for ensuring compliance with the established rules of engagement. More information on types of ROE is in Chapter 5.

AIR DEFENSE INTEGRATION

The successful conduct of the counterair battle requires the integrated operation of all available air and missile defense weapon systems within a theater. Authority to integrate or coordinate air defense operations in a theater is delegated to the area air defense commander.

Authority to integrate does not imply command or control authority. Air defense operations must also be coordinated with other operations: air, land, sea, and space.

SELF-DEFENSE

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

JOINT THEATER MISSILE DEFENSE DOCTRINE

This section outlines doctrine for joint theater missile defense (JTMD) as contained in Joint Pub 3-01.5.

JTMD includes all measures and means to counter the theater missile (TM) threat posed by air-to-surface, subsurface-to-surface, and surface-to-surface missiles. TMs include short-, medium-, and intermediate-range ballistic missiles, tactical air-to-surface missiles, and cruise missiles. Army air defense and other forces conduct theater missile defense (TMD) operations in support of JTMD.

Theater missile defense operations are conducted to detect and destroy enemy theater missiles and enemy aircraft armed with air-to-surface cruise missiles. TMD also includes actions to destroy enemy theater missile launchers, command and control and logistics assets, and to disrupt hostile TM operations. TMD employs an appropriate mix of mutually supportive offensive and defensive measures. TMD operations include the contributions of surface-to-air missiles, bombers, SOF, attack helicopters, surface-to-surface missiles, and interceptors to destroy the TM threat both before and after it is launched.

OBJECTIVES

The primary objective of JTMD is to ensure that the JFC has the freedom to conduct joint operations without undue interference from TM operations conducted by the enemy. Supporting objectives are to deter enemy use of TMs, and to protect the force and areas of vital interest from TM attack. In addition, JTMD must detect and target TM systems; detect, warn, and report a TM launch; and coordinate a multifaceted response to a TM attack, integrating that response with other combat operations. Finally, JTMD operations reduce the probability of, and or minimize the effects of, damage caused by a TM attack.

OPERATIONAL ELEMENTS

JTMD is composed of four operational elements: passive defense; active defense; attack operations; and command, control, communications, computers, and intelligence (C4I). 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. See the TMD Operational Elements illustration 3-2.

PASSIVE DEFENSE

Passive defense applies to measures initiated to reduce vulnerability and to minimize the effect of damage caused by TM attack. Passive defense includes TM early warning and NBC protection, countersurveillance, deception, camouflage and concealment, hardening, electronic warfare (EW), mobility, dispersal, redundancy, recovery, and reconstitution.

ACTIVE DEFENSE

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

ATTACK OPERATIONS

Attack operations apply to operations initiated to destroy, disrupt, or neutralize TM launch platforms and their supporting command, control, and communications (C3); logistic structures; and reconnaissance, intelligence, surveillance, and target acquisition (RISTA) platforms. Attack operations include offensive action by air, land, sea, space, and special operations forces.

COMMAND, CONTROL, COMMUNICATIONS, COMPUTERS, AND INTELLIGENCE

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 missile warning sensors and ground stations. C4I provides command authorities at all levels with timely and accurate data and systems to plan, monitor, direct, control, and report TMD operations.

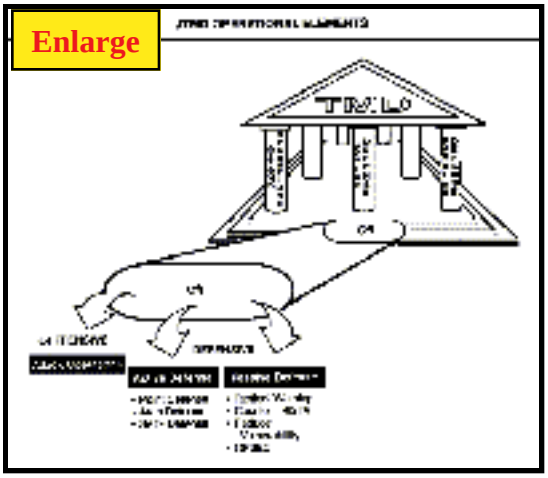

Figure 3-2. JTMD Operational Elements

CONDUCT OF THEATER MISSILE DEFENSE OPERATIONS

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, transitioning to JTMD operations, and the four operational elements of JTMD. Though discussed sequentially, the four elements are normally executed simultaneously.

PREPARATION FOR WAR

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 are intelligence preparation of the battlefield (IPB); JTMD preparation and training; and operations planning. During operations planning, forces are organized, known and suspected enemy TMs and TM-related targets are prioritized and assigned, and ROE are established to protect assets and provide freedom of maneuver for friendly forces. The plan should include passive defense measures, along with a concept of operations for active defense and attack operations. A detailed discussion of IPB and air defense planning is provided in Appendices A and B. As discussed in the following paragraphs, requirements and planning considerations for a contingency theater are different than those for a mature theater.

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, target acquisition, and

communications 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.

During the peacetime phase, forces are organized, enemy targets prioritized and assigned, and ROE established to protect assets and provide freedom of maneuver for friendly forces. Passive and active missile defense measures and attack operations are planned.

Contingency Theater

In an immature or contingency theater, the availability of TMD active defense from the initiation of the operation 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). The Navy may provide limited active defense of forces and assets in the littoral. Counter-RISTA 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.

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 Navy is in support of land operations, Navy and land-based JTMD operations must be coordinated to ensure unity of effort.

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.

TRANSITION TO WAR

The first indication of an impending act of war may be 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.

Army 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 and 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.

CONDUCT OF PASSIVE DEFENSE OPERATIONS

Passive missile defense measures provide protection for friendly forces and facilities. Through thorough IPB, which is timely, relevant, accurate, and predictive, methods of TM attack may be anticipated and passive measures chosen for employment before, during, and after attack. The objective of passive

missile defense is to degrade the enemy's ability to target US, host nation, and allied forces and facilities. Passive defense also reduces vulnerability and increases survivability, and provides for reconstitution and recovery of forces. Passive missile defense measures protect combat forces by reducing the effects of the TM attack. The measures used to accomplish passive defense are--

- Tactical warning of missile attack.
- Reducing targeting effectiveness.
    - OPSEC.
    - Deception.
    - Mobility.
- Reducing vulnerability.
    - Hardening.
    - Redundancy and robustness.
    - Dispersal.
    - Training civilian authorities.
    - NBC defense.
- Recovery and reconstitution.

Theater CINCs 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 triggers 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 CINC's tactical warning requirements are supported by national and theater intelligence and warning systems.

Of primary importance for tactical warning of ballistic missile attack are the tactical event system (TES) and the joint tactical ground station (JTAGS). 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. A more thorough discussion of missile warning capabilities is provided in Appendix C.

CONDUCT OF ACTIVE DEFENSE OPERATIONS

The role of active missile defense is to destroy incoming TMs in flight for the protection of selected assets and forces. This includes attack of ballistic missiles, air-to-surface missiles, antiship missiles, and cruise missiles as early as possible during the flight trajectory, and the attack of aircraft equipped with TASMs and cruise missiles. Defensive measures also include those actions which mitigate the effectiveness of targeting and delivery systems through electronic and electro-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.

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 IPB, launch warning, launch point prediction, threat classification, impact point prediction, weapons system cueing, communications, damage assessment, et cetera.

During the latter phases of a missile's trajectory, incoming missiles are destroyed by surface-to-air missiles. Because an enemy attack may integrate aircraft and missiles, active missile defense must be coordinated with the joint counterair system.

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. Active missile defense operations defend only what is most important and critical due to resource limitations. The JFC, component commanders, and intermediate commanders establish priorities for TMD and accept risk, should the enemy attack lower priority assets which are not defended. The principal contributors to active missile defense operations include surface-to-air missile systems, and aircraft which engage enemy airborne launch platforms.

COMMAND AND CONTROL

The JFC exercises control of active defense operations by integration of JTMD systems and forces into the C4I systems supporting theater counterair operations. Component commanders retain OPCON of their active defense TMD forces and conduct TMD operations within their areas of operations per AADC-developed, JFC-approved ROE and airspace control measures to protect their forces and the JFC's air and missile defense priorities. Corps commanders employ their organic active defense TMD forces similarly.

Effective control requires continuous surveillance of likely missile launch areas. A confirmed launch triggers reaction by a preplanned 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.

RULES OF ENGAGEMENT

Appropriate ROE should be established by the JFC for both air and missile threats. Cruise missiles, like UAVs, present ROE challenges due to the fact that they have radar characteristics similar to manned aircraft. Additionally, ROE for ballistic missiles should be as permissive as possible in order to facilitate rapid engagement of hostile missiles.

PLANNING

Active missile defense planning begins with IPB. Upon completing initial analyses, the joint or multinational force commander provides his concept and mission priorities. The commander finalizes decisions on apportionment of resources after the staff completes its comparison and analyses of the various courses of action. Intelligence capabilities are identified and designated for TM detection, acquisition, and identification. Threat priorities and ROE are established for engaging both enemy aircraft and missiles. Units are designated to protect critical assets or areas of the theater, fleet operating areas, and the battlefield.

EXECUTION

Active missile defense operations are decentrally executed according to joint doctrine, multinational procedures, and applicable rules of engagement. An enemy launch observed and identified through surveillance systems triggers near-real-time active missile defense and attack operations. This initiates passive missile defensive actions by military units and civilian authorities. Army active missile defense will include contributions from division, corps, and theater ADA units.

TM trajectory data are passed in near-real-time directly to surface-to-air point defensive systems. Enemy launch locations and other targeting information are passed simultaneously to appropriate units and commands with missions to conduct attack operations.

Active defense systems attack threat missiles to destroy warheads or disrupt guidance systems. Missiles are attacked at maximum range to reduce damage to the targeted area. To protect against attack by TBMs, Army active defense systems are employed in a task force consisting of a long-range, high-altitude upper

tier defended by THAAD and several lower-altitude, point defense lower tiers defended by Patriot.

CONDUCT OF ATTACK OPERATIONS

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; RISIA 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.

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, 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 radars to locate and target enemy TM systems, their components, and supporting nodes.

Systems used to support attack operations may include rotary- and fixed-wing aircraft in air-to-air and air-to-surface operations, surface-to-surface missile forces, SOF, antisubmarine forces, EW systems, and maneuver forces. 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. 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.

COMMAND AND CONTROL

Designation of engagement areas, assignment of AOs, 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 TMs outside the other component commanders' AOs.

Effective attack operations require real-time coordination between all component commanders as well as continuous wide-area surveillance over the entire AOR. Coordination of attack operations involves the detection, acquisition, and identification of enemy TMs and the dissemination of the targeting information to the designated attack system for execution.

PLANNING

Planning for attack operations begins with the IPB process. IPB is conducted, including surveillance of likely TM launch areas, and prediction of enemy TM activities. Upon completing the initial analyses, the JFC issues guidance on the concept and priorities for TM attack operations. Based upon the JFC's 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.

Effective JTMD attack operations require 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. Established, the joint targeting coordination board may be an integration center for this effort or serve as a JFC-level review mechanism. Because of

the mobility of TM systems, the time to acquire, target, and attack TM elements may be very short. Thus, an accelerated execution cycle using the decide-detectdeliver-assess process is required. Based upon preestablished JFC approved priorities and ROE, enemy TM targets are attacked by the most appropriate attack system as soon as detected.

Throughout the planning cycle, commanders continually reassess friendly and enemy dispositions. They use all available intelligence to anticipate enemy attack plans, predict TM system dispositions, and plan appropriate attack responses.

EXECUTION

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, decentrally executed, and governed by applicable joint policies, doctrine, and procedures.

COMMAND, CONTROL, COMMUNICATIONS, COMPUTERS, AND INTELLIGENCE

JTMD C4I functions are performed through an arrangement of personnel, equipment, communications, facilities, data bases, and procedures. They are designed for planning, directing, coordinating, and controlling forces to accomplish JTMD.

LINKAGES

The C4I system must use its resources efficiently to support management of JTMD operations without significant loss to other operational capabilities. 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 poststrike assessments to the appropriate JTMD element. For each operational 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.

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, 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.

PLANNING

C4I planning begins with the JFC 's estimate of the situation, objectives, and overall concept of operations. Based on the commander's guidance and priorities, appropriate subordinate commanders task forces and resources. To ensure complementary efforts and to achieve synergism, 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.

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.

INTELLIGENCE SUPPORT REQUIREMENTS

The intelligence system must provide current, integrated, accurate, and timely all-source information of enemy capabilities and activities. The intelligence system must accommodate a variety of service, 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.

EXECUTION

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

Some theaters may have offensive constraints or limitations, requiring a reactive JTMD 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 TM systems and their supporting operations. Intelligence preparation must provide near-real-time data on enemy TM, 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.

Launch warnings provide for the alert and increased readiness of friendly defensive assets and the employment of offensive and passive countermeasures. performing the vital operating functions which prepare Increasing the readiness posture includes weapon systems, RISTA assets, and command and control nodes for the level of enemy activity anticipated.

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

An observed and 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 response. In-flight enemy 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.

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 enemy missile data to ensure targetable accuracy. National or theater sensor and surveillance assets may search areas which will then require more refined RISTA activities by theater and tactical assets. Friendly aerial reconnaissance, ground surveillance systems, and other intelligence assets requiring cueing are focused rapidly to achieve the necessary accuracies for IPB targeting objectives.

RESPONSIBILITIES AND COMMAND RELATIONSHIPS

The conduct of JTMD 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. This paragraph sets forth the responsibilities and command relationships of the various commanders, staff elements, and components involved in conducting JTMD operations in both joint and multinational operations environments.

COMMANDER IN CHIEF

The CINC of a geographic combatant command, as the JFC, establishes theater guidance and objectives for JTMD. He has combatant command (COCOM) of all assigned forces. The CINC uses joint staff elements and component commanders and their staffs to plan, monitor, advise, coordinate, and execute the overall operations, including TMD. The CINC delegates command authority to assigned or attached subordinate commanders.

JOINT FORCE COMMANDER

The JFC has operational control (OPCON) of those forces assigned to him. 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.

The JFC establishes guidance and objectives for JTMD. He uses component commanders, component staff, and joint staff elements to plan, monitor, advise, coordinate, and execute the overall operations to include JTMD. 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 JTMD. Component commanders conduct JTMD operations under the guidance and in support of the objectives of the JFC.

JFC STAFF

The JFC is supported by the staff in the joint operations center. The JFC uses the staff to plan, monitor, advise, and coordinate overall operations. The joint staff develops and issues the JFC-approved concept of operations, which includes JTMD operations. The JFC's concept of operations, issued to component commanders, should include guidance and objectives but not be limited to the following:

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

operations, such as sensor and attack assets and special operations forces.
- Identification of areas of responsibility.

COMPONENT COMMANDERS

The component commanders plan and execute all JTMD 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 which the component commanders must protect with their assigned active defense forces. Close coordination among component commanders, the JFC, and the AADC (if designated) is necessary to employ the most appropriate resources and measures to execute JTMD 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 JTMD operations.

MULTINATIONAL OPERATIONS CONSIDERATIONS

Counterair and TMD operations are required within the context of an alliance, coalition, or other international arrangement. Within this context, the JFC is either subordinate to or may be the multinational CINC. In either event, the JFC must consider those areas peculiar to multinational operations which 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

Requirements, responsibilities, and organizational considerations for conducting counterair and TMD in a multinational operations 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 which 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

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 counterair and TMD assets are provided for defense within JFC-established priorities. This may entail introducing counterair and TMD assets from another theater. For this reason, counterair and TMD 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

Consensus on the enemy threat, a clearly defined chain of command, and a responsive, interoperable command and control structure are crucial to successful multinational counterair and TMD 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

The threat 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

National forces are assigned counterair and TMD 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

C4I systems must be sufficiently interoperable to respond to the needs of the multinational command. Information critical to counterair and TMD needs are identified and systems are established to speed the flow of critical information throughout the multinational chain of command.

INTELLIGENCE

Intelligence requirements in support of counterair and TMD operations must be determined and prioritized to plan the collection and analytical effort and to allocate appropriate resources to these functions. US forces which are part of multinational commands will be supported by some number of national intelligence systems to augment their organic intelligence systems. These must be integrated to ensure responsiveness to operational needs.

RULES OF ENGAGEMENT

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

WARNING

Planning for, and dissemination of, warning and attack prediction to civil authorities must be considered by multinational commanders. They must establish simple, effective systems.

EXERCISES

The 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 counterair and TMD 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 DEFENSE OPERATIONS

This chapter describes the principles and fundamentals for the employment of the air defense combat function, and the integration of AD capabilities into combined arms operations.

To achieve decisive victory, the Army must have the capability to deploy overwhelming combat power on the battlefield to defeat enemies quickly with minimum casualties. Successful air and missile defense operations are key to generating and sustaining combat power in force-projection operations. ADA will be challenged to provide protection of committed forces and assets throughout the theaters of operations and in the US.

To counter the spectrum of aerial threats, current doctrinal initiatives are built on the premise that a seamless defense must be the overall goal of the air and missile defense efforts. Air threats confronting US forces today and in the future are divided into those best addressed by manned aircraft and those best countered by surface-based systems. As such, air- and surface-based air defenses seek efficiency by avoiding duplication.

The Army requires ADA to counter ballistic and cruise missiles, UAVs, satellites, and helicopters, and to defeat any fixed-wing aircraft that avoid destruction by joint and multinational fighter aircraft. Synergy in the joint arena results from sound doctrine, proper training, and a common understanding of joint force relationships and procedures.

JOINT, MULTINATIONAL, AND INTERAGENCY OPERATIONS

Combatant commanders seek the synergy inherent in joint operations by synchronizing the complementary warfighting capabilities of all the components and supporting commands into a unified effort. Participation in joint training exercises and joint doctrine development 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.

Forward-presence 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.

ADA forces must be prepared to conduct a number of operations that integrate warfighting and operations other than war. Robust liaison will facilitate understanding, coordination, and mission accomplishment.

INTEGRATION OF ARMY AIR DEFENSE CAPABILITIES

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

TOTAL FORCE

ADA conducts operations as a total force of Active and Reserve Components and civilians. ADA brigades are task-organized with a mix of active and reserve component battalions. Some ADA battalions have an active component and a reserve component roundout. ADA coordinates and integrates with joint and multinational air defense forces.

TYPES OF FORCES

ADA has a wide mix of forces available to accomplish the mission. In fact, an air defense employment principle supports a mix of capabilities. ADA units can be long or short range, high or low altitude, and mobile or semimobile. Individual systems may have widely varying capabilities against different threat classes. The commander tailors the force to defeat the enemy and protect the force. The commander must also integrate the efforts of combat support and combat service support forces.

BALANCE

The components of combat power can be joined in a limitless array of combinations. 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 enemy RISTA activities is essential to protect friendly forces and assets, and to maintain surprise and the freedom to maneuver.

COMBINED ARMS

Just 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 combat, combat support, and combat service support 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 which have been thoroughly rehearsed.

TECHNOLOGY

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 with doctrine.

LEVELS OF WAR

The 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 war and operations other than war.

STRATEGIC LEVEL

Strategy involves the art and science of employing armed forces with other 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.

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.

National missile defense is inherently a strategic operation. Satellite defense, depending on the expected outcome, may also be a strategic operation. Defense against air and missile attacks which originate outside the CINC's battle space may be theater-strategic operations.

Defense of theater-strategic forces and geopolitical assets may also fall into the strategic level of war. Many operations other than war 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.

EAC air defense commands 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

The focus at the operational level is on conducting joint or multinational operations--the employment of 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.

EAC and corps ADA brigades usually plan and execute at the operational level of war. In some situations, ADA battalion are employed to protect operational forces and assets.

TACTICAL LEVEL

The tactical level of war 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 enemy. Battles and engagements are planned and executed to accomplish military objectives. Tactics is battlefield problem-solving--usually rapid and dynamic in nature. ADA brigades and battalions conduct operations at the tactical level.

PLANNING CONSIDERATIONS

Planning is a continuous process that begins with the assignment of guidance and continues until the mission is accomplished. 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, an awareness of the total mission, anticipation of future events, and application of the battlefield framework.

SIMULTANEOUS OPERATIONS

More than one campaign can occur concurrently within the same theater. Operations go on simultaneously throughout the commander's battle space. A wide variety of combat and noncombat

operations requires synchronization to achieve designated objectives. A single unifying concept of operations synchronizes actions taken at each level of war against the enemy. 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.

TOTAL MISSION AWARENESS

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 battle space. By having a total mission awareness, the commander thinks about immediate tasks to accomplish and about activities before and after the immediate tasks.

TEAMWORK

Deterring aggression and, if need be, winning wars are the team's common goals. Americans culturally respond to and respect teamwork as an important value. An effective fighting force requires teamwork which 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

Army planning requires the complete definition of the mission, expression of the commander's intent, completion of commander and staff estimates, and development of a concept of operations. These 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. Mission orders which specify what the subordinate commands are to do without directing how they must do it are often the best.

SEQUENCING OPERATIONS

Army commanders determine the best sequence of operations to achieve a tempo which will reach the desired objective. Commanders consider a variety of factors which affect sequencing decisions. Force-projection operations are complicated by a rapidly changing enemy situation. The sequence that commanders choose, therefore, should not rule out future options but should be flexible enough to accommodate change.

Phases

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 also determine conditions for phases. Logistics is crucial to phasing. Operational planners must consider establishing logistics bases, lines of communications, priorities for services and support, and protection of logistics. Logistics, then, is key to sequencing the major operations of a campaign; and air defense is critical to protection of all logistics activities.

Branches and Sequels

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.

Branches. 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.

Sequels. 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

Deception operations are designed to mislead enemy decision makers by distorting, concealing, and falsifying friendly intentions, capabilities, and dispositions. The deception objective is the enemy commander. The goal is to mislead the opposing military commander, prompting the enemy to conduct activities that unwittingly serve friendly purposes.

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 having less to do with what is to be done, but deceiving the enemy as to exactly when, where, how, or who will accomplish the missions.

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.

REHEARSALS

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 to validate its feasibility, logic, and adequacy of its battle command measures. While rehearsals with combat units usually occur at the tactical level, headquarters at the operational level 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.

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 flexible to accomplish both tasks.

WEAPONS OF MASS DESTRUCTION

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. Planning for the possibility of their use against friendly forces is critical to campaign design.

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.

ADA units provide for the protection of the force and geopolitical assets from many forms of chemical or biological air or missile attack. Current capabilities against nuclear air or missile attack must be improved. ADA soldiers must be prepared to survive, fight, and win under conditions produced by weapons of mass destruction.

BATTLEFIELD FRAMEWORK

A battlefield framework helps commanders relate their forces to one another and to the enemy in time, space, resources, and purpose. This battlefield 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), battle space, and operations in depth. Proper relationships allow for simultaneous operations and massing of effects against the enemy.

US joint doctrine establishes a preferred framework where joint forces can apply combat power simultaneously throughout the land, sea, air, and space dimensions of the theater. Thus, US Army doctrine also prefers such a battlefield framework. Selecting choices to lay out that framework is the business of both tactical- and operational-level commanders and staffs.

THEATER STRUCTURE

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, the forces allocated for the theater, the strategy for employment, the factors of mission, terrain, troops, and time available (METT-T), and the presence of alliance or coalition structures.

In operations other than war, CINCs focus their efforts through the designation of an AO. If required, the AO may be further subdivided into a joint operations area (JOA), joint zone (JZ), or joint special operations area (JSOA).

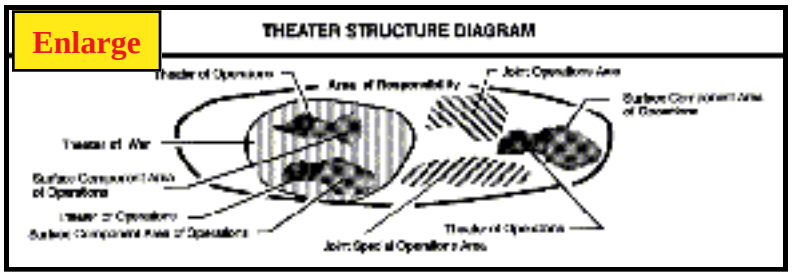

Figure 4-1. Theater Structure Diagram

In war, the CINC achieves focus through the designation of a theater of war (see preceding diagram 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.

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. Finally, the theater commander would continue normal peacetime activities throughout the remainder of the AOR. 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.

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 (LOCs), and other agencies required to support forces in the field. The COMMZ includes air and seaports that support the flow of forces into the theater. It is usually contiguous to the CZ but may be separate--connected only by thin LOCs.

AREA OF OPERATIONS

A theater of war will normally contain more than one theater of operations, which can extend from friendly ports and logistics areas to distant sources of enemy support. Within a theater of operations, the JFC may define the lateral, rear, and forward boundaries of a geographical area of operations, including the airspace above. Subordinate commanders may also define smaller AOs as the conditions of METT-T dictate. Within the AO, the supported commander has the authority to control and synchronize the timing, priority, and effects of joint force actions consistent with the higher commander's intent and concept.

The AO must be appropriate in size and design so that the commander can accomplish the mission and protect the force. It should allow for employment of all systems to the full extent of their capabilities.

If a land component commander is designated, an AO may be assigned. This determines what activities occur within the AO and how they contribute to mission accomplishment. The commander allocates parts of this area to subordinate commanders, usually using zones or sectors. Commanders at all levels have the full range of measures described in FMs 101-5 and 101-5-1 to help them control operations within their AO. Generally, however, they should use the minimum measures necessary for effective control of combat and sustaining activities.

ADA units are typically assigned an area of operations also. This area is actually three-dimensional as it encompasses the airspace above. The AO may be called a missile, joint, or low-altitude air defense engagement zone. It may not exactly correspond to the supported unit AO.

AREA OF INTEREST

The area of interest is the area of concern to the commander, including the area of operations and his battle space, 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 which could jeopardize the accomplishment of the mission. The area of interest for ADA commanders includes all areas from which the enemy could launch aircraft or missiles against the protected force. The area of interest overlaps those of adjacent and higher units, to include areas to the rear of the AO. The area of interest helps to focus the information requirements of commanders from battalion to echelons above corps.

BATTLE SPACE

Battle space is an intellectual tool that the commander uses to first see the battlefield, then to dominate it. Within a given battle space, commanders must understand the effects of geography and terrain, appropriately apply use of organic capabilities, and integrate joint and multinational assets that can be brought to bear against the enemy. The commander is aware of the battle space vertical and horizontal

considerations of ADA systems' performance and the implications this has on both engagement and force operations.

Commanders seek to dominate the enemy in a given battle space. Battle space is a physical volume that expands or contracts in relation to the ability to acquire and engage the enemy. It includes the breadth, depth, and height in which the commander positions and moves assets over time. Battle space is not assigned by a higher commander and extends beyond the commander's AO. It is based on the notion that commanders expand their thinking to develop a vision for dominating the enemy and protecting the force before any mental constraints are emplaced, such as boundaries. This gives them complete freedom of thought to envision operations according to existing and projected factors of METT-T.

Battle space includes the combat power of all friendly forces that can be brought to bear on the enemy, including joint and multinational forces. It contains the physical, three-dimensional view of the battlefield, which can later be depicted with operational graphics. Battle space also includes the operational dimensions of combat, including time, tempo, depth, and synchronization.

At the lower tactical levels, battle space is determined by the range of direct and indirect fire systems and the terrain on which they are applied. The higher the echelon, the greater the complexity and number of variations of battle space. An ADA brigade commander envisions the multinational battle space of ADA battalions' short- and long-range weapons, airborne and ground sensor systems, and other assets.

Unity of effort is essential to operations within a given battle space. Ownership of assets is less important than application of their effects toward an intended purpose. In that way, battle space can overlap, shared by two adjacent commanders who perceive ways to employ their respective assets to mutual advantage.

Battle space must be used to every possible advantage. It is best to see, target, and hit the enemy at a distance from which he cannot hit back. Conversely, if the enemy has distinct advantages at long range, the counter may be to move in closer to deter the enemy from using firepower that may endanger its own forces.

Understanding battle space allows commanders to keep options open, protect and sustain forces, synchronize combat power, and keep the enemy off balance. As the commander considers the mission, he can visualize how the battle space should look at different times as the unit moves against the enemy. This helps to determine how to task-organize and position units during different phases.

Effective commanders have always known how to use battle space. The tempo of operations today has accelerated to the point that all commanders must learn to dominate their battle space. That space has expanded dramatically as have events and combat systems that can impact on it. The challenges to control battle space have increased as have the penalties for failing to know what is where within that space and how those resources can be respectively protected, denied, damaged, or destroyed. ADA leaders will be challenged to constantly remind supported commanders of the requirement to dominate the aerial dimension of battle space.

Commanders use the concept of battle space to help determine how the terrain and all available combat power can be used to dominate the enemy and protect the force. Eventually, this vision becomes the battlefield framework from which their intent and concept of operation are derived. Understanding battle space allows commanders to synchronize combat power against the enemy and keep the enemy from extending its battle space to its greatest range. As commanders consider their mission, they visualize how they can make best use of their battle space. This helps them determine how they might task-organize and position their units. By understanding how to visualize operations in depth, commanders can synchronize operations to disrupt the enemy in depth, to throw it off balance, to attack its functions, and to set the conditions for decisive victory.

BATTLEFIELD ORGANIZATION

Commanders visualize their battle space to set the relationship of friendly forces to one another and to the enemy in time, space, resources, and purpose. Once commanders decide the purpose and relationship of battlefield activities, they determine how to arrange them within the breadth, depth, and space of the battlefield to meet their considerations of METT-T. This, in turn, helps them relate their activities to those of the enemy over time.

Three closely related sets of activities characterize operations within an AO--deep, close, and rear operations. Army commanders fight deep, close, and rear actions simultaneously in a manner that appears to the enemy as one continuous operation. They seek to attack the enemy simultaneously throughout the depth of the battlefield and mass both effects and forces when and where necessary to accomplish the mission.

Consistent with the JFC's plan, assets of other members of the joint team are used to accomplish these attacks as well as operate outside tactical depths to achieve simultaneous attacks throughout the theater. Fighting within this framework thus requires constant synchronization. The lines between these actions may be transparent and will often shift. Sometimes time and space are separated between these elements. Commanders arrange deep, close, and rear operations consistent with orders they have received and in a way that accomplishes the mission at least cost.

Reaching the decisive point quickly is the aim. The factors of METT-T determine the relationship between assets committed to close, deep, and rear operations. Commanders must see the entire AO and react promptly to developments anywhere within it.

Understanding time-space relationships and systems capabilities is vital to minimize reaction times and contributes directly to maintaining the momentum of operations and the initiative. It is important to know not only the location of the enemy but also how fast friendly and enemy commanders can react to each other's initiatives.

Synchronization of deep, close, and rear operations is a complex undertaking. It requires a clear understanding of the commander's intent. Effective operations in depth require dynamic, anticipatory responses to synchronize a variety of assets, including space-based systems. The ultimate success in synchronizing deep, close, and rear operations determines the outcome of battles, major operations, and campaigns.

Deep Operations

Deep operations are those directed against enemy forces and functions beyond the close battle. They are executed at all levels with fires, maneuver, and leadership. Protection provided by air defense is embedded in the plan. Deep operations affect the enemy through either attack or threat of attack. They expand the battlefield in space and time to the full extent of friendly capabilities. Effective deep operations facilitate overall mission success and enhance protection of the force.

The deep battle is designed to shape the battlefield by nullifying the enemy's firepower, disrupting command and control, destroying supplies, and breaking morale. A well-orchestrated deep battle may help cause the enemy to be defeated outright or may prevent it from achieving intended objectives. ADA leaders are active proponents in nominating counterair and TMD targets for attack by Army or joint assets.

While the enemy is best defeated by fighting him deep, it may be necessary to fight close and deep simultaneously. In doing so, Army forces use deep operations to set the conditions for decisive future operations. Attack of enemy formations at depth delays, diverts, or reduces enemy combat capabilities and hastens enemy defeat. These operations enable friendly forces to choose the time, place, and method

to fight the close battle.

While firepower plays an essential role in the conduct of deep operations, the integrated application of firepower and maneuver makes the Army's deep attack capability effective. Airborne and air assault forces, attack aviation, and high-speed armor forces provide the land component and joint force commanders the capability to thrust deep into the battlefield to seize facilities and destroy key enemy functions that would be too expensive or risky to attack by other means.

Maneuver at depth will often require dedicated air defense protection. Successful deep maneuver requires the synchronization of supporting assets, including systems organic to Army echelons and those of other services or multinational forces.

Close Operations

Forces in immediate contact with the enemy are fighting close operations. Close operations are usually the corps and division current battles. At the tactical level, they include the engagements fought by brigades and battalions. Commanders should dictate when and where to fight decisive close battles. Only ground forces can dominate the terrain through close operations. Close battle occurs where, when, and against whom commanders choose to commit assault formations. Normally, it takes close operations on land to gain decisive and lasting battlefield effects.

The concept of close operations is sufficiently elastic to adjust to the conditions of a wide range of combat situations. Commanders must concentrate forces only when necessary for decisive effects, preferring to concentrate effects instead. Deciding between concentration of forces or massing of effects is a function of METT-T. Friendly forces are most likely to be attacked by rotary-wing aircraft during close operations. Air defense of close operations focuses on this threat while retaining the tactical flexibility to protect the force from attack by all the others.

Rear Operations

Rear operations assist in providing freedom of action and continuity of operations, logistics, and battle command. Their primary purposes are to sustain the current close and deep fights and to posture the force for future operations. At the operational level, rear operations support current operations and posture the force for the next phase of the major operation or campaign. At the tactical level, they enhance the commander's ability to influence the tempo of combat, helping him take advantage of any opportunity without delay. At either level, rear areas may not be contiguous with forward areas, complicating both protection for rear area forces and sustainment of forces fighting close operations.

Rear operations can be the targets of the enemy's deep attack. To preclude diverting assets needed for close operations, commanders train and equip units involved in rear operations to protect themselves against all but the most serious threats. Active air defense should be provided by dedicated ADA units. By providing defense in depth, the air, missile, and surveillance threats can be defeated or reduced in strength prior to their arrival in the rear. All units must be able to take self-defense measures (both active and passive).

THEATER COMBAT OPERATIONS

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 defense operations.

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

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

The theater campaign plan originates with broad, strategic guidance from the National Command Authority, Joint Chiefs of Staff, or coalition 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.

The 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 which support the theater strategy and 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, a general concept for follow-on campaign operations, and campaign sustainment guidance.

The component commanders assist in preparing the theater campaign plan, and they 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 plan.

Roles of the Components in the Campaign

The US Army, Air Force, Navy, and Marine Corps, as well as allied and coalition 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.

The Army's role in the theater campaign is also multidimensional and requires combined arms. The Army's combat functions directly support land operations. These systems also support and are integral to 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 illustration 4-2 depicts an example of integrated Army and Air Force support required to conduct the theater campaign.

THE AIR OPERATION

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. The JFACC is responsible for air operations planning, allocation, direction, and execution, and for control of air operations.

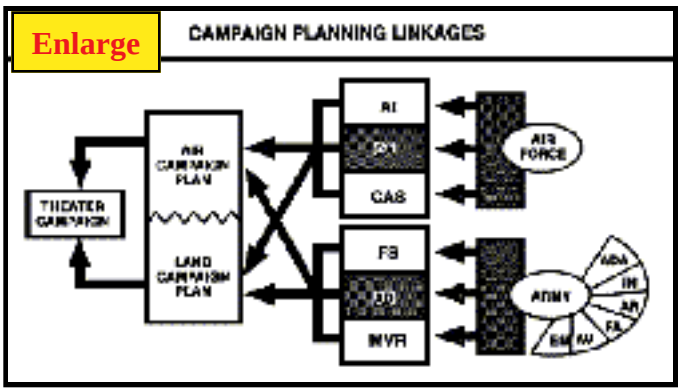

Figure 4-2. Campaign Planning Linkages

Joint Air Operations

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 which 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 air interdiction.

Counterair and Theater Missile Defense Operations

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 Defense

Chapter 3 introduced the three operational elements of counterair operations. They are OCA, DCA, and SEAD. Chapter 3 also introduced the four operational elements of theater missile defense. Known as the four pillars of TMD, they are active defense, passive defense, attack operations, and C4I.

General Requirements of Counterair and Defense Operations

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

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

ARMY AIR DEFENSE MISSION, COORDINATION, AND PLANNING

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 is a major contributor, providing a wide spectrum of air and missile defense-capable systems and forces. The theater objectives of Army air defense are to preserve combat power, to gain the initiative, and to support offensive operations (see the following illustration).

THEATER OBJECTIVES OF ARMY AIR DEFENSE

Preserve combat power

- Passive measures
- Active measures

Gain initiative

- Reduce threat capability
- OCA: Attack threat assets
- TMD attack operations: Attack threat assets
- DCA: Destroy attacking threat target
- TMD active defense: Destroy attacking threat missiles
- Enable transition of counterair assets

Support offensive operations

- Protect forces/assets
- Preserve freedom of maneuver

AIR DEFENSE MISSIONS

At the 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.

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.

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.

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

Field artillery units can attack TBM 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.

All combat, combat support, and combat service support branches participate in the air 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.

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 successively lower levels of command, 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.

At the theater level, the commander must control the airspace to protect strategic critical 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. They also control forces capable of destroying enemy air power on the ground or in the air. Objectives of air defense at the corps 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.

Since 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.

APPORTIONMENT

The contribution of Army assets, particularly ADA, to the joint counterair and theater missile defense mission is important to other air and ground operations. 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.

Attack operations may be factored into OCA, but can be accomplished in other mission areas such as interdiction. Once air superiority has been established by joint forces and Army air defense, the JFC can reduce the apportionment of capabilities and forces to counterair. These assets can then be tasked in support of other air, naval, and ground operations. Therefore, the Army air defense contribution to the counterair and theater missile defense operation is a major factor in providing the ground force commanders greater combat air power to achieve their objectives.

FORCE-PROJECTION CONSIDERATIONS

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 operations other than war. ADA commanders and forces will routinely be required to plan and execute multiple concurrent activities.

Force projection is a complex process in which each action affects many others. ADA units should not expect to move smoothly from one stage to the next. 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 are able to execute them successfully.

LETHALITY

Credible, robust, lethal, and tailored 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 ADA 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. A tailored ADA 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

ADA commanders and units everywhere in the Army must expect to be alerted and deployed with little prior warning. This attitude enables ADA forces to mentally and physically prepare. 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 ADA 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

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. Initial and follow-on ADA reinforcement forces can then be tailored to meet the specific concerns of the long-term mission. Commanders consider the factors of METT-T, strategic lift, pre-positioned assets, and host nation and joint or multinational support when they tailor forces.

Commanders might find they 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 which builds the cohesion that is essential for mission success. 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

The intelligence combat function must provide timely, relevant, accurate, and predictive all-source intelligence on enemy capabilities and activities. As described in FM 34-1, the following principles are

critical to IEW operations:

- The commander drives intelligence.
- Intelligence synchronization.
- Broadcast dissemination.
- Split-based operations.
- Tactical tailoring.

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 (PIRs). Each commander must broker subordinate commanders' intelligence requirements. Then intelligence assets are tasked to meet those requirements.

BATTLE COMMAND

Force-projection operations will tax 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. Tactical 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.

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 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

Successful ADA force projection requires tailorable, flexible, modular logistics. The nature of logistical projection depends on the factors of METT-T. Force projection may require the development of forward support bases, intermediate staging bases, and lodgments in theater. Contracted logistics may provide some initial support. Split-based logistical operations (part in theater and part in the US) reduce the burden on the deployment flow and preclude unnecessary stockage in theater. A split-based logistics concept relies on assured communications systems.

TRAINING

Demanding and relevant training focused on the ADA mission 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 enemy, and other conditions permit. 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 hostilities cease.

MULTINATIONAL OPERATIONS

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

Allied or coalition counterair and missile defense requirements must be incorporated into the overall plan. Likewise, allied or coalition capabilities must be maximized during operations.

MEDIA IMPACT

The impact of visual media on the conduct of ADA operations is substantially greater today than in any previous era. When hostilities begin, tactical ADA commanders are normally separated from the media's visual presentations, which are usually available at the theater and national levels. 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 targeting, combat damage, and friendly force deployment data; and weaken public support.

POSTCONFLICT CONSIDERATIONS

At all stages of force-projection operations, commanders at all levels must consider issues related to the end state 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 postconflict operations.

FORCE-PROJECTION OPERATIONS

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.

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 include mobilization, predeployment activities, deployment, entry operations, operations, postconflict or postcrisis operations, redeployment, and demobilization. The following paragraphs discuss the potential stages of force-projection operations.

MOBILIZATION

Mobilization is a process in which the armed forces augment the active component capability in preparation for war or other national emergencies. Mobilization includes activating all or part of the Reserve Components as well as assembling and organizing personnel, supplies, and materiel; and certifying the proficiency of individuals and units. The mobilization system includes five levels which can support the mobilization for specific, limited contingencies up to extended mobilization necessary to support large, protracted wars. The actual mobilization flow for a unit also includes five phases from planning to port of embarkation.

ADA commanders must be involved in the mobilization process because an extensive part of their task organization is from the Reserve Components. Some Patriot battalions have reserve component roundout batteries. All ADA units will receive individual augmentees to round out their strength. Details of the mobilization process are in FM 100-17.

PREDEPLOYMENT ACTIVITY

Since all units are an integral part of the force-projection strategy, units' mission-essential task lists must reflect appropriate mobilization and deployment tasks. ADA unit training must emphasize all critical aspects of force projection.

Force tailoring 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 lift requirements consistent with METT-T. ADA commanders use available time to complete training and certification as well as building new team cohesion. For forward presence forces, it also may be necessary to provide air defense force protection and counter-RISTA during this stage.

DEPLOYMENT

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, yet 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-T 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, combat capability, sustainment, and lift, along with the need to forecast future events that call for decisions early in the deployment stage.

ADA commanders are responsible to provide force 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 geopolitical assets during the initial phases of the deployment. Counter-RISTA will also be a significant part of the responsibilities of the ADA commanders, especially with respect to UAVs. Protection of joint air defense priorities may outweigh defense of service priorities.

ENTRY OPERATIONS

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 force will be critical to the success of this phase of the operation.

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.

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 which may require the following:

- Establishing forward operating and logistics bases.
- Closing the remainder of the force.
- Expanding the lodgment.
- Linking up with other forces.
- Preparing for future operations.

Positioning the forces must achieve initial mission success and also maximize future employment

options.

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-RISTA 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-RISTA operations deny the enemy targeting information which is key to the enemy sustaining a productive air or missile attack. Units conducting counter-RISTA 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 enemy RISTA throughout the AO. This is particularly critical to deceiving the enemy on the US intended course of action.

OPERATIONS

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 while it moves and to mask the move from the enemy. ADA units may be involved in deception operations related to repositioning the force.

Army commanders normally seek to engage enemy 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 characterize ADA operations. Counter-RISTA and force protection remain 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.

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 tailored to their mission and capabilities. Examples of AD estimates and annexes are at Appendix B. ADA commanders use employment principles and guidelines to design air 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-T, IPB, and the air defense priorities.

Air Defense Employment Principles

There are four principles which commanders apply when planning active air defense operations. These principles are mass, mix, mobility, and integration.

Mass. Mass is the concentration of air defense combat power. It is achieved by assigning enough firepower to successfully defend the force or the asset against air and missile attack or surveillance. To mass air defense combat power, commanders may have to accept risks in other areas of the battlefield.

Mix. 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 problem of the attacker. All joint and multinational arms resources are considered when applying this principle. Proper mix causes the enemy to adjust their tactics. Tactics designed to defeat one system may make the enemy vulnerable to another system.

Mobility. Mobility is the capability to move from place to place while retaining the ability to perform

the air defense mission. The mobility of air 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.

Integration. 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 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. This includes integration with joint and multinational forces.

Air Defense Artillery Employment Guidelines

Six employment guidelines apply when planning and positioning ADA resources. The guidelines are mutual support, overlapping fires, balanced fires, weighted coverage, early engagement, and defense in depth. Which guidelines apply to a given situation depend upon METT-T. See the illustration 4-3.

Mutual support. 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 nonoperational units or units at lower states of readiness.

Overlapping fires. Overlapping fires are achieved by positioning weapons so their engagement envelopes overlap. Because of the many altitudes from which the threat can attack or surveil, the defense planner must apply mutual support or overlapping fires vertically and horizontally.

Balanced fires. 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.

Weighted coverage. Weighted coverage is achieved by combining and concentrating fires toward the most likely enemy 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.

Early engagement. 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.

Enlarge

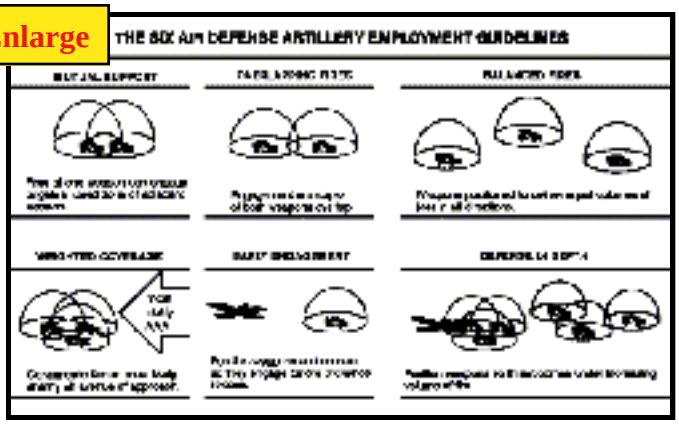

Figure 4-3. The Six Air Defense Artillery Employment Guidelines

Defense in depth. 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 threat will reach the defended asset or force.

Air Defense Priorities

The ADA commander considers METT-T, IPB, and the supported commander's intent and concept of operations before establishing air 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. See the following illustration.

CONSIDERATIONS FOR AD PRIORITIES

ADA commander develops and recommends air defense priorities to the supported commander.

- Considers METT-T, IPB, and the supported commander's intent

Priorities developed in consideration of ***criticality, vulnerability, recuperability,*** and ***threat.***

- **Criticality**--The degree to which an asset or force is essential to mission accomplishment.
- **Vulnerability**--The degree to which an asset or force is susceptible to surveillance and attack or to damage if attacked.
- **Recuperability**--The degree to which an asset or force can recover from inflicted damage to continue its mission.
- **Threat**--The probability an asset or force will be targeted by enemy air.

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.

Vulnerability. Vulnerability is the degree to which an asset or force is susceptible to surveillance and attack or to damage if attacked. Consideration should be given to the asset's or force's hardness, its specific mission in the overall operation, its ability to disperse or displace to another position, its capability to provide for its own air defense, and the amount of protection afforded by its passive air defense measures.

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.

Threat. The probability of an asset or force being targeted for surveillance or attack by enemy air must be assessed. The use of threat information to develop AD priorities is a reverse IPB process--what we expect enemy air to surveil and attack, based on IPB. Targeting information provided by intelligence estimates, past enemy surveillance and attack methods, and enemy doctrine is useful in evaluating air

defense priorities. To determine the relative importance of assets and forces, the ADA commander considers certain characteristics which make an asset or force a lucrative target for the enemy. In effect, this is reverse target value analysis.

POSTCONFLICT OR POSTCRISIS OPERATIONS

When hostilities cease or a truce is declared, deployed forces transition to a period of postconflict operations. This transition can occur in one part of a theater while combat operations are still underway in other parts. Postconflict operations focus on restoring order, minimizing confusion following the operation, reestablishing host nation infrastructure, preparing forces for redeployment, and continuing presence to allow other elements of national power to achieve the overall strategic aims. Postconflict operations place demands on every level of command. Batteries may be called upon to conduct humanitarian assistance and population control. ADA units may be called on to control prisoners, handle refugees, and perform other required humanitarian assistance activities.

However, the postconflict 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.

REDEPLOYMENT

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

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, ADA forces must be prepared to counter desperation or retaliatory air and missile attacks.

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 premobilization levels of readiness, regeneration of logistics stockpiles, and the accountability of mobilized equipment and supplies.

DEMOBILIZATION

Demobilization is the process by which units, individuals, and materiel transfer from active to a premobilization posture. Although the overall focus is generally on units and individuals, the demobilization of logistics also requires significant resources. Lessons learned must be captured before demobilization is completed.

CHAPTER 5

ARMY AIR DEFENSE BATTLE COMMAND

This chapter provides doctrine for air defense battle command. It addresses the aspects of command, the responsibilities of the commander, 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 operations other than war.

BATTLE COMMAND CONCEPT

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, 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 end state. 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.

Commanders assess; take risks; 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

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

Decision making is knowing if to decide, then ***when*** and ***what*** to decide. Decision 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.

The commander cannot, and should not, attempt to 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 wherever he is on the battlefield.

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 bes assess the operation and risks and make the necessary adjustments.

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 can be handled by his staff and subordinate commanders is key to time management and a decentralized command environment.

Leadership

Leadership is taking responsibility for actions of the command and the decisions which 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.

The 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 tactical proficient and possess the moral toughness that provides soldiers the will to fight.

COMMAND

Command--the art of motivating and directing soldiers and organizations to accomplish a mission-- must be supported by the means to regulate the forces to achieve the commander's intent. Command, however, and the decision making and problem solving that come with it, are not done in isolation. The commander's staff and subordinates assist in developing, modifying, and improving the initial versions of plausible courses of action and in development of future courses of action for events that most likely are not yet totally clear.

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 to achieve victory.

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

Control is inherent in battle command. Control is more scientific than command. Commanders command 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.

Control provides the commander freedom to operate, 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.

The role of the staff 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.

They perform 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.

Control provides the means to regulate, synchronize, and 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 situational awareness throughout the battle space. Responsive control means (communications, computers, and sensors) allow the commander to manage and direct the process.

The communications segment of the battle command and RISTA systems must provide information quickly and with reasonable security, to whomever needs it. Information transfer between sensors, deciders, 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 real-time information which can, if properly presented, reduce uncertainty and confusion. However, if improperly managed, it could burden the commander

The speed of operations has quickened because of advances in the rate of intelligence and information flow. The ability to gather, manage, process, and circulate information, in near-real-time, among sensors, deciders, 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.

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

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.

Reliable communications are imperative to battle command and to 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 the 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 reconnaissance, intelligence, surveillance, navigation, early warning, and positioning information that greatly facilitate battle command. Satellite communications support all battlefield operating systems. These space-based systems significantly upgrade the speed and accuracy of information that commanders exchange with subordinates. For more details on space operations, see Appendix C.

Engagement Operations

EO includes those functions required to execute the air, missile, and countersurveillance 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

FO includes those functions required to plan, coordinate, prepare for, and sustain the total air defense 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.

The coordination function implements the coordination and cooperation required to develop, distribute, and execute the plan. Meanwhile, 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

Key to the centralized 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

The commander is the key to concept formulation, planning, and executing at each level of command. The commander's personal responsibility is formulating the single unifying concept. 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.

Through personal assessment and war-gaming, commanders must determine and specify which critical and priority items of information they need to see and understand the battlefield and the flow of operations. 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 get. Whatever factors are present, the commander is personally responsible for establishment of the commander's critical information requirements and priority intelligence requirements.

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.

Commanders must be able to convey to subordinates a clear, concise statement of their intent for future operations which includes the purpose; what, how, and when they want specific 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.

While techniques and procedures may vary, 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 battle success. They must be able to orchestrate all functions affecting their battle space--intelligence, fires, force positioning, resourcing, 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.

Decision making and problem solving are not done in isolation. However, the commander must determine which decisions may be made by designated subordinates.

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 means.

AIR DEFENSE COORDINATOR

As air defense coordinator (ADCOORD), the ADA commander and representatives in the force CP are responsible for active air and missile defense planning. The ADCOORD is an integral member of the commander's staff planning team. The ADCOORD assists in integrating CA and TMD priorities into the force's targeting process. He recommends active, passive, and other combined arms air defense measures in the air defense estimate. After approval and staff coordination, the ADCOORD develops the air defense annex to the plan. Appendix B provides a detailed description of the air defense estimate and annex.

The ADCOORD also coordinates with AD elements at higher and lower echelons, as well as at adjacent

units. Coordination ensures vertical and horizontal integration of air defense coverage throughout the battlefield. In force-projection operations, this will include integration with joint or multinational counterair and theater missile defense participants.

AIR DEFENSE BATTLE COMMAND ORGANIZATIONS

A command post (CP) is a location which provides the means for a commander to exercise control of his forces. To promote efficiency and staff coordination, the commander groups his staff elements by function. He is responsible for his headquarters location, composition, and organization. Command posts in ADA units are generally organized into CPs, tactical operations centers (TOCs), and fire direction centers (FDCs).

COMMAND POSTS

Air defense batteries and platoons usually perform force operations functions from a command post. However, any ADA command from theater Army to squad level may form a CP to perform c2 functions as directed by the commander. Battalions and brigades may form assault CPs to conduct force operations functions when larger, more robust headquarters are not available.

TACTICAL OPERATIONS CENTERS

A TOC is a subelement of a CP for headquarters with staff elements (brigades and battalions). A TOC consists of a physical grouping of the staff elements concerned with current and future tactical operations and tactical support. Air defense TOCs handle force operations.

FIRE DIRECTION CENTERS

A fire direction center is that subelement of brigade and battalion TOCs and battery and platoon CPs where the commander exercises engagement operations. The FDC receives target intelligence and fire control orders and translates them into appropriate fire directions and fire distribution. The following systems are used at ADA FDCs:

- The command and control system AN/ TSQ-73 controls engagement operations for Hawk battalions and ADA brigades.
- The information and coordination central AN/MRC-136 performs these functions at Patriot battalions, Hawk battalions, Hawk and Patriot task forces, and ADA brigades.

AIR DEFENSE BATTLE COMMAND OPERATIONS

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

FUNCTIONS

At each echelon, 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.
- Sustain the tempo of operations by 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 situational information to higher headquarters.
- Conduct air defense engagement operations.

COMMUNICATIONS

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 warfighting 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 CONTROL STRUCTURES

Command and control relationships for ADA units are established by the joint force commander, joint force land component commander, and corps/division commanders according to joint 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 JFLCC.

COMMAND RELATIONSHIPS

Special command relationships can be formed by placing the ADA unit under tactical control, attachment, operational command, or operational control of another unit. These statuses create special operational, training, administrative, and logistical relationships among the ADA unit, its parent organization, and the receiving unit. Standard ADA support relationships can also be used.

Tactical Control

Tactical control is the detailed! and usually local, direction and control of movement and maneuver necessary for mission accomplishment. The parent ADA unit commander retains training, administrative, and logistical responsibilities.

Attachment

Attachment is the temporary placement of a unit within another organization. Subject to the limitations imposed by the attachment order and by the rules of engagement and air defense procedures established by the joint force commander, the commander of the organization receiving an attached ADA element will exercise the same degree of command and control over attached units as over organic units. This includes administrative and logistical support. The parent ADA unit commander retains the responsibility for the transfer and promotion of personnel.

Operational Control

Operational command and operational control (US) are synonymous terms in a pure US environment. In this relationship, the commander receiving the ADA unit is responsible for--

- Task organization of subordinate forces.
- Assignment of tasks.
- Designation of objectives.
- Employment of forces.

The parent ADA unit commander is responsible for--

- Administration.
- Discipline.
- Internal organization.
- Logistics.
- Training.

Operational Command (NATO)

Operational command is a special command status in which the receiving commander is responsible for--

- Assignment of missions or tasks.
- Deployment of units.
- Reassignment of forces.
- Retention or delegation of tactical control.

The parent ADA unit commander retains responsibility for--

- Administration.
- Logistics.

Operational Control (NATO)

Operational control gives the receiving commander responsibility for--

- Direction of forces for specific missions or tasks usually limited by function, time, or location.
- Deployment of units concerned.

The parent ADA unit commander retains responsibility for--

- Administration.
- Logistics.

Support Relationships

Support relationships define specific arrangements and responsibilities between supporting and supported units (see the following illustration 5-1). There are four support relationships.

Enlarge

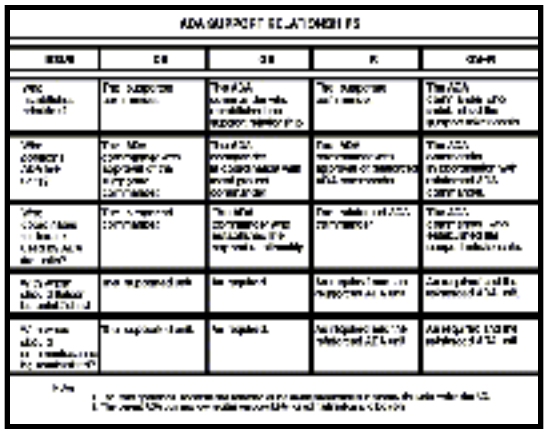

Figure 5-1. ADA Support Relationships

Direct support. In DS, the supporting unit provides dedicated support to a specific unit. A DS ADA unit provides dedicated air defense for a specific element of the force which has no organic air defense. The supporting ADA unit coordinates its movement and positioning with the supported unit. A FAAD 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. An ADA unit in 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. A reinforcing (R) ADA unit augments the coverage of another ADA unit and strengthens the air defense 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 ADA battalion assigned to the division.

General support-reinforcing. An ADA unit with a 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.

Selecting a support relationship. To determine the most appropriate support relationship for accomplishing the ADA mission, the following questions need to be answered:

- Who establishes AD priorities?
- Who coordinates terrain on which ADA units will position fire units?
- Who positions ADA fire units?
- With whom should liaison be established?
- With whom should communications be established?

CONTROL CHAIN

The control chain is a more complex structure than the command structure. In a US environment, the JFC normally assigns responsibility for theater-level air and missile defense operations to a single area air defense commander. The AADC manages by coordinating and integrating the entire counterair effort

within the theater. The AADC may create air defense regions and appoint a commander for each. The region air defense commanders (RADCs) may be selected from any service component. The RADC is fully responsible for integrating defensive counterair operations throughout the region. The control and reporting center (CRC) supervises the surveillance and control activities of subordinate radar elements, provides means for air traffic identification, and integrates region defensive counterair operations.

In certain regions, an air operations center (AOC) is interposed between the RADC and CRC. The sector commander then exercises tactical command over all subordinate elements. In these regions, the SOC liaison team provided to the corps is termed the air defense operations liaison team and acts as a point of coordination between the integrated air defense system and the corps conducting operations in the sector.

When Army air defense means are assigned, attached, or organic to Army maneuver elements, they remain subject to area or region rules of engagement to ensure a coordinated and integrated air defense effort. The maneuver corps and division commanders will have command as previously described, of these assigned, attached, or organic Army air defense units. Priorities for these air defense resources will be developed by the maneuver commander.

COORDINATION AND LIAISON

While automation and digitization are becoming bigger factors in battle command, 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

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

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 which serves to unify the effort of the force at all echelons.

LIAISON

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.

The senior ADA organization in the theater is responsible to provide liaison to the land component commander, the battlefield coordination element, 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.

Corps ADA brigade commanders 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 ADCOORD.

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 ADCOORD 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 ADCOORD, ADA commander, and AD staff officer.

ENGAGEMENT OPERATIONS PRINCIPLES

Effective battle command enables air defense forces to successfully perform their 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.

Although these principles apply to both offensive and defensive activities, they particularly relate the management of air defense systems in active air and missile defense operations to the conduct of the overall battle.

CENTRALIZED CONTROL WITH DECENTRALIZED EXECUTION

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.

Centralized control is essential to ensure integration and coordination 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 air defense weapon control procedures. Data integration and operational coordination complete the synchronization. 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

The related functions of airspace control and air defense engagement operations are coordinated through the principle of air battle management which maximizes both offensive and defensive effectiveness.

Air battle management is essential in an air environment that has large quantities of both threat 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.

Extensive coordination is necessary to prevent interference among all airspace users. As a participant in air battle management, the ADCOORD 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.

Integrated Combat Airspace Command and Control

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 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.

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 ADCOORD and A2C2 element at each echelon provide Army requirements to the battlefield coordination element (BCE) at the USAF air operations center or the equivalent coordination element at the Navy or Marine Corps tactical control facility for incorporation into the airspace control plan.

An important function of airspace control in air defense operations is identification. Positive 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.

Other airspace control procedures 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 airspace procedural control measures. Joint Pub 3-52, FM 100-103, and FM 100-103-1 provide further details.

Positive Control

Positive control relies upon 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

Procedural control overcomes positive control and identification shortcomings. Procedural control relies upon techniques such as segmenting airspace by volume and 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 real-time data transmission capabilities.

Mix of Positive and Procedural Control

The 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-T in their analysis. They specifically focus on mission, AO, and the threat expected.

For positive management, commanders also 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.

Air traffic behind the division generally moves in ways that are wellsuited 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 the preferred method. Procedural control provides backup.

Forward of the corps, aircraft generally move based primarily on mission requirements. These aircraft are used to provide a rapid and flexible response to the needs of both air and ground commanders. The high volume of aircraft and friendly missiles, combined with flexible and varying missions, make positive control extremely difficult and necessitate more reliance on procedural control.

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 PROCEDURES

Engagement operations procedures facilitate the integration of air defense into both the force commander's concept of the operation and the battle for air superiority. The AADC establishes and promulgates JFC approved ROE for air and missile defense. Additionally, the AADC, in conjunction with the ACA and the component commanders, may establish air space coordination areas such as fighter and missile engagement zones. The principal users of the procedures are ADA units, but all participants in air defense operations must adhere to these procedures.

WARNING PROCEDURES AND ALERT STATUSES

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

Defense Readiness Conditions

Defense readiness conditions (DEFCONs) describe progressive alert postures primarily for use between the Joint Chiefs of Staff and the commanders of unified commands. DEFCONs are graduated to match situations of varying military severity, and are numbered 5,4,3,2, and 1 as appropriate. DEFCONs are most applicable to national missile defense.

Weapons Alert Designators

Weapons alert designators (WADs) 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 which are required to be at given states of readiness. ADA commanders use WADs to meet the threat, provide maintenance, and allow crew rest among other tactical concerns.

States of Readiness and States of Emissions Control

States of readiness (SORs) 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 (SOEs) control. SORs and SOEs are based on the WAD and air defense warning. They are normally designated by ADA battalion commanders for their subordinate batteries, platoons, and fire units. Additionally, SORs and SOEs can be used to specify personnel manning requirements. ADA commanders use WAD and SORs and SOEs 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.

Air Defense Warnings

Air defense warnings (ADWs) represent the commander's evaluation of the probability of air attack within the AO. ADWs are routinely issued by area or region AD commanders. They can also be issued by any commander. In no case can a commander lower ADW issued by the AD area or region 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. 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 ADWs are--

- ***ADW Red:*** attack by hostile aircraft or missiles is imminent or in progress. This means that hostile aircraft 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 or missiles is probable. This means that hostile aircraft or missiles are enroute toward a respective AO, or unknown aircraft or missiles suspected to be hostile are enroute towards, or are within, a respective AO.
- ***ADW White:*** attack by hostile aircraft or missiles is improbable. ADW White can be declared either before or after ADW Yellow or ADW Red.

Air Defense Emergency

Air defense emergency 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.

RULES OF ENGAGEMENT

Rules of engagement (ROEs) are the positive and procedural management directives which 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. The first three ROE are applicable to all air defense contributors. The others are primarily for ADA forces.

Right of Self-Defense

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 which normally govern engagements.

Hostile Criteria

Hostile criteria are basic rules that assist in the identification of friendly or hostile air platforms. 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 enemy 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 real-time data transmission capability assist the controlling authority by forwarding target information. The controlling authority makes final target identification and delegates engagement authority. Delegation of the controlling and identification authority to lower echelons is normal for ADA and non-ADA units that do not have real-time transmission capability for identification data. Such units have both identification and engagement authority.

Weapon Control Status

Weapon control statuses--*WEAPONS FREE, WEAPONS TIGHT* , or *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, UAVs, and for missiles is normal. Air defense forces must have the ability to receive and disseminate weapon control statuses for all classes of air platforms. The AADC imposes the fixed-wing weapon control status. The AADC normally delegates the authority for establishing rotary-wing weapon control status to the appropriate maneuver force commander. The AADC may also delegate the weapon control status for UAVs to the maneuver force commander. The maneuver force commander may further delegate the authority to subordinate maneuver commanders, based on the tactical situation or operation. Maneuver commanders who do not have authority to establish weapon control statuses still may direct more restrictive weapon control statuses in their AO.

WEAPONS FREE. Weapons can fire at any air target not positively identified as friendly. This is the least restrictive weapon control status.

WEAPONS TIGHT. Fire only at air targets positively identified as hostile according to the prevailing hostile criteria. Positive identification can be effected by a number of means to include visual identification (aided or unaided) and meeting other designated hostile criteria supported by track correlation.

WEAPONS HOLD . Do not fire except in self-defense or in response to a formal order. This is the most restrictive weapon control status.

Level of Control

Level of control describes the AD echelon at which positive management of the air battle is being conducted. This can be an AOC, CRC, ADA brigade, battalion FDC, or the individual fire unit.

Modes of Control

The 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 situation.

Centralized control . This control mode is where 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.

Decentralized control. This is the normal wartime mode of control for air defense, whereby a

higher echelon monitors unit actions, making direct target assignments 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.

Control of engagement operations during the air battle can be centralized at a higher headquarters' FDC, or decentralized to a subordinate FDC. 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

Autonomous control 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.

Fire Control Orders

Fire control orders are commands which are used to control engagements on a case-by-case basis, regardless of the prevailing weapon control status. These commands are most often used by higher control echelons when monitoring the decentralized operations of subordinate units. 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.

Engage . This command is used to order a unit to engage (fire on) a specific target. This order cancels any previous fire control order which may have been given on that target.

Cease Engagement . This command 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).

Hold Fire . This is an emergency fire control order used to stop firing and all tactical action to include the destruction of any missiles in flight. This order may be used to protect friendly aircraft.

Cease Fire . This command 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.

Cover . This command 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).

Engage Hold (Patriot only). This command 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.

Stop Fire . This is an emergency fire control 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

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). The supplemental fire control measures are discussed in the following paragraphs.

Air Defense Operations Area

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

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 (see below), except that ADOA are normally in effect for longer periods of time.

Air defense area . This is a specifically defined airspace for which air 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.

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

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.

ADA engagements within an activated WEZ can be conducted by the echelon controlling engagements without further permission or from the establishing authority of the WEZ if the targets meet specified hostile criteria. This holds true regardless of the level of control, weapon control status, or hostile criteria in effect outside the activated WEZ. 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 WEZs are discussed in the following paragraphs.

Fighter engagement zone . A fighter engagement zone (FEZ) is established in an area where no effective surface-to-air capability is employed.

Missile engagement zone . A missile engagement zone (MEZ) is a 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.

Forward area air defense engagement zone . A forward area air defense engagement zone (FAADEZ) is an area of FAAD deployment that may fall within a MEZ. It is also possible that some areas may be solely defended by FAAD assets. A FAADEZ 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. (JCS publications still use the terms SHORAD and SHORADEZ.)

Joint engagement zone . A joint engagement zone (JEZ) is a concept under study. In a JEZ, AD forces from two or more components (one airborne and one surface-based) operate together in the same volume of airspace.

High-Density Airspace Control Zone

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. HIDACZs are established by the ACA upon request of ground commanders. AHIDACZ 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 (see below) 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

An air defense zone is established for the protection of key assets. Units are at *WEAPONS FREE.*

Temporary Airspace Restrictions

Temporary airspace restrictions can be imposed on segments of airspace of defined dimensions in response to specific situations and requirements. These can include combat air patrol operations, air refueling areas, and concentrated interdiction areas. The promulgation of such restrictions will include--

- 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.

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.

Restricted operations area . A 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. These areas are established by the airspace control authority 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.

Restricted operations areas for air and missiles can be established to maximize ADA effectiveness. In

such eases, the normal ADA weapon control status will be *WEAPONS FREE.*

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

Minimum risk route . Minimum risk route (MRR) is a 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.

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,* that particular route will be closed by the commander who established it.

Standard-use Army aircraft flight route and air corridor . Standard-use Army aircraft flight routes identify temporary 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.

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,* that particular route will be closed by the commander who established it.

Procedures for deconflicting friendly surface-to-surface missile firings and UAV operations can be found in FMs 34-25-2 and 100-103-1.

Sectors of fire and primary target lines. Sectors of fire and primary target lines (PTLs) are established to assist in the distribution of ADA fires. Sectors of fire for HIMAD are normally designated at battalion after review of fire unit radar coverage diagrams. Sectors of fire or PTL for FAAD are normally designated by the battery commander or platoon leader. 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.

Cruise missiles and UAVs. In general, cruise missiles and UAVs should come under the ROE established for manned aircraft. Due to the similarity of cruise missiles and UAVs to manned aircraft, appropriate ROE must be established to deal with that potential threat. A balance must be drawn between the possibility of fratricide and the threat of an armed UAV or cruise missile penetrating the defense.

CHAPTER 6

PLANNING AND CONDUCTING AIR 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.

ARMY AIR DEFENSE IN THEATER AIR DEFENSE OPERATIONS

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 Anny 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 defense procedures and measures. This joint approach to CA and TMD provide the synchronization necessary to obtain the synergism required for success.

Army air 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 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 DEFENSE IN MATURE AND CONTINGENCY THEATERS

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

MATURE THEATERS

Alliance commitments and in-place multiservice forces are characteristic 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

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 threat weapon systems are generally less than that of a mature theater. However, without

adequate air defense, force-projection forces in the initial stages of an operation are susceptible to catastrophic damage from even an unsophisticated enemy.

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 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 DEFENSE OBJECTIVES

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

STRATEGIC OBJECTIVES

At the theater strategic level, ADA protects forces or geopolitical and military assets of strategic significance. 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 defense units at every echelon of command. Strategic assets could include cities, economic facilities, and religious or cultural sites which 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 to the formation and maintenance of a friendly coalition. Other strategic assets could include production, processing, and transportation facilities for natural resources or other materials which are of vital interest to the United States.

OPERATIONAL OBJECTIVES

Counterair and theater missile defense plans support 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 the 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

The objective of air defense operations at the tactical level is 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, provide freedom to maneuver, and destroy enemy aircraft and missiles in the air. Every participant in Army air defense--ADA, maneuver, fire support, aviation, and intelligence--has a role in achieving those objectives, as do the joint forces which support corps and division operations.

Air defense objectives at the tactical level are an extension of the operational-level objectives, but are more specific. Tactical-level air 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 delineate specific tactical

objectives for ADA brigades and battalions.

Ensure Freedom to Maneuver

The freedom of friendly forces to maneuver is a fundamental part of Army doctrine. An objective of air 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 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

On the fast-paced, modern battlefield, timely information is of paramount importance to get the right force to the right place at the right time. Friendly forces, including ADA, 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 defense operations. Denial of RISTA 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 RISTA data increases the probability of success of friendly operations and saves lives.

Right Force at the Right Place at the Right Time

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-T. 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

To sustain the battle and force's ability to maneuver, systems engaged in air defense operations must protect vital assets and forces which 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 and refueling and rearming operations. Air 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 defense resources.

Kill Enemy Aircraft and Missiles the First Time

Air defense operations must be carried out according to the mission, the commander's intent, and the concept of the operation. Success on the battlefield depends upon the ability of air defense operations to prevent the air threat from returning and repeatedly jeopardizing friendly forces' freedom to maneuver. This prevents further destruction of friendly forces. Preventing air surveillance and losses to attack sustains friendly combat power. Killing threat aircraft and missiles destroys the enemy's ability to synchronize the combat power of coordinated air and land battle efforts. Killing enemy aircraft and missiles the first time sustains friendly combat power by denying aerial RISTA and preventing the destruction of friendly forces and assets. Successful air defense operations also destroy the enemy's will to fight early in the battle. The combination of enemy 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 defense operations must be so overmatching as to make

the cost of air operations prohibitive to the enemy. Air defense operations must achieve this objective early while ADA forces still have the capability to rearm, reorganize, and reconstitute.

There will 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 ROLES AND FUNCTIONS

The commander of the highest echelon Army air defense command in the theater normally participates as the joint force land component commander's theater Army air defense coordinator (TAADCOORD). The TAADCOORD serves as the JFLCC's principal advisor and coordinator for theater counterair and theater missile defense operations. The highest echelon command in the theater may be a battalion, corps brigade, EAC brigade, or higher command, depending on the size of the theater of operations and the joint force.

Tactical-level air defense requires the integration of ADA units with other combined arms elements. As discussed in Chapter 1, tactical-level air 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 defense operations. Each participant has a specific role in tactical air defense plans and operations. These integrated roles are mutually supporting.

THE JOINT FORCE AND COMPONENT COMMANDERS

The JFC establishes campaign objectives, approves plans, establishes air defense and missile defense priorities, allocates forces, and apportions air power. He assigns overall responsibility for air defense to an area air defense commander, and for airspace control to an airspace control authority. The JFC normally commands his forces through component and functional commanders. See the Joint Force Commander's Air Defense Role illustration 6-1.

Joint Force Land Component Commander

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 defense forces; assigns missions; establishes air and missile defense priorities for forces assigned to the land component and plans and executes TMD, DCA, and OCA operations within his assigned AO. Depending on the threat, and on the composition of the joint force, the JFLCC (or one of his subordinate land force commanders), may also be assigned responsibilities as the airspace control authority and or area air defense commander.

Joint Force Air Component Commander

The JFACC's 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 the airspace control authority and the area air defense commander.

Joint Force Maritime Component Commander

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 preponderance of air assets are provided by the naval forces, 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

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

The JFC assigns overall responsibility for theater-level defensive counterair and active defense TMD operations to a single 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 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 data base of friendly TMD active defense capabilities to facilitate TMD planning.
- Develops and executes plans for JTMD active 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

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 and deconflicts airspace user requirements. The ACA develops the airspace control plan and, after JFC approval, promulgates it throughout the area of operations. Normally, the same commander assigned responsibilities as the AADC will also serve as the ACA.

THE THEATER ARMY AIR DEFENSE COORDINATOR

The TAADCOORD performs several functions. He is the Army air defense coordinator to the JFLCC, the JFACC, and the AADC. The TAADCOORD ensures that the Army is an integral part of joint counterair and active missile defense operations and planning at the theater level. The TAADCOORD, as a special staff officer to the JFLCC, participates in the J3 or DCSOPS planning 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 TAADCOORD also participates in the AADC's DCA planning as ADCOORD and Army AD representative to the JFACC. In addition, the TAADCOORD ensures that corps air and missile defense requirements are integrated into joint counterair and TMD planning.

As the commander of the highest echelon air defense command in the theater, the TAADCOORD also contributes the majority of the joint forces surface-to-air missile forces. He deploys resources in both 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.

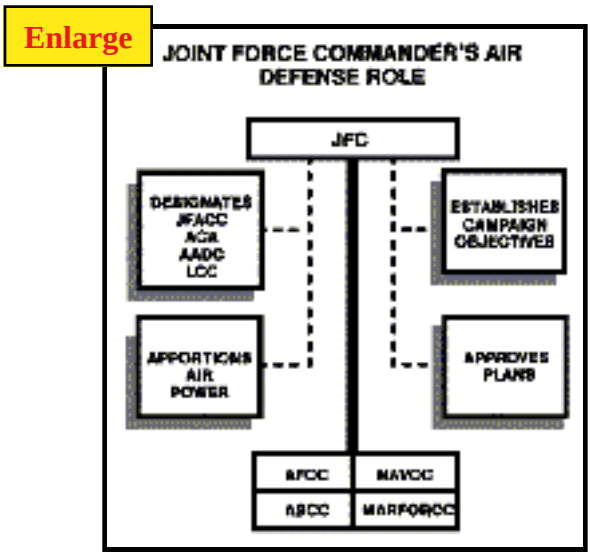

Figure 6-1. Joint Force Commander's Air Defense Role.

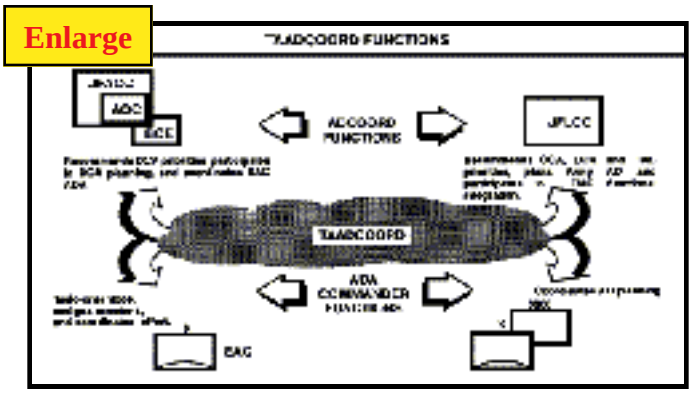

Figure 6-2. TAADCOORD Functions

THE ADA COMMANDER

At each level, the ADA commander has two roles. He is both the commander of the ADA forces assigned to him, and the air defense coordinator to the commander of the maneuver unit he protects.

ADA Command Functions

The ADA commander is the proponent for the air defense combat function at each echelon. The ADA commander has total responsibility for active air defense and missile planning, within the Army component, and possibly for the entire land force. These responsibilities include recommending air and missile 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 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, and prepare the air defense and missile defense annexes to division and corps OPLANs and

the JFLCC's operation plan.

Corps and divisional ADA units accomplish the majority of tactical air defense missions. The corps ADA brigade and the divisional ADA battalion, respectively, are the corps and division commanders' primary air defense resources. See the Brigade Commander's Functions illustration 6-3. The corps commander's requirement to provide air 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 and must reinforce those defenses when necessary. The corps commander's requirement to provide high- to medium-altitude ADA protection to divisions, with specific emphasis on supporting offensive operations, is particularly important. The division commanders, who have only low-altitude ADA weapon systems, require corps support for high-to medium-altitude air and missile defense and any additional low-altitude weapons needed for mission accomplishment.

Air Defense Coordinator Functions

As ADCOORD, the ADA commander and representatives in the corps or division CP are responsible for planning air and missile defense operations to support the force commander's concept of the operation. The ADCOORD is an integral member of the maneuver commander's staff planning team. To develop TMD, OCA, and DCA priorities for recommendation, the ADCOORD, with input from the G2, assesses the air and missile threat and the commander's intent. The ADCOORD assists the FSCOORD to integrate OCA and TMD attack operations priorities into the force's targeting process. The ADCOORD 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 ADCOORD develops the air defense annex to the operation plan. Appendix B provides a more detailed description of the air defense estimate and annex.

The ADCOORD also coordinates with ADA elements at higher and lower echelons, as well as with adjacent units. Coordination ensures vertical and horizontal integration of air defense coverage throughout the battlefield. For example, the corps ADCOORD integrates corps ADA with theater, division, and adjacent corps ADA forces. In contingency operations, this may include integration with joint counterair and TMD participants. The division ADCOORD ensures the air defense plan interfaces with the corps and adjacent division air defense plans.

THEATER MISSILE DEFENSE COORDINATOR

The maneuver commander at any echelon may appoint a TMD coordinator to focus the force's TMD planning and integration functions. The TMD coordinator may be the ADCOORD or another staff officer or commander. When the commander appoints a separate TMD coordinator, the ADCOORD actively participates in TMD planning, and closely coordinates ADA contributions to the overall TMD effort. If a TMD coordinator is not appointed, the ADCOORD assumes responsibility for TMD planning and integration.

MANEUVER

Infantry and armor forces with an air defense capability increase the density and effectiveness of air 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. lank main guns, IFVs, antitank weapons, and other direct-fire systems must engage these enemy air platforms when possible. The force commander can assign combined arms resources to protect critical areas or assets from air attack. The ADCOORD recommends to the ground force commander the use of other combat

arms in an air defense role. The ADCOORD bases the recommendation on a careful target value analysis and estimate of the air threat.

FIRE SUPPORT

Fire support enhances tactical-level air 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 FARPs. Surface-to-surface fire coordination for OCA operations takes place through normal fire support channels. Fire support elements coordinate targets for attack by air forces supporting corps and division operations.

The ADCOORD works closely with the FSCOORD, G3, and G2 to recommend prioritized OCA and TMD targets. The threat's ability to disrupt friendly operations dictates target priority. The ADCOORD 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

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 antiarmor mission. Air combat operations are planned to support the ground tactical plan and can be either offensive or defensive.

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.

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 RISTA 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 ground air defense capability of the combined arms team. 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.

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

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 ADCOORD. IEW supports air defense 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.

Following the identification of all PIR and IR during the planning phase, the ADCOORD coordinates with the G2 or S2 to ensure air defense requirements are met. 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 IRs. A request for intelligence information is generated when organic assets cannot satisfy an IR. The focus of tactical intelligence could include forward operating bases, FARPs, missile and UAV launch systems, electronic warfare systems, logistics facilities, and C2 nodes. The interface between the ADCOORD and G2 or S2 is essential for many reasons including a coordinated and accurate evaluation of threat air and missile capabilities.

COMBINED ARMS FOR AIR DEFENSE

Every participant 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 provides a significant terminal defense. Guns, by their very nature, provide both real and virtual attrition. Combined arms for air defense (CAFAD) is an essential element in this attrition. 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.

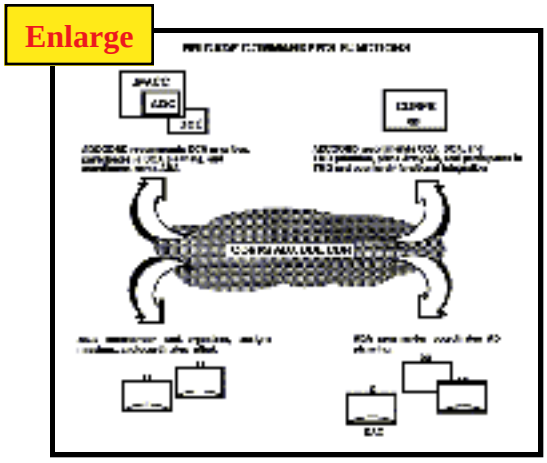

Figure 6-3. Brigade Commander's Functions.

AIR DEFENSE PLANNING

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 policy decisions into operation plans (OPLANs) and operation orders (OPORDs) in support of national security objectives. It is a dynamic system currently evolving through incremental integration and enhancement. JOPES consists of both operational and supporting functions. See Figure 6-4., Jopes Operational And Supporting Tasks.

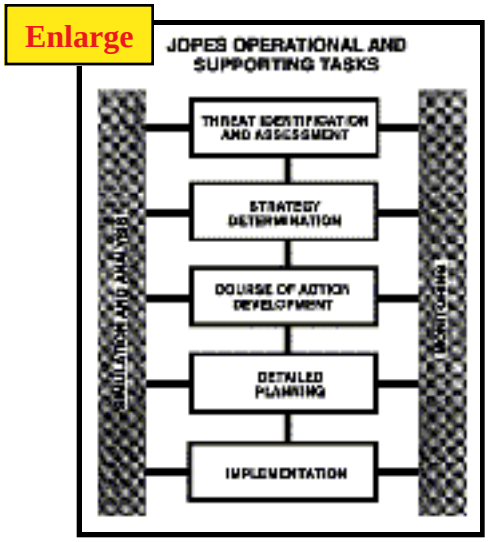

Figure 6-4. Jopes Operational And Supporting Tasks.

OPERATIONAL FUNCTIONS

JOPES consists of seven interrelated functions that provide a framework within which joint military planning and execution occurs. The operational functions are sequentially related, proceeding in a logical order.

Threat Identification and Assessment

This function involves detecting actual and potential threats to national security, alerting decision makers, and then determining capabilities and intentions.

Strategy Determination

This function 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.

Course of Action Development

This function helps the CINC's staff develop and test alternative COAs 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 (CAP).

Detailed Planning

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

Implementation

This function gives decision makers the tools to monitor, analyze, and manage events during execution. Implementation begins with the CJCS execution order and usually ends with some type of replanning effort, such as termination or redirection of operations.

SUPPORTING FUNCTIONS

The supporting functions relate to all of the operational functions and have an impact on each.

Monitoring

This function makes current and accurate information concerning friendly, enemy, and neutral forces and resources available to users.

Simulation and Analysis

This function includes automated techniques that support each of the other JOPES functions.

THEATER-STRATEGIC PLANNING

Theater-strategic planning during peacetime provides the framework for the wartime employment of forces. Theater 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.

In time of conflict or war, planners develop strategic end states tailored to the particular situation. 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.

The theater commander 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 theater commander's OPLAN is a theater campaign plan which integrates air, land, and naval operations to accomplish a common objective. All theater OPLANs are designed to achieve strategic goals. The theater commander uses operational art in theater design to influence the strategic intent found in both the theater strategy and campaign plan.

OPERATIONAL PLANNING

The focus of air and missile defense planning at the operational level is on protection of forces and assets in the theater base and joint rear area. The JFLCC develops air and missile defense priorities, which include the JFC's priorities, and tasks his subordinate commanders to protect those priorities. He allocates ADA units to EAC ADA brigades and to the corps based upon his air and missile defense priorities, and the concept of operations for land operations. While planning for air and missile defense of his AO, the JFLCC also considers the contributions of the AADC and other components to protection of force from air and missile attack.

In the JFLCC's air and missile defense plan, the EAC ADA brigades may be tasked to protect theater assets such as airbases, logistics facilities, seaports, and geopolitical assets, as well as maneuver forces in assembly areas. Corps commanders may also be tasked to protect theater assets located in the corps area using corps ADA forces.

Operational Planning Process

Air defense planning at the operational level is an iterative process. The same type of process would occur if the USN or USMC were providing the majority of the air assets.

The AADC develops the air defense concept for the theater. The JFLCC's staff (J3 or DCSOPS, with

input from the TAADCOORD, the fire support element, and Army airspace command and control cell) recommends Army CA priorities, TMD priorities, and resource allocation to support the JFC's air defense concept. The JFLCC, through the BCE, provides an air defense estimate to the AADC. With JFC's guidance, the JFACC in coordination with the JFLCC, develops the air operations plan.

The AADC develops the DCA portion of the plan and allocates air assets for various missions. The JFLCC's TAADCOORD determines whether the corps has sufficient air and missile defense resources or if the JFLCC should allocate additional theater Army air and missile defense assets for protection of the corps. The TAADCOORD recommends which assets Army ADA units can protect and which assets require Air Force or Navy coverage. The TAADCOORD integrates ADA units into the AADC's DCA planning process.

The plan enables the JFLCC to finalize the air and missile defense and fire support portions of the land operation plan. The JFLCC prioritizes the allocated CAS in coordination with fire support plans. The JFLCC's priorities are the foundation for interdiction targeting. The JFLCC's TAADCOORD develops the air and missile defense portion of the land operation plan.

The JFLCC allocates resourcing and assigns tasks to corps which can suballocate assets and assign air and missile defense missions to divisions. In each corps and division main CP, the G3 plans section develops the maneuver plan. Within the G3 plans section, the ADCOORD, with input from the G2, A2C2 cell, and FSE, incorporates the air defense mission into this maneuver plan.

The ADCOORD, in conjunction with the G2, develops and recommends OCA and TMD targeting priorities, nominates OCA and TMD targets and TAIs to the FSCOORD, and 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. See the Development of Air Defense and Fire Support Annexes illustration 6-5.

The FSCOORD and the ADCOORD incorporate the approved priorities into the fire support and air defense annexes of the maneuver plan. The FSCOORD integrates OCA and TMD targets, targeting priorities, and TAIs into the force's targeting process. The ADCOORD includes the DCA and TMD active defense priorities and associated IPB products in the development and coordination of the force's air defense operation.

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

The 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 integral to the theater campaign plan and to the maneuver plan at each Army echelon.

Air Defense in OCA and TMD Attack Operations Planning

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 ADCOORD 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.

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:

- Vehicles. OCA and TMD attack operations destroy UAVs, rotary- and fixed-wing aircraft, TBMs, cruise missiles, and launcher vehicles on the ground, before, during, and after launch.
- Support facilities. All facilities supporting enemy air and missile operations are targets. These facilities include airfields, launch sites, logistics support facilities, technical support facilities, FARPs, and navigational aids.
- C2 facilities. The enemy depends upon C2 facilities to maintain centralized control of air and missile assets. Early warning, 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. As discussed in Chapter 3, SEAD is an integral part of all friendly air operations. The Army participates in joint SEAD.

Air Defense in Active Defense Planning

Integration and prioritization permit Army ADA units the flexibility to support the commander's concept of the operation. The AADC integrates low-, medium-, and high-altitude air defense systems with airborne counterair resources to make the defense effective.

Combat air patrols consist of aircraft designated to intercept and destroy hostile aircraft over a critical area or force. The AADC, with JFACC, JFLCC, and TAADCOORD input, incorporates combat air patrols into DCA plans. 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. Because of their limited numbers, ADA resources are allocated based on specific air and missile defense priorities. In the air and missile defense plan, EAC ADA brigades may protect maneuver forces and other theater assets. 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 to protect designated priorities. The air defense employment principles and guidelines in Chapter 5 form the basis for the design of these defenses.

Air Defense in Passive Measures Planning

Passive measures are an essential part of air and missile defense planning at all levels. All units conduct passive actions in conjunction with their assigned missions. Passive actions reduce the effectiveness of the enemy air threat. Conducting passive operations is an implied task critical to the survival of every unit.

At all levels, the ADCOORD evaluates and recommends passive measures for incorporation into the maneuver commander's plans and SOPs. ADCOORDs recommend measures which 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.

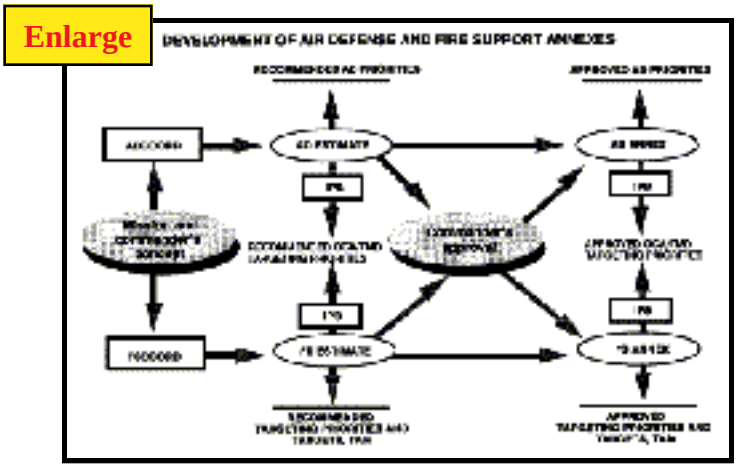

Figure 6-5. Development Of Air Defense And Fire Support Annexes

Integration of ADA into Theater CA and TMD

In most theaters, the majority of air defense coordination of interest to ADA occurs between the AADC and the JFLCC. The JFLCC integrates Army capabilities into joint air and missile defense efforts through close coordination with the AADC. This coordination is accomplished by the BCE (see the Battlefield Coordination Element illustration 6-6) which collocates 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 air defense activities. Each component provides a liaison representative to the AADC. The representatives function as the necessary interface among the service component headquarters.

The BCE 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 BCE based on the type of theater and the AOC organization. In force-projection operations involving only one corps, the corps commander will structure the BCE. The BCE provides JFLCC input into the air operations planning process. Army air defense contributions are planned and coordinated through EAC ADA brigade, corps, and division CPs. Refer to FM 100-103 for a more detailed discussion of the BCE and the control and reporting center.

TACTICAL PLANNING

Successful execution of air defense results from a well-organized air defense plan. The process is continuous.

METT-T

METT-T is the driving force behind all ADA planning. The type of theater and operation provide the framework for METT-T analysis.

METT-T in mature theaters. The type of theater can affect our ability to collect intelligence and targeting information on the enemy. It also has effects on the deployment of friendly forces and the development timeline. The sophistication, lethality, and numerical strength of the threat in the mature theater are generally greater than those in contingency theaters. Pre-positioned 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 threat in a mature theater leaves little time for reaction. The rapid tempo of operations becomes the key factor in the analysis of time.

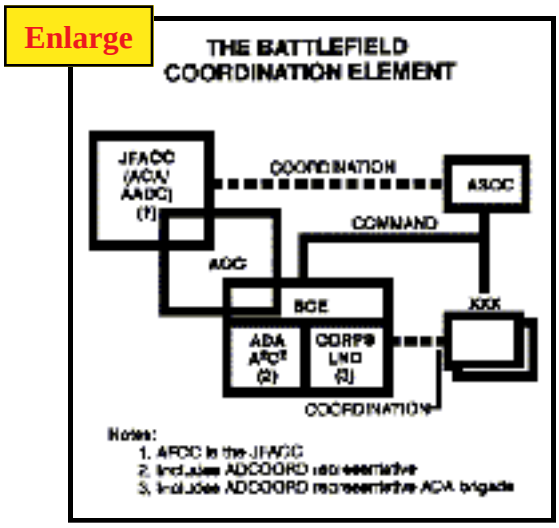

Figure 6-6. The Battlefield Coordination Element

METT-T in contingency theaters. Contingency theaters may have no pre-positioned forces. Contingency operations are generally of a smaller scale than those 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.

METT-T in close, deep, and rear operations. METT-T analysis 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.

Close operations involve highly mobile, armored 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.

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 provides air defense coverage at all altitudes and allows the force conducting deep operations the maximum freedom to maneuver.

The rear area air threat is 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 which are less mobile, but have greater ranges to allow for early and multiple engagements.

The objective of ADA planning is to establish low- to high-altitude air defense coverage of the maneuver commander's air 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. METT-T influences integrated air defense planning from theater through battalion level and reinforces the synchronization process.

Scheme of Maneuver

The 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-T, 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 incorporate possible enemy courses of action. Appendix A describes the development of air IPB in greater detail.

The ADCOORD develops an estimate which includes air defense coverage for each maneuver course of action. (See Appendix B.)

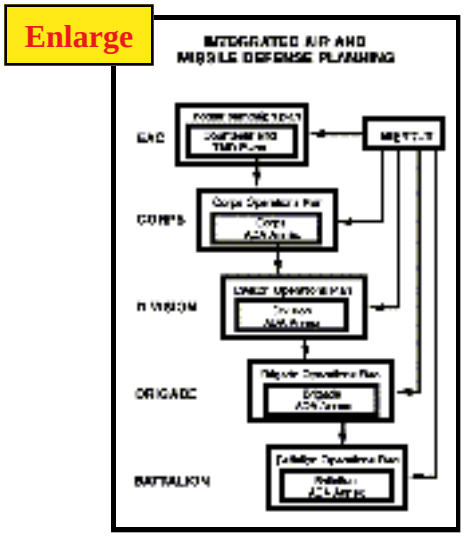

Figure 6-7. Integrated Air And Missile Defense Planning

Air Defense Priorities

The ADA commander considers METT-T, IPB, and the supported commander's intent and concept of operations as he develops AD priorities. Priorities are based on the factors of criticality, vulnerability, recuperability, and the threat as explained in Chapter 4. The ADA commander recommends these priorities to the maneuver commander for approval.

ADA Concept of Operations

The purpose of the ADA concept of operations is to maximize protection of the force. The ADA commander assesses the factors of METT-T, the force commander's intent, the IPB, and the approved air and missile defense priorities to determine the numbers and types of air defense 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 (see Chapter 4). The ADA concept of operations is the basis of the air defense plan and is synchronized with the higher and adjacent AD plans (see the accompanying illustration 6-7). Major considerations that impact on the development 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.

The ADA concept of operation, by integrating active and passive air 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 to accomplish each task.

Characteristics of mature theaters. In mature theaters, forces require all-altitude protection from enemy surveillance and attacks. 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 CAP support. 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.

Characteristics of contingency theaters. Contingency theaters require air defense for each stage of the operation. During the predeployment activities, analysis of the air threat identifies the air defense requirements. In the deployment stage, ADA systems require lift to the area of operations to provide early air defense protection of the PODs, LOCs, and lodgment area. ADA systems must deploy rapidly and in sufficient numbers to defeat the threat. During the entry stage, ADA counters enemy RISTA and 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 defense requires integration of the ADA concept of operations into the joint counterair and TMD plans.

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

During the operations stage, ADA shifts emphasis from counter-RISTA to force protection. 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 defense operations.

Considerations in close, deep, and rear operations. 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 defense. The ADA commander's objective is to provide the force with sustained, low- to high-altitude air 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 air defense capabilities of all available resources, the ADA commander effects the necessary coordination to integrate and synchronize their contributions with the supported force's concept of operations.

The focus of the ADA concept of operations in close operations is the protection of maneuver forces 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. As a result of this synergistic effect, the force kills more enemy air, loses fewer systems, and gains greater freedom to maneuver.

In deep operations, ADA must maneuver with the force to provide low-altitude protective fires.

Overwatching 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 defense assets may consist of only FAAD systems and attack helicopters which 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 enemy threat are crucial to the deep operation.

Rear area air and missile defense includes operations by both forward area and high- to medium- altitude air defense throughout the battlefield. The size of the area, however, requires the weighting of air defense 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. Forward-area ADA is added to the highest priority forces and assets to screen against RISTA 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 FAAD 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.

Passive air defense measures. 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 defense priorities, not all assets will receive dedicated ADA forces for protection. However, most assets will receive a degree of air defense protection from coverages provided by higher echelon and adjacent ADA units. To enhance the protection available from these air defense coverages, 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.

As an example, the threat's air plan may allocate a specific number of air assets to locate and attack battle command assets. The vulnerability of a specific friendly battle command 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

Based on the concept of operations, the ADA commander structures ADA forces unit by unit. 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.

Four 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 at each echelon the flexibility and authority to vertically and horizontally synchronize their forces. 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 air defense 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.

NATIONAL MISSILE DEFENSE OPERATIONS

Concepts and operational requirements for national missile defense are in the development stage. Therefore, the information in this section is subject to change.

MISSION

The basic national security objective is to preserve the US as a free nation with fundamental institutions and values intact. The broad mission statement of national missile defense is to deter nuclear attack on the US and its forces, discourage the use of nuclear weapons in any war, and should deterrence fail, defeat strategic ballistic missile attacks against the US. This mission directly supports the basic national security objectives.

COMMAND AND CONTROL

The principle of centralized command with decentralized execution is applicable to national missile defense. The battle management strategy is to totally negate all reentry vehicles with predicted impact points in the US. If the threat exceeds system engagement capabilities, an adaptive flexible defense strategy will be used to protect the maximum number of prioritized civilian and military assets. This strategy will be predetermined by the NCA. Priorities may be changed during an attack.

Commander in Chief, United States Space Command (USCINCSPACE)/Commander, US Element NORAD (CDRUSELM-NORAD) will exercise combatant command of all forces. Upon receipt of mission and engagement authority, Commander, Army Space Command (COMARSPACE) will conduct the real-time warfighting execution. Due to the time-critical nature of the mission during crisis and wartime, USCINCSPACE/CINCNORAD mission selection and engagement commands will be passed directly to the ADA battalion. For the initial national missile defense operations, COMARSPACE will delegate warfighting execution authority to the ADA battalion commander. COMARSPACE will continue to assess the performance of the battalion and make recommendations to USCINCSPACE/CINCNORAD on the employment of this force.

The ADA battalion commander will conduct the real-time warfighting execution of the initial national missile defense system. For the objective, multisite system, COMARSPACE will retain the real-time warfighting execution responsibilities. Then the ADA battalion commander would implement COMARSPACE's real-time warfighting commands.

DEPLOYMENT

A national missile defense system will be deployed in an incremental manner. Initially, it will provide limited capabilities for ballistic missile defense and culminate in a system that will meet the total operational requirements. Deployment will be sequenced such that it takes maximum advantage of system element availability as the elements are deployed. System deployment sequencing will be based upon the threat, technology, and funding.

Command and control elements and battle management/command, control, and communications components will be deployed prior to weapons elements, and prior to or in conjunction with the deployment of the sensor elements. This sequencing will provide the capability to control forces as they are fielded.

Surveillance elements will be deployed to enhance the existing integrated system capability to detect

ICBM and SLBM launches. The initial deployment of sensor elements with their increased accuracy and timeliness builds confidence in the sensor suite's ability to detect and report ballistic missile launches prior to the deployment of the weapon elements.

Weapon elements will be deployed incrementally subsequent to the initial deployment of control facilities and surveillance elements. This incremental approach ensures confidence in an in-place, operationally proven command and control system and reliable sensor suite prior to the weapon element deployment.

THEATER MISSILE DEFENSE

TMD encompasses all measures taken to defeat, destroy, or neutralize enemy missiles employed against friendly forces and assets. See the Air and Missile Defense Enclave (Task Force) illustration 6-8. TMD is a coordinated joint services effort, with the Army's contribution being the focus of this section.

Due to the political and military aspects of the threat, TMD objectives are often strategic in nature. These include deployment for operations other than war as explained in Chapter 8 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.

The combination of the theater high-altitude area defense (THAAD) and Patriot systems constitutes the Army's active defense against TBMs. In addition, FAAD, Hawk, and Patriot all participate in TMD counter-RISTA and counter-CM operations. To accomplish the TMD mission, the defense must provide protection for key military assets and forces during deployment, entry, operations, and postconflict operations. In addition, the protection of selected geopolitical assets stabilizes the theater, prevents threat intimidation of allies or coalition members, and may provide for a measure of deterrence by demonstrating national resolve.

Effective employment of these defensive weapon systems must accommodate trends in force structure, advances in technology, and increases in threat capabilities. The limited number of ADA resources mandate prioritized defense of critical theater assets. Effective employment demands decentralized engagement operations to successfully counter the high-threat velocities and extremely short engagement time lines anticipated on the battlefield.

FORCE STRUCTURE

The force structure objective is to provide sufficient ADA assets to support two nearly simultaneous major regional conflicts. Two THAAD battalions are expected to be resourced. Prior to final fielding of the units, user operational evaluation system prototypes will be available for emergency deployments. Nine Patriot battalions constitute the assets available for deployment. In the long term, the corps SAM system will also be part of the TMD team. Additionally, the Marine Corps, Navy, and Air Force all have plans or programs to participate in active missile defense.

MISSION

The THAAD and Patriot systems, possibly augmented by Aegis cruisers or destroyers in the littoral, will provide a two-tiered defense for selected high-value theater assets (military and geopolitical). The two tiers will provide near-leak-proof defense for high-value assets, deny the enemy a preferred attack option, and support the theater and corps campaigns and battles. THAAD will provide the upper tier defense against medium- and short-range ballistic missiles. Patriot and Aegis cruisers/destroyers if available, will provide the lower tier defense primarily against short-range ballistic missiles as well as cruise missiles and air-to-surface missiles. Patriot will also engage the air-breathing threat which penetrates the joint defenses.

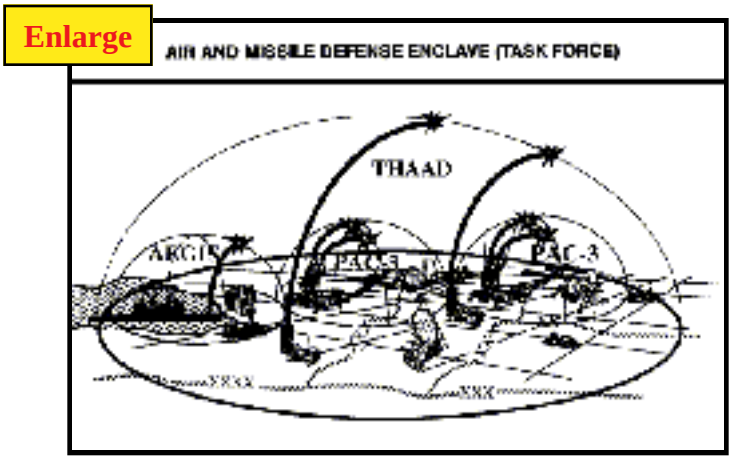

Figure 6-8. Air And Missile Defense Enclave (task Force)

DEPLOYMENT

An air and missile defense enclave (task force) consisting of one Patriot battalion and one or more THAAD batteries should be deployed to provide force protection against air and missile attack. The task force composition may vary depending on the factors of METT-T. If the task force must protect priority forces and assets in the littoral, Aegis cruisers/destroyers may contribute lower-tier protection as a part of the enclave. Aegis capable ships may be particularly important for active defense during entry operations involving amphibious assault or port operations. Once the lodgment is established, THAAD and or Patriot units should be deployed ashore quickly to establish a fully capable air and missile defense enclave (task force). The assault elements of the task force will include a TOC, a mix of THAAD and Patriot batteries based on METT-T and lift available, and supporting communications elements. Follow-on elements will be deployed as lift becomes available. Task forces will move or reposition as required by the campaign plan and the commander's priorities.

ADA brigades may be deployed as the situation requires to exercise command over one or more task forces or battalions. The brigade commander task-organizes the task force and focuses on allocation and constitution or reconstitution of resources to provide optimum defenses and signal support for multiple defenses. The brigade will also provide personnel and logistics support, distribute essential information, establish required data link interfaces with higher headquarters, and provide requisite ADCOORD and liaison personnel.

DEFENSE PLANNING

Defense planning is critical to coordinated execution of the two-tiered defense. The overall defense will be centrally planned and coordinated by the task force TOC. Defense planning consists of two subfunctions--defense design and defense organization. Defense planning software will be resident in all battle command facilities regardless of echelon. This will allow a battery to perform defense planning in the event the TF TOC is unavailable.

Defense design will consider METT-T as well as system operational characteristics, enemy attack options, and enemy order of battle. Using the IPB and the force commander's concept of the operation and mission priorities, the TF commander will develop options for positioning ADA assets and will evaluate the defense design effectiveness using the software resident in the TOC.

Defense organization will produce the detailed plan for implementing the chosen defense options including the parameters for the initialization of weapon and surveillance system operational software. The outputs of the defense organization function will include firing doctrine, parameters, and thresholds that will classify, identify, and prioritize targets and control, and optimize the coordinated upper and

lower tier missile engagements.

BATTLE COMMAND

Defense planning is centralized, but engagement operations against missiles are decentralized to battery level. The Patriot battalion commander will normally be the task force commander, and the Patriot staff will perform the required battalion-level functions.

The brigade, task force, and battery will contain the facilities and equipment for the conduct of battle command. Command posts will be modular and reconfigurable by software or the addition of software and hardware modules. These command posts will be identical, interchangeable, and reconfigurable to ensure full redundancy of critical EO and FO functions.

When conducting active defense operations, task force elements operate under the rules of engagement and weapon control procedures promulgated by the AADC. The types of controls and procedures appropriate for the airbreathing threat will not apply to the active missile defense battle. There is, for example, no identification or weapon control decision required when tracking an incoming ballistic target with a predicted impact point on or near a defended asset.

The task force will normally receive early warning information directly from national, theater, and joint task force intelligence and sensor systems. The task force will send surveillance data, launch point, and engagement status to higher echelons. THAAD surveillance data will be used by the task force FDC to alert and cue Patriot batteries as appropriate.

COMMUNICATIONS

THAAD and Patriot will employ redundant means to achieve reliable data and voice communications. Internal EO data will be passed on joint tactical information data system and tactical data information networks while the area common user system will be used for EO voice. It will also be the primary means for both FO data and voice. External communications will be primarily obtained using the area common user system for EO and FO voice and data. The commander's tactical terminal-hybrid will provide the means to participate in theater intelligence networks.

EXECUTION OF TACTICAL OPERATIONS

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-T. The ability to perform the battlefield tasks provides flexibility to execute the plan and to continuously provide ADA coverage to the force.

SHOOT

All combatants on the battlefield go through the same steps to deliver fire on a target. Every shooter must detect, acquire, identify, and engage targets to destroy them.

Detect

ADA systems must discern the presence of an enemy air element which 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.

Identify

ADA systems must determine if a potential target is friendly or hostile and support target prioritization. Ideally, the identification process would discriminate between real targets and decoys, and even identify the type of enemy unit or element.

Engage

Participants in air defense, having detected, acquired, and identified enemy targets, must prioritize them for engagement and destruction. ADA systems must have the capability to attack enemy targets with ordnance or electronic countermeasures.

Destroy

The immediate goal of every air defense operation must be the destruction of enemy targets. If the target's destruction is not posible, the destruction is not possible, the operation must, as a minimum, prevent the enemy target from fulfilling its mission.

MOVE

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

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.

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 determine communications requirements. The total integration of air defense 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

As warfare's intensity and complexity increase, so does the importance of logistics and trained manpower. 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.

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 around 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

ADA limits the freedom of action of enemy forces and, therefore, enhances friendly freedom to maneuver. In developing and executing air defense missions, mission accomplishment is foremost in priority. The ADA commander makes an estimate of the situation and considers the factors of METT-T. 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.

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

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.

CHAPTER 7

COMBAT SERVICE SUPPORT

This chapter provides doctrine for sustainment of air 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.

Inadequate logistics place all Army operations at risk; but air defense units are especially vulnerable to logistics deficiencies. Shortcomings in maintenance, repair parts supply, or ammunition resupply can disable fire units, and expose critical friendly forces and assets to air and missile attack for extended periods of time. To ensure air defense operations succeed, commanders must plan and resource combat service support with the same care and emphasis given combat operations. *"Before the fighting proper, the battle is fought and decided by the quartermasters,"* Field Marshall Erwin Rommel.

COMBAT SERVICE SUPPORT FUNDAMENTALS

The objective of combat service support is to ensure that operations succeed. In modern warfare and in operations other than war, 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, from the strategic and operational levels of war to the tactical level, provides the commander the means to initiate and sustain operations.

STRATEGIC LOGISTICS

Strategic logistics links the national industrial base with 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 (NICPs), national maintenance points, and the depots, arsenals, data banks, plants, and factories associated with United States Army Materiel Command (AMC). Other organizations which provide strategic support include the Defense Logistics Agency (DLA), US Transportation Command (USTRANSCOM), and the General Services Administration (GSA).

DLA, GSA, and AMC receive and fill requisitions from force projection, forward presence, 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 intertheater lines of communications (LOCs). Most materiel is moved by ship over sea LOCs; while personnel and high-priority materiel may be moved by US Air Force, Civil Reserve Air Fleet, and commercial aircraft over air LOCs.

ADA units have greater contact with the strategic logistics system than most tactical organizations. Logistics assistance representatives (LARs) from the US Army Missile Command (MICOM), a subordinate command of AMC, 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, for repair part identification, and for resupply.

OPERATIONAL CSS

Operational CSS encompasses those support activities required to sustain 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 LOCs, 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.

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 TAADCOORD exercises operational CSS responsibilities by recommending priorities for allocation of logistics functions to all ADA units in the theater. He plans and coordinates the theaterwide 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

Tactical CSS sustain 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

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

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.

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

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. Even deception plans should incorporate CSS activities. The Army seeks opportunities for such integration throughout the planning and execution of operations by

determining who can best provide support.

Continuity

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.

While both combat operations and support operations can vary in intensity, combat operations may enter periods of relative inactivity but CSS operations do not. 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

The CSS system must react rapidly in crises. 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 are 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.

Improvisation

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.

Commanders and planners continually review planning factors and consumption rates, maintain intransit asset visibility, 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

The CSS needs of the force determine the CSS structure (see the Theater Organization illustration 7-1 on the next page). In war, as in peacetime and conflict, the JFC may designate a joint rear area (JRA). It is designated 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 sea ports 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-linked only by tenuous air, land, or sea LOCs.

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-T, strategic lift, pre-positioned 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.

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 CSS 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.

During most contingencies, the ASCC will establish a theater logistics base within the COMMZ. Normally at the junction of intratheater and intertheater LOCs, it contains APOD and SPOD and the CSS facilities required to support operations within the theater. Protection of the theater logistics base is usually a high priority for the EAC ADA brigades.

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 (ASGs). In addition to other types of support, 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 ASGs is provided by the operational-level CSS MMC.

CSS in the early part of a force-projection operation will be packaged into the force itself. CSS for operations other than war also require CSS packages integral to the ADA force.

In the corps area, the corps support command (COSCOM) provides corpswide CSS support. 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 division of the MMC manages system peculiar maintenance and supply for ADA systems.

The 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 (FSBs) support each maneuver brigade.

These elements provide logistical support for units in the division rear and forward areas.

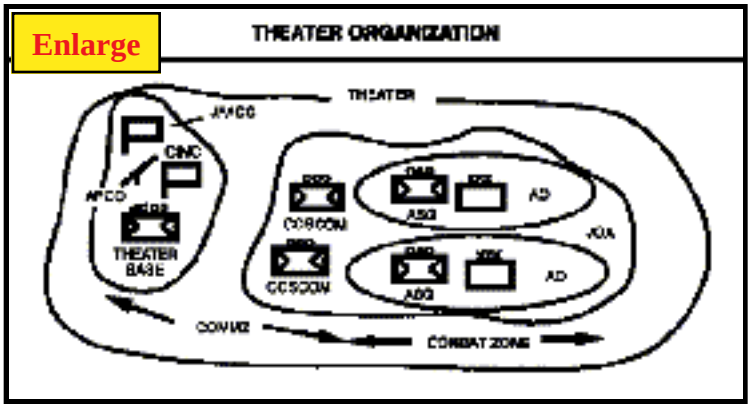

Figure 7-1. Theater Organization

COMBAT SERVICE SUPPORT PLANNING CONSIDERATIONS

CSS planning is conducted as an integral part of operational planning. The G4 or S4 and G1 or S1

participate in all phases of the command estimate and order and plan development as detailed in Appendix B . Logistics preparation of the battlefield is just as important as IPB.

Logisticians anticipate support requirements through development of a CSS estimate. The G4 or S4 and G1 or S1 must be aware of the significant differences between the current logistics status and the anticipated logistics status at the time the operation begins. Current and projected status can be identified using CSS estimates of higher headquarters.

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

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

MANNING

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 all personnel service support functions and actions required to ensure support during predeployment, deployment, and redeployment for war and operations other than war.

The focus during planning is personnel readiness and maintenance of unit strength. The G3 or S3 provides the G1 or S1 OPORD, OPLAN, and FRAGOs that stipulate task organization information necessary for identifying command and control relationships. This information is used to--

- Provide accurate strength accountability.
- Determine necessary modular PSS support 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.

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

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. Modern warfare consumes large amounts of ammunition. 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.

AMC, through MICOM, provides ADA missiles to the theater according to production and stockage 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. The standing operating procedure should describe distribution of the basic load.

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, expressed in rounds per weapon per day, or missiles per day, may be derived from experience or from planning factor reference manuals.

Missile RSRs are forwarded, reviewed, and consolidated at each level in the ADA unit's chain of command, and also provided to the TAADCOORD in the theater. He develops a theaterwide 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 TAADCOORD. The TAADCOORD, 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

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.

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 the 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/DISCOM, while at EAC, they are forwarded to the operational CSS MMC.

FIXING

Maintenance preparation for future operations includes preexecution 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 stockage, and the availability of key maintenance personnel.

During the period preceding the planned operation, maintenance efforts to repair nonoperational ADA systems are the focus of commanders and logisticians at all levels. Battalions and brigades monitor repair activities of batteries and provide assistance as appropriate. Battalion and brigade commanders augment battery maintenance personnel by providing maintenance staff officers, contractor personnel, LARs, and DS or GS contact teams to assist with repair operations.

Logisticians maintain visibility of repair parts throughout the theater, and cross-level parts routinely to repair nonoperational systems. In addition, LARs can assist in providing status of high-priority parts requisitions which 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

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.

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.

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

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

CSS operations are planned and monitored by the G1 or S1 and G4 or S4 in the logistics readiness center (LRC). The LRC, which operates around the clock as a part of battalion and brigade TOCs, is jointly manned by the S1 and S4. 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.

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 battalion 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

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.

The S1 must ensure 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.

The Army's PASR system accounts for soldiers and civilians; reports other strength-related information; and updates command data bases at all levels. Information gained throughout PASR provides readiness managers the details necessary to analyze personnel strength as a component of combat power. This information is also used by other personnel system managers to plan and provide their support.

The casualty system focuses on recording, reporting, verifying, 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.

The 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-T. Replacement management is the physical reception, accounting, processing, support, reequipping, 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 TAADCOORD, 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 the 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

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.

In a divisional ADA battalion, the S4 submits a requisition, using DA Form 581, to the division ammunition officer (DAO). 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.

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. Firing batteries are resupplied by battalion using unit distribution. ADA units must plan for ammunition transfer points within the immediate vicinity of current and proposed unit positions.

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

FUELING

The fuel distribution system is an automatic resupply system based upon fuel forecasts and status reports. It relies on the routine rapid push of bulk fuel, with distribution both lateral and forward. Requirements flow from MMCs and Class III supply points. S4s forecast requirements for the 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.

The ASCC petroleum group and its subordinate units ship bulk fuel, either by pipeline or bulk carriers, to corps and EAC petroleum supply companies (GS). Medium truck companies (petroleum) then transport bulk fuel to ASG, corps support group (CSG), or divisional supply companies (DS), which provide fuel on an area basis.

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 the ASG, CSG, or MSB/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

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 close as possible to the point of failure or damage.

Maintenance in ADA units begins with the operator and supervisor. Opertors perform preventive maintenance checks and services 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.

When the operators or organizational maintainers identify an LRU or circuit board as unserviceable, they obtain a replacement from the unit prescribed load list and install it into the major end item. They then perform diagnostic or operational checks to ensure proper system operation. Unserviceable LRUs and circuit boards are evacuated to the supporting DS maintenance company's repairable exchange activity. The supply support activity of the DS maintenance company provides repair parts supply support using supply point distribution.

A maintenance company (DS) may 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 DS maintenance company, or will be attached from a DS and GS missile maintenance company assigned to the ASG or COSCOM. FAAD batteries receive conventional DS

maintenance and supply support from a DS maintenance company assigned to the ASG, CSG, or DISCOM. DS and GS missile maintenance and supply support are provided by a missile support company attached to the ASG, CSG, or MSB.

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 pans 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

Organic 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 movements release to the ASG, CSG, or transportation unit tasked to support the move.

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

Sustaining soldiers and their systems includes 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

Personnel service support (PSS) is the management and execution of personnel services, resource management, finance services, chaplaincy activities, command information services, and legal service support. These functions in war and operations other than war 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. The brigade and battalion S1 are the commander's principle staff officers for coordinating all aspects of personnel services. Personnel services include personnel readiness management; 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.

The 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-T 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, supported maneuver brigade and battalion S1 or S4, and higher echelon transportation support.

Chaplain activities. 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 services. Legal service support is coordinated by the EAC, corps, division, or brigade staff judge advocate (SJA). 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.

Public affairs. 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.

Public affairs officers plan and conduct proactive command information programs to keep soldiers informed of events in their AO as well as at home. PAOs also plan and conduct aggressive media relations which help tell the Army story and build public support for Army operations.

Finance services. Finance support teams (FSTs) provide military pay support--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

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) HSS. The BAS performs triage, treats, stabilizes, and evacuates injured, ill, or wounded soldiers. Combat medics perform emergency medical treatment and arrange evacuation of casualties at battery level.

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.

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.

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

Field services are provided on an area support basis by the ASG or CSG. The battalion and brigade LRC coordinates for field services as required, when the tactical situation allows. Field services serve to preserve the health, morale, 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

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

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 the supporting supply company of the ASG, CSG, or DISCOM.

RECONSTITUTION OPERATIONS

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.

Reconstitution plans must take into account the situation, degraded units' conditions and missions, and the expected intensity of future operations. Reconstitution plans should cover--

- Information requirements.
- Reporting procedures.
- Assessment procedures.
- Staff reconstitution responsibilities.
- Function, composition, and equipment of damage assessment teams.
- Procedures to reestablish battle command.
- Techniques to maintain cohesiveness.
- Procedures for acquiring assistance from supporting commands.

REORGANIZATION

Reorganization is restoring combat effectiveness by cross-leveling assets within a unit or by forming a composite (smaller) unit. For example, an attrited battalion could be reorganized into a headquarters and two full-strength batteries. Reorganization provides a means to maintain a level of continuous combat effectiveness.

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--

- Equipment status.
- Current supply status.
- Maintenance status.
- Soldier and unit morale.
- Availability of combat and combat support assets.

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

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 is 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.

CHAPTER 8

OPERATIONS OTHER THAN WAR

This chapter describes operations other than war. It also addresses the possible contributions to these efforts by ADA units.

ENVIRONMENT

In preparing to fight our nation's wars, the Army also develops the leadership, organizations, equipment, discipline, and skills useful for a variety of operations other than war (OOTW). Doctrine for war complements that for OOTW. 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 OOTW.

OOTW are described as activities. The following paragraphs present the reader with an assessment of which activities ADA units support and the extent of participation. However, there are no absolutes and ADA units may be called to participate in other activities not addressed. ADA units must be capable of participating in OOTW as required.

The armed forces of the United States are performing OOTW activities on a global scale. ADA units, as contributors of purely defensive capabilities, have become the units of choice for several types of OOTW missions in support of national interests. As regional conflicts and instability increase around the world, the armed forces and specifically Army air defense artillery must remain prepared to perform the entire spectrum of global missions when and where required.

Activities during OOTW 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 OOTW in coordination with the force commander. The civil affairs officer, if authorized, is trained in the special actions to support local US and foreign governments.

Each specific activity has different requirements. Some basic planning questions which 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

OOTW 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 noncombat operations. Unity of command requires modification as described below. 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 noncombat operations.

The relative 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

Each separate operation must be integrated with every 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

ADA commanders must protect their forces at all times. They should never be lulled into believing that the nonhostile 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

In OOTW, other government agencies will often have the lead. 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

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

OOTW may be short or long in 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 a sensitivity for the long-term strategic aims and the restraints placed on operations.

RESTRAINT

The actions of ADA units and soldiers are framed by the disciplined application of force. In OOTW, 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. Understanding of the rules of engagement throughout all units requires follow-through and rehearsals.

NONCOMBATANT EVACUATION OPERATIONS

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 nongovernment organizations (NGOs) 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 the environments of OOTW or war.

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

Arms control focuses on promoting strategic military stability. It encompasses any plan, arrangement, 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 this type of operation. However, ADA soldiers may be selected to serve on arms control teams.

SUPPORT TO DOMESTIC CIVIL AUTHORITIES

When the appropriate 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

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 activities such as refugee assistance, food distribution, medical treatment and care, restoration of law and order, damage and capabilities 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.

Army elements involved in international disaster relief operations are 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 environments make it ideally suited for these missions.

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. However, 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

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 subcomponents--the International Military Education and Training Program and the Foreign Military Sales Program.

INTERNATIONAL MILITARY EDUCATION AND TRAINING PROGRAM

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.

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

This 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

Nation assistance supports a 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 to--

- 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.

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.

Air defense artillery units usually do not participate in nation assistance activities. 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 COUNTERDRUG OPERATIONS

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.

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 centers 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 an OOTW posture.

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.

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 FAAD 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. An example of this support is the border surveillance provided by 2-1 ADA to Joint Task Force Six.

COMBATING TERRORISM

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 activities.

Combating terrorism has two major subcomponents--antiterrorism and counterterrorism. 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 counterterrorism, 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. Counterterrorism occurs in conflict and war; antiterrorism occurs across the continuum.

Since ADA units may face a terrorist threat during OOTW, they 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

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

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

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 engagement of the US abroad.

Peace Building

Peace building consists of postconflict 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

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

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.

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.

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.

The 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.

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.

ADA provides capabilities which 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 ROE, air defense procedures and measures, and a fully capable BM/C4I system is critical. Of major concern in peacekeeping air 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

Peace enforcement operations are military operations in support of diplomatic efforts to restore peace between hostile factions which 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.

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

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.

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 which 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

At the direction of the National Command Authority, US military forces may assist either insurgent movements or host nation governments opposing the insurgency. In both instances, the military instrument of US national power predominantly supports political, economic, and informational objectives.

The US will use its military resources to provide support to a host nation's counterinsurgency operations in the context of foreign internal defense (FID) through logistical and training support. 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.

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

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 which 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

The ADA commander manages the resources in the command. These resources consist of personnel, equipment, funds, and time.

PERSONNEL

The personnel assigned to ADA organizations have very complex, specific skills. Some of these skills can be directly applied to OOTW. Some personnel may be requested for liaison, although this places a burden on each unit. The number of people or manpower available to the ADA commander is fixed by the applicable modified table of organization and equipment (MTOE).

EQUIPMENT

The equipment assigned to ADA organizations has very specific purposes. Some of this equipment can be used to support OOTW. 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 OOTW will have to be identified, received, made operational, and trained upon by the personnel.

FUNDS

The funding for OOTW will be made available to support these activities. This funding should be provided to preselected organizations and units. This would allow for the personnel of these units to train for a specific mission or set of missions to support OOTW. It would reduce costs in purchasing special equipment for all ADA units by selecting certain units to handle one or more of the OOTW activities. Expenditures of funds in this manner would provide cost benefits for manpower and personnel use, special OOTW equipment requirements, and better use of time.

TIME

The proper use of time to service tactical mission requirements and OOTW activities will result in clearer focus of resources. The assignments of the specific units to OOTW activities will result in a better use of time by not requiring all units to train and equip for all OOTW activities. 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

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 threat 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, TASMs, 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.

The IPB process has four steps

- Define the battlefield environment
- Describe the battlefield's effects
- Evaluate the threat
- Determine threat courses of action.

Since terrain, weather, and other characteristics of the battlefield have different effects on air and air defense operations, aerial IPB differs from ground IPB. Enemy 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

The battlefield includes aerial dimensions to an area of operations, battle space, 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

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.

BATTLE SPACE

Battle space is a physical volume that expands or contracts in relation to the ability to acquire and engage

the enemy. It varies in width, depth, and height as the commander positions and moves assets over time. Battle space is not assigned by a higher commander and can extend beyond the commander's area of operations.

AREA OF INTEREST

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. Because the commander and staff need time to process information and plan and synchronize operations, the commander's area of interest is generally larger than the area of operations or battle space. It is also larger due to the great distances that 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 threat 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 which could affect friendly forces.

DESCRIBE THE BATTLEFIELD'S EFFECTS

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

Terrain analysis in support of air 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 threat air to approach, acquire, and engage a target, or deliver airborne or air assault troops. Analysis of the terrain for IPB follows the same principles as ground analysis and uses the military aspects of terrain (OCOKA).

Observation and Fields of Fire

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, radars, jammers, 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 which provide the best protection for air threats entering the target area, and those which provide the best fields of fire once they reach the target area.

Cover and Concealment (Masking)

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 flying is flying a constant altitude above ground level (AGL) of less than 22.8 meters (75 feet). This allows for maximum use of terrain masking
- Pop-up tactics are the use of a low-altitude approach to the target area. Target acquisition and engagement is made by popping up in altitude at a predetermined position or time to minimize exposure
- Masking is using terrain to protect an air system from visual and electronic observation or detection. Electronic warfare supplements natural masking
- Cover is using terrain to provide protection from direct-fire weapon systems

- Ground clutter can be 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.

Threat 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

Obstacles are broken down into three primary types

- Those which prevent the effective employment of ADA systems
- Those which restrict contour flight
- Those which force air threats to employ a particular surveillance or attack profile or route, or to gain excessive altitude.

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.

Key Terrain

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 which 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, missile and UAV launch sites, 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 threat 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

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 enemy point of origin, and river beds. Factors which should be used to determine air avenues of approach, both ingress and egress, are the-

- 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.

Type of air threat. UAVs are small and elusive. They usually fly low. 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. TASMs usually fly direct routes from launch platform to the target. Rotary-wing aircraft primarily conduct contour flights. They follow ridge lines 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.

Point of origin. When determining air avenues, the staff looks at the commander's entire area of interest. Analysis begins at the threat airfield or 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.

Probable threat 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; or at a drop or landing zone. Reverse IPB is used to pick threat objectives. Potential to support maneuver forces. Air assets which 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. Missiles and RISTA UAVs are not limited by ground corridors.

Freedom to maneuver. Does the avenue-

- Canalize the air system
- Have access to adjacent avenues
- Provide the ability to acquire a target and use available munitions
- Assist in navigation?

Protection for the air system and pilot. Does the avenue provide-

- Terrain masking (cover and concealment)
- For the full use of air system speed
- Protection against radar detection
- Protection from air defense weapon systems and tactical air support
- A standoff orbit location
- A standoff orbit?

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

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

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 RISTA. 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

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 threat air capabilities
- Conduct target evaluation.

COLLECT AND ANALYZE DOCTRINAL THREAT DATA

Typical questions which should be answered during this step must also include the commander's 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 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 threat 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 threat 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 RISTA? 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 size 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 defense capability)
- What are air system combat ingress and egress speeds
- Where are missile and UAV launch points? 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 aerially 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?

ANALYZE THREAT AIR CAPABILITIES

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

What are the capabilities of the air systems in terms of-

- 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 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, 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 defense systems
- Type, quantity, and quality of training the pilot has received
- How much do they conform to doctrine
- Ability of pilots to fly at night or perform contour flying? During peacetime did the pilot conduct the type of mission expected to be conducted during war
- Types and capabilities of threat ordnance? Each type of ordnance should be evaluated for-
- Range: assume engagement at maximum range and two-thirds maximum range
- Accuracy
- Release altitude: how high or low must the aircraft fly
- Reload and refire 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

What are the capabilities of threat UAVs in terms of-

- Performance (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?

Tactical ballistic missiles

What are the capabilities of threat TBM systems in terms of-

- Performance (flight time, speed, trajectory, launch restrictions)
- Maximum and minimum ranges
- Circular error probabl
- Crew proficiency
- Reload and refire time? What is the number of TBMs available per transporter erector launcher
- Warhead type and size
- Guidance modes
- Location of surveyed launch sites?

Cruise missiles

What are the capabilities of threat cruise missiles in terms of-

- Performance (flight time, speed, altitude, and launch restrictions)
- Maximum and minimum ranges
- Circular error of probability
- Targeting capabilities and type
- Contour flying capability
- Vulnerability to countermeasures
- Guidance modes
- Warhead type and size?

CONDUCT TARGET VALUE EVALUATION

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

Determining both the threat air and ground courses of action integrates the results of the previous three steps into a meaningful conclusion. Given what threat air and missile forces prefer to do, and the effects of the operational environment, what are the enemy's likely objectives and what COAs are available to him? The G2 or S2 develops enemy threat models that depict the threat's air and missile COAs. They also prepare event templates and matrices that focus intelligence collection on identifying which COA the threat 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 COAs.

SITUATION TEMPLATE

Situation templates are graphic depictions of expected threat 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.

EVENT TEMPLATE

The event template is a guide for collection and reconnaissance and surveillance (R&S) planning. It

depicts named areas of interest (NAIs) where the commander expects to see certain activities of tactical significance and is used to confirm or deny an enemy course of action. These NAIs are based on the terrain constraints on air approach routes to potential targets and analysis of the enemy's attack and RISTA 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, aerial choke points, and TBM, cruise missile, and UAV launch points.

DECISION SUPPORT TEMPLATE

The decision support template is based on the situation and event templates, event matrix, and the wargaming of friendly COA results and should depict-

- Air avenues of approach
- Airborne and air assault objectives
- Landing and drop zones and largest size enemy element which could be employed at the zone
- Ranges of enemy systems
- Ranges of friendly air defense systems
- Target areas of interest (TAIs)
- Decision points (DPs).

Air TAIs and DPs 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 TAIs.

APPLYING IPB

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 threat'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 defense and land force missions on the modern battlefield.

APPENDIX B

ARMY AIR DEFENSE PLANNING

This appendix describes planning for air defense operations. Battle command and staff procedures contained in FM 101-5 are the basis for ADA procedures. This chapter highlights the specific requirements of the AD estimate and annex. The estimate process assists the force commander in decision making. The ADA commander, as ADCOORD, prepares the air defense estimate. Planning begins with the receipt of a warning order. After the force commander approves a course of action, a warning order is sent out and the air defense planning process continues. The end result of this process is the air defense annex detailing air defense support for the concept of the operation.

PREPARING THE AIR DEFENSE ESTIMATE

Estimates are evaluations of how factors in each field of interest will influence the courses of action the commander considers. Although the estimate of the situation lies first and foremost in the commander's mind, staff estimates help the commander determine feasible, suitable, and acceptable courses of action. Staff estimates help the commander gather, update, analyze, evaluate, and validate critical facts, assumptions, and events. The estimate also allows the commander to formulate conclusions based on each staff's estimate.

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.

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 furnished by the force S2 or G2. Then, 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 best supports the mission. 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

The air defense estimate follows the basic staff estimate format. The air defense estimate provides information regarding the air defense supportability of proposed courses of action. It also provides recommended air defense priorities and an air defense scheme of maneuver. This information forms a basis for the air defense plan and is presented in the air defense annex. The estimate must be constantly reevaluated to keep it current. The factors of METT-T, 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. The Air Defense Estimate Situation Overview illustration shows the relationship among troop-leading procedures, decision making, estimate of the situation, and IPB. The Estimate of the Air Defense Situation illustration shows a supporting commander's or operations estimate. The commander's or operations estimate formats provided in FM 101-5 may also be used.

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. THE SITUATION AND COURSES OF ACTION

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

a. Considerations affecting possible courses of action. For this paragraph, determine those factors of the situation which influence friendly and enemy 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

(1) Operations to be supported. A brief description of the operation to be supported includes composition and strengths of possible supported forces, peculiar or unusual mission requirements, and any other factors that affect the scope of the supported unit mission.

(2) Characteristics of the area of operations. This paragraph includes analysis of the effects of pertinent characteristics on conducting air defense operations. Consider the following

(a) 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 enemy UAVs; missiles; aircran, both fixedand rotarywing aircraft; and airborne or air assault operations. Try to determine or predict when the enemy will probably use those assets due to the weather.

(b) Terrain. Analyze the effects of terrain, including effects on observation and fire; cover and concealment; movement (surface and air); employment of friendly and enemy 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 enemy will most probably use air assets.

(c) 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 enemy operations

(3) Enemy situation. A threat evaluation discusses enemy capabilities that are or may be a threat to the operation.

(a) Disposition. List locations of enemy forces that will participate in air or missle operations or that threaten friendly air defense operations. Determine combinations of air platforms that the enemy may use when conducting a particular type of operation.

(b) Composition. The enemy 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.

(c) Strength. Numbers and sizes of committed and reinforcing units. Consider the location of the enemy, enemy 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 platfomms will the enemy fly during this operation?

(d) Other considerations. Enemy forces not discussed above.

(e) Recent and present signicant activities. Summary of recent enemy activities that were both successful and unsuccessful. Highlight any enemy air activity to include number, type of air plaffomms, and locations.

(f) Peculiarities and weaknesses. Indicate enemy peculiarities and weaknesses that might influence combat effectiveness, including vulnerability to deception.

(g) Enemy capabilities. A compilation of available information from which to draw conclusions about possible enemy air courses of action and how they relate to the enemy ground courses of action.

(4) Own situation. The friendly force air defense disposition, composition, and strength. Highlight the vulnerability of the force to enemy air and missile attacks and surveillance.

(a) Tactical situation. State the force commander's course of action. Include any guidance which affects air 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.

(b) Personnel, logistics, and civil-military operations. The status of

personnel and logistics in the unit. Identify civil-military operations requirements. Identify limitations which affect or may affect the conduct of air defense operations. Can the mission be accomplished.

b. Anticipated difficulties or difficulty patterns. Identify those aspects in the commander's plan which create difficulity in providing air defense and affect the ability of the force to accomplish its mission.

c. Own courses of action. 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
- Key passive air defense measures
- Type of action required in each operational area (close, deep, and rear)
- Combined arms for air defense active measures

3. ANALYSIS OF COURSES OF ACTION

Present a narrative which war-games each course of action. Determine the probable outcome of each course of action, including critical incidents, areas, times, and significant difficulties. Apply these factors to the analysis by considering the impact of enemy capabilities and significant difficulties on the possible success of each course of action.

4. COMPARISON OF COURSES OF ACTION

Compare each of the courses of action to determine which course of action air defense can best support. Present advantages and disadvantages for each course of action.

5. DECISION (RECOMMENDATION)

Compare each of the courses of action to determine a recommendation

- 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 defense assets
- Possible OCA targets
- Passive and active air defense measures which will be most effective.

_____

NAME

RANK

(Air Defense Coordinator)

ANNEXES: (as required)

(Classification)

PREPARING THE AIR DEFENSE ANNEX

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.

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

AIR DEFENSE ANNEX

The ADCOORD writes the plan as a five-paragraph annex to the supported unit's OPLAN or OPORD. See the Annex G (Air Defense) to OPORD illustration. The air defense annex assigns specific air defense missions each unit must accomplish. Concurrently or sequentially, ADA units may be preparing their own OPLANs or OPORDs.

ANNEX G (AIR DEFENSE) TO OPORD

(Classification)

Copy___of___copies
Issuing headquarters
Place of Issue
Date-time group of signature
Message reference number

ANNEX G (AIR DEFENSE) TO OPORD_____

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

1. SITUATION

a. Enemy Forces. Detail enemy air capabilitles

(1) Enemy air order of battle. See Intelligence Annex.

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

(3) Additional air threat information. List air 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.

(4) Air avenues of approach. List all expected air avenues of approach. List all known beginning points and describe avenue of approach as it goes through the area of interest.

(5) Terrain and weather. Briefly discuss when and where the enemy will most probably use air platforms, due to terrain and weather constraints.

b. Friendly Forces. ADA mission 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 defense resources attached from other commands and identify those air 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. Concept of the operatlon. Commanders overall ADA plan to include the intent, objectives, and priorities.

b. Tasks to subordinate ADA 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.

(2) SOR plan. Briefly discuss initial SOR and plans to change or rotate SOR.

(3) WCS and WCS authority. Include any plans to change WCS.

(4) Hostile criteria. Basic rules the commander has established to assist in the identification of friendly or hostile air vehicles. Include preplanned changes.

(5) 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.

(6) Passive air defense. Briefly discuss specific passive air defense measures that all units should take to protect themselves from air and missile attack or surveillance during this operation.

(7) Comblned arms for air defense. Briefly discuss specific techniques units should use to help in defending themselves against an air or missile attack or surveillance.

(8) Early warning. Review method and format for passing early warning to the entire force.

4. SERVICE SUPPORT

See Service Support Annex.

5. COMMAND AND SIGNA

a. Command

(1) ADA CP locations.

(2) Succession of command

b. Signal. See Signal Annex

(1) IFF code edition and book number.

ACKNOWLEDGE:
OFFICIAL: NAME (Commander's last name)
APPENDIXES: RANK (Commander's rank)
APPENDIXES:
DISTRIBUTION:

(Classification)

APPENDIX C

SPACE SUPPORT

This appendix gives a summary of space support to air 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

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

Generally, the orbital characteristics of a space system are related to the function of the satellite. Satellites may be in circular or elliptical orbits which 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 does the field of view and station time; but the ability to resolve small objects decreases at higher altitudes.

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. Periods range from 90 minutes for the lowest orbits to 24 hours or more for deep space orbits.

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.

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.

One type orbit which 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

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

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

Satellite systems are vulnerable to environmental conditions in space such as temperature extremes, radiation, meteoroids, and space debris. Satellite systems also can be affected by atmospheric disturbances and solar activity such as solar flares. 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.

Coverage

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 altogether, 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

The space systems discussed are divided into five categories. A brief narrative is provided at the beginning of each category. Specific systems are described in terms of their space, control, and user segments.

COMMUNICATIONS

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, intertheater, and a significant portion of intratheater traffic at division level and above. Some tactical intratheater 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

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 FLTSATs and dedicated, leased satellites. The FLTSATs will be replaced by UHF follow-on satellites in the future. 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 FLTSATs. 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

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 a mix of DSCS II and 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 which can be activated to provide additional capabilities when needed.

Each DSCS II satellite has two transponders which provide four channels through two earth coverage antennas and two narrow spot beam antennas. Each DSCS III satellite has six transponders providing six channels through earth coverage antennas, narrow beam antennas, and multibeam antennas. The DSCS satellites provide worldwide coverage from 70 degrees north to 70 degrees south latitude. Additional DSCS III satellites are available for launch.

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 (DSCSOCs). The Army Space Command operates all five of the DSCSOCs. Platform control of DSCS III satellites and both payload and platform control of DSCS II satellites are provided by the Air Force Space Command. Users include the Defense Information Systems Agency which 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.

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.

RISTA

Satellites have unique capabilities that can be used for RISTA. Space-based sensors have the advantage of unrestricted access over battlefields and denied areas. They can be used to observe enemy 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 enemy capabilities. When the information provided through space systems is integrated with that gathered by other systems, a more complete IPB is attained.

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.

ENVIRONMENTAL MONITORING

Environmental monitoring consists of gathering weather and terrain data. Three satellite systems are the primary contributors.

Weather

Weather has a significant impact on the conduct of tactical operations in terms of visibility, temperature, and trafficability. 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.

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 which 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

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.

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) is a US civil satellite system used to provide worldwide land surface data and some ocean data. LANDSATs 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 which has 7 different bands. The maximum multispectral 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 groundprocessing 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) 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 multispectral (visible wavelength) bands with a resolution of 20 meters. The HRVs 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. SPOT is controlled by the European Space Agency with France as the executive agent. Customers submit coverage requests and payment to SPOT marketing offices located around the world.

POSITION AND NAVIGATION

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.

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, some allied military services, and certain other designated users have access to Precision 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.

WARNING

The Defense Support Program (DSP) was initiated as a space-based strategic surveillance system to

detect the launch of ICBMs and SLBMs. 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 ICBMs, SLBMs, tactical ballistic missiles, satellite booster rockets, and certain other rockets. USSPACECOM exercises authority over DSP through the Air Force Space Command which operates and controls the satellites. Data is centrally processed and transmitted to users. The principal users are the National Command Authority, US Space Command, Strategic Command, North American Aerospace Defense Command (NORAD), and unified and specified CINCs.

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 defense systems) and attack systems.

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).

JTAGS is a new satellite receiver that allows direct downlink 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

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.

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.

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.

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), which consists of ARSPACE and SDC, 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.

The development of the Army's AirLand 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 RISTA capabilities which 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.

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, space capabilities are exploited by every soldier on the battlefield. 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.

GLOSSARY

A

A2C2 Army airspace command and control
AAA antiaircraft artillery
AADC area air defense commander
ACA airspace control authority
ACO airspace control order
AD air defense
ADA air defense artillery
ADCOORD air defense coordinator
ADIZ Air Defense Identification Zone
ADOA air defense operations area
ADW air defense warning
AGL above ground level
AI air interdiction
air defense artillery (ADA) ground-based surface-to-air weapons, for engaging air and missile targets
air defense operations area (ADOA) 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
airspace management the coordination, integration, and regulation of the use of airspace of defined dimensions
air superiority that degree of dominance in the air battle of one force over another that permits the conduct of operations the former and its related land, sea, and air forces at a given time and place without prohibitive interference by t opposing force air supremacy that degree of air superiority wherein the opposing air force is incapable of effective interference
ALERT attack and launch early reporting to theater
ALOC air lines of communications
AMC United States Army Materiel Command
AO area of operations
AOC air operations center
AOR area of responsibility
APOD aerial port of debarkation
AR armor
area air defense commander (AADC) within an over seas unified command subordinate unified command, or joint task force, the commander will assign overall responsibility for air defen to a single commander
ARM antiradiation missile
ARSPACE Army Space Command
ASCC Army Service Component Commander
ASG area support group

ASP ammunition supply point
ASPO Army Space Program Office
ATACMS Army tactical missile system
ATP Allied Tactical Publication
AV aviation
AWACS Airborne Warning and Control System

B

BAS battalion aid station
battlefield air interdiction air interdiction attacks against targets which are in a position to have a near term effect on friendly land forces
battlefield coordination element (BCE) the Army liaison element collocated with the TACC which processes land forces' requests for tactical air support, monitors and interprets the land battle situation for the TACC, and provides the necessary interface for the exchange of current intelligence and operational data
BCE battlefield coordination element
bde brigade
BM battle management

C

C2 command and control
C2W command and control warfare
C3 command, control, and communications
C4I command, control, communications, computers, and intelligence CA counterair
CAFAD combined arms for air defense
CAP combat air patrol; crises action procedures
CAS close air support
cdr commander
CDRUSELM-NORAD Commander, United States Element-North American Aerospace Defense
CEP Command circular error probable
CHS Combat health support
CINC Commander In Chief
CINCNORA Commander In Chief, North American Aerospace Defense
CJCS Command Chairman, Joint Chiefs of Staff
close air support (CAS) air action against hostile tar gets which are in close proximity to friendly forces
CM cruise missile
CMMC corps materiel management center
COA course of action
COCOM combatant command
COMARSPACE Commander, United States Army Space Command
command the authority that a commander in the military service lawfully exercises over subordinates by virtue of rank or assignment. Command includes the authority and responsibility for effectively using available resources and for planning the employment of, organizing, directing, coordinating, and controlling military forces for the

accomplishment of assigned missions. It also includes responsibility for health, welfare, morale, and discipline of assigned personnel.

command and control the exercise of authority and direction by a properly designated commander over assigned forces in the accomplishment of the mission. Command and control functions are performed through an arrangement of personnel, equipment, communications, facilities, and procedures employed by a commander in planning, directing, coordinating, and controlling forces and operations in the accomplishment of the mission.

COMMZ communications zone

COMSEC communications security

control authority that may be less than full command exercised by a commander over part of the activities of subordinate or other organizations

CONUS continental United States

COSCOM corps support command

counterair operations air operations conducted to attain and maintain a desired degree of air superiority by the destruction or neutralization of enemy air forces

CP command post

CRC control and reporting center

CRP control and reporting post

CSA corps storage area

CSG corps support group

CSR control supply rate

CSS combat service support

CZ combat zone

D

DA Department of the Army

DAO division ammunition officer

DCA defensive counter air

DCSOPS Deputy Chief of Staff for Operations and plans

DEFCON defense readiness condition

defensive counterair the protection of assets from air attack through both direct defense and destruction of the enemy's air attack capacity in the air

DISCON division support command

DISE deployable intelligence support element

DLA Defense Logistics Agency

DMSP Defense Meteorological Satellite Program

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

DSP defense support program

E

EA electronic attack
EAC echelons above corps
ECM electronic countermeasures
EHF extremely high frequency
electronic warfare military action involving the use of electromagnetic energy to determine, exploit, reduce, or prevent hostile use of the electromagnetic spectrum and action which retains friendly use of the electromagnetic spectrum
electronic countermeasures that division of electronic warfare involving actions taken to prevent or reduce an enemy's effective use of the electromagnetic spectrum
EMCON emissions control
EN Corps of Engineers
engage a command order used to direct surface-to-air units to engage specific targets with intent to destroy
EO engagement operations
EOSAT Earth Observation Satellite
EP electronic protection
EROS Earth Resources Observation System
ES electronic warfare support
EW electronic warfare

F

FA field artillery
FAAD forward area air defense
FAADEZ forward area air defense engagement zone
FARP forward area rearm/refuel point
FDC fire direction center
FEZ fighter engagement zone
FID Foreign Internal Defense
fire support coordinator (FSCOORD) the individual responsible for the planning and execution of fires so that targets ar adequately covered by a suitable weapon or group of weapon
fire support element (FSE) a functional element of a force command post that provides centralized targeting, coordination, and integration of fires delivered on surface targets by fire support means under the control of or in support of the force. This element is staffed from the field artille headquarters or field artillery staff section of the force and representatives of other fire support means.
FLOT forward line of own troops
FLTSAT Fleet Satellite
FLTSATCOM Fleet Satellite Communication System
FM field manual
FO force operations
FRAGO fragmentary order
FS fire support
FS fire support
FSB forward support battalion
FSCOORD fire support coordinator
FSE fire support element

FST finance support team

G

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
GMFSC Ground Mobile Forces Satellite Communications
GPS Global Positioning System
GS general support
GS-R general support-reinforcing
GSA General Services Administration

H

HE high explosive
HIDACZ high-density airspace control zone
HIMAD high- to medium-altitude air defense
HQDA Headquarters, Department of the Army
HRV high resolution visible
HSS health service support

I

ICBM intercontinental ballistic missile
IEW intelligence and electronic warfare
IFF identification, friend or foe
IFV infantry fighting vehicle
IN infantry
intelligence preparation of the battlefield (IPB) a continuous, integrated, and comprehensive analysis of the effects of terrain, weather, and enemy capabilities on operations
IPB intelligence preparation of the battlefield
IR intelligence requirement
IRBM intermediate-range ballistic missile

J

J3 Operations Directorate
JCS Joint Chiefs of Staff
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
JOA joint operations area
joint force air component commander (JFACC) The joint force air component commander's responsibilities will be assigned by the joint force commander (normally these would include, b not be limited to, planning, coordination, allocation, and tasking based on the joint force commander's appointment

decision).

joint force land component commander (JFLCC) the designated senior land commander in a joint force who exercises command and control of all assigned land forces. Based upon the joint force commander's guidance, the JFLCC develops his concept of operations, assigns missions and allocated resources. He supports subordinate units by conducting joint planning and coordination requir to implement their schemes of maneuver.

JOPES Joint Operations Planning and Execution System
JOTS Joint Operations Tactical System
JRA joint rear area
JSOA joint special operations area
JSTARS Joint Surveillance and Target Attack Radar System
JTAGS Joint Tactical Ground Station
J-TENS Joint-Tactical Exploitation of National Capabilities
JTF joint task force
JTMD joint theater missile defense
JZ joint zone

L

LADW local air defense warning
LANDSAT Land Satellite
LAR logistics assistance representative
LCC land component commander
LNO liaison officer
LOC lines of communications (logistic routes)
LRC logistics readiness center
LRU line replaceable unit
LZ landing zone

M

MARFORCC Marine Force Component Commander
MCO movement control officer
MCT movement control team
MEF Marine expeditionary force
METT-T mission, enemy, terrain, troops, and time available
MEZ missile engagement zone
MICOM Missile Command
MILSATCOM Military Satellite Communications
MLRS multiple-launch rocket system
MMC Materiel Management Center
MRR minimum risk route
MSB main support battalion
MSI multispectral imagery
MSR main supply route
MTOE modified table of organization and equipment
MWR morale, welfare, and recreation

N

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

O

OCA offensive counterair
OCOKA observation, cover and concealment, obstacles, key terrain, and avenues of approach
offensive counterair (OCA) an operation mounted to destroy, disrupt, or limit enemy air power close to its source as possible
OLS Operational Linescan System
OOTW operations other than war
OP observation post
OPCON operational control
operational command those functions of command involving the composition of subordinate forces, the assignment of tasks the designation of objectives, and the authoritative direction necessary to accomplish the mission
operational control synonymous with operational command
operational level of war the level of war at which campaigns and major operations are planned, conducted, and sustained to accomplish strategic objectives within theaters or areas of operations
operations security (OPSEC) the process of denying adversaries information about friendly capabilities and intentions by identifying, controlling, and protecting indicators associated with planning and conducting military operation and other activities
OPLAN operation plan
OPORD operation order
OPSEC operations security
ORF operational readiness float

P

PAC Patriot advanced capabilities
PAO public affairs officer
passive air defense all measures, other than active defense, taken to minimize the effects of hostile air action. These include the use of tactical warning of air or missile attack, cover, concealment, camouflage, deception, dispersion, and protective construction.
PASR personnel accounting and strength reporting
PIR priority intelligence requirement
POD port of debarkation
POL petroleum, oils and lubricants

positive control a method of airspace control that relies on positive identification, tracking, and direction of aircraft within an airspace, conducted with electronic means by an agency having this authority and responsibility therein
PPS precision positioning system
PRM personnel readiness management
procedural control a method of airspace control that relies on a combination of previously agreed and promulgated orders and procedures
PSS personnel system support
PTL primary target line
pub publication
PZ pick-up zone

R

R reinforcing
R&S reconnaissance and surveillance
RADC region air defense commander
remotely-piloted vehicle an unmanned aerial vehicle capable of being controlled by a person from a distant location through a communications link. It is normally designed to be recoverable.
RISTA reconnaissance, intelligence, surveillance, and target acquisition
ROE rules of engagement
RSR required supply rate
RT return to duty
rules of engagement (ROE) directives that delineate the circumstances under which weapons may fire at an aircraft. The right of self-defense is never denied.

S

S1 Adjutant
S2 Intelligence Officer
S3 Operations and Training Officer
S4 Logistics Officer
SDC Strategic Defense Command
SEAD suppression of enemy air defenses
SEP spherical error probable
SHF super high frequency
SHORAD short-range air defense
SHORADEZ short-range air defense engagement zone
SJA staff judge advocate**SLBM** sea-launched ballisti
SOC sector operations center
SOE state of emissions
SOF special operation forces
SOP standing operating procedure
SOR state of readiness
SPOD sea port of debarkation
SPOT Systeme Probatoire d'Observation de la Terre
SSDC Space and Strategic Defense Command
STANAG Standardization Agreement

strategic level of war the level of war at which a nation or group of nations determines national or alliance security objective and develops and uses national resources to accomplish tho objectives

suppression of enemy air defenses (SEAD) that activity which neutralizes, destroys, or temporarily degrades enemy air defenses in a specific area by physical attack and or electronic warfare

T

TAADCOORD theater Army air defense coordinator
TACC tactical air control center
TACDAR Tactical Detection and Reporting

tactical air control center (TACC) the principal air operations installation (land- or ship-based) from which all aircraft and air warning functions of tactical air operations are controlled

tactical level of war the level of war at which battles and engagements are planned and executed to accomplish militar objectives assigned to tactical units or task forces

TAI target area of interest
TASM tactical air-to-surface missile
TBM tactical ballistic missile
TENCAP Tactical Exploitation of National Capabilities
TERS Tactical Event Reporting System
TES Tactical Event System
TF task force
THAAD Theater High-Altitude Area Defense
TIBS Tactical Information Broadcast System
TM technical manual; theater missile
TMD theater missile defense
TOC tactical operations center
TRANSCOM Transportation Command
TRAP Tactical Receive Equipment and Related Applications
TSA theater storage area

U

UAV unmanned aerial vehicle
UHF ultrahigh frequency
USAF United States Air Force
USCINCSPACE United States Commander in Chief, Space Command
USMC United States Marine Corps
USN United States Navy
USSPACECOM United States Space Command
USSR Union of Soviet Socialist Republics
USTRANSCOM United States Transportation Command

W

WAD weapons alert designator
WCS weapon control status
WEZ weapon engagement zone

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TRADOC Pam 525-5. Force XXI Operations. 01 August 1994.

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STANAG	TITLE	
STANAG 3700	NATO Tactical Air Doctrine (ATP-33(B))	4
STANAG 3805	Doctrine and Procedures for Airspace Control in Time of Crisis and War (ATP-40(A))	4
STANAG 3880	Counter Air Operations (ATP-42(B))	2

DOCUMENTS NEEDED

These documents must be available to the intended users of this publication.

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DA Form 2028. Recommended Changes to Publications and Blank Forms. 01 February 1974.

AUTHORIZATION LETTER

FM 44-100
15 June 1995

By Order of the Secretary of the Army:

GORDON R. SULLIVAN

General, United States Army

Chief of Staff

Official:

JOEL B. HUDSON
Acting Administrative Assistant to the
Secretary of the Army
00080

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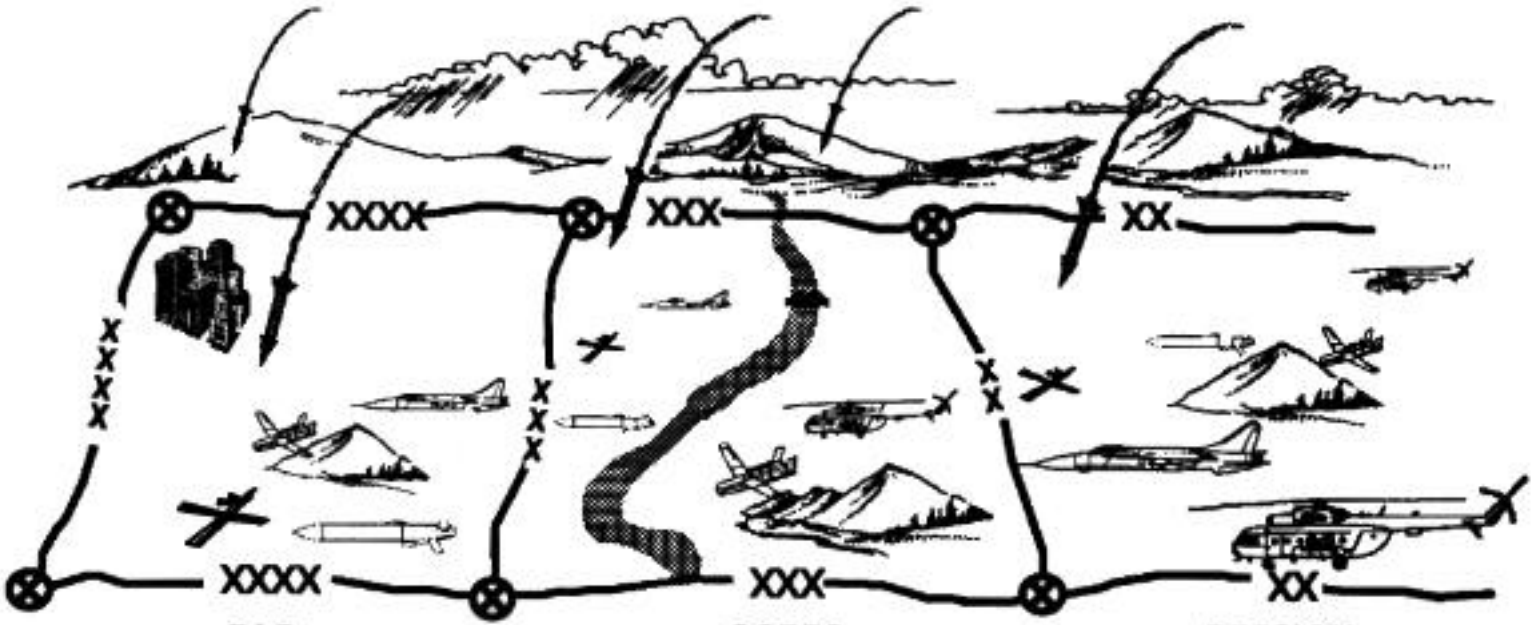
THREAT LAYDOWN



EAC

TBM, CRUISE MISSILE, RISTA UAV, FIXED-WING AIRCRAFT

CORPS

TBM, RISTA UAV, CRUISE MISSILE, ROTARY-WING AIRCRAFT, FIXED-WING AIRCRAFT, ATTACK UAV

DIVISION

RISTA UAV, ROTARY-WING AIRCRAFT, TBM, CRUISE MISSILE, FIXED-WING AIRCRAFT, ATTACK UAV

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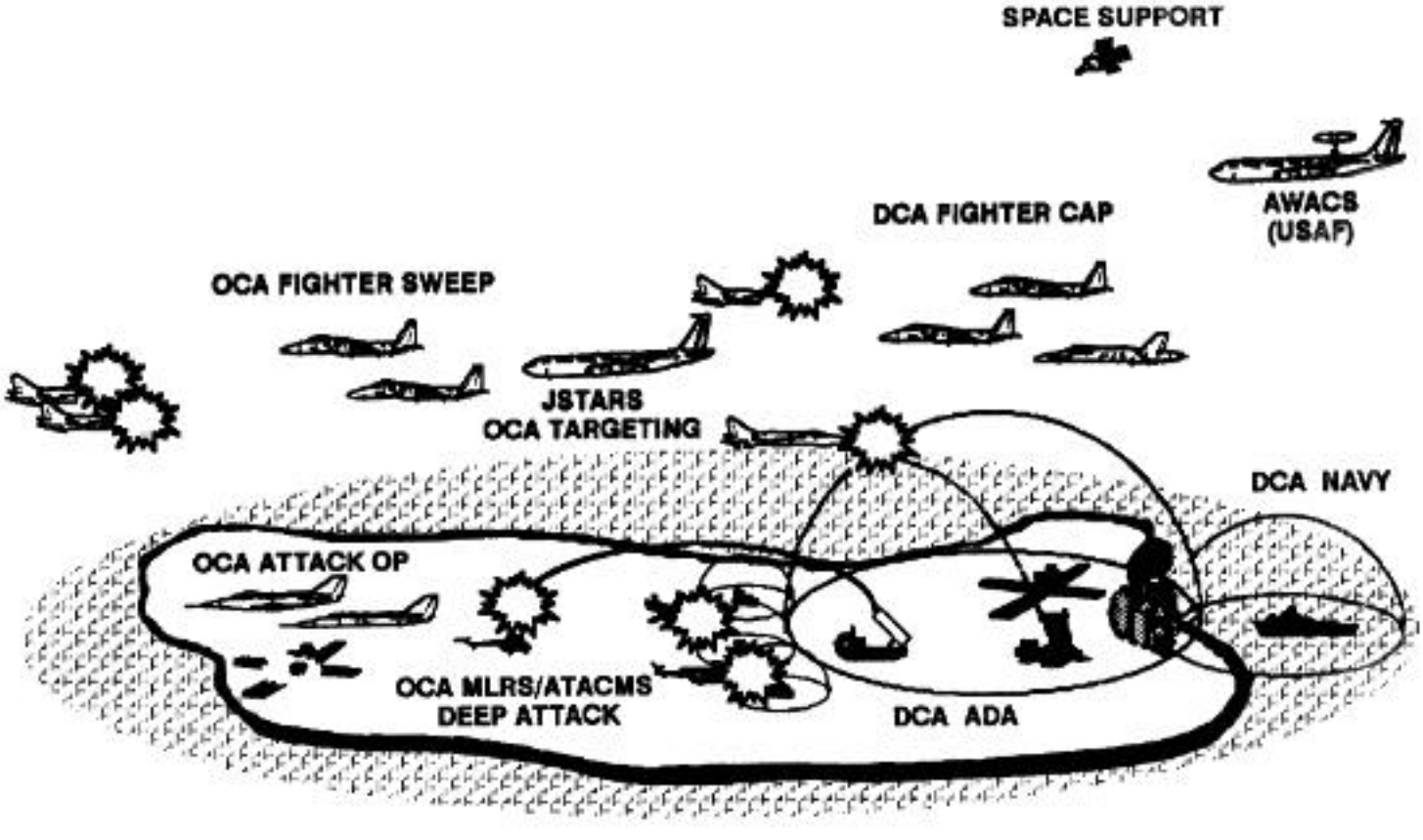
COUNTERAIR TEAM EFFORT



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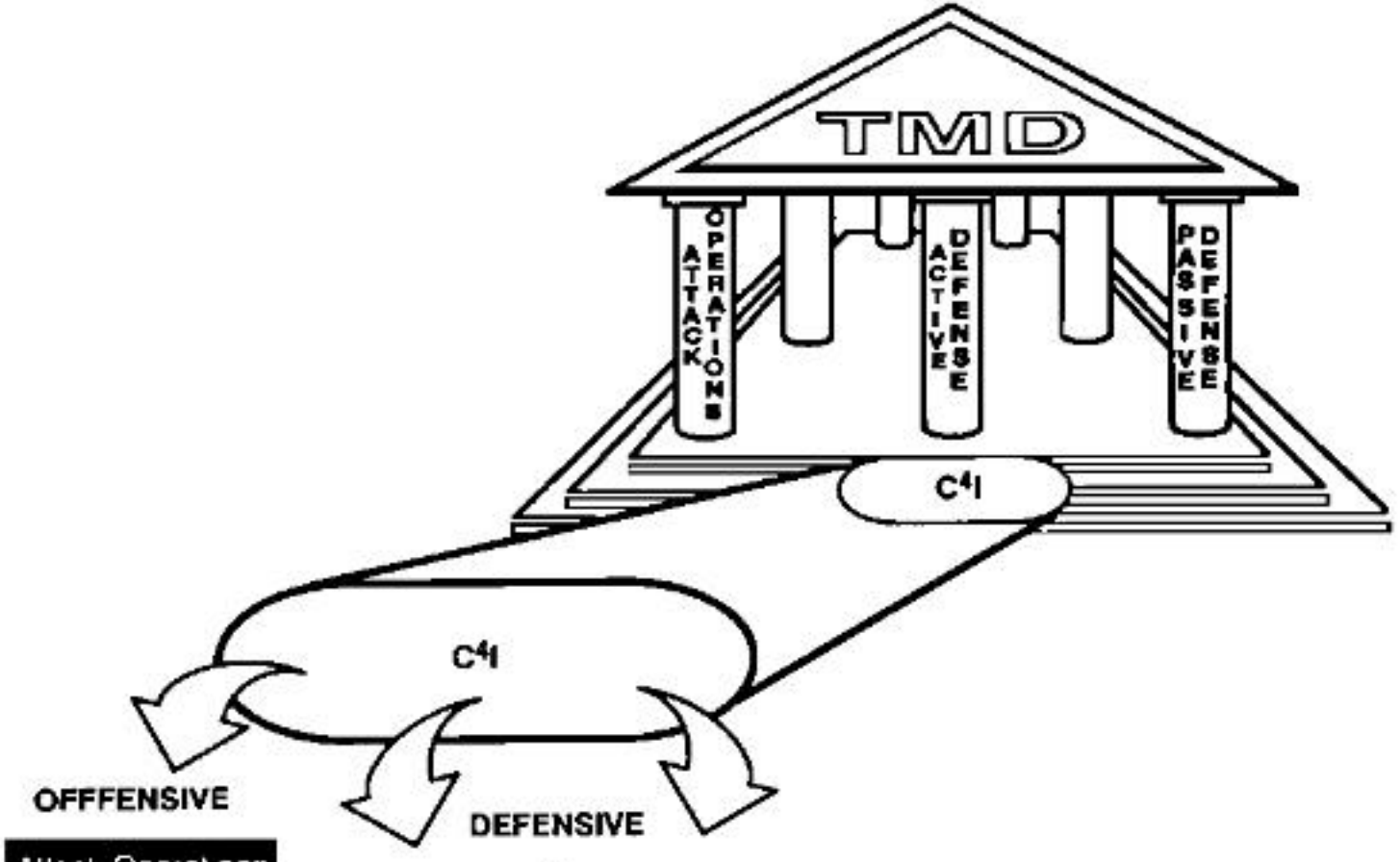
JTMD OPERATIONAL ELEMENTS



Attack Operations

Active Defense

- Point Defense
- Area Defense
- Self- Defense

Passive Defense

- Tactical Warning
- Counter -RISTA
- Reduce Vulnerability
- OPSEC

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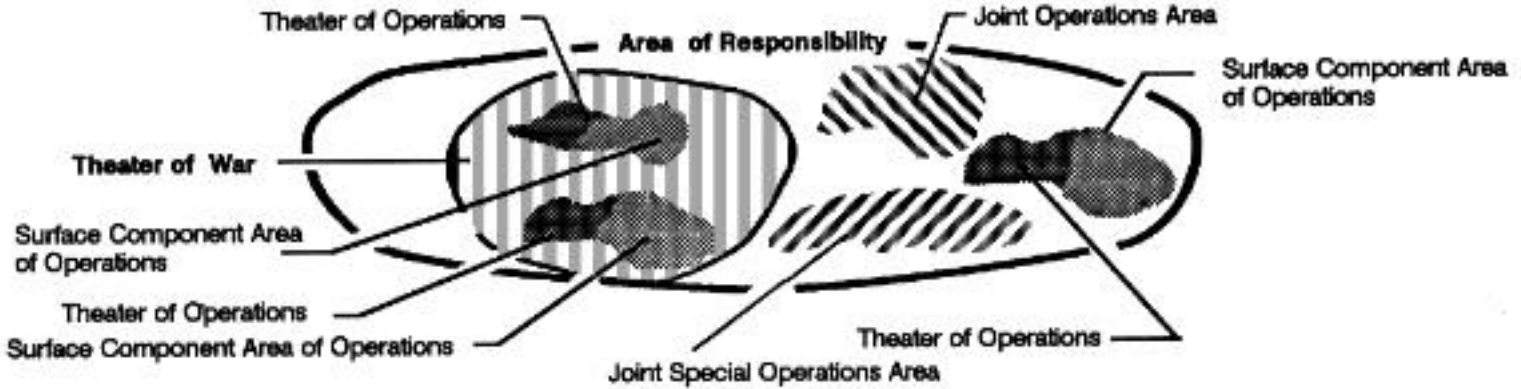
THEATER STRUCTURE DIAGRAM



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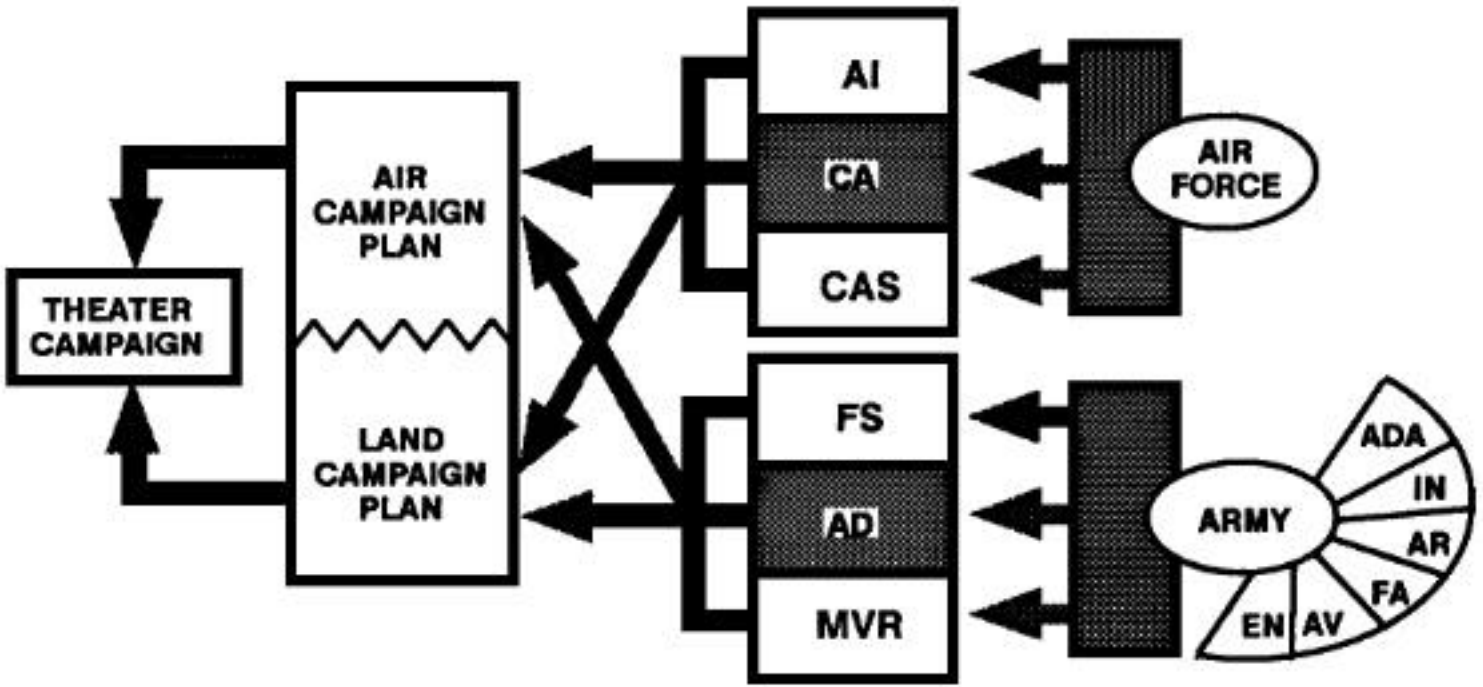
CAMPAIGN PLANNING LINKAGES



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THE SIX AIR DEFENSE ARTILLERY EMPLOYMENT GUIDELINES

MUTUAL SUPPORT

Fires of one weapon can engage targets in dead zone of adjacent weapon.

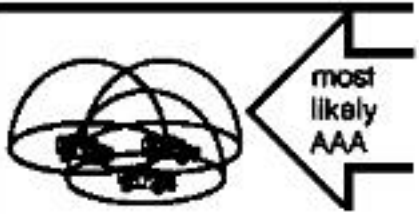
OVERLAPPING FIRES

Engagement envelopes of both weapons overlap.

BALANCED FIRES

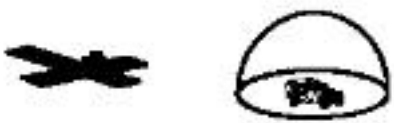
Weapons positioned to deliver equal volumes of fires in all directions.

WEIGHTED COVERAGE



Concentrate fire on most likely enemy air avenue of approach.

EARLY ENGAGEMENT



Position weapons and sensors so they engage before ordnance release.

DEFENSE IN DEPTH

Position weapons so threat comes under increasing volume of fire.

Return

ADA SUPPORT RELATIONSHIPS

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

Notes:

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

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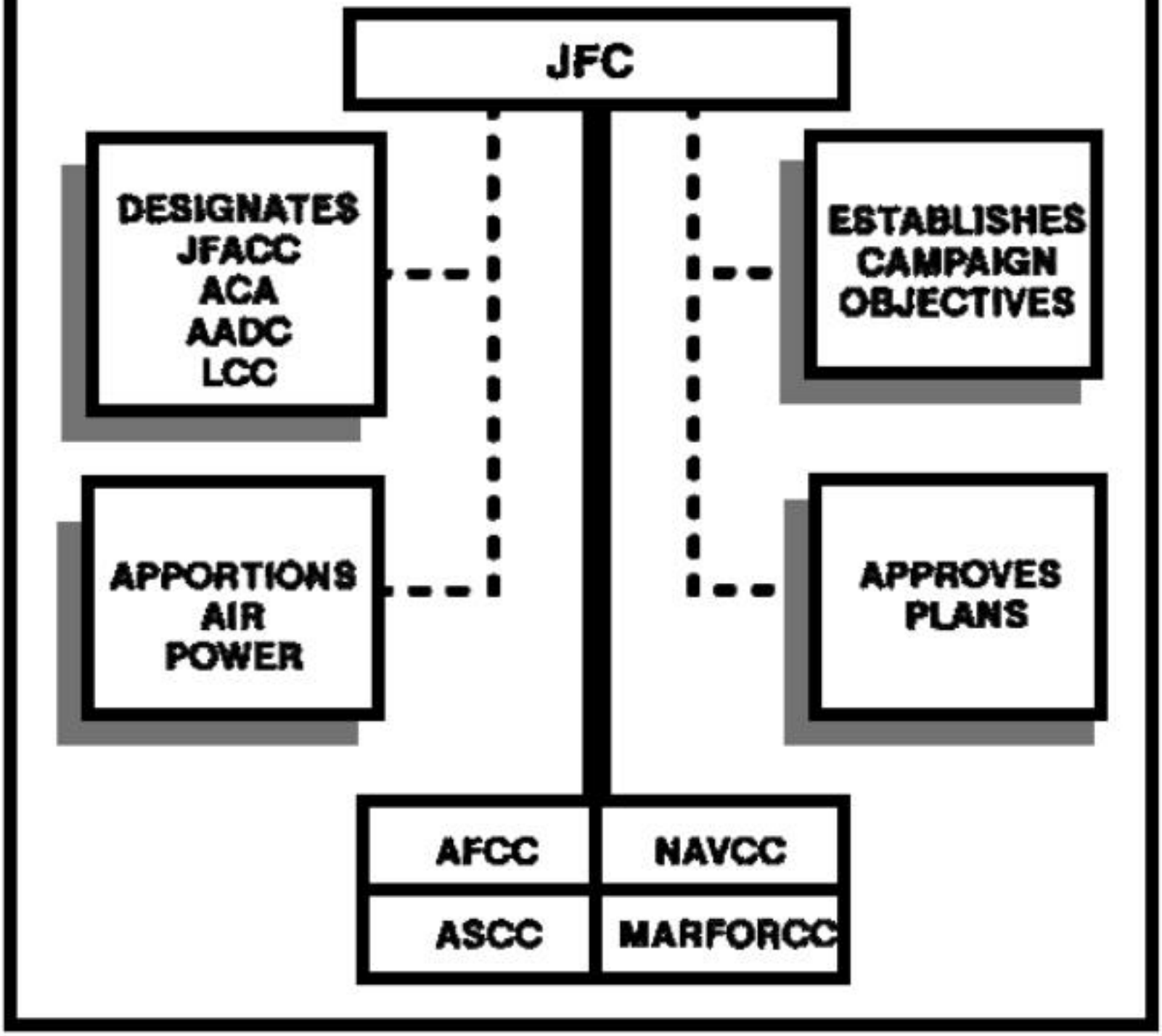
JOINT FORCE COMMANDER'S AIR DEFENSE ROLE



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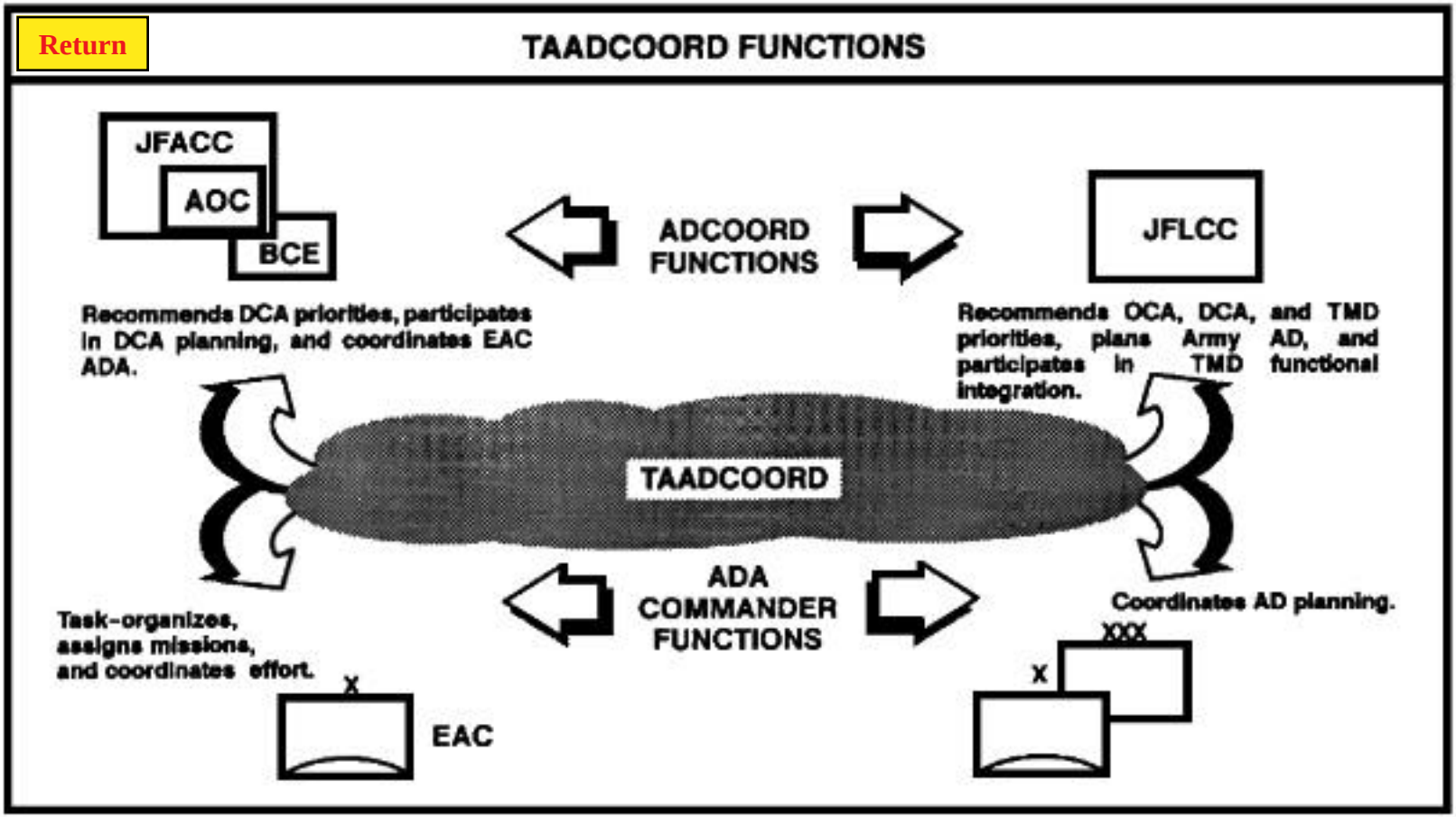
TAADCOORD FUNCTIONS



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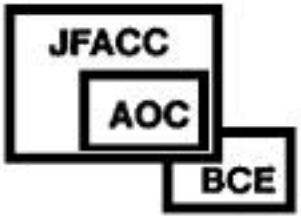
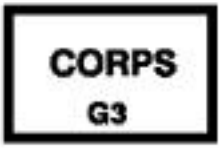
BRIGADE COMMANDER'S FUNCTIONS



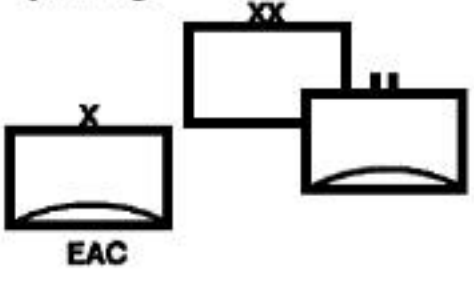


ADCOORD recommends DCA priorities, participates in DCA planning, and coordinates corps ADA.

ADCOORD recommends OCA, DCA, and TMD priorities, plans Army AD, and participates in TMD and counterair functional integration.

ADA commander task-organizes, assigns missions, and coordinates effort.

ADA commander coordinates AD planning.



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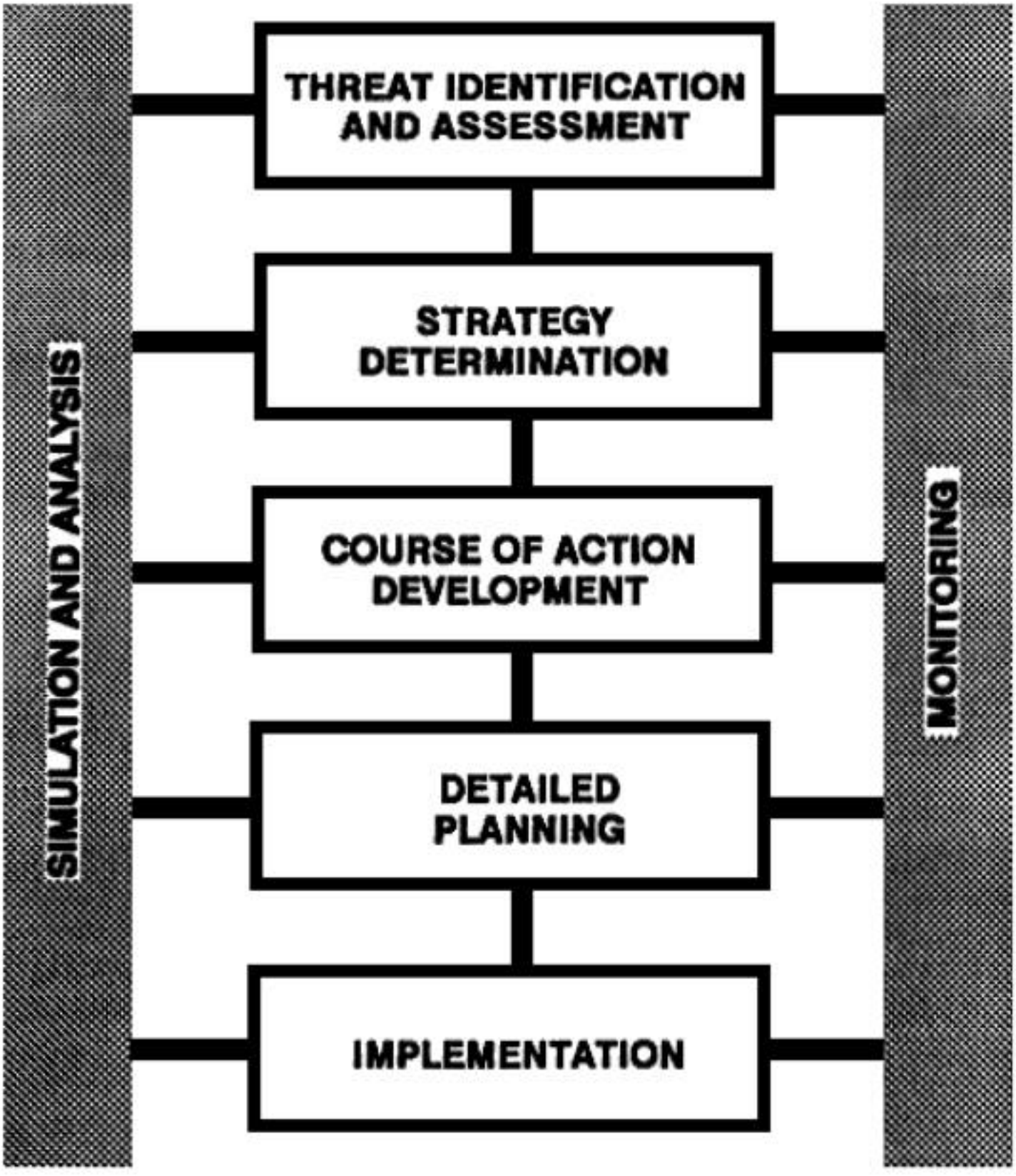
JOPES OPERATIONAL AND SUPPORTING TASKS



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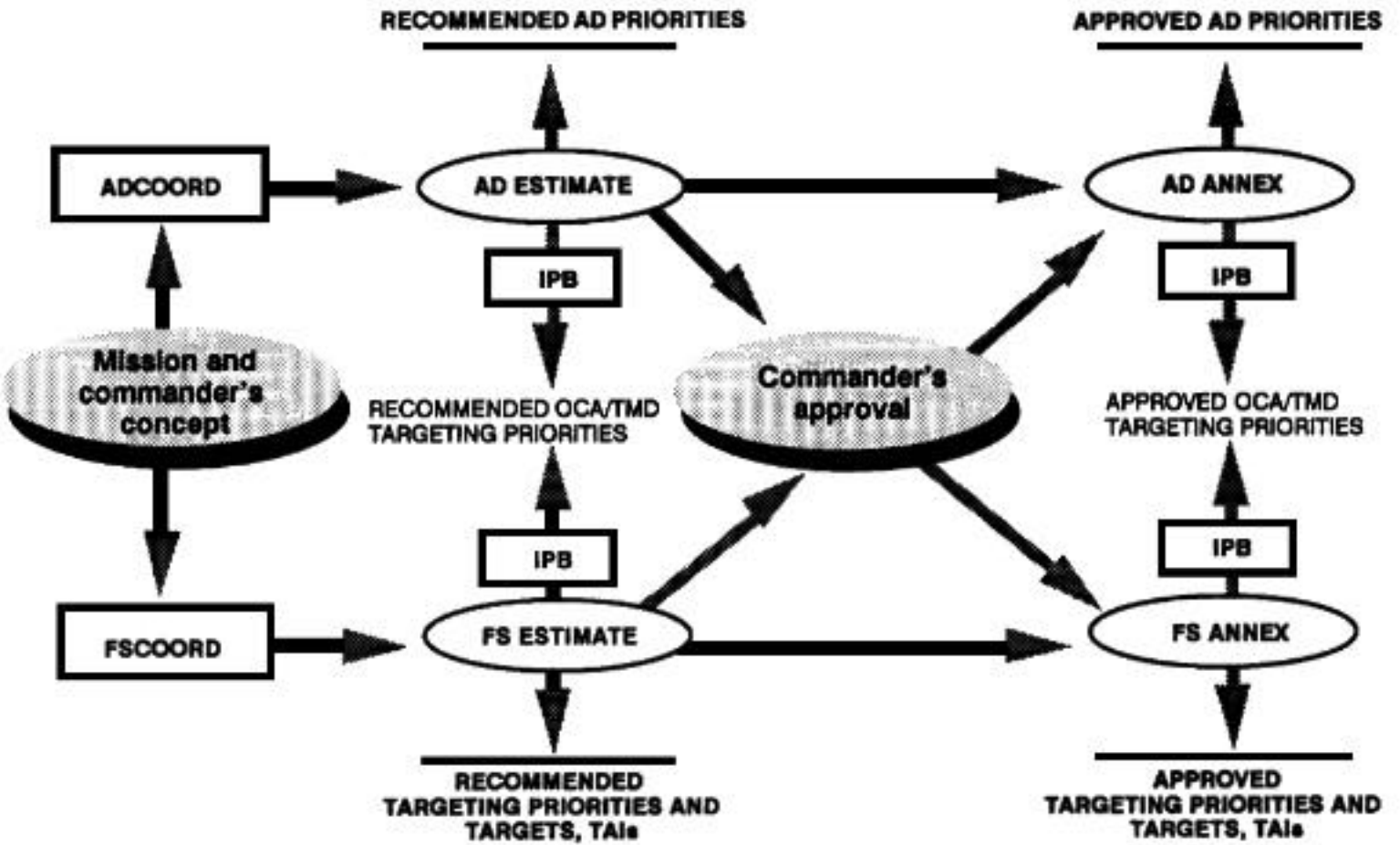
DEVELOPMENT OF AIR DEFENSE AND FIRE SUPPORT ANNEXES



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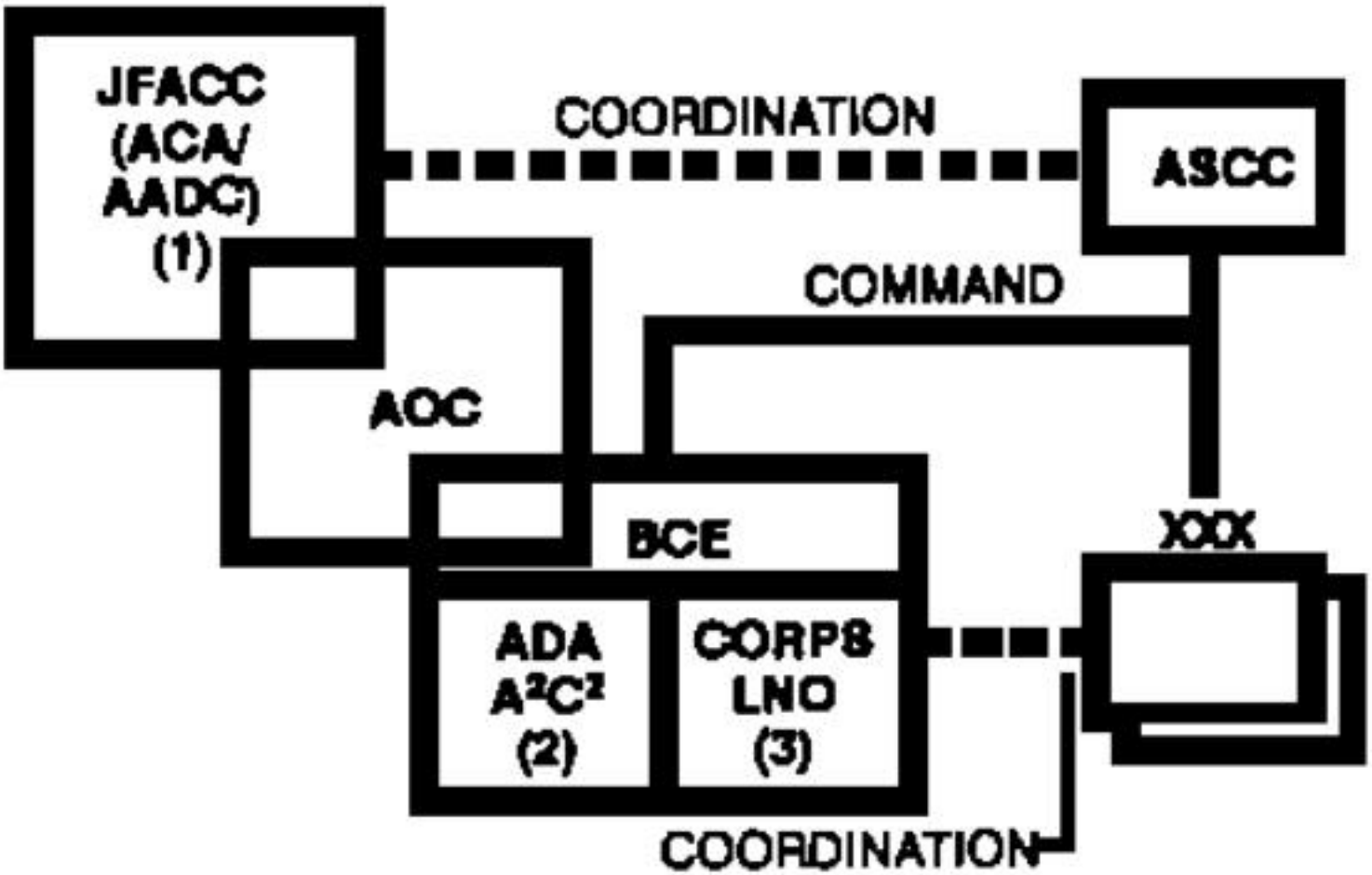
THE BATTLEFIELD COORDINATION ELEMENT

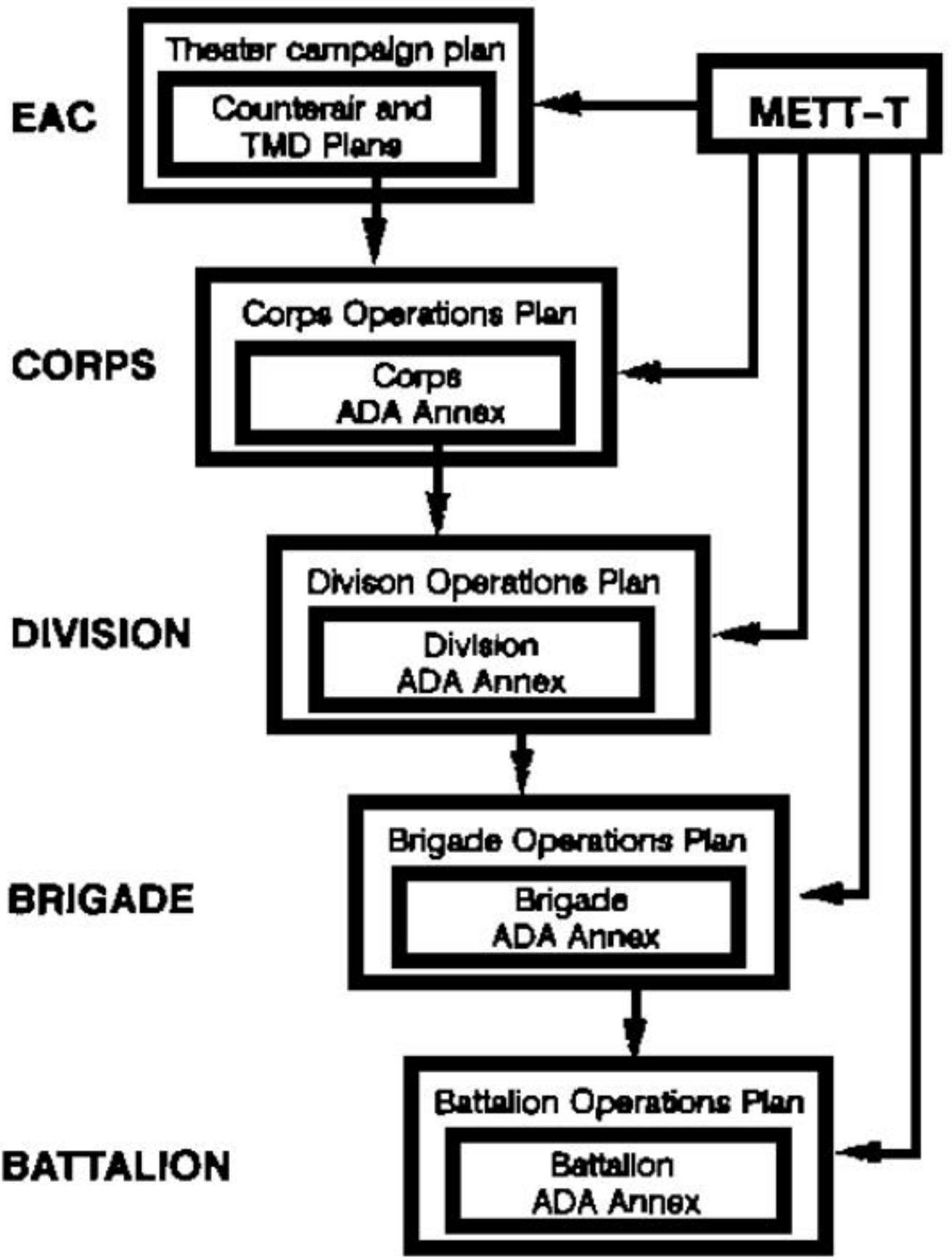


Notes:

1. AFCC is the JFACC
2. Includes ADCOORD representative
3. Includes ADCOORD representative ADA brigade

Return

INTEGRATED AIR AND MISSILE DEFENSE PLANNING



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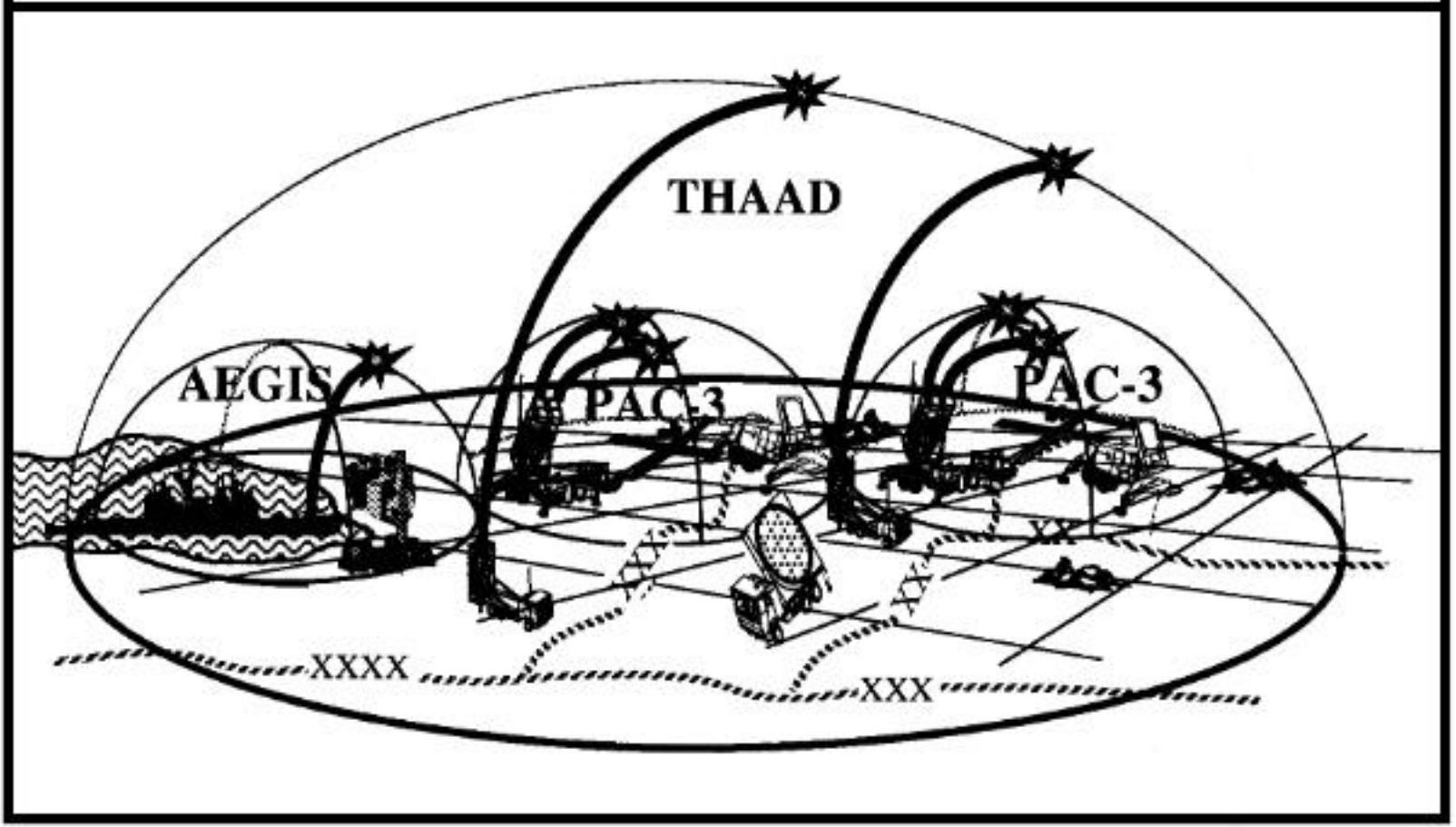
AIR AND MISSILE DEFENSE ENCLAVE (TASK FORCE)



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THEATER ORGANIZATION