Counterair Operations

Air Force Doctrine Document 2-1.1

26 April 2002

This document complements related discussion found in Joint Publications 3-01, *Countering Air and Missile Threats;* JP 3-01.1, *Aerospace Defense of North America;* JP 3-01.2, *Offensive Operations for Countering Air and Missile Threats;* and JP 3-01.3, *Defensive Operations for Countering Air and Missile Threats.*

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AIR FORCE DOCTRINE DOCUMENT 2-1.1
26 APRIL 2002

SUMMARY OF REVISIONS

This change defines air superiority as a subset of air and space superiority (page 1); explains how any action by any force taken to gain air superiority falls under counterair operations (page 1); corrects the use of the term area of operations (AO) to the term airspace control sector when pertaining to the discussion on the Command and Reporting Center (CRC) (page 8); adds surface forces to the forces available for offensive counterair operations (page 17); structures the document similar to JP 3–01, *Joint Doctrine for Countering Air and Missile Threats*; updates theater air and missile defense within the counterair construct and incorporates it within the definitions of offensive and defensive counterair operations (Chapter One); clarifies operational control (OPCON) and tactical control (TACON) authorities (Chapter Two); changes JFACC to JFASCC and clarifies his authorities (Chapter Two); and adds details of the JSTARS role in Operation ALLIED FORCE (Chapter Two).

Items in **Bold Blue** indicate added emphasis.

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Commander, Air Force Doctrine Center

FOREWORD

The mission of the United States Air Force (USAF) is to defend the United States by gaining and exploiting air and space superiority. **Air and space superiority provides the freedom to operate in the air, space, and information mediums. Unless we can freely maneuver in each of these environments while denying the enemy the same, we do not have air and space superiority.** The methods and objectives of achieving air superiority differ from space and information superiority, thus requiring separate documents. Therefore, this counterair publication addresses how the COMAFFOR can best employ his assets within a joint force to achieve the effect of air superiority as part of the overall air and space superiority effort.

Counterair is more than just force protection or air and missile defense. It also includes offensive actions against an enemy's capabilities, thereby seizing the initiative and forcing them into a defensive posture. Furthermore, **counterair is executed by more than just air assets. Counterair is a joint team effort,** gained and maintained by a combination of command and control systems, intelligence, surveillance, and reconnaissance platforms, air-to-air and air-to-ground aircraft and missiles as well as surface-to-air air defense weapons. **Counterair is the function used to gain and maintain the effect of air superiority.**

The effect of air superiority is not normally an end unto itself. Air superiority provides enormous military advantages, allowing all our forces greater freedom of action to carry out their assigned missions (freedom to attack) while minimizing their vulnerability to enemy detection and attack (freedom from attack). The success of any major air, land, or sea operation may depend on the degree of air superiority achieved. This Air Force Doctrine Document (AFDD) provides guidance for planning, integrating, coordinating, and executing counterair operations. It provides operational doctrine to gain and maintain control of the air. As such, it focuses on how air forces can be organized, trained, and equipped to conduct counterair operations.

DAVID F. MacGHEE, JR.
Major General, USAF
Commander, HQ Air Force Doctrine Center

26 April 2002

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INTRODUCTION

If you don't control the air, you'd better not go to war.

General Charles Horner

PURPOSE

Air Force Doctrine Document (AFDD) 2-1.1 provides Air Force doctrine for counterair operations and supports basic air and space doctrine. It replaces AFDD 2-1.1, dated 6 May 1998.

APPLICATION

This AFDD applies to all active duty, Air Force Reserve, Air National Guard, and civilian Air Force personnel. This doctrine is authoritative but not directive; commanders are encouraged to exercise judgment in applying this doctrine to accomplish their missions.

SCOPE

Counterair operations will be necessary to a greater or lesser degree throughout the range of operations. These operations run the gamut from the defense of the North American continent to striving for air supremacy in a major theater war, to enforcing a no-fly zone in a peacekeeping operation, to passive defensive measures in a humanitarian relief operation.

TERMINOLOGY

The term joint force air and space component commander (JFASCC) is the term the Air Force believes best describes what the functional component can contribute to the joint force. Hence, we use JFASCC instead of joint force air component commander (JFACC). In joint publications the approved term is JFACC. Over time we hope to incorporate the JFASCC term into joint doctrine.

FOUNDATIONAL DOCTRINE STATEMENTS

- ✪ **Air and space superiority is achieved by gaining control of the air, space, and information mediums. Only by gaining control of all three do we have true air and space superiority.**
- ✪ **Any action taken with the intent of gaining air superiority falls under counterair operations. These actions are not limited to the air component: land, maritime, and special operations forces routinely take actions in support of that objective.**
- ✪ **The JFASCC is normally the supported commander for counterair operations. Other components support that objective in accordance with the JFC's directives. The JFASCC normally assumes the roles of Airspace Control Authority (ACA) and Area Air Defense Commander (AADC).**
- ✪ **Counterair operations are subdivided into offensive counterair operations (OCA) and defensive counterair operations (DCA).**
  - ✪✪ **OCA is comprised of surface attack, fighter sweep, escort, and suppression of enemy air defenses.**
  - ✪✪ **DCA includes actions taken against enemy aircraft and missile attacks and are executed by the JFASCC acting as the AADC.**

CHAPTER ONE

COUNTERAIR OPERATIONS

The first objective of all commanders in the Pacific war, whether ground, sea or air, whether American, Allied, or Japanese, was to assure control of the air.

The United States Strategic Bombing Surveys

The war in the Persian Gulf provided a textbook example of what air supremacy means both for the country that gained it, and for the country ceding it.

General A. Malyukov
Soviet Air Force Chief of Staff

GENERAL

Control of the air and space environment is a necessity for providing the joint force with greater freedom of action while reducing its vulnerability to enemy detection and attack. **Air and space superiority consists of three elements: air superiority, space superiority, and information superiority.** If a joint force commander (JFC) isn't able to attain a level of superiority in each of these mediums, he will not be able to gain or maintain air and space superiority. Each medium provides its own challenges, but the Joint Force Air and Space Component Commander (JFASCC) must be able to provide the JFC with a plan that incorporates different joint force elements to achieve superiority in all three. At the direction of the JFC, **any capability can be used to achieve the effect of air and space superiority.**

This counterair publication addresses air superiority, a core competency of the United States Air Force, and is **normally the first priority of US forces whenever the enemy possesses air and missile assets capable of threatening friendly forces or inhibiting their ability to use the air and space medium to apply force.** Counterair consists of offensive and defensive operations to ensure freedom from attack, freedom to maneuver, and freedom to attack. Although the effect of air superiority is tied to space and information superiority, the methods, objectives, and tasks employed to achieve these effects warrant an examination of these functions in separate documents. The distinguishing factor between these concepts is the desired effects, not the method of force application. **Within the counterair construct, any action taken to achieve the effect of dominance above the Earth's surface yet within the atmosphere fits into counterair operations.** Whether this action takes the form of an information attack, air attack, surface attack, or space-based attack does not matter. If the effect is air superiority, you are talking counterair operations.

Air superiority enables friendly operations through the battlespace.

COUNTERAIR OBJECTIVES

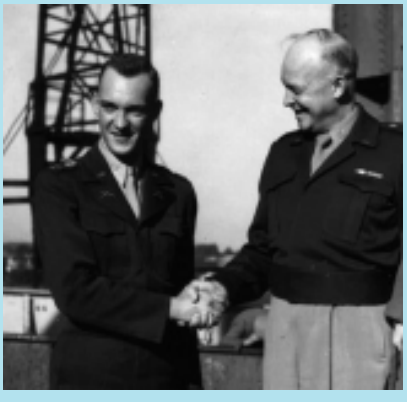
The objectives of the counterair function are to enable friendly operations against the enemy and protect friendly forces and vital

assets through control of the air. Counterair is directed at enemy forces and target sets that directly (airborne aircraft, surface-to-air missiles) or indirectly (airfields; petroleum, oils, and lubricants; command and control facilities) challenge control of the air. Airmen conduct intensive and continuous counterair operations aimed at gaining varying degrees of air superiority at the place and time of their choosing. **Air superiority can range from local superiority in a specific area to control over the entire theater of operations.** Control may vary over time. As seen during the Gulf War and Operation ALLIED FORCE, air superiority may not totally eliminate air and missile opposition. **Some enemy aircraft may continue to fly and some enemy missiles may be launched in spite of air superiority.** However, air superiority provides a favorable environment for friendly forces to perform their tasks without prohibitive interference from enemy air and space forces, while limiting the enemy's ability to function effectively. The commander must balance the level of air superiority necessary to conduct operations with an acceptable level of risk versus the effort required to achieve that level of air superiority. For instance, the level of effort necessary to eliminate all mobile SAMs may be too high when the joint force requires close air support (CAS) or air interdiction (AI) missions to be flown.

COUNTERAIR OPERATIONS

Counterair consists of offensive and defensive operations. Counterair operations are conducted across the tactical, operational, and strategic levels of war by the entire joint force. **As the supported commander for counterair operations, the joint force air and space component commander (JFASCC) will use more than just his organic air, space, and information**

D-Day, 1944



Over the decades, the Normandy invasion and breakout have become the classic example of Second World War combined-arms, mechanized, air-land, coalition warfare. Fortunately, the Allies possessed not merely air superiority, but air supremacy, making victory on the ground that much easier. The Allies had won the critical battle for air supremacy, not over the beachhead, but in several years of air war that had gutted the Luftwaffe.

In June 1944, John S. D. Eisenhower, the general's son, *(pictured with his father)* graduated from West Point—ironically on the same day that Allied forces stormed ashore at Normandy. June 24 found the new lieutenant riding through Normandy with his father, observing the invasion's aftermath:

The roads we traversed were dusty and crowded. Vehicles moved slowly, bumper to bumper. Fresh out of West Point, with all its courses in conventional procedures, I was offended at this jamming up of traffic. It wasn't according to the book. Leaning over Dad's shoulder, I remarked, "You'd never get away with this if you didn't have air supremacy." I received an impatient snort:

"If I didn't have air supremacy, I wouldn't be here."

John S. D. Eisenhower
Strictly Personal

resources. He will also take advantage of those forces made available for tasking by other components (tactical control) and set the timing, priority, and effects for the other component commanders contributing to the counterair effort. Operations are conducted over enemy and friendly territory exploiting the full benefit of both the offensive and the defensive. They range from seeking out and destroying the enemy's ability to conduct air and missile attacks to taking reactive measures to minimize the effectiveness of enemy air and missile attacks. The overall situation and the concept of operations determine when, where, and how these operations are used to gain the desired degree of air superiority.

Offensive Counterair (OCA)

OCA consists of offensive operations aimed at destroying, disrupting, or degrading enemy air and missile threats. Ideally, most OCA operations will prevent the launch of aircraft and missiles by destroying them and their supporting systems on the ground. Otherwise, OCA operations seek out and destroy these targets as close to their source as possible. These operations range throughout enemy territory and are generally conducted at the initiative of friendly forces. **OCA includes targets such as enemy air defense systems (aircraft, antiaircraft artillery, and surface-to-air missiles), airfields and supporting infrastructure, theater missiles (cruise and ballistic), ground-, sea-, and air-based launch platforms and its supporting infrastructure as well as command, control, communications, computers, and intelligence (C4I) nodes.** OCA operations enable friendly use of contested airspace and reduce the air and missile threat posed against friendly forces. OCA is often required to enable the successful execution of other air operations such as strategic attack, interdiction, and close air support.

Defensive Counterair (DCA)

The objective of DCA is to protect friendly forces and vital interests from enemy air and missile attacks and is synonymous with air defense. DCA consists of active and passive air defense operations including all defensive measures designed to destroy attacking enemy air and missile threats or to nullify or reduce the effectiveness of such attacks should they escape destruction. The basic active defense criteria to detect, identify, intercept, and destroy remains the same for air and missile threats. DCA generally reacts to the initiative of the enemy forces and is subject to the weapons control procedures and measures of the area air defense commander (AADC). For further explanation see JP 3-01, *Countering Air and Missile Threats.*

- **Active air defense is direct defensive action taken to destroy attacking air and missile threats or to reduce their effectiveness against friendly forces and assets.** Engaging enemy aircraft or missiles with friendly aircraft or SAMs is an example of an active air defense measure.

- **Passive air defense includes all measures, other than active air defense, taken to minimize the effectiveness of hostile air and missile attacks or measures used to minimize the effectiveness of enemy attacks.** Camouflage, concealment, and deception (CCD); dispersal; and the use of protective construction (hardening) are examples of passive air defense measures. Stealth and low-observable (LO) technology are growing technologies used to minimize the enemy's air defense effectiveness.

Air and Missile Threats

The continuing proliferation of weapons of mass destruction (WMD) makes air superiority more important than ever. Several nations are expected to have advanced surface-to-air and surface-to-surface missiles by 2005. These advanced systems will have longer ranges and improved command options. **Mobile theater missiles pose a significant threat to friendly forces, and the ability to locate and destroy these systems prior to launch remains a challenge for effective counterair operations.** A dramatic increase in new generation fighters, along with older airframes with improved avionics and weapons packages, will make achieving and maintaining air superiority even more complex.

INTELLIGENCE, SURVEILLANCE, AND RECONNAISSANCE (ISR) REQUIREMENTS

Effective counterair operations require timely collection, processing, analysis, production, and dissemination of reliable and accurate intelligence. Near-real-time and real-time information from air-, surface-, and space-based sensors is used to provide warning, situational awareness, targeting, and combat assessment. Intelligence, surveillance, and reconnaissance (ISR) information is also needed to identify and either attack or exploit emerging targets which pose a substantial threat to friendly operations. Timely target detection and geo-location, target development, weapon selection, mission planning, and combat assessments depend on integrated collection and analysis.

Intelligence, surveillance, and reconnaissance platforms such as the U–2 increase battlespace awareness.

Proper intelligence preparation of the battlespace (IPB) is a crucial step in conducting counterair operations. Without an accurate, well-defined enemy air order of battle (AOB), friendly forces will operate under increased risk. Other component intelligence resources provide valuable information concerning any air operations within their area of operations (AO). In addition to developing the AOB, IPB can enable a predictive analysis to help determine likely enemy actions or reactions, thus optimizing ISR effectiveness and combat air patrols.

CHAPTER TWO

COMMAND AND CONTROL (C2)

Air power is indivisible. If you split it up into compartments, you merely pull it to pieces and destroy its greatest asset—its flexibility.

Field Marshal Bernard Montgomery

The air ocean and its endless outer space extension are one and indivisible and should be controlled by a single homogeneous force.

Alexander P. de Seversky

GENERAL

Centralized control and decentralized execution is a fundamental tenet of airpower. Command and control (C2) systems are tailored to support this tenet. Centralized control is exercised from the appropriate command level while permitting decentralized execution of counterair operations. **Integrated communications systems enhance unity of effort and enable the C2 needed to effectively execute counterair operations.** These systems expedite C2 functions through fast, reliable, flexible, and secure exchange of information throughout the chain of command. Effective and interoperable C2 systems are vital to planning, employing, and sustaining successful counterair operations.

COMMAND RELATIONSHIPS

Command relationships for counterair are in accordance with JP 0-2, *Unified Action Armed Forces* and JP 3-01, *Countering Air and Missile Threats*. US armed forces generally fight as a joint team. Airmen should expect most counterair operations to be joint efforts. **The Commander, Air Force Forces (COMAFFOR) normally exercises his command function through the air and space operations center (AOC). If the joint force commander (JFC) designates the COMAFFOR as the joint force air and space component commander (JFASCC), the AOC will become the core of the joint air operations center (JAOC). When assigning JFASCC duties, the JFC normally assigns the airspace control authority (ACA) and area air defense commander (AADC) duties to the JFASCC.** The authority and responsibilities associated with each designation associated with counterair operations follows.

Joint Force Commander (JFC)

The JFC is responsible for the employment of forces assigned, attached, or otherwise made available to accomplish the assigned mission or objective. Key to the JFC's responsibilities is the development of objectives and priorities for the joint forces. These objectives and priorities provide the basis for all subordinate and supporting plans.

The JFC may be a combatant commander, a subunified combatant commander, or a joint task force commander. **The combatant commander derives the operational authority to employ forces in combat from the Secretary of Defense and may delegate that authority as a whole or in part to a subordinate joint force commander.** That command authority is normally delegated to a subordinate joint force commander for those forces made available to accomplish the assigned mission. Normally

Joint Force Priorities

The air planners' first priority was gaining command of the air. This goal was a basic tenet of air operations, and its achievement would generate at least three specific advantages in the war. First, the incapacitation of airfields and the air defense system would allow sustained prosecution of attacks against the other target sets. Second, command of the air would prevent Iraqi offensive strikes against Coalition forces, in particular strikes delivering chemical weapons. Third, the Coalition would prevent Iraqi reconnaissance flights that might uncover the shift of ground forces to the west, the surprise to be sprung at the start of the ground offensive. The planners therefore directed their most intense and immediate attention to destroying the Iraqi defensive systems through the use of F–117s, other aircraft employing antiradiation missiles to attack radar systems, and a vast array of electronic countermeasures.

Gulf War Airpower Survey

operational control (OPCON) entails the proper authority to employ forces in combat and includes authoritative direction over all aspects of military operations and joint training necessary to accomplish missions assigned to the command. OPCON normally provides full authority to organize commands and forces as the commander in operational control considers necessary to accomplish assigned missions. OPCON does not, in and of itself, include authoritive direction for logistics or matters of administration, discipline, internal organization, or unit training.

Commander, Air Force Forces (COMAFFOR)

Anytime Air Force forces are assigned to a JFC, a Commander, Air Force Forces (COMAFFOR) will be identified as the Air Force component commander subordinate to the JFC. The COMAFFOR normally exercises OPCON of all Air Force Forces presented (assigned or attached) as part of the Air and Space Expeditionary Task Force (AETF). The COMAFFOR advises the JFC on all issues affecting his forces, performs missions assigned by the JFC, and provides forces as directed to the JFASCC for tasking. Additionally, the COMAFFOR exercises those specified aspects of administrative control (ADCON) for those forces Air Force Forces assigned or attached.

Joint Force Air and Space Component Commander (JFASCC)

The JFASCC, when designated by the JFC, is the Service component commander having the preponderance of air and space assets and the capability to plan, task, and control joint air operations. In most cases the COMAFFOR will be the JFASCC. Although assets capable of performing counterair missions are assigned to different components, the JFASCC is normally the supported commander for counterair operations. Routinely, the JFASCC has TACON and/or a supported relationship to conduct counterair operations employing augmenting forces that remain assigned to other components. **The JFASCC derives his authority from the JFC who has authority to exercise operational control, direct coordination among subordinate commanders, and redirect and organize forces to ensure unity of effort. The JFASCC's responsibilities are assigned by the JFC and normally include, but are not limited to, planning, coordination, allocation, and tasking based on the JFC's apportionment guidance. The JFASCC's responsibilities include air defense, airspace control, and ISR efforts.** Using the JFC's guidance and authority, and in coordination with component and supporting commanders, the JFASCC recommends to the JFC apportionment of the air effort.

Area Air Defense Commander (AADC)

Within a unified command, subordinate unified command, or joint task force, **the JFC normally assigns overall responsibility for air defense to a single commander designated as the AADC. Normally the JFASCC should be designated the AADC. The AADC is responsible for integrating the entire air defense effort and should be the component commander with the C4I capability to plan and execute integrated air defense operations with other air operations.** The JFASCC dual-hatted as the AADC has the responsibility to integrate the counterair effort, offensive and defensive, from all components into one cohesive effort. Splitting the assets among multiple commanders can only reduce effectiveness. Any attempt to separate missile defense from the overall air defense structure has the potential to seriously degrade the overall air defense effort.

Airspace Control Authority (ACA)

The ACA is responsible for airspace control within the joint operations area and for coordinating and integrating the use of the airspace. Normally, the JFC will designate the JFASCC as the ACA. The ACA develops policies and procedures for airspace control and for the coordination required among components within the theater. The ACA establishes an airspace control system for the JFC, integrates the airspace control system with host nations, and coordinates and deconflicts user requirements. **The ACA develops these procedures into an airspace control plan (ACP) and, after JFC approval, promulgates it throughout the theater.** The ACP is then implemented through the airspace control order (ACO). A key responsibility of the ACA is to provide the flexibility needed within the airspace control system to rapidly employ forces.

COMMAND, CONTROL, COMMUNICATIONS, COMPUTERS, INTELLIGENCE, SURVEILLANCE, AND RECONNAISSANCE (C4ISR) RESOURCES AND REQUIREMENTS

Effective counterair operations require a reliable C4ISR capability. **C4ISR assets should be capable of exchanging information rapidly with other Services, components, and coalition partners.** The information flow supports the chain of command and should be as complete, secure, and near real time as possible. The system should be flexible enough to redirect selected forces, even when they are airborne.

The information exchange between different Services and components and between all levels of command should be survivable, interoperable, and flexible, even if an intermediate level is disabled. **The JFASCC uses the following C4ISR resources to conduct counterair operations.**

Theater Air Control System (TACS)

The TACS provides the JFASCC/AADC/ACA an overarching means of controlling counterair operations. It includes the personnel, procedures, and equipment necessary to plan, direct, and control air operations and to coordinate air operations with other components. It is composed of agencies and communications nodes to provide centralized control and decentralized execution for air operations. The radar-equipped C2 elements of the TACS provide mobility and communication information interface, as well as automation. TACS ground elements rely on the Modular Control System (MCS) while the airborne elements include the Airborne Warning and Control System (AWACS); airborne battlefield command and control center (ABCCC); joint surveillance,

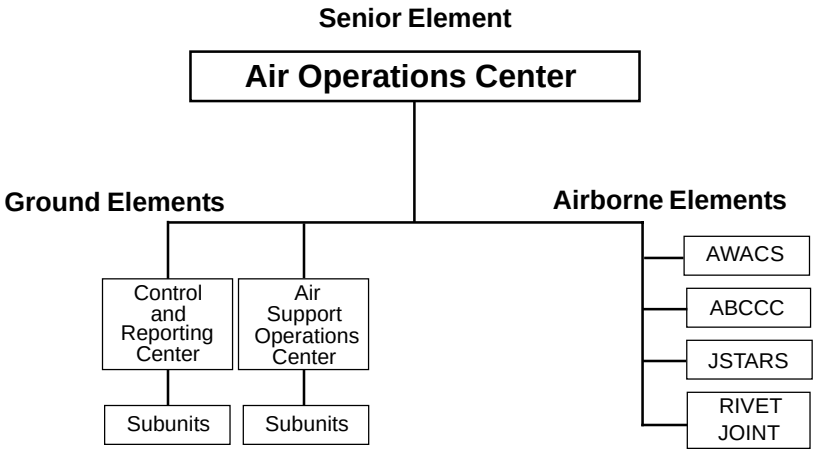


Figure 2.1. Key Elements of theater air control system for the counterair function.

target attack radar system (JSTARS); and RIVET JOINT (RJ). Figure 2.1 depicts the TACS counterair function.

Air Operations Center (AOC)

The AOC is the principal air operations system from which aircraft and air warning functions of combat air operations are directed, controlled, and executed. As the senior element of the TACS, the AOC coordinates command and control of air operations with other Services and components. If the COMAFFOR is appointed JFASCC, then the AOC becomes the core of the joint air operations center (JAOC). **The AOC includes the equipment and personnel necessary to accomplish the planning, directing, controlling, and coordinating theaterwide air operations.** Within the AOC, the airspace control management team coordinates and integrates the use of airspace in the theater. It displays the current air and surface situation, using data from many sources, and is responsible to the ACA for developing airspace control procedures through the ACP and coordinating airspace control activities. The AOC ensures that the ACP is compatible with current operational requirements and capabilities and relies on the ACP to ensure missions are deconflicted.

Normally each participating Service and functional components have liaison teams in the AOC. These include such liaison teams as: the Army battlefield coordination detachment (BCD), the special operations liaison element (SOLE), and the Navy/Marine naval and amphibious liaison element (NALE). The COMAFFOR and the JFASCC should consider reciprocal liaisons with other allied, Service, or functional components.

Control and Reporting Center (CRC)

The CRC is the control and surveillance radar facility directly subordinate to the AOC and provides theater mission control through employment of C2 elements of the TACS. The CRC is assigned an airspace control sector by the AOC. It manages and directs activities of all deployed Air Force surface radars within that sector.

The CRC's primary mission is to provide airspace management and airspace control to include: air traffic detection, tracking and identification, scramble or airborne orders, data link management, and management of air defense activities within its sector. Additionally, it

establishes C2 liaison, mission control, navigational air rescue assistance, aircraft threat warning, and coordination with artillery warning control centers and the friendly artillery warning service. The CRC may further delegate control and surveillance areas to subordinate radar units or AWACS within its sector for optimum radar and radio coverage and management of air operations.

Within the TACS, the CRC communicates up to the AOC, down to subordinate units, and laterally to other TACS/joint/allied units. **It provides management of air operations, weapons control, air surveillance and identification functions, and also directs the region or sector air defense.** The CRC relays instructions and information from the AOC to subordinate or lateral units, determines operating procedures, and coordinates assignment of targets to ensure defensive assets of all components are employed in mutually supporting roles within its assigned sector. The CRC also detects, identifies, collects, and reports all air activity within its assigned sector and provides the digital data link interface between Air Force, Army, Navy, and Marine Corps joint tactical air operations systems, as well as those of allied nations. **The CRC performs the airspace control function within the sector.**

The CRC battle staff directs fighter aircraft and air defense artillery assets necessary to defend its assigned area. The CRC battle commander normally establishes operating procedures for initial assignment of airborne targets to air defense artillery. **All air defense elements coordinate continuously with air defense artillery fire coordination units to eliminate duplication of efforts and ensure adequate commitment of assigned weapons against hostile threats.** Execution authority for air defense systems may be provided to the CRC. The authority to declare a hostile in the area of surveillance and identification may also reside in the CRC.

Air Support Operations Center (ASOC)

The ASOC is the air component element responsible for planning, coordinating, controlling, and executing air operations that directly support ground combat forces. ASOCs are normally located at the Corps level, report to the JAOC, and provide expertise on how and when air operations can enhance the effectiveness of ground operations.

Airborne Warning and Control System (AWACS)

The AWACS provides the TACS with a flexible and capable airborne radar platform. It provides an initial battle management function and command and control capability and is normally among the first systems to arrive in any new theater of operations. Through voice and data connectivity, AWACS issues air defense warning, directs aircraft, manages air refueling, monitors counterair missions, provides an air picture to joint air defense forces, assists with navigation, and coordinates air rescue efforts. AWACS can detect and identify hostile airborne threats and assign weapon systems to engage enemy targets.

E–3 Airborne Warning and Control System (AWACS) aircraft are a key element of C2.

AWACS may carry an airborne battle staff or airborne command element (ACE) authorized to redirect forces under the authority of the JFASCC. When employed with an ACE, AWACS can scramble and divert aircraft conducting counterair operations and recommend changes in air defense warning conditions. **The AWACS can perform many, but not all, CRC functions.**

Airborne Battlefield Command and Control Center (ABCCC)

The ABCCC is an integral part of the airborne elements of the TACS. **It is a specialized airborne command, control, and communications (C3) center equipped with extensive communications systems providing the capability to perform some AOC and ASOC functions. ABCCC's primary function is battle management of tactical air operations—directing air support to ground operations in the forward area.** As an extension of the AOC, ABCCC can scramble or divert assets as mission requirements dictate, while assisting the ASOC by providing C2 services in the forward area beyond the ASOC's communications range.

Airborne Battlefield Command and Control Center (ABCCC) provides critical C3 functions in the Theater Air Control System.

Continuous communications with most air and ground agencies in the TACS keeps the ABCCC battlestaff abreast of developing air and ground situations and maintains higher headquarters coordination for positive control of counterair assets. Although not radar equipped, ABCCC's computerized tactical battle management system (TBMS) is linked with the joint tactical information distribution system (JTIDS) and other intelligence, surveillance, and information fusion systems providing capability for improved situation awareness. The ABCCC can deploy in an initial response to world events and to provide C2 services as the theater situation matures.

Joint Surveillance, Target Attack Radar System (JSTARS)

The JSTARS is a long-range, airborne sensor system that provides real-time radar surveillance information on moving and stationary surface targets, via secure data links to air and surface commanders. By identifying and locating such targets as SCUD missiles and launchers, SAM sites, and AAA sites (among others), JSTARS can play an important role in the effort to gain air superiority. The system has expanded into an integral part of the TACS function. JSTARS provides updates on enemy force disposition, identifies opportunities for rapid interdiction and retargeting of enemy ground forces, and performs limited battle management functions. **JSTARS information builds situational awareness for the JFC and JFASCC to manage air operations, to update target information, and to provide real-time targeting.**

RIVET JOINT

RIVET JOINT is an airborne signals intelligence (SIGINT) collection and reporting platform. Working in conjunction with the AWACS and JSTARS aircraft, RIVET JOINT **provides near-real-time assessment of hostile airborne-, land-, and sea-based electronic emitters via secure communications.** RIVET JOINT capabilities "round out" the radar tracking information provided by the AWACS and JSTARS by correlating location, type, and mode of emitted signals.

RC–135 RIVET JOINT provides battlespace awareness.

RULES OF ENGAGEMENT (ROE)

ROE are "directives issued by competent military authority which delineate the circumstances and limitations under which United States forces initiate and/or continue combat engagement with other forces encountered" (JP 1-02). Effective operations require the establishment and promulgation of easily understood ROE. Optimum weapons employment depends on early separation of friend from foe. Positive identification of hostiles allows for maximum beyond-visual-range engagement and minimizes fratricide. Just as important, ROE related to air-to-surface and surface-to-air threats for both OCA and DCA operations must be defined and clearly understood. The JFC is responsible for developing and implementing ROE unless it is established by higher authority. **The components and supporting commanders are then responsible for ensuring compliance with established ROE.**

AIRSPACE CONTROL

Theater airspace control can become very complex since all military components, and possibly civilian traffic, can execute operations in the same airspace. **The timely exchange of information over reliable, interoperable means of communication is required to effectively coordinate, integrate, and deconflict the airspace used for friendly air operations. The airspace control authority (ACA) develops and implements an airspace control plan (ACP) based on the JFC's guidance.** Execution of the plan is accomplished through airspace control orders (ACOs) which provide specific airspace control procedures applicable for defined periods of time. **The main goals of the ACA are deconfliction of all airspace users and their air assets, enhancement of combat operations, and protection of friendly forces from enemy air and missile attacks.**

Standardized procedures and close coordination help to facilitate common understanding, reduce the possibility of confusion, and contribute to the overall effectiveness of counterair operations. **The JFC establishes the geographic boundaries within which airspace control is to be exercised and also provides priorities and restrictions regarding the use of the airspace.** Airspace control is normally one of the primary functions of the Air Force TACS. The Air Force's C2 system is structured to conduct airspace control, OCA and DCA operations, and other air operations to minimize the risk of harm to friendly forces. Since different components have OPCON of specific counterair assets, **the C2 structure is designed to integrate with other components to provide responsive and timely support. Integration with host-nation airspace and air defense control structures is also essential.**

Friendly and Enemy Combat Identification (CID)

The objective of CID is to maximize mission effectiveness by providing high confidence, positive identification of friend or foe. Accurate and timely identification (ID) enhances real-time tactical decisions and optimizes weapons employment, allowing timely engagement of enemy aircraft and missiles, conserving resources, and reducing risk to friendly forces.

CID information may be obtained from onboard or off board surface, air, and space systems, and through airspace control measures documented in the ACP or ACO. **To be most effective, this CID "system of systems" requires a common data link backbone with the goal of seamless near-real-time information sharing between theater platforms.** To avoid a single point of failure, no one node will act as an exclusive conduit of all CID information. Electronic methods, which provide the most

rapid and reliable means of identification, are normally used when available. Visual and procedural means of identification are not as practical but may be essential in some scenarios. Some individual weapons systems retain an autonomous CID capability.

Airspace control requires an effective combination of positive and procedural ID. Both are intended to effectively provide safe and flexible use of the airspace. **Positive identification relies on a high confidence ID derived from visual observation, radar observation of point of origin, and/or electronic means by an authorized control facility. Procedural control relies on a combination of airspace control measures documented in the ACP or ACO.** For most scenarios, a combination of positive and procedural ID techniques is used to identify friendlies, neutrals, and foes.

Coordination and Integration of Airspace Control and Counterair Operations

Unity of command is imperative to employ forces effectively. Because of the integrated nature of airspace control and counterair operations, the ACA and AADC duties should normally be performed by the JFASCC. These functions often rely on the same resources and are frequently executed simultaneously in the same airspace. Assigning responsibility and authority to coordinate and integrate airspace control and counterair operations to one air commander **greatly enhances the effort to gain and maintain control of the air. The ACP is integral to all air operations and provides a framework for joint coordination and integration.**

CHAPTER THREE

OFFENSIVE COUNTERAIR OPERATIONS

Offense is the essence of airpower.

General "Hap" Arnold

The best way to defend the bombers is to catch the enemy before it is in position to attack. Catch them when they are taking off, or when they are climbing, or when they are forming up. Don't think you can defend the bomber by circling around him. It's good for the bombers morale, and bad for tactics.

Brigadier General Robin Olds

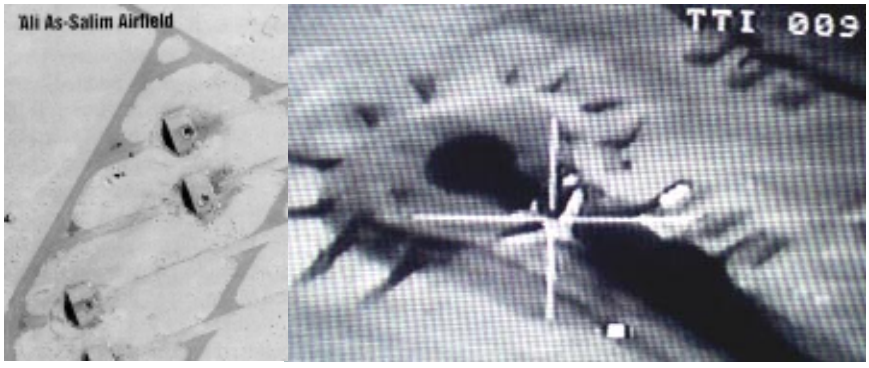
GENERAL

Offensive counterair (OCA) will likely be the highest payoff air component mission for as long as the enemy has the capability to significantly threaten friendly forces. The commander's risk assessment, both the risk to surface forces from enemy air and missile threats and the threats to friendly aircraft from the enemy's air defense system, determines when the air component commander can reduce the OCA effort in favor of other missions. **Successful OCA operations limit the risk of enemy attacks and allow friendly forces to concentrate more on mission accomplishment and less on self-defense.**

OCA TARGETS

OCA target sets are those which directly or indirectly challenge our control of the air environment. The JFC's guidance and objectives, coupled with intelligence assessments of enemy threats, locations, and capabilities help determine OCA target selection, target priority, and sequencing. Airmen may plan targets prior to hostilities and keep them current based on the latest intelligence. Planners evaluate target defenses, to include active and passive systems, and determine the vulnerability of each target. They consider means and resources available to reduce collateral effects—especially if WMD may be present. **Ideally, OCA concentrates on attacking targets as close to their source as possible (e.g., aircraft on airfields, theater missiles and SAMs in storage).** Otherwise, OCA missions seek and attack targets wherever found: on the ground, in the air, or at sea. The following are examples of OCA target sets:

- **Airfields and Operating Bases. Damaging runways or taxiways may prevent use of an airfield for short periods, thus preventing subsequent takeoffs and reducing the enemy's offensive capabilities.** Destruction of hangars, shelters, maintenance facilities, POL, and other storage



DESERT STORM's dominating offensive counterair strikes left the Iraqis with no effective command and control and little offensive or defensive air capability.

areas degrades the enemy's ability to generate aircraft sorties.

In the Pacific, the Battle of Wewak in August 1943 dealt a crippling blow to the Japanese air forces. After the war, General Tanikawa of the Fourth Air Army testified, "We lost 100 planes…it was a decisive Allied victory…our air power was severely crippled. Consequently our air power was rapidly diminishing and was unable to aid our ground forces effectively which, in the end, constituted one of our chief reasons for losing the war."

George Odgers
Air War Against Japan, 1943–1945

- **Aircraft. This category includes enemy fixed-wing and rotary-winged aircraft, and unmanned aerial vehicles (UAV). In many situations, aircraft on the ground are the most lucrative targets for OCA operations.** With advanced technology, timely intelligence, and precision-guided munitions, aircraft on the ground can be destroyed whether they are in revetments, shelters, or in the open.

- **Theater Missiles (TMs) and Support Infrastructure.** Theater missiles refer to **ballistic missiles, cruise missiles, and air-to-surface missiles whose potential targets are within a given theater of operations.** TMs pose a significant threat to friendly forces. These missiles may possess conventional as well as nuclear, biological, and chemical (NBC) capabilities. **OCA operations destroy or disable these missiles before they are launched.** Destruction of known missiles, launch platforms, support facilities, and infrastructure greatly limits effective TM attacks against friendly forces. Usually, OCA missions should be capable of being rapidly retasked to attack time sensitive targets (TSTs), such as mobile launchers, once they are located.

- **C4ISR Systems.** C4ISR systems are critical to the effective employment of forces and assets and should be given a high priority during OCA targeting. **Intelligence gathering, warning, and control systems include ground-controlled intercept, early warning, acquisition, and other sensors together with their supporting facilities. Destruction of such sites would substantially reduce the enemy's capability to detect, react, and bring forces to bear against friendly forces. Nonlethal means may also be used to achieve similar effects.** Attacks on C4ISR sites can be planned with appropriate weapons to increase the probability of kill. For example, destroying the associated ground facilities (receiving and tracking stations or launch facilities) may deny the enemy effective use of some space-based systems. **Clearly, attacking C4ISR systems may be part of OCA but it may also contribute to strategic attack or counterspace operations depending on the intended effects.**

- **Air Defense Systems. Disruption or destruction of enemy air defense systems and the personnel who control, maintain, and operate them may render those systems ineffective against friendly forces.** For more detailed information on suppression of enemy air defenses (SEAD), refer to the SEAD portion of this chapter.

OCA RESOURCES AND FORCES

The effectiveness of OCA operations to destroy the array of targets previously listed depends on the availability and capabilities of certain resources and systems. The choice of system depends upon the situation, threats, weather, and available intelligence. **Whenever possible, use systems and methods which minimize risk to friendly forces.** For example, do not insert ground SOF for a direct action mission when aircraft employing standoff weapons can accomplish the mission. The following are some of the forces and weapon systems used to conduct OCA:

- **Aircraft.** Fighter and bomber aircraft provide the bulk of the forces for OCA operations. Other types of aircraft are often critical enablers of the counterair function.

- **Missiles.** Missiles include surface-to-surface, air-to-surface, air-to-air guided missiles, as well as air-, land-, and sea-launched cruise missiles. Many of these weapons have long launch ranges and **some have very quick reaction times which can eliminate or reduce the risk of harm to friendly forces.**

- **Unmanned Aerial Vehicles (UAVs).** UAVs may be used in counterair operations to provide **surveillance, reconnaissance, deception, jamming, or harassment of enemy forces and air defense systems.** Although UAVs are primarily used in an enhancement role, they are now capable of carrying some weapons. These vehicles may be preprogrammed or remotely piloted. They provide valuable intelligence to friendly forces and may now be used to attack some targets either too dangerous for manned aircraft or where manned aircraft are not present to respond.

Unmanned aerial vehicles: Global Hawk (above left), Predator (above right) and unmanned combat air vehicle (right).

As the F–117s headed south from Baghdad, Col David Livingston's missile crew at Aa'ar and Hafar al-Batin were primed to fire. The BQM–74 target drones that were mounted on the crew's launchers were not the most sophisticated weapons that had been developed. But they did not have to be. The missiles were not meant to destroy Iraqis, only to fool them.

The plan was straightforward. Livingston's men would launch the drones while Navy A–6s fired TALDs (tactical air-launched decoys), the unguided decoys. The hope was that the drones would prompt the Iraqis to turn on their antiaircraft radars and fire their antiaircraft missiles. Like turning on a spotlight in a darkened room, activating the radars would expose them to attack by allied antiradiation missiles, which home in on enemy radar beams. After the radars were blown up, the Iraqi ground-to-air capability would be blunted. The F–117s would then come back for another round of attacks. In essence, the aim was to get the Iraqis to fight shadows while the F–117s wound up for another punch.

At 3:48 A.M., Livingston's crew fired the drones toward Baghdad and Basra, while the Navy A–6s launched their decoys. Meanwhile, flights of Air Force F–4G Wild Weasels and Navy FA–18s, A–7s, and A–6s closed in on Baghdad. Armed with HARM [high-speed] antiradiation missiles, the planes waited for the Iraqis to respond.

They did not wait long. With much of the capital in darkness and panic, the Iraqis were determined to stave off another attack. The Iraqi radars were up and running, and the missile crews began to launch their SAMs at the drones. American intelligence later concluded that the Iraqis had taken the falling drones for downed enemy airplanes. The Iraqis thought they were protecting their capital, but they were simply setting themselves up for a fall.

As the Iraqis fired off their SAMs, the HARM carrying planes pulled up short of Baghdad and unleashed a lethal rain of antiradiation missiles.

Triumph Without Victory

✪ **Special Operations Forces (SOF). SOF conduct or enhance OCA operations** in a number of ways. SOF can **conduct direct attacks, collect intelligence, and provide terminal guidance for attacks against valuable enemy targets.** Examples include targets concealed by triple canopy jungle or "safe haven" targets. SOF may also be used in a synergistic attack role with other air operations to locate, positively identify, and then designate targets for friendly forces to destroy. **JFASCC planners in the AOC coordinate with the SOLE for timely integration, coordination, and deconfliction with special operations assets.**

✪ **Surface Fire Support. Artillery and naval surface fire support** may be employed in OCA operations when enemy targets are within their range. **With the proper coordination, this may be a very effective way to destroy enemy targets while minimizing risk to friendly forces.**

✪ **C4ISR Systems.** These systems include **early warning and surveillance systems, satellites, radar, identification systems, communications systems, and surface-, air-, and space-based sensors.** These systems **enhance OCA operations by providing early warning, intelligence, and targeting data, as well as C2 of friendly forces.**

Typical offensive counterair weapons systems: F–117, F–15E, B–52, B–1, and F–16 (clockwise from upper left).

✪ **Information Warfare (IW). IW is another resource which can reduce the demand for sorties.** Many OCA targets, such as C4I, theater missiles and support infrastructure, and airfields/operating bases can be affected by various IW techniques such as malicious codes, electronic warfare, or electromagnetic pulse (EMP) generators. **Some of these IW techniques afford the JFASCC access to a target that may be inaccessible by other means.**

✪ **Surface Forces.** The ability to occupy and secure key areas, as well as the lethality of supporting surface fires, can achieve significant counterair effects. By occupying an airfield or securing a vulnerable area from surface threats, surface forces can provide vital support for counterair operations.

OCA MISSIONS

Different types of OCA operations are used to achieve specific counterair objectives. Tasked units have decentralized execution authority and are given much latitude in the detailed planning and coordination of the tasks. **Primary OCA missions are shown in figure 3.1.**

✪ **Surface Attack.** Surface attack missions are intended to **destroy, disrupt, or degrade select targets on the ground.** These missions are directed against enemy air and missile threats and their support infrastructure (e.g., airfields, launch sites, launchers, runways) before launch. **The main goal is to prevent enemy air and missile assets from being employed.**

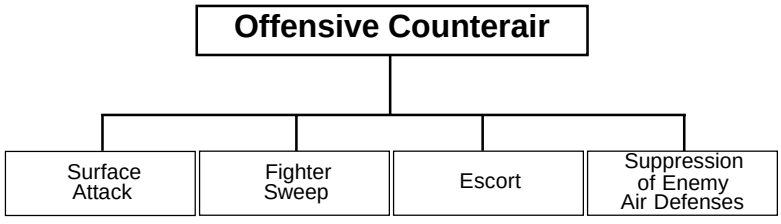


Figure 3.1. Offensive Counterair Missions

✪ **Fighter Sweep.** The fighter sweep is **an offensive mission by fighter aircraft to seek out and destroy enemy airborne target sets** such as aircraft, airborne missile launch platforms, and airborne targets of opportunity.

✪ **Escort. Escort missions are protection sorties flown over enemy territory against enemy aircraft and air defense systems.** Friendly aircraft, en route to or from a target area, may be assigned escort aircraft to protect them from enemy air-to-air and surface-to-air threats. Escort aircraft may be tasked to protect such missions as interdiction, reconnaissance, airlift, search and rescue, aerial refueling, airborne C2, and electronic warfare.

✪ **Suppression of Enemy Air Defenses (SEAD). SEAD is an OCA mission designed to neutralize, destroy, or temporarily degrade enemy surface-based air defenses by destructive or disruptive means.** SEAD requirements may vary according to mission objectives, system capabilities, and threat complexity. SEAD objectives are specified by the JFC, who considers the unique capabilities of each component to contribute to counterair operations.

Counterair on the Ground

In World War II the British sent commandos to knock out an effective German bomber unit on Crete; MacArthur and Kenney used ground forces to seize airfields.

From the war of 1973 to the 1982 Lebanon incursions, the Israelis used naval and ground forces to knock holes in ground-based air defense systems. The Israelis even won complete air superiority without use of air weapons during their rescue raid at Entebbe. On that operation, a group of commandos by themselves destroyed the enemy's air force.

Col John Warden III, USAF
The Air Campaign

SEAD operations fall into three categories: AOR/JOA (area) air defense suppression, localized suppression, and opportune suppression. Area air defense suppression consists of operations conducted against specific enemy air defense systems to destroy, disrupt, or degrade or destroy their effectiveness. It targets high payoff air defense assets that result in the greatest degradation of the enemy's total system and permits effective friendly operations. **Localized suppression is normally confined to geographical areas associated with specific ground targets or friendly transit routes, contributing to local air superiority. Finally, opportune suppression is usually unplanned and includes aircrew self-defense and attack against targets of opportunity.** The JFC will establish ROE for opportune suppression. Each of these categories reduces attrition and creates favorable conditions for friendly air operations by disabling enemy air defense systems or major capabilities of those systems. **Therefore, SEAD is an integral part of planning and executing air operations.**

PLANNING AND EXECUTION OF OCA OPERATIONS

Planning for OCA operations involves making choices similar to those made for all air and space operations. **The planner must prioritize objectives, determine targets, and integrate the entire counterair effort.** Understanding how counterair operations will contribute to achieving the JFC's overall objectives is essential. The planner must balance the level of effort required to gain and maintain air superiority against the potential delay in achieving other JFC objectives.

Target selection is another critical aspect of planning OCA operations. Simply stated, targeting is a process through which installations and forces or their component parts are selected for attack. The following **five considerations are important in establishing target priorities. (See figure 3.2.)**

Figure 3.2. Offensive Counterair Targeting Considerations

- **Threat.** The threat posed by enemy forces includes **an assessment of the urgency or the need to counter them.** An NBC capable SCUD launcher would normally merit diversion of assets from a lesser threat, such as a SAM site.

- **Direct Effects. Immediate, first-order effects** (e.g., weapons employment results). They are the results of actions with **no intervening effect or mechanism** between act and outcome.

- **Indirect Effects.** Those effects, which are **created through an intermediate effect or mechanism,** producing a final outcome or result. They are 2d, 3rd, and nth order effects, which may be **functional, systemic, or psychological in nature.** Indirect effects tend to be **delayed and typically are more difficult to recognize** than direct effects.

- **Forces Available.** The **forces available are assessed against the number, types, and priority of targets that can be attacked.** Sufficient and capable forces must be provided to ensure that the desired results are obtained.

- **Risk Calculation.** Risk calculation involves **weighing the risk to friendly forces against expected gains from target attack.**

OCA operations are often flown deep within enemy territory, relying on integrated C4ISR systems for deconfliction with other operations. Against fixed targets, OCA operations place great emphasis on detailed planning, accurate and timely intelligence, target selection and time-over-target deconfliction, and ROE. This emphasis enhances mission effectiveness while minimizing fratricide and interference with other operations. Based on the latest intelligence, strike packages can be augmented with dedicated escorts or fighter sweep, while AWACS and other C4I platforms warn of real-time, air-to-air threats.

A responsive, integrated C4I system is required to assign the optimum weapon system against mobile targets such as SAMs or ballistic and cruise missile launchers. Because the situation is constantly changing, C4I systems constantly monitor the status of offensive weapons, sensors, and many other systems to maintain the flexibility to execute timely attacks. With proper planning, timing, and weapons loads, most aircraft can be retasked to conduct attacks against time-sensitive and high-value targets as the situation warrants.

CHAPTER FOUR

DEFENSIVE COUNTERAIR OPERATIONS

The whole art of war consists of a well-reasoned and extremely circumspect defensive followed by a rapid and audacious attack.

Napoleon Bonaparte

It is a doctrine of war not to assume the enemy will not come, but rather to rely on one's readiness to meet him; not to presume that he will not attack, but rather to make one's self invincible.

Sun Tzu

GENERAL

Defensive counterair (DCA) operations provide a secure area from which all elements of the joint force can operate effectively. DCA operations defend friendly lines of communication and protect friendly forces and assets while denying the enemy the freedom to carry out offensive air and missile operations. DCA encompasses both active and passive air defenses. **Active air defense** operations are conducted using a mix of weapon and sensor systems supported by secure and highly responsive C4I systems to **detect, identify, intercept, and destroy or track enemy aircraft and missiles in flight.** Active air defense actions are taken to destroy and reduce the effectiveness of hostile air and missile threats against friendly forces and assets. **Passive air defense** measures are required by all commanders to **provide maximum protection for friendly forces and assets and to complicate the enemy's identification, surveillance, and targeting processes.** It includes such measures as camouflage, concealment, and deception (CCD); hardening; reconstitution; dispersal; and low observable (LO) or stealth technologies.

On Air Defense

Because of hostile domination of the air, travel anywhere in the forward area was an exciting business. Lookouts kept a keen watch of the skies and the appearance of any plane was the signal to dismount and scatter.... Truck drivers, engineers, artillerymen and even the infantrymen in the forward areas had constantly to be watchful. Their dislike of the situation was reflected in the constant plaint, "Where is this bloody Air Force of ours? Why do we see nothing but Heinies? When the enemy has air superiority the ground forces never hesitate to curse the aviators."

Gen Dwight D. Eisenhower
Crusade in Europe

ACTIVE AIR DEFENSE OPERATIONS

Active air defense neutralizes or degrades the effectiveness of enemy attacks and protects friendly forces and interests through the direct employment of weapons systems. Integrated employment of air-to-air and surface-to-air defense systems through coordinated detection, identification, engagement, and assessment of enemy forces is necessary to blunt enemy attacks and protect friendly forces. Airspace control in an active air defense environment is extremely difficult. Rapid, reliable, and secure means of identification are critical to the survival of friendly aircraft and to facilitate effective defense against enemy air and missile attacks.

Active Air Defense Targets

Active air defense targets may include airborne fixed-wing or rotary-wing aircraft and theater missiles. Because no air defense system is guaranteed to be 100 percent effective, active air defense is conducted in close coordination with passive air defense operations to minimize the effectiveness of enemy systems that escape destruction.

Typical defensive counterair weapons systems: E–3, Patriot missile, Standard missile, and F–22 (clockwise from upper left).

Active Air Defense Resources and Forces

Air defense systems are integrated to provide efficient control and exchange of essential real-time information to all air defense resources. Counterair is normally a joint operation. **Services work in unison and provide a mix of dedicated weapon systems to maximize the effectiveness of air defense operations.** When working in unison, the limitations of some assets are balanced by the advantages of other assets. Some of the primary assets used in conducting active air defense missions are discussed below.

- **Aircraft.** Aircraft include fighter interceptors; armed helicopters; and early warning, reconnaissance and surveillance platforms such as AWACS and RIVET JOINT.

- **Antiaircraft Artillery (AAA) and Surface-to-Air Missiles (SAMs).** These weapons include antiaircraft artillery and short-, medium-, and long-range SAMs.

- **C4ISR Systems.** These systems include early warning and surveillance systems using a combination of sensors, satellites, radar, and identification systems.

Active Air Defense Measures

Units employed to achieve air defense objectives have **decentralized execution authority** and latitude in the detailed planning and coordination of the assigned DCA tasks. **The following missions are directly connected to active air defense operations.**

- **Area Defense.** Area defense missions are conducted for the **defense of a broad area** using a combination of weapon systems. There can be specialized applications of area defense when friendly assets are dispersed over a large geographical area with defined threat boundaries.

✪ **Point Defense.** Point defense missions are conducted for the **protection of a limited area,** normally in defense of the vital elements of forces and installations.

✪ **Self-Defense.** Self-defense missions are conducted by friendly units to defend themselves against direct attack or threat of attack through the use of organic weapons and systems. **Inherent to all ROE and weapon control procedures is the right of self-defense.**

✪ **High Value Airborne Asset (HVAA) Protection.** HVAA protection uses fighter aircraft to protect critical airborne theater assets such as AWACS, RIVET JOINT, and JSTARS.

PASSIVE AIR DEFENSE OPERATIONS

Passive air defense includes all measures, other than active air defense, taken to minimize the effectiveness of hostile air and missile attacks. Tactical warning initiates many passive defense measures. Warnings are general or specific. **General warnings indicate that attacks are imminent or have occurred. Specific warnings signify that specific units or areas are in danger of attack. Passive air defense does not involve the active employment of any lethal weapons, but it improves survivability of friendly forces by reducing the potential effects of enemy attacks.** Depending on the situation and time available in the AO, a variety of actions can be taken to improve the passive air defense posture of friendly forces such as listed in figure 4.1. **Passive air defense requires preplanning and practice during peacetime.**

Figure 4.1. Passive Defense

✪ **Camouflage, Concealment, and Deception (CCD). CCD deny accurate location and targeting of friendly assets by misleading and feeding false information to the enemy.** These measures reduce vulnerability of friendly assets by limiting their exposure to targeting. They are conducted continuously over time, in response to warning, or under the cover of darkness to deny an enemy vital data about friendly forces. **Timely and accurate intelligence concerning the overflight of enemy satellite and aircraft collection systems enhances the effectiveness of CCD.** This may cause enemies to abort, delay, or modify an attack, or deplete valuable resources by attacking false targets. CCD measures are primarily associated with actions taken to alter or hide the appearance of personnel or fielded equipment. They are often, but not exclusively conducted in the RF, IR, and visual ranges of the electromagnetic (EM) spectrum.

✪ **Hardening.** Valuable assets and their shelters are hardened to **protect against hostile attacks.** Hardening actions should be accomplished during peacetime. However, hardening may be a continual process throughout operations.

✪ **Reconstitution.** This capability provides for the rapid repair of damage resulting from enemy attacks and the return of damaged units to a desired level of combat readiness. Reconstitution includes the ability to **repair valuable assets** such as airfields, communications, warning and surveillance systems, and to **restore essential services** such as power, water, and fuel supplies.

- **Nuclear, Biological, and Chemical (NBC) Defensive Equipment and Facilities.** NBC equipment and facilities allow collective protection from WMD by providing contamination detection and avoidance, identification, and decontamination. Use of individual protective equipment such as full-body ensembles for friendly forces ensures continuous operations in an NBC environment.

We must be able to conduct operations in a nuclear, biological and chemical environment.

- **Redundancy.** Duplication of critical capabilities keeps vital systems functioning even when critical nodes are destroyed or damaged. **Redundancy includes dual, contingency, or back-up capabilities** which can assume primary mission functions, in whole or in part, upon failure or degradation of the primary system.

- **Detection and Warning Systems.** Timely detection and warning of air and missile threats **provide maximum reaction time** for friendly forces to seek shelter or take appropriate action against enemy attacks. Missile warning is especially vital to friendly forces when considering the compressed timelines for detection and warning of TMs. **Connectivity of available communications and sensor systems is required** to transmit accurate, real-time data to friendly forces. A combination of air-, space-, and surface-based detection and communication assets is established to maximize opportunities for missile detection and warning times.

- **Dispersal.** Dispersal **complicates the enemy's ability to locate and target friendly assets by spreading them out and bringing them together in concentration only at the time and place of our choosing.** Combined with mobility and deception, dispersal increases uncertainty as to whether a location is occupied or will remain occupied. It forces the enemy to search more locations, requiring more resources and time.

- **Mobility.** Mobility is the capability of easily **moving from one location to another** and is facilitated by keeping a small footprint. Frequent movement of units, inside the enemy's decision cycle, can be of critical importance. **Mobility reduces vulnerability and increases survivability of friendly assets** by complicating enemy surveillance, reconnaissance, and targeting.

- **Stealth and LO Technology.** Stealth and LO technologies are those measures, normally designed into a weapon system, which attempt to hide its presence during mission execution or reduce the envelope of vulnerability to enemy threat systems. Stealth and LO technology are often, but not exclusively conducted in the RF, IR, and visual ranges of the EM spectrum.

EXECUTION AND INTEGRATION OF DCA OPERATIONS

Joint forces practice and employ all levels of defensive measures to provide maximum protection for friendly forces and assets. The AADC is responsible for the integration of all air defense efforts regardless of system ownership in the theater of operations. The AADC develops engagement procedures for all air defense weapons based on the JFC's objectives and guidance. Execution of efficient air defense 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. Target track production is a sequential process that begins with the surveillance function. Near-real-time surveillance and threat analysis is dependent upon our ability to fuse all source sensor data, whether from ground-based radar, sea-based radar, or space-based sensors, into an accurate theater attack assessment. As a track is detected, it is identified and labeled; this information is disseminated as rapidly as possible. The track data provided is sufficiently detailed and timely to permit the C2 system 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.

The effective use of counterair forces requires clear and concise ROE. The AADC assists the JFC in establishing and implementing these rules. The component and supporting commanders are responsible for ensuring compliance with the established ROE. **To be effective, engagement control procedures are centrally imposed, requiring standardized ROE.** The optimum employment of air defense weapon systems involves the earliest possible discrimination of friend from foe to maximize beyond-visual-range engagement and to avoid fratricide.

Control and Coordination of DCA Weapons

An integrated execution system that provides real-time or near-real-time information to all DCA assets provides optimum effectiveness. DCA weapon systems are normally capable of autonomous operations if they become separated from the integrated execution system, but their effectiveness will be degraded. In the absence of an integrated defense system, procedural means are used to permit the safe passage of friendly aircraft and to enable the use of air defense weapons. **Since many DCA assets are owned by different Services and allies, integration, coordination, and normal airspace control procedures are required to enhance the synergistic capabilities of the various systems.**

Area control measures include fighter engagement zones and missile engagement zones. These zones are defined as dimensions of airspace in which the responsibility for engagement rests with a particular weapon system. The ideal aim of area control measures, based on advanced signature technology, is to have **a joint engagement zone where all air and ground defense systems employ and operate simultaneously, in the same airspace.** Advanced technologies will allow for the identification of all airborne objects. Only those airborne objects positively identified as hostile will be targeted and engaged. This reduces fratricide and minimizes overly restrictive airspace control procedures. ROE remains simple, giving air defense systems the flexibility to operate beyond the current constraints of procedural control measures.

- **Fighter Aircraft.** When the CRC or AWACS detects a hostile, potentially hostile, or unknown target, they can assign or commit fighter aircraft to intercept the target. When possible, **aircraft remain under the direction of the initiating control agency and are continuously directed until the pilot confirms visual or radar contact.** If required, this control may be transferred to adjacent sectors of responsibility. Intercept control can be transferred to the pilot when the aircraft is in positive contact with the target or when the environment precludes positive direction by the controlling agency. In the latter situation, alternative procedures such as a broadcast “air picture” of enemy activity or autonomous action by the aircrew may be required.

- **Armed Helicopters.** Armed helicopters may conduct limited DCA operations when required. Command and control relationships regarding these armed helicopters performing DCA missions will be determined by the JFC.

- **Surface-to-Air Weapons. Surface-to-air weapons effectiveness requires a highly reliable centralized linkup with air operations and an adequate identification process.** This precludes engagement

Short-range air defense weapon systems: Avenger, left, and Stinger, right.

of friendly aircraft and unnecessary expenditure of valuable resources. Weapons control measures and ROE are used to control surface-to-air engagements. Therefore, **all available surface-to-air defense assets in the theater of operations are incorporated into the overall DCA plan and are subject to the integrated procedures and weapons control measures imposed by the AADC.**

DCA Weapons Employment

Defense-in-depth, the siting of mutually supporting defensive positions designed to absorb and progressively weaken the enemy, is invaluable to DCA. Early warning of enemy attack is vital if defense-in-depth is to be obtained. Airmen develop defenses to permit the destruction of intruding enemy aircraft and missiles as early as possible and as far away as feasible. To maximize attrition to the enemy force, **the engagement process is continuous** throughout the threat's approach, entry to, and departure from the friendly operational area.

- **Fighter Aircraft. DCA missions for fighters include HVAA protection, point defense, and area defense.** A combat air patrol (CAP) can be used to accomplish these missions, with the objective of intercepting and destroying hostile missiles and aircraft before they can reach their intended targets. These CAPs ensure rapid reaction to enemy intrusion and may be positioned well ahead of forces being protected. **HVAA protection sorties are generally flown to protect high-value assets such as refueling aircraft and AWACS to ensure their freedom of operation.**

- **Armed Helicopters. Armed helicopters can engage such suitable targets as enemy helicopters, battlefield air defenses, and other targets within their combat range.**

- **Surface-to-Air Weapons. Surface-to-air missiles (SAMs) are employed in area or point defense operations.** These weapons can offer tremendous firepower and quick responsiveness to defended assets. Since optimum range and altitude capabilities of each weapon system are different, **the employment of various types of surface-to-air weapons must be fully coordinated and integrated into the overall air defense system for maximum effect.** This coordination and integration ensures minimum risk to friendly aircraft and the means to deconflict employment of surface-to-air weapons and aircraft.

Integration of surface-to-air systems provides mutual support and the most efficient coverage available. Normally, surface-to-air weapons made available to the AADC for DCA are provided in direct support. Regardless of the command relationship, **all active defense forces are subject to the ROE, airspace, weapons control measures, and fire control orders established by the AADC.** The AADC is granted the necessary authority to deconflict and control engagements and to exercise real-time battle management.

The future battle on the ground will be preceded by battle in the air. This will determine which of the contestants has to suffer operational and tactical disadvantages and be forced throughout the battle into adopting compromise solutions.

General Erwin Rommel

At the very heart of warfare lies doctrine. . .

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Glossary

Abbreviations and Acronyms

AAA	antiaircraft artillery
AADC	area air defense commander
ABCCC	airborne battlefield command and control center
ACA	airspace control authority
ACE	airborne command element
ACO	airspace control order
ACP	airspace control plan
AFDD	Air Force Doctrine Document
AO	area of operations
AOC	air operations center
AOR	area of responsibility
ASOC	air support operations center
AWACS	Airborne Warning and Control System
BCD	battlefield coordination detachment
BMD	ballistic missile defense
C2	command and control
C3	command, control, and communications
C4I	command, control, communications, computers, and intelligence
C4ISR	command, control, communications, computers, intelligence, surveillance, and reconnaissance
CAP	combat air patrol
CCD	camouflage, concealment, and deception
CIC	combined intelligence center
CID	combat identification
CINC	commander in chief
COCOM	combatant command (command authority)
COMAFFOR	commander Air Force forces
CONUS	continental United States
COP	common operational picture
CRC	control and reporting center
CSAR	combat search and rescue
DCA	defensive counterair
DOD	Department of Defense
EMP	electromagnetic pulse
EW	electronic warfare
GCCS	Global Command and Control System
HARM	high-speed antiradiation missile
HVAA	high value airborne asset

ID	identification
IO	information operations
IPB	intelligence preparation of the battlespace
ISR	intelligence, surveillance, and reconnaissance
ITW/AA	integrated tactical warning and attack assessment
IW	information warfare
JAOC	joint air operations center
JFACC	joint force air component commander
JFASCC	joint force air and space component commander
JFC	joint force commander
JOA	joint operations area
JP	joint publication
JSTARS	joint surveillance target attack radar system
JTIDS	Joint Tactical Information Distribution System
JTTP	joint tactics, techniques, and procedures
MCS	modular control system
NALE	naval and amphibious liaison element
NBC	nuclear, biological, and chemical
NCA	national command authorities
NMCC	National Military Command Center
OCA	offensive counterair
OCS	offensive counterspace
OPCON	operational control
POL	petroleum, oils, and lubricants
RAOC	regional air operations center
ROE	rules of engagement
SAM	surface-to-air missile
SEAD	suppression of enemy air defenses
SHORAD	short-range air defense
SIGINT	signals intelligence
SOF	special operations forces
SOLE	special operations liaison element
SROE	standing rules of engagement
TACON	tactical control
TACS	theater air control system
TBM	theater ballistic missile
TBMS	tactical battle management system
TM	theater missile
TST	time-sensitive target

UAV	unmanned aerial vehicle
US	United States
USAF	United States Air Force
WMD	weapons of mass destruction

Definitions

active air defense. Direct defensive action taken to nullify or reduce the effectiveness of hostile air action. It includes such measures as the use of aircraft, air defense weapons, weapons not used primarily in an air defense role, and electronic warfare. See also **air defense.** (JP 1-02)

aerospace defense. 1. All defensive measures designed to destroy or nullify attacking enemy aircraft and missiles and also negate hostile space systems. 2. An inclusive term encompassing air defense, ballistic missile defense, and space defense. See also **air defense; space defense.** (JP 1-02)

air defense. All defensive measures designed to destroy attacking enemy aircraft or missiles in the Earth's envelope of atmosphere, or to nullify or reduce the effectiveness of such attacks. See also **active air defense; aerospace defense; passive air defense.** (JP 1-02)

air defense operations area. An area and the airspace above it within which procedures are established to minimize mutual interference between air defense and other operations; it may include designation of one or more of the following: air defense action area, air defense area, air defense identification zone, and/or firepower umbrella. (JP 1-02)

airspace control authority. The commander designated to assume overall responsibility for the operation of the airspace control system in the airspace control area. Also called **ACA.** (JP 1-02)

airspace control in the combat zone. A process used to increase combat effectiveness by promoting the safe, efficient, and flexible use of airspace. Airspace control is provided in order to prevent fratricide, enhance air defense operations, and permit greater flexibility of operations. Airspace control does not infringe on the authority vested in commanders to approve, disapprove, or deny combat operations. Also called **combat airspace control; airspace control.** (JP 1-02)

air superiority. That degree of dominance in the air battle of one force over another which permits the conduct of operations by the former and its related land, sea, and air forces at a given time and place without prohibitive interference by the opposing force. (JP 1-02)

air supremacy. That degree of air superiority wherein the opposing air force is incapable of effective interference. (JP 1-02)

allocation (air). The translation of the air apportionment decision into total number of sorties by aircraft type available for each operation or task. (JP 1-02)

apportionment (air). The determination and assignment of the total expected air effort by percentage and/or by priority that should be devoted to the various air operations or geographic areas for a given period of time. (JP 1-02)

area air defense commander. Within a unified command, subordinate unified command, or joint task force, the commander assigns overall responsibility for air defense to a single commander. Normally, this is the component commander with the preponderance of air defense capability and the command, control, and communications capability to plan and execute integrated air defense operations. Representation from the other components involved is provided, as appropriate, to the area air defense commander's headquarters. Also called **AADC.** (JP 1-02)

combatant command (command authority). Nontransferable command authority established by title 10 ("Armed Forces"), United States Code, section 164, exercised only by commanders of unified or specified combatant commands unless otherwise directed by the President or the Secretary of Defense. Combatant command (command authority) cannot be delegated and is the authority of a combatant commander to perform those functions of command over assigned forces involving organizing and employing commands and forces, assigning tasks, designating objectives, and giving authoritative direction over all aspects of military operations, joint training, and logistics necessary to accomplish the missions assigned to the command. Combatant command (command authority) should be exercised through the commanders of subordinate organizations. Normally this authority is exercised through subordinate joint force commanders and Service and/or functional component commanders. Combatant command (command authority) provides full authority to organize and employ commands and forces as the combatant commander considers necessary to accomplish assigned missions. Operational control is inherent in combatant command (command authority). Also called **COCOM.** See also **combatant command; combatant commander; operational control; tactical control.** (JP 1-02)

control. Authority which may be less than full command exercised by a commander over part of the activities of subordinate or other organizations. (JP 1-02)

counterair. A mission which integrates offensive and defensive operations to attain and maintain a desired degree of air superiority. Counterair missions are designed to destroy or negate enemy aircraft and missiles, both before and after launch. See also **air superiority; defensive counterair; offensive counterair.** (JP 1-02)

defensive counterair. All defensive measures designed to detect, identify, intercept, and destroy or negate enemy forces attempting to attack or penetrate the friendly air environment. Also called **DCA.** See also **counterair; offensive counterair.** (JP 1-02) *[Defensive counterair operations are synonymous with air defense operations. Defensive counterair encompasses both active and passive measures and is normally conducted near or over friendly territory and generally reacts to the initiative of enemy forces.]* {Italicized definition in brackets applies only to the Air Force and is offered for clarity}

electronic warfare. Any military action involving the use of electromagnetic and directed energy to control the electromagnetic spectrum or to attack the enemy. Also called **EW.** The three major subdivisions within electronic warfare are:

a. electronic attack. That division of electronic warfare involving the use of electromagnetic, directed energy, or antiradiation weapons to attack personnel, facilities, or equipment with the intent of degrading, neutralizing or destroying enemy combat capability. Also called **EA.** EA includes: 1) actions taken to prevent or reduce an enemy's effective use of the electromagnetic spectrum, such as jamming and electromagnetic deception, and 2) employment of weapons that use either electromagnetic or directed energy as their primary destructive mechanism (lasers, radio frequency weapons, particle beams).

b. electronic protection. That division of electronic warfare involving actions taken to protect personnel, facilities, and equipment from any effects of friendly or enemy employment of electronic warfare that degrade, neutralize, or destroy friendly combat capability. Also called **EP.**

c. electronic warfare support. That division of electronic warfare involving actions tasked by, or under direct control of, an operational commander to search for, intercept, identify, and locate sources of intentional and unintentional radiated electromagnetic energy for the purpose of immediate threat recognition. Thus, electronic warfare support provides information required for immediate decisions involving electronic warfare operations and other tactical actions such as threat avoidance, targeting, and homing. Also called **ES.** Electronic warfare support data can be used to produce signals intelligence (SIGINT), which includes both communications intelligence (COMINT) and electronic intelligence (ELINT).

information operations. Actions taken to affect adversary information and information systems while defending one's own information and information systems. Also called **IO.** (JP 1-02) The Air Force believes that in practice a more useful working definition is: *[Those actions taken to gain, exploit, defend or attack information and information systems and include both information-in-warfare and information warfare.]* {Italicized definition in brackets applies only to the Air Force and is offered for clarity.}

information warfare. Information operations conducted during time of crises or conflict to achieve or promote specific objectives over a specific adversary or adversaries. Also called **IW.** (JP 1-02) The Air Force believes that, because the defensive component of IW is always engaged, a better definition is: *[Information operations conducted to defend one's own information and information systems, or to attack and affect an adversary's information and information systems.]* {Italicized definition in brackets applies only to the Air Force and is offered for clarity.}

Joint Force Air and Space Component Commander. The JFASCC derives authority from the Joint Force Commander (JFC) who has the authority to exercise operational control, assign missions, direct coordination among subordinate commanders, redirect and organize forces to ensure unity of effort in the accomplishment of the overall mission. The JFC will normally designate the component with a preponderance of the air and space assets and the ability to command and control them as the JFASCC. The JFASCC's responsibilities will be assigned by the JFC (normally these would include, but not be limited to, planning, coordination, allocation and tasking based on the JFC's apportionment decision). Using the JFC's guidance and authority, and in coordination with other Service component commanders and other assigned or supporting commanders, the JFASCC will recommend to the JFC apportionment of air sorties and use of space assets to accomplish various missions or geographic areas. The JFASCC will serve as the JFC's designee for ensuring prompt and sustained offensive and defensive space operations and ensuring the integration of those operations into JTF activities in support of the JFC's objectives and strategy. Also called **JFACC** in joint doctrine.

offensive counterair. Offensive operations to destroy, disrupt, or neutralize enemy aircraft, missiles, launch platforms, and their supporting structures and systems both before and after launch, but as close to their source as possible. Offensive counterair operations range throughout enemy territory and are generally conducted at the initiative of friendly forces. These operations include attack operations, fighter sweep, escort, and suppression of enemy air defenses. Also called **OCA.** (JP 1-02)

operational control. Transferable command authority that may be exercised by commanders at any echelon at or below the level of combatant command. Operational control is inherent in combatant command (command authority). Operational control may be delegated and is the authority to perform those

functions of command over subordinate forces involving organizing and employing commands and forces, assigning tasks, designating objectives, and giving authoritative direction necessary to accomplish the mission. Operational control includes authoritative direction over all aspects of military operations and joint training necessary to accomplish missions assigned to the command. Operational control should be exercised through the commanders of subordinate organizations. Normally this authority is exercised through subordinate joint force commanders and Service and/or functional component commanders. Operational control normally provides full authority to organize commands and forces and to employ those forces as the commander in operational control considers necessary to accomplish assigned missions. Operational control does not, in and of itself, include authoritative direction for logistics or matters of administration, discipline, internal organization, or unit training. Also called **OPCON.** (JP 1-02)

passive air defense. All measures, other than active air defense, taken to minimize the effectiveness of hostile air action. These measures include deception, dispersion and the use of protective construction. See also **air defense.** (JP 1-02)

space defense. All defensive measures designed to destroy attacking enemy vehicles (including missiles) while in space, or to nullify or reduce the effectiveness of such attack. See also **aerospace defense.** (JP 1-02)

suppression of enemy air defenses. That activity that neutralizes, destroys, or temporarily degrades surface-based enemy air defenses by destructive and/or disruptive means. Also called **SEAD.** (JP 1-02)

weapon engagement zone. In air defense, airspace of defined dimensions within which the responsibility for engagement of air threats normally rests with a particular weapon system. (JP 1-02)