

Airspace Control In The Combat Zone



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This document complements related discussion found in Joint Publication 3-30, *Command and Control for Joint Air Operations* and Joint Publication 3-52, *Joint Doctrine for Airspace Control in the Combat Zone*.

SUMMARY OF REVISIONS

This document is substantially revised and must be completely reviewed.

This revision updates key airspace control doctrine concepts to include a discussion of airspace control during varying levels of conflict/contingency; discusses other possible nongovernmental users of the airspace during conflict and en route air traffic control/airspace/airfield management during contingencies and conflict (Chapter One); adds a discussion of conventional air launched cruise missiles and Army tactical missile systems and their requirements for airspace coordinating measures (Chapter Four); updates the discussion of the theater air control system, including deletions of the terms airborne battlefield command and control center and control and reporting element; adds a discussion on the airborne command element, the air mobility liaison officer, the expeditionary operations center and the regional air movement control center (RAMCC); updates the discussion of the airborne warning and control system and data links used for airspace control (Chapter Five). Adds a discussion of en route airspace management (Chapter Six); adds a new appendix that discusses RAMCC operations and employment (Appendix C); updates definitions, terminology, historical references, and readings throughout.

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FOREWORD

Military operations in the 21st century are highly complex and require close coordination to be effective and safe. As Airmen we are delegated control of the most fluid portion of the battlespace: the airspace, where aircraft and missiles fly. Recent conflicts have demonstrated the need for airspace control in varying levels of conflict, from major combat operations to stability operations. We share the airspace during military operations with civil users, nongovernmental organizations, coalition military forces, and host nation users. We must ensure the safety of all users, even if military operations are ongoing while civil aviation continues. The doctrine outlined in this document allows combat effectiveness, while promoting the safe, efficient, and flexible use of airspace with a minimum of restraint placed upon airspace users.

Our doctrine for airspace control rests upon the Air Force tenets of centralized control and decentralized execution. A commander of Air Force forces will be designated whenever Air Force forces are presented to a joint force commander. This designation provides unity of command. To a joint force commander, a commander of Air Force forces provides a single face—one “go-to guy”—for all US Air Force issues.

The joint force commander normally designates the commander of Air Force forces as the joint force air and space component commander, resulting in clear lines of authority for both joint and Air Force component operations. The joint force air and space component commander normally is assigned the duties of the airspace control authority and area air defense commander, due to the integrated relationship between these functions. We organize, train, and equip Airmen to execute the myriad tasks of airspace control in the combat zone through the theater air control system and other Air Force systems.

Our doctrine is broadly stated to fit varying levels of contingencies and diverse geographical areas, while encompassing joint and multinational operations. Study it, discuss it, and be ready to recommend improvements to it based upon your unique experiences. We must be able to articulate the unique contributions Airmen make to provide a safe, reliable, and flexible environment for all airspace users, while guaranteeing freedom from attack for our forces.

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INTRODUCTION

PURPOSE

Air Force commanders and personnel will normally lead the effort to control airspace for joint force commanders. US Air Force training, equipment, and procedures must be formulated and implemented with joint operations in mind. Airmen must understand how to organize Air Force forces and how to present them to the joint force commander to ensure safety and survivability for all users of the airspace, while ensuring mission accomplishment. This Air Force doctrine document details principles for conducting airspace control in the combat zone.

APPLICATION

This Air Force doctrine document (AFDD) applies to all active duty, Air Force Reserve, Air National Guard, and civilian Air Force personnel.

The doctrine in this document is authoritative, but not directive. Therefore, commanders need to consider the contents of this AFDD and the particular situation when accomplishing their missions. Airmen should read it, discuss it, and practice it.

SCOPE

This airspace control doctrine is broad in nature and is adaptable to diverse geographic and force deployment situations and differing levels of conflict. Although space-based assets will play an important role in the joint campaign or operation, airspace control in this publication does not include controlling space-based assets. Future airspace control may also involve the deconfliction of space operations over an existing joint force area of responsibility in support of a single joint force commander.

COMAFFOR / JFACC / CFACC

A note on terminology

One of the cornerstones of Air Force doctrine is “the US Air Force prefers—and in fact, plans and trains—to employ through a COMAFFOR who is also dual-hatted as a JFACC.” (AFDD 1)

To simplify the use of nomenclature, Air Force doctrine documents will assume the above case unless specifically stated otherwise. The term “commander, Air Force forces” (COMAFFOR) refers to the Title 10 Service responsibilities while the term “joint force air and space component commander” (JFACC) refers to the joint operational responsibilities.

While both joint and Air Force doctrine state that one individual will normally be dual-hatted as COMAFFOR and JFACC, the two responsibilities are different, and are typically executed through different staffs.

Normally, the COMAFFOR function executes operational control/administrative control of AF forces through a Service A-Staff while the JFACC function executes tactical control of all joint air and space component forces through an air and space operations center.

When multinational operations are involved the JFACC becomes a combined forces air and space component commander. Likewise, though commonly referred to as an AOC, in joint or combined operations the correct title is JAOC or CAOC.

FOUNDATIONAL DOCTRINE STATEMENTS

Foundational doctrine statements are the basic principles and beliefs upon which AFDDs are built. Other information in the AFDDs expands on or supports these statements.

- ✦ Airspace control is essential to combat effectiveness in accomplishing the joint force commander's objectives at all levels of conflict. (Page 1)
- ✦ Unity of effort is essential for effective airspace control. (Page 2)
- ✦ The airspace control structure and procedures need to be simple to execute for both ground operations personnel and aircrews. (Page 3)
- ✦ Information assurance is a key enabler to airspace control capabilities. (Page 5)
- ✦ As the nation's only full-service air and space force, the Air Force is the primary user of airspace in most areas of responsibility or joint operational areas. (Page 6)
- ✦ Airspace control structures and procedures require extensive planning before operations commence. The airspace environment may transition through varying stages from peacetime to combat and back to peacetime operations during a contingency. (Page 12)
- ✦ The airspace control authority may assign a portion of airspace to another commander to accomplish a specified mission. (Page 22)
- ✦ The Air Force airspace command and control system is a reflection of the air and space power tenet of centralized control and decentralized execution. The Air Force theater air control system provides the Air Force component commander with the means to achieve this tenet. (Page 28)
- ✦ Close coordination among airspace control, air defense, and air traffic control elements is required to maximize combat effectiveness while preventing fratricide and mutual interference. (Page 43)

CHAPTER ONE

CONSIDERATIONS FOR AIRSPACE CONTROL



Air control can be established by superiority in numbers, by better employment, by better equipment, or by a combination of these factors.

—General Carl A. “Tooeey” Spatz

GENERAL

Before World War II, there were few airspace users. Planes, airships, and balloons were slow and easy to recognize and identify. World War II introduced large joint operations with far more airspace users, creating the need for an airspace control system. The advent of integrated air defense systems, cruise missiles and unmanned aerial vehicles (UAV) further complicated theater airspace control requirements. In today's complex political and strategic environment, civilian use of airspace in a combat zone can occur alongside ongoing military operations. Civilian airliners, nongovernmental organizations (NGOs), and relief agencies may demand to use the airspace in a combat zone, even though the host-nation air traffic control system has broken down or is nonexistent. These increased demands require a more complex airspace control system to promote flight safety and prevent fratricide.

OBJECTIVE

Airspace control is essential to combat operations effectiveness in accomplishing the joint force commander's (JFC's) objectives at all levels of conflict. Airspace in the combat zone is a crucial dimension of the battlespace and is used by all components of the joint and multinational force. Joint Publication (JP) 1-02, *DOD Dictionary of Military and Associated Terms*, defines airspace control in the combat zone as “[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 and safety of operations. Airspace control does not infringe on the authority vested in commanders to approve, disapprove, or deny combat operations. The concept is also referred to as “airspace control” and “combat airspace control.” This publication will use the terms “airspace control,” “combat airspace control,” and “airspace control in the combat zone” interchangeably. The terms “air defense” and “defensive counterair” will

similarly be used synonymously when referring to defensive measures to destroy or negate air or missile threats.

AIRSPACE CONTROL SYSTEM FUNDAMENTALS

In order to enhance combat operations effectiveness, the airspace control system must be developed using the following fundamentals: unity of effort, common procedures, and simplicity. These precepts are discussed below:

Unity of Effort

Unity of effort is essential for effective airspace control. Commanders, whether representing a Service, component, or coalition, view the battlespace through their own “lens.” The objectives of the corps commander are not the same as those for the commander of the amphibious task force. To ensure the airspace requirements of these commanders are addressed within the context of a theater airspace structure, an airspace control authority (ACA) is normally designated by the joint force commander (JFC). *The ACA is the commander designated to assume overall responsibility for the operation of the airspace control system. The ACA achieves unity of effort primarily through centralized planning and control.* The ACA should, to the maximum extent possible, coordinate with joint force component liaisons throughout the campaign planning process, but especially prior to hostilities. The ACA must integrate information flow throughout the system to provide necessary information for airspace control throughout the area of responsibility (AOR).

Closely allied with the ACA is the area air defense commander (AADC). The AADC will be given overall responsibility for air defense from the unified, subordinate unified, or joint task force (JTF) commander. Normally, this will be the component commander with the preponderance of air defense capability to plan and execute integrated air defense operations. For most operations, assigning the roles of ACA and AADC to a single commander, the joint force air and space component commander (JFACC) further unifies efforts across the spectrum of airspace use. Vesting appropriate authority and responsibility in a single air component commander provides for the effective exercise of leadership and power of decision over assigned forces to achieve a common objective. The air component commander develops strategies and plans, determines priorities, allocates resources, and controls air and space forces made available to achieve that objective. Having one commander with the responsibility and authority to coordinate and integrate air defense and airspace control greatly enhances the effort to gain and maintain control of the airspace environment. The planned and coordinated use of airspace gives flexibility to the self-defense of surface forces, helps prevent inadvertent attacks on friendly forces, and enables the execution of offensive attacks against an enemy's warfighting potential.

Centralized control and decentralized execution of air forces help make those forces responsive, serve to ensure that forces are properly used and integrated, and foster initiative at the action level. While centralized control guides actions to support a

broad plan of action, decentralized execution provides the flexibility for subordinate commanders to use ingenuity and initiative in attacking targets.

Constraints on the airspace in the combat zone, special missions, or the sheer demand for airspace may result in overlapping areas of airspace control. Close liaison and coordination among all airspace users is necessary to promote timely and accurate information flow to airspace managers in the joint operations area (JOA). *The primary reason for close coordination among airspace control, air traffic control, and area air defense elements is to maximize combat effectiveness while reducing the risk of fratricide and balance those risks with the requirements for an effective air defense system.* Identification requirements for airspace control must be compatible with those for air defense. Airspace control, air defense, military air traffic control, and supporting command and control (C2) procedures, equipment, and terminology need to be compatible, mutually supporting, and interoperable.

Common Procedures

Common airspace control procedures throughout the JOA enhance the effectiveness of air operations. These procedures need to allow maximum flexibility through an effective mix of identification and control measures. The control structure needs to permit close coordination of air operations with all components, and allow rapid concentration of combat power in a specific portion of airspace in minimum time. Objectives of airspace control procedures are to:

- ✧ Safely accommodate and expedite the flow of all air traffic in the AOR.
- ✧ Prevent fratricide.
- ✧ Facilitate air defense identification.
- ✧ Enhance effectiveness in accomplishing the joint force commander's objectives.

Simplicity

The airspace control structure and procedures need to be simple to execute for both ground operations personnel and aircrews. Procedures should include visual, electronic, geographic, and/or maneuver means for sorting friendly and enemy aircraft.

Reliable and Interoperable Command and Control Systems

The airspace control system should have a reliable, jam-resistant, and, where appropriate, secure C2 network. Coordinated and detailed planning is required to ensure that communication systems and procedures are interoperable and compatible among all airspace managers and users.

Survivable, Sustainable, and Redundant Systems

Airspace control systems need to be survivable, sustainable, and redundant because they are likely to be targeted by an adversary. Positive airspace control must be backed up by procedural coordinating measures. The airspace control system in the combat zone needs to be responsive to evolving enemy threat conditions and to the ongoing operation, as well as capable of supporting day, night, and all-weather operations.

Positive Control and Procedural Control

The ACA is delegated the authority from the JFC to ensure effective airspace control. This control capability is achieved through both positive and procedural control measures. **Positive control** relies on positive tracking, direction, and identifying aircraft to exercise airspace control. It is conducted electronically by agencies equipped with radar; identification, friend, or foe (IFF) interrogators and receivers; beacons; computers; digital data links; and communications equipment. Generally, two conditions must exist for a commander to exercise positive control: the means to identify and locate airspace users and the ability to maintain continuous communications with them.

Procedural control relies on previously agreed upon and promulgated orders and procedures. Included in these orders and procedures are airspace control measures, fire support coordinating measures, and air defense control measures. Procedural control divides the airspace by volume and time and uses airspace control measures, real time communications capabilities, and weapons control statuses to manage aviation operations. Procedural control can be executed by following a planned route, with timing established for passing each waypoint along a course. This serves to deconflict the route or airspace with other aircraft. It can also be used in real time, with a control agency maintaining communications with airspace users and directing entry/exit to maintain safety and effective use. Procedural control can serve as a backup system if positive control is the primary system of control, but becomes unavailable.

INTEROPERABILITY AND ADAPTABILITY

Using current US national military objectives and assigned missions as a baseline, the air component develops AOR-specific concepts for airspace control. Procedures to implement these concepts must take into consideration the likelihood of multinational operations. As such, the need for developing procedures to ensure compatibility and interoperability of support systems and methods to handle potential alliances and coalitions must be met. US forces participating in multinational operations may also be subject to international agreements that address issues related to coalition command structure, interoperability, and other relevant matters.

TRAINING

Effective and safe operations in today's complex airspace environment require all users to be effectively trained. Training is a Service component responsibility. Theater-specific training should augment Service component training. Airspace control procedures and personnel must be trained and exercised in peacetime to be effective in combat. To provide a realistic assessment, it is crucial that the airspace control system be exercised as an overall system rather than a series of individual components. Exercises and simulations involving multiple agencies and users across the range of military operations provide needed complexity to train operators. Both joint and coalition elements should be incorporated whenever feasible.

INFORMATION ASSURANCE (IA)

Information assurance is a key enabler to airspace control capabilities. IA comprises those measures taken to protect and defend information and information systems by ensuring their availability, integrity, authenticity, confidentiality, and non-repudiation (ability to prove sender's identity and prove delivery to recipient). IA depends on the continuous integration of trained personnel, operational and technical capabilities, and necessary policies and procedures to guarantee continuous and dependable information, while providing the means to efficiently reconstitute these vital services following disruptions of any kind, whether from an attack, natural disaster, equipment failure, or operator error. In an assured information environment, warfighters can leverage the power of the information age.

Developing and implementing security and protection in the 21st century requires recognition of the globalization of information and information systems. The Air Force employs a defense-in-depth philosophy by providing layered and integrated protection of information, information systems, and networks. The defense-in-depth approach employs and integrates the abilities of people, operations, and technology to establish multilayer, multidimensional protection. Security and protection include the policies and programs to help counter internal and external threats—whether foreign or domestic—to include protection against trusted insider misconduct or error. Security, like interoperability, must be incorporated into information systems designs from the beginning to be effective and affordable. Levels of protection must be commensurate to the importance and vulnerability of the specific information and information systems.

Traditional programs such as communications security (COMSEC), physical security, emissions security, and network defense are methods to protect our information and information systems. In addition, other information assurance programs help assess the interoperability, compatibility, and supportability of our information systems and aim specifically to reduce vulnerabilities and to improve the overall security of shared networks and systems. Due to the US dependency on and the general vulnerability of information and its supporting systems, IA is essential to airspace control.

SUMMARY

Awareness of the airspace environment within the AOR and the ability to affect it at will are the aims of airspace control operations. Each of the joint force components has legitimate airspace requirements that must be melded into a comprehensive airspace control system. Airspace control procedures should facilitate combat operations, expedite air defense identification, safely accommodate and expedite the flow of all air traffic in the theater of operations, prevent mutual interference from all users of the airspace, prevent fratricide, and lead to an early return to peacetime procedures.

CHAPTER TWO

ROLES AND RESPONSIBILITIES



Nothing is so important in war as an undivided command.

—Napoleon: *Maxims of War*

GENERAL

As the nation’s only full-service air and space force, the Air Force is the primary user of airspace in most AORs or JOAs. Air Force commanders will likely be responsible for planning and integrating airspace control for joint forces in accordance with JFC guidance. In order to establish an airspace system that maximizes combat effectiveness of all forces while reducing risks of fratricide, Air Force commanders must train their personnel to soundly employ operational risk management principles and be knowledgeable of all component systems and procedures. International agreements, forces, operational concepts, and operating environments will necessitate specific arrangements for joint airspace control; however, the basic doctrine, ideas, and concepts relating to airspace control remain constant. These “constants” are the subject of this chapter.

Consistent with existing provisions of JP 0-2, *Unified Action Armed Forces (UNAAF)*, JFCs organize assigned and attached forces to best accomplish their assigned mission. The organization of forces will depend on the mission assigned, the manner in which the mission is to be fulfilled, and the capabilities and strength of the component elements of the forces assigned. Consequently, the organizational form of the airspace control system may vary.

COMMANDERS’ ROLES

The primary emphasis of command relationships is to keep the chain of command simple so all involved understand who is in charge. In terms of airspace control, unity of command is a guiding principle. Understanding the roles of the JFC, Service component commanders, functional component commanders, the ACA, the AADC, and airspace management agencies involved in executing the JFC’s campaign or operations plan is essential.

Joint Force Commander

“A general term applied to a combatant commander, subunified commander or a joint task force commander authorized to exercise combatant command (command authority) or operational control over a joint force.” (JP 1-02) The JFC for a particular

operation is responsible for employment of forces assigned, attached, or otherwise made available to accomplish the assigned mission or objective in accordance with guidance provided by the establishing commander. In accomplishing the mission or objective, the JFC will normally employ forces through Service component commands, functional component commands, or a combination of functional and Service component commands.

Commander, Air Force Forces (COMAFFOR)

The COMAFFOR is the Air Force officer designated as commander of the Air Force component command assigned or attached to a JFC at the unified, subunified, and JTF level. Command and control of Air Force forces assigned or attached to the Air Force component is exercised through the COMAFFOR. Air Force forces should be organized as an air and space expeditionary task force (AETF). The AETF commander is the COMAFFOR. The COMAFFOR will have complete administrative control (ADCON) of all assigned US Air Force forces and specified ADCON of all attached Air Force forces. Through the JFC's command authority, the JFC normally will conduct operations through the COMAFFOR by delegating operational control (OPCON) of the Air Force component forces to the COMAFFOR. When designated as the JFACC, the COMAFFOR normally maintains OPCON of assigned and attached Air Force forces and normally receives tactical control (TACON) of forces from other components as directed by the JFC. If the JFACC is designated from another component of the joint force, the COMAFFOR will ensure Air Force forces are employed in accordance with the JFACC's guidance and tasking.

Joint Force Air and Space Component Commander

The JFACC derives authority from the JFC who has the authority to exercise or delegate operational and/or tactical control, assign missions, direct coordination among subordinate commanders, and redirect and organize forces to ensure unity of effort in the accomplishment of the overall mission. If JFCs elect to organize functionally, they will normally designate a JFACC. The JFACC typically exercises TACON over air capabilities/forces made available for tasking. The JFACC's responsibilities are assigned by the JFC, but will normally include developing a theater air and space campaign plan, assigning missions, tasking forces, and ensuring unity of effort in accomplishing the overall theater air mission. To ensure unity of effort in airspace control and air defense, the JFC will also normally designate the JFACC as the ACA, AADC, and the space coordinating authority (SCA). To accomplish these missions, the JFACC will use established interfaces with the JFC and other components to establish a theater wide command and control system that will meet the JFC's objectives. In most large scale operations the Air Force will provide the preponderance of air assets and possess the necessary C2 capabilities to exercise command and control over all theater air operations. Accordingly, the Air Force component commander will normally be designated the JFACC.

Airspace Control Authority

The JFC designates the ACA. “The ACA is the commander designated to assume overall responsibility for the operation of the airspace control system in the airspace control area.” (JP 1-02) The broad responsibilities of the ACA include coordinating and integrating the use of the airspace control area. Subject to the authority and approval of the JFC, the ACA develops broad policies and procedures for airspace control and for the coordination required among units within the AOR. The ACA establishes an airspace control system that is responsive to the needs of the JFC, provides for integration of the airspace control system with that of the host nation, and coordinates and deconflicts user requirements. If the host nation air traffic control (ATC) infrastructure does not exist or is significantly degraded, such as occurred when the Taliban was removed from power in Afghanistan in 2002, the ACA may be requested to provide advisories to civil and commercial users of the ATC and airspace system of the host nation, until the nation’s ATC system can be reactivated. The ACA provides this service through the airspace management specialty team, the terminal airfield operations element and the regional air movement control center, (RAMCC), if activated. This service provides a safe and efficient operating environment by managing the complex interaction of military and civil aircraft attempting to access or transit the airspace control area.

The ACA publishes an airspace control plan (ACP) that provides the basic information on all aspects of airspace control. The ACP establishes procedures for the airspace control system (ACS) in the operational area. See Appendix A for an example of the topics that should be considered when developing an ACP. The JFC approves the ACP. *To provide effective operational procedures the ACP and air defense plan (ADP) must be integrated with the JFC’s operation plan (OPLAN) and orders. Both plans should articulate available C2 systems and capabilities.* The ACP must consider procedures and interfaces with the international or regional air traffic systems necessary to effectively support air operations, augmenting forces, and JFC objectives. As a consequence, the ACP should be preplanned as much as possible and be put in a simplified, understandable format. Because the airspace control area normally coincides with air defense boundaries, coordination between combat zone airspace control and area air defense operations is essential.

Implementation of the ACP is through the airspace control order (ACO). The ACO is an order that provides the details of the approved requests for airspace coordination measures (ACM). While the ACP provides general guidance for the control of the airspace, the ACO implements specific control procedures for established time periods. It is published either as part of the ATO or as a separate document. It defines and establishes airspace for military operations as deemed necessary by the appropriate military authority. It notifies all agencies of the effective time of activation and the composite structure of the airspace to be used. The ACO may include ACMs and fire support coordinating measures (FSCMs) such as air routes, base defense zones (BDZs), and restricted operations areas (ROAs). A change to the ACO should be distributed whenever a new area is established or an existing area deleted.

A key responsibility of the ACA is to provide the flexibility needed within the airspace control system to meet contingency situations that necessitate rapid employment of forces. Matters on which the ACA is unable to obtain agreement will be referred to the JFC for resolution. A summary of the ACA responsibilities is provided below:

- ✦ Coordinate and integrate the use of the airspace.
- ✦ Develop policies and procedures of airspace control and for the coordination required among units within the operational area.
- ✦ Establish an airspace control system that is responsive to the needs of the JFC, provide for effective and timely integration of the airspace control system with that of the host nation, and coordinate and deconflict user requirements.
- ✦ Develop the airspace control plan and, after JFC approval, distribute it throughout the JOA. Implement the airspace control plan through the airspace control order.
- ✦ Provide necessary facilities and personnel for airspace control functions in assigned areas and identify these facilities and personnel for inclusion in the airspace control plan.

The ACA develops the ACP and, after JFC approval, promulgates it throughout the AOR. The ACP must be integrated with the area air defense plan (AADP) and coordinated with the other joint operation plans. The ACP must consider procedures and interfaces with the international or regional air traffic systems necessary to effectively support JFC objectives, air operations (including en route overflight of neutral nations), and augmenting forces. An example of the topics that should be considered when developing an ACP is provided in Appendix A. These documents must be coordinated to facilitate continued operations in the event of degraded command and control systems. *The ACP needs to support an orderly transition from peacetime operations to combat operations and back to peacetime.* Such a transition could occur during a period of increasing tensions or suddenly without warning.

Area Air Defense Commander

The JFC will normally designate an AADC as the single commander responsible for air defense (protection of friendly forces and other vital assets from attack by enemy air and missile threats). This includes, but is not limited to, defensive measures designed to destroy attacking enemy air and missiles or to nullify or reduce the effectiveness of such attacks should they escape destruction. The AADC should be the commander with the preponderance of air defense capability and possessing the capability to plan and execute integrated air defense operations. The successful conduct of air defense operations requires the integrated operation of all available air defense systems. Air defense operations must be coordinated with other operations, both on and over land and sea. The AADC develops the AADP and, after JFC approval, promulgates it throughout the AOR. The responsibilities of the AADC are interrelated with those of the ACA.

Other Component Commanders

Each component commander advises the JFC on the employment of forces. The JFACC, in coordination with other components, plans and executes AOR-wide air and space operations. Subject to the authority of the JFC, each component commander within a joint force:

- ★ Provides airspace control in areas designated by the ACA in accordance with directives and/or procedures in the ACP, and is prepared to provide airspace control in other areas designated by the ACA when combat or other factors degrade the airspace control system.
- ★ Forwards requests for ACMs to the ACA in accordance with the ACP.
- ★ Develops detailed airspace control instructions, plans, and procedures in accordance with guidance in the ACP. These detailed instructions, plans, and procedures need to be coordinated by the ACA to ensure consistency with JFC-approved airspace control guidance and approved in accordance with directives and/or procedures in the ACP.
- ★ Provides necessary facilities and personnel for airspace control functions in assigned areas of operations and identifies these facilities and personnel to the ACA for inclusion in the ACP.

COORDINATION WITH THE HOST NATION AND INTEGRATION WITH CIVIL AND MILITARY AIR OPERATIONS

Airspace management personnel should coordinate the ACP with representatives of the host nation(s) in whose airspace the operations will take place and with civil air activities that may occur in or near the airspace. There should also be close planning and coordination between representatives employing both offensive and defensive weapon systems of US and multinational armed services. Broad areas of concern for developing the ACP include familiarity with the basic operation plan, knowledge of host and multinational capabilities, procedures of military and civil airspace control and air traffic control systems, and general locations of friendly and enemy forces. Additionally, planners must be familiar with any host nation agreements that could impact air operations. They should be prepared to identify any new requirements that should be negotiated and formalized with the host nation. Host nation agreements may only be negotiated by authorized personnel in accordance with Air Force instructions on negotiating airspace control activities. They must integrate surface-to-air defense weapons and air defense aircraft for maximum effectiveness.

Proper coordination with civil air operations is especially important during transitions into or out of wartime status or during non-wartime periods of heightened tensions. Adequate protections must exist to prevent misidentification of civil air traffic as a hostile threat. Operation NOBLE EAGLE, the defense of America's skies after the attacks of September 11, 2001, has demonstrated the need for close civil-military coordination during homeland security operations. Additional information on defense of

America's skies is detailed in JP 3-01.1, *Aerospace Defense of North America* and AFDD 2-10, *Homeland Security Operations*.

Airspace Coordinating Measures

ACMs are the means to define controlled sub-areas within a given airspace. They are referred to as zone, area, corridor, etc., in their description, and define airspace restrictions, access, and control and coordination procedures (a list of ACMs is at Appendix B). The ACP should specify ACMs to be used in the AOR and how these measures will be promulgated. The ACP also should include FSCMs and all Service and component-unique ACMs and terms. FSCMs are employed by land or amphibious commanders to facilitate the rapid engagement of targets and simultaneously provide safeguards for friendly forces. FSCMs are usually activated for a limited time and refer to areas where fires may be active. ACMs should also identify areas that are protected from overflight such as religious sites or those that are environmentally protected.

Air Traffic Control Integration with Airspace Control

The ACP should provide procedures to fully integrate the resources of military air traffic control facilities with terminal-area airspace control responsibilities. ATC facilities should be interfaced and linked with airspace control system communications to form a system that ensures the safe and efficient flow of air traffic supporting the combat effort while permitting maximum combat flexibility.

Integration with Air Defense

The integration of air defense in the ACP is critical. The location of specific types of air defense operations and specific procedures for the identification of aircraft are critical to a viable ACP. The area air defense plan needs to be written with detailed engagement procedures that are consistent with the airspace control plan and operations in the combat zone. Drafters of the AADP must be cognizant of fielded equipment (and its possible limitations) employed by the joint/combined forces involved. Airspace control and area air defense operations need to be capable of functioning in a degraded C2 environment. Detailed engagement procedures and the roles of subordinate commanders in decentralized execution of air defense operations are keys to success in a degraded environment.

Providing an Air Picture for the Joint Force

The JFACC is also responsible for incorporating data from various air, ground, and space sensors into a recognized air picture (RAP), that enables planning and decision making for air operations in the theater. Feeds from data links are managed by the interface control officer (ICO) at the air and space operations center (AOC) and combined with other sources into a common operational picture (COP). A COP utilizes the common operating environment (COE), to help joint force commanders synchronize the actions of air, land, sea, special operations, and space forces. This fused picture is shared for mission planning and execution at all levels of command.

CHAPTER THREE

DEVELOPING THE AIRSPACE CONTROL SYSTEM



The primary goal of combat zone airspace control is to enhance air, land, maritime, and special operations force effectiveness in accomplishing the JFC's objectives.

—JP 3-52, *Doctrine for Joint Airspace Control in the Combat Zone*

GENERAL

Airspace control structures and procedures require extensive planning before operations commence. The airspace environment may transition through varying stages from peacetime to combat and back to peacetime operations during a contingency. Contingencies may be of short duration, or they may last for years. As such, air defense, methods of controlling and identifying aircraft within the airspace, and rules of engagement (ROE) must be addressed.

OPERATIONAL REQUIREMENTS

Every joint force is different, depending on the mission to be accomplished, forces assigned, and the command structure established by the JFC. In most cases, these forces will have specific operational requirements for airspace that must be taken into account when developing the ACP. These requirements must be determined as early as possible to be incorporated in the overall joint force planning effort. Political constraints, national and military airspace control and air traffic control systems and procedures, and the capabilities and limitations of these systems are important considerations. ROE, disposition of air defense weapons, fire support plans, and procedures for identification of US and multinational aircraft are also important items that should be considered.

PLANNING CONSIDERATIONS

Planning Process

For situations that require significant involvement of Air Force forces, the Air Force component should identify a COMAFFOR, as soon as feasible, to the joint force commander. Normally the COMAFFOR is designated as the JFACC, and should rapidly assemble a joint staff representing all airspace control, airspace management and air defense forces anticipated for the operation. This staff should proceed with

completion of all phases of crisis action planning including the formulation of an ACP and AADP for the JFC's approval. These plans must be developed in coordination and in parallel with the JFC and other component staffs' planning efforts. The airspace control system that will execute the AADP must be designed to meet and complement the JFC's campaign plan.

Integrated Planning Cycles

The airspace planning cycle should be integrated with the planning cycle for the joint campaign plan and the overall joint air operations plan. Inputs from all organizations involved in the conflict must be consolidated, and the final ACP devised and disseminated to users. The ACP can be added as an appendix to the operations annex to the joint force operation plan or the overall joint air operations plan.

Volume of Air Traffic and Degraded Operations

Planning for airspace control in the combat zone must consider the aircraft traffic volume throughout the operation. It is highly likely that offensive operations will significantly increase the complexity of airspace control planning and execution. Planners must anticipate this and develop a straightforward, easily understood, and executable plan. This plan must fully integrate all airspace and air traffic control functions across the AOR, to include the possible integration and deconfliction of civil/humanitarian operations and the activation of a RAMCC, if required. Plans should anticipate the effects of information operations and communications degradation. An effective airspace control system needs to plan for the full spectrum of communications from no degradation to full degradation. Plans also should consider the effects of the full range of applicable weather conditions and day/night operations.

TRANSITION FROM PEACETIME TO COMBAT OPERATIONS

JFCs should have an ACP that is continually updated both in peacetime and throughout the evolution of a campaign, and a standing ACO to provide airspace control during degraded operations. The Air Force component will likely develop and coordinate such plans in most theaters. Peacetime airspace rules and organizations change during actual conflict, and the nature of these changes is different from theater to theater. During stability operations, normal airspace control and air defense operations may be in place. The ACP needs to provide instructions to transition from peacetime to combat and back again in simple, clear steps. For example, existing air defense and/or air traffic control structures may be overwhelmed by massed enemy attacks over small geographic areas. These massed attacks may be heavily supported by electronic and communications jamming, or by asymmetric covert methods. Once the scope and nature of enemy massed operations are determined, friendly forces can be focused within the AOR to counter the enemy threat and to re-establish an air defense and air traffic control system.

INTEGRATION OF AIRSPACE CONTROL AND AIR DEFENSE OPERATIONS

Because these two functional areas would conflict and interfere with each other if operating independently, prioritization and integration are essential. Ultimately, the airspace control function must be integrated with air defense operations. Airspace control procedures will be used to assist in aircraft and missile identification, facilitate engagement of enemy aircraft and missiles, and provide safe passage of friendly air vehicles. Normally the JFACC unifies these functions in the AOC.

Area Air Defense Commander—The Prime Integrator

The AADC utilizes all joint theater air defense forces made available into an integrated air defense system (IADS) that can respond to the array of enemy threats by optimizing employment of all friendly air defense forces. The JFC, through the AADC, ensures detailed coordination and control of defensive measures with the affected air, land, and maritime commanders. The exchange of liaison personnel at the joint force level is essential for the coordination necessary to ensure unity of effort. *For most operations, assigning the roles of ACA and AADC to a single commander, the JFACC, further unifies efforts across the spectrum of airspace use.*

Surface-to-Air Weapons

Air defense units must be free to engage hostile aircraft within prescribed air defense procedures promulgated by the AADC. *Airspace coordinating measures should not unduly restrain surface-to-air or air-to-air weapons systems so as to significantly increase the enemy's chance of success.* Procedures will need to be established within the airspace control system to allow identification of friendly aircraft, avoid delays in air operations, and prevent fratricide. These procedures must be simple to execute for both aircrews and ground operations personnel and may include visual, electronic, separation by altitude and timing, and other procedural means for sorting friend from foe. Air defense operations should not cause delays in air operations by creating an unnecessarily complicated or lengthy air route structure. Full integration of surface-to-air weapons into the overall IADS will help minimize the fratricide potential, and will also expedite targeting of hostile aircraft and missiles.



Integration of the Army Air and Missile Defense Command (AAMDC)

The AAMDC is the Army's operational lead for Army theater air and missile defense (TAMD). *The commanding general of the AAMDC has two roles common to every air defense artillery (ADA) commander—commander of all assigned ADA forces and theater Army air and missile defense coordinator (TAAMDCOORD) for the commander, Army forces (COMARFOR).* The AAMDC's forces may be employed in either the ADA or the theater missile defense (TMD) role, depending upon the mission tasking. The AAMDC commander may be appointed as deputy area air defense commander (DAADC). The three roles discussed above reflect the total theater involvement of the AAMDC. The JFC and AADC will determine whether a DAADC should be designated. This designation formalizes the relationship between the land-based TAMD assets dedicated to theater level missions and the AADC and helps to ensure fully integrated and synchronized counterair operations. The DAADC performs integration and parallel planning to ensure efficient coordination and rapid response to the AADC's counterair requirements. The DAADC ensures the Army land forces' contribution to the counterair fight is properly planned, synchronized, and executed. The AAMDC, as the senior Army air defense element in support of the AADC/DAADC requirements, is the primary interface at the joint AOC (JAOC) for all land-based active air defense operations. Although the AAMDC commander may serve as a "deputy" AADC, the DAADC would not assume the role of the AADC if the AADC were incapacitated. Not a true deputy commander, the DAADC's primary responsibilities are to assist the AADC in planning, coordinating, integrating, and synchronizing land-based TAMD operations. Neither the AAMDC commander nor his staff has the tactical, technical, or procedural expertise and capability to perform all of the functions of an AADC in a joint environment. The DAADC and the AAMDC support the AADC/DAADC relationship by providing the following support to the AADC:

- ✦ Integrate land-based TAMD into theater defensive counterair (DCA) operations.
- ✦ Advise the AADC regarding ROE, weapons control status, weapons control procedures, states of readiness/alert, fire control orders, airspace coordinating measures, and air defense warnings.
- ✦ Assist the AADC with AADP development.
- ✦ Advise the AADC regarding land-based TAMD operations and capabilities.

Flexibility of Procedures

Highly flexible airspace control procedures are necessary to respond to potential threats or coordinated attacks. The procedures should allow coordinated and, if appropriate, integrated employment of air, land, and maritime air defense systems against the threat, and use the inherent flexibility of airborne air defense platforms to mass forces to meet the threat. All elements of the air defense system must understand their roles and responsibilities at each level of attack. The process of identifying and

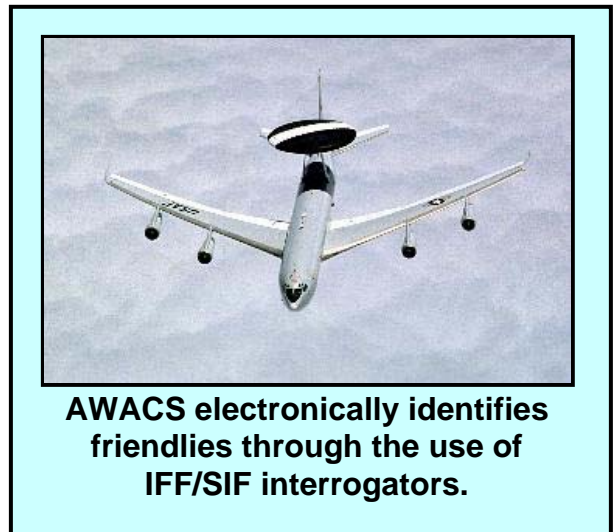
classifying friendly, neutral, and hostile aircraft during the heat of battle and employing air defense forces against these enemy elements is a highly complex task.

TYPES OF IDENTIFICATION

The types of identification (ID) vary throughout the range of military operations that include both combat and non-combat activities. The methods employed within an AOR are positive, procedural, and a combination of both. The airspace control structure needs to be responsive to evolving enemy threat conditions and changing tactical situations. Based on the concept of operations, the JFC, through the ACA, decides the appropriate identification method.

✦ Positive identification: Identification is determined by visual recognition, electronic support systems, non-cooperative target recognition (NCTR) systems, identification friend or foe/selective identification feature (IFF/SIF) systems, or other physics-based identification techniques. Positive identification does not assume identity solely based on location or adherence to airspace procedures

✦ Procedural identification: Identification assumptions are made based on adherence to agreed upon ACMs and rules. Identification is assumed to be friendly as long as rules are followed, but identification is assumed unknown if rules are not followed and the suspect vehicle is not otherwise positively identified. Examples of procedural identification are minimum risk routes (MRR) and safe passage corridors.



Most airspace control methods employ a combination of positive and procedural means or measures to effect identification. When employing a combination of identification means, procedural measures may be used to identify friendlies but are not used to identify suspects or hostiles. Visual and electronic systems may be used to identify friendlies and hostiles. Stated another way, procedural measures may be used to identify friendlies but positive techniques must be used to identify hostiles. Hostiles are not normally engaged based only on lack of friendly (LOF) identification. Exceptions are when self-defense criteria are met or when the AADC specifically promulgates weapons control status that allows it. Positive hostile identification (PHID) is required in most cases, as specified by theater-specific ROE. Positive ID is a high-confidence ID derived from visual observation and/or electronic ID systems. When available, positive ID is used because it provides the most rapid, reliable, and transferable means of identification. Most enemy PHIDs are derived from technology-based ID systems that exploit the physical or electronic characteristics of a target (e.g., NCTR, signals intelligence, and electronic support measures). For more information on identification

techniques and classification of tracks as discussed below, see Air Force Tactics, Techniques, and Procedures (Interservice) (AFTTP [I]) 3-2.31, *Multi-Service Tactics, Techniques, and Procedures for an Integrated Air Defense System*, and AFTTP 3-1.1, *General Planning and Employment Considerations* (Classified). Whatever ID method is used, theater-specific ROE must be followed in all cases. ROE are normally classified.

Classification of Tracks

Once tracks are identified, they must be classified by the air defense structure, prior to engagement or interception—if engagement or interception is required. This description of track classification is notional. Theater-specific ROE and operations order (OPORD) guidance must be followed in all cases. Identified tracks are assigned a category. An element in the air defense system then defines and assigns a more specific classification. Classification may be automatically performed by the system or determined by system operators. Track classifications are grouped into four main categories:

- ★ **Pending.** When an aircraft is initially detected by the system it is classified as pending, waiting for the operator or the system's database to further classify the track.
- ★ **Unknown.** A track in this category can be classified as:
 - ★ ★ **Assumed Friend.** Meets one or more of the identification criteria detailed in the OPORD.
 - ★ ★ **Assumed Enemy.** Meets only some, not all, of the Friendly identification criteria detailed in the OPORD.
 - ★ ★ **Evaluated Unknown.** Track data is screened by the operator and the system database—classification is still unknown.
- ★ **Friendly.** The track meets all friendly criteria detailed in the OPORD.
- ★ **Hostile.** A track in this category is classified as:
 - ★ ★ **Assumed Enemy.** Meets the hostile identification criteria detailed in the OPORD or meets the threat criteria loaded in the databases of the systems' nodes. The system will automatically identify and classify a track only up to this hostile level.
 - ★ ★ **Enemy.** Meets all of the enemy identification and classification criteria detailed in the OPORD. The authority for declaring a track enemy is tightly controlled. A designated air defense commander is required to make the final approving determination of this classification.

LEVELS OF CONTROL IN AIR DEFENSE OPERATIONS

The degree of control held at higher echelons of command is situation dependent and reliant on the ability to maintain situational awareness and communicate orders. Levels of control in air defense operations are slightly different than the air and space tenets of centralized control and decentralized execution and need to be explained. Examples of centralized and decentralized control follow:

- ✦ **Centralized Control.** In air and space employment, centralized control is the vesting of authority in one commander for planning and directing operations of all air forces throughout the AOR. This centralized planning and direction enables timely allocation and tasking of assets to exploit the speed, range, and flexibility of air capabilities across the entire area. Centralized tasking and allocation of resources is accompanied by progressive decentralization of task execution to the lowest command echelon capable. In centralized control, authority may be progressively delegated to subordinate echelons (as opposed to command by negation, which progressively pulls authority back from subordinate echelons).
- ✦ **Centralized Control in Air Defense.** This is the control mode whereby a higher echelon makes direct target assignments to subordinate units. Identification and engagement authority may be delegated from the AADC to the regional air defense commander or sector air defense commander during joint engagement zone (JEZ) centralized control operations.
- ✦ **Decentralized Control.** In air defense, decentralized control is the normal control mode. A higher echelon monitors unit actions, making direct target assignments to units only when necessary to ensure proper fire distribution or to prevent engagement of friendly aircraft.
- ✦ **Autonomous Operation.** In air defense, autonomous operation is the mode of operation assumed by a unit after it has lost all communications with higher echelons. The unit commander assumes full responsibility for control of weapons and engagement of targets. While not the normal mode of operation, autonomous operations procedures must be in place as they may be required with little or no warning. Autonomous operations will be in accordance with the ROE and weapons control status established by the AADC in the AADP.

ENGAGEMENT OF ENEMY AIR THREATS

Engagement of enemy air threats by friendly air, land, and maritime assets must be fully coordinated and, if possible, integrated to reduce uncoordinated simultaneous engagements, unengaged penetrators, and fratricide. Airspace control in a combat zone and area air defense operations are inextricably linked in enemy engagement operations. The airspace control system plays a key role in identifying friendly and enemy air vehicles and ensuring safe passage of friendly aircraft throughout the AOR. It also coordinates and disseminates information throughout the area air defense network.

Reliable voice and data communications, use of proper joint procedures, effective joint training and exercises, and exchange of liaison personnel are necessary for effective information flow to ensure effective and safe operations. Also, joint planning and coordination are extremely important and necessary to optimally deploy air defense assets prior to and after the start of hostilities.

In the space between the outer barrier of guns and London itself, there were at the time a considerable number of guns. At night, when our patrols were up, it was plain that, as it was not possible to distinguish friend from enemy, these guns must remain silent. I therefore began to clear this patrol zone of guns, and I filled it with searchlights. With a little more training, and with some improved projectors now becoming available, the searchlights would be able to help the pilots by pointing the beams toward the target, even if they could not illuminate it. In this zone, our pilots could fly on their patrol lines, without risk from gun-fire.



—Major-General E. B. Ashmore,
Discussing initiatives for the air defense of
London, September 1917, in his book, [Air Defence](#)

Joint Engagement Zone Operations

The JEZ is that airspace within which multiple air defense systems (surface-to-air missiles and aircraft) are simultaneously employed to engage air threats. These operations involve air defense weapon systems of one or more Service components. Combined fighter and missile engagement zone operations present the enemy with the dilemma of defending against two entirely different weapon systems, which decreases their survivability and impacts their mission effectiveness. Successful JEZ operations depend on correctly identifying friendly, neutral, and hostile aircraft and the proper allocation and coordination of air defense systems to avoid duplication of effort. Positive identification can ensure that real-time engagement taskings are based on comprehensive situational awareness. Under procedural identification, all air defense systems and aircraft must be capable of accurately discerning between enemy, neutral, and friendly air vehicles in a highly complex environment before full joint engagement operations occur. If these conditions cannot be met, separate zones for missile and fighter engagement should be established. A JEZ, without effective command and control, is extremely difficult to safely implement.

Fighter Engagement Zone (FEZ) Operations

In FEZ operations, the responsibility for engagement lies with the fighter. These operations may take place in airspace above and beyond the engagement ranges of surface-based (land and sea) air defense systems and are an alternative engagement operation if the detailed control aspects of joint engagement operations cannot be met.

Situations requiring massed combat airpower to counter enemy threats are highly dependent on coordination and flexibility within the airspace control system. In a FEZ, surface-to-air missile systems will not be allowed to fire weapons unless targets are positively identified as hostile and assigned by higher authority, or unless they are firing in self defense. FEZ operations offer great ability for the JFC to respond immediately with fighter assets to an enemy air offensive regardless of its location. FEZ operations within the airspace control area should not result in undue restraints on the ability of surface-based air defense systems to engage the threat.



Missile Engagement Zone (MEZ) Operations

In MEZ operations, responsibility for engagement lies with surface-to-air missiles. These operations are ideal for point defense of critical assets, protection of maneuver units in the forward area, and area coverage of rear operations. MEZ operations offer the JFC the ability to meet the enemy with a high- and low-altitude, all-weather capability. Advanced surface-to-air missile systems have long-range, high-firepower capability that can engage enemy aircraft and missiles beyond the forward line of own troops (FLOT) or disrupt massed enemy air attacks prior to committing fighter assets. MEZ operations need to be designed to maximize the full range and capabilities of various systems. Finally, MEZ operations within the airspace control area should not unduly restrain flexibility and responsiveness of air assets or result in attacks on friendly assets.

Coordination of Enemy Engagement Operations

The ACA and the AADC are normally the same person. This is extremely important in order to maintain the unity of effort and flexibility needed for effectively meeting the enemy air threat. With this in mind, the following general guidelines apply:

- ✦ When urgent or emergency combat situations arise, the airspace control authority can authorize deviations from established policies and procedures. In these exceptional situations, the airspace control authority should notify all affected air defense assets and airspace users prior to authorizing deviations. The JFC also should be informed as soon as possible, as well as The International Civil Aviation Organization (ICAO), who can aid in disseminating notices to Airmen and other advisories.

- ✪ When the circumstances of a contingency situation necessitate the rapid deployment and employment of forces for which there are no approved operations plans or previously established ACP, the ACA, as directed by the JFC, will establish a temporary airspace control system responsive to immediate tactical or operational requirements. The ACA will implement the planning and coordination requirements to modify or adjust the system as the nature of participating forces changes.

Integration of Friendly Electronic Warfare and Suppression of Enemy Air Defense

The JFC will integrate electronic warfare and suppression of enemy defense measures into the overall campaign plan. This integration could degrade the effectiveness of some airspace control assets in the combat zone, degrade some of the positive identification aspects of the system, and reduce the capability to identify aircraft. Proper coordination by the ACA will allow procedural identification measures to be developed to compensate for this degradation. Thorough planning is required to preclude electronic warfare efforts from unduly degrading air defense and airspace control efforts.

TRANSITION FROM COMBAT TO PEACETIME OPERATIONS

The ACP must be continually updated and evaluated throughout the evolution of a campaign. *When combat operations cease, or the host nation/coalition again becomes able to provide airspace control capabilities, the ACP must reflect the new situation.* The ACP should accommodate the redeployment of TACS and air traffic control assets from the AOR and provide for the orderly assumption of their duties by other agencies. Effective planning will ensure adequate airspace control for all levels of conflict encountered during a conflict and support the JFC's overall campaign plan throughout the campaign.

The transition from combat back to peacetime operations may take time and may proceed through many phases. The ultimate goal of transition is to return the air traffic control system back to its pre-conflict state, usually within requirements as an ICAO signatory. This transition may depend upon many factors, such as the level of destruction of the occupied nation's C2 and air traffic control infrastructure and the level of training and proficiency of their airspace control personnel. Facilities such as the RAMCC may aid in this transition. The RAMCC aids in the management and flow of military and civil airlift that flows into a region during a conflict. It can also aid in returning the nation's air traffic control infrastructure back to normal after a conflict has ceased. For more on the mission of the RAMCC see Appendix C.

CHAPTER FOUR

AIRSPACE CONTROL FOR SPECIFIED MISSIONS

GENERAL

This chapter discusses missions that may be sub-elements of a larger operation, or may not exactly fit into the category of full-scale combat operations. **The ACA may assign a portion of airspace to another commander to accomplish a specified mission.** This may be done to accomplish a specified mission, or at the direction of the JFC. In this situation, the ACA may temporarily designate a subordinate commander as the control authority for the specified airspace area. This designated commander must coordinate with the ACA to ensure:

- ✦ Unity of effort and minimize interference along adjacent boundaries.
- ✦ Agreement on procedures for coordination of flight information, clearance of aircraft to enter and depart the airspace and coordination of airspace control services.

AIRSPACE CONTROL WITHIN AN AMPHIBIOUS OBJECTIVE AREA (AOA)

For airspace control in amphibious operations, the JFC or higher authority who orders the amphibious operations will assign to the commander, amphibious task force (CATF) an AOA, which will include an airspace of defined proportions.

Control by the Commander, Amphibious Task Force

All air operations and airspace control procedures in the AOA will be under the control of the CATF, or designated CATF representative, until the amphibious operation is terminated. Unity of effort in overall air operations must be ensured. The CATF will coordinate air operations within the defined airspace with the commander responsible for airspace control in the surrounding area when adjacent airspace control areas exist.



USS Essex conducting amphibious operations.

Transfer of Authority to the Commander, Landing Force (CLF). As conditions warrant and as control and coordination agencies are established ashore, the CATF delegates the authority to control and coordinate supporting arms to the CLF. As part of this authority airspace control and the control of air operations in the AOA are passed to

the CLF or to a commander of forces ashore who has the capability to control and coordinate such operations.

Transfer of Authority Back to the ACA. At the termination of the amphibious operation, the AOA will be disestablished. Airspace control will be passed to the ACA designated for that area in accordance with the JFC's initiating directive.

JFC's Guidance on Coordination. Guidance on the coordination procedures required for aircraft providing support into the AOA and amphibious task force aircraft providing support outside the AOA must be established in the initiating directive. Approved missions will be reflected in the standard air tasking order (ATO) as described in JP 3-30, *Command and Control for Joint Air Operations*.

For specific details on airspace control in amphibious operations, refer to JP 3-02, *Joint Doctrine for Amphibious Operations*, and JP 3-02.1, *Joint Doctrine for Landing Force Operations*.

AIRSPACE CONTROL FOR MARITIME MISSIONS

The variety of organic weapons within the carrier strike group (CSG) allows for defense options other than airborne defense alone. Control and defense procedures and measures may differ from those in land-based operations. *To achieve unity of effort for the defense of the CSG, or for a specific mission in support of the JFC, the ACA may designate an airspace control sector or area to the maritime commander.* The Maritime Airspace Sector Commander should coordinate with the ACA on the areas listed below:

- ✦ Procedures for coordination of flight information.
- ✦ Clearance of aircraft to enter and depart the maritime airspace sector.
- ✦ Procedures for assisting and coordinating with airspace control elements that respond to adjacent or supporting component commanders.
- ✦ Procedures for deconfliction of operations during transitional operations and during operations in overlapping airspace areas (including FEZ, JEZ, and MEZ operations).
- ✦ Procedures for coordination of minimum-risk routes and fleet air defense identification zones to assist in eliminating fratricide

AIRSPACE CONTROL DURING STABILITY OPERATIONS

Air Force forces must be ready to undertake a variety of missions. Stability operations are generally confined to a specific geographic area and are often characterized by constraints on the forces, weapons, and tactics employed and the level of hostility. Depending on the environment, mission, and location throughout the range

of military operations, the degree of control may need to be increasingly rigorous and the ROE more restrictive. This is especially true in an environment that can transition quickly from combat to noncombat and back again and often has constraints on the forces, weapons, and conduct of ATC activities. Any required changes or waivers to national regulations, as well as problems that result from restrictions to military operations, should be forwarded to the JFC and may be referred through diplomatic channels for resolution.

Joint forces may be called on to participate in operations that involve US security for intelligence missions, raids, rescue missions, or other limited uses of military forces. In these operations it may not be possible to implement some of the airspace control procedures described in this publication. When conducting these missions, joint forces may encounter opposing military forces whose capabilities and potential for hostilities vary widely, so the airspace control function will have to vary accordingly. Planning for these operations, however informal or brief, should include:

- ✦ Deconfliction between units and aircraft performing the military mission and other types of air traffic.
- ✦ Timely and effective implementation of appropriate airspace control procedures if hostilities ensue.



Peacekeeping Operations

Peacekeeping operations can involve all air missions, including both fixed and rotary-wing aircraft of all components. These are the missions most likely to fluctuate from combat to noncombat and back again. To reduce the risk of mutual interference and/or fratricide all missions must appear on the ATO. However, in cases of high-density aircraft operations, such as an AOA, published in the ACO, aircraft may operate without an ATO mission number. All aircraft involved in the operation must monitor a common frequency and operate on designated IFF/SIF modes and codes, which must be appropriately checked prior to mission start. This type of rigorous control is necessary during such operations because the mix of friendly, enemy, and neutral

aircraft and mission constraints require the JFC to strictly control flights in the AOR. The airspace control methods the ACA recommends to the JFC should be continually evaluated for effectiveness and efficiency as the environment and mission change.

Foreign Internal Defense (FID) or Low Air Threat Situations

When supporting FID or low air threat situations, activities are focused so the host nation is the primary agent in most actions. Extensive coordination with the host nation(s) or multinational force airspace control or ATC system will be required.

- ✦ Airspace control in a FID situation is based on air traffic regulations and control of civil and military airspace users. In FID, the ATC system of the host nation frequently provides the framework around which most of the airspace control takes place. A theater air control system may or may not be established. The existing airspace control system may require some modification as the specific situation requires.
- ✦ Airspace control activities in this environment are largely related to air traffic regulation and control. Special identification procedures and air traffic regulation may require that all flight operations be planned and coordinated with the appropriate ATC systems of the nations involved. Adherence to ICAO regulatory procedures must be considered.

UNMANNED AERIAL VEHICLES (UAVs)

The established principles of airspace management used in manned flight operations will normally apply to UAVs. Pilots and operators of USAF UAVs are trained and certified to fly and operate their aircraft. They maintain currency just as aircrew on manned aircraft. They require theater certification before piloting and operating their aircraft in an AOR.

UAVs are generally difficult to acquire due to their small radar cross-section, and therefore present a potential hazard to high performance aircraft. There has also been a proliferation of UAVs in recent years. The mission of UAVs has expanded from that of ISR missions to include capabilities of weapons delivery as well. As adversaries improve upon UAV technology, counter UAV operations are becoming an important consideration. Therefore, it is imperative to be able to distinguish friendly UAV operations and enemy UAVs. Small UAVs are more difficult to visually acquire and pose greater challenges to air defense and airspace management personnel. The use of procedural control measures or tracking devices will soon be required to identify friendly unmanned systems, as is already the case with manned aircraft.



Global Hawk UAV in flight.

Airspace Integration and Management of UAVs in the Combat Zone

Unmanned Aerial Vehicles vary in size and weight, ranging from the 25,000 pound Global Hawk to the half-pound Black Widow. As technology improves, the numbers of UAVs in the battlespace are growing dynamically each year. Regardless of size, UAV operations require special considerations in terms of airspace control and usage. Specific volumes of planned airspace for UAVs need to be included in the ACO, and operational UAV information must be part of the theater airspace control plan (ACP) and special instructions (SPINS). Each service will have significant numbers of UAVs that may operate over or near friendly forces, airfields, and ports providing force protection or conducting reconnaissance, surveillance, or targeting missions. All UAV missions need to be coordinated with the appropriate command and control agency prior to launch, ensuring effective integration/deconfliction with other airspace users. Although coordinated, small UAVs may not be included in the ATO/SPINS. These UAVs must be deconflicted on a real-time basis with the appropriate airspace control agency. If UAV operations are not deconflicted properly, unsafe flying conditions may result, which may result in some airspace users being unable to accomplish their mission. Thorough coordination will ensure the safe separation of UAVs and manned aircraft as well as preventing engagement by friendly forces.

Airspace Integration and Management of UAVs in the National and International Airspace

Unmanned systems must be integrated into national and international airspace. Operation of UAVs and remotely piloted aircraft (RPAs) *inside restricted and warning areas* in the United States are conducted at the discretion of the Air Force. Operations in the National Airspace System require a Federal Aviation Administration (FAA) certificate of authorization (COA) negotiated with the appropriate FAA region. The Air Force currently has several COAs on file with the FAA, and all have enabled UAVs and RPAs to operate outside of restricted/warning areas when required in order to complete mission requirements.

The *Office of the Secretary of Defense UAV Roadmap* instructed the Air Force to “coordinate revising FAA Order 7610.4, *Special Military Operations*, to replace the requirement for using the certificate of authorization process for all UAVs with one for using the DD175 (flight plan) form for qualifying UAVs.” Also, the Air Force is working with other Services and US Government agencies to develop technologies, such as sense-and-avoid systems, that will increase flight safety. The near-term goal is for RPA and UAV operators to be able to file a flight plan and fly above or below commercial air traffic, with some restrictions on climbing and descending through airspace that is also used by commercial aircraft. By 2025, RPA and UAV operators may be able to file an instrument flight plan and fly anywhere in national or international airspace.

CRUISE/LONG RANGE MISSILE OPERATIONS

Much like UAVs, in the employment of cruise and long range missile systems such as conventional air launched cruise missiles (CALCM), joint air to surface standoff missiles (JASSM), and Army tactical missile systems (ATACM) operations, the established principles of airspace management used in manned flight operations will normally apply. The CALCM is designed to be a standoff weapon fired from a launch point on a pre-programmed flight profile to a designated target. The flight profile is based on the en route threat to the weapon from launch point to target. Due to its small radar cross-section, positive control is not an effective means to deconflict CALCM operations with other airspace users. Procedural ACMs must be used and are identified primarily in the ACO and also discussed in the ACP during the planning phase of air operations. Deconfliction must be done on a real-time basis once operations commence.

The JASSM is an autonomous, long-range, conventional, air-to-ground, precision standoff missile. It is designed to destroy high-value, well-defended, fixed and relocatable targets at ranges beyond enemy air defenses. It is fired from a preplanned launch point or area. Its route of flight is designed to minimize exposure to known threats and is normally known prior to missile launch. Similar to CALCM, procedural ACMs must be used and identified in the ACP, ATO, and SPINS during the planning phase of air operations, or deconfliction must be done on a real-time basis once operations commence. Once hostilities start, deconfliction procedures will be included in the ACO and may be included in the ATO and SPINS.

The ATACMS provide long-range, surface-to-surface fire support for Army corps and division operations. ATACMS are guided missile systems with an antipersonnel/antimateriel (APAM) warhead. Targets include surface-to-surface missile and multiple rocket launcher units; air defense systems; logistics elements; and command, control, and communications complexes. ATACMS operations are usually planned or requested by corps, echelon above corps, Service, and/or functional components, or the JFC. Procedural means are used to deconflict ATACMS operations via the ACO, ATO, SPINS, or real-time notification measures are used for immediate fires. The AOC airspace cell, upon notification of an imminent ATACMS launch, establishes a restricted operations zone (ROZ) around the launch area and impact area, and, a corridor to protect the missile en route. Working in concert with the Army airspace command and control system (A2C2) element, the air support operations center (ASOC) (or direct air support center, if applicable) is able to deconflict close air support (CAS) aircraft in the projected impact area. Deconfliction is also required beyond the range of CAS operations/assets and will be coordinated through the airborne warning and control system (AWACS) or the control and reporting center (CRC) or the tactical air operations center (TAOC) as the applicable controlling agency.

CHAPTER FIVE

AIRSPACE CONTROL EXECUTION: THE THEATER AIR CONTROL SYSTEM (TACS)

Combat inspires the need to invent things on the spot when you have to handle difficult circumstances you've never come across before.

—General John P. Jumper, CSAF



GENERAL

The Air Force airspace C2 system reflects the air and space power tenet of centralized control and decentralized execution. The Air Force TACS is the C2 mechanism that provides the COMAFFOR with the means to achieve this tenet. TACS elements may be employed in garrison, deployed for contingencies or deployed to augment theater-specific systems. Advances in communications and data link capabilities enable tailoring the configuration of the TACS to meet the dynamics of an operation. While sometimes configured differently in the various theaters of operations, the basic functions performed by the TACS are the same. The TACS is the COMAFFOR's executor for the AADP, ACP, and ACO. When combined with other component's C2 elements the TACS becomes the theater air-ground system (TAGS), to execute operations for the JFACC.

ORGANIZATION, FACILITIES, AND PERSONNEL

The Air Force organization for controlling air forces is derived from the basic qualities of airpower: flexibility, range, and speed. Because airpower can quickly apply force to a wide range of targets, centralized planning and control are essential to efficient employment. On the other hand, the details of directing the actions of many widely separated units require delegation; thus the necessity for decentralized execution. The TACS is a hierarchy of organizations and C2 systems to plan, direct,

and control theater air operations and coordinate air operations with other Services and allied forces. The TACS airspace control role is to be the executor of the ACP and ACO. The elements of the TACS coordinate, integrate, and regulate airspace activities within the Air Force. For a more detailed examination of each element of the TACS, see AFTTP 3-1, Vol. 26, *Theater Air Control System* and AFOTTP 2-3.2, *Air and Space Operations Center*.

AIR AND SPACE OPERATIONS CENTER (AOC)

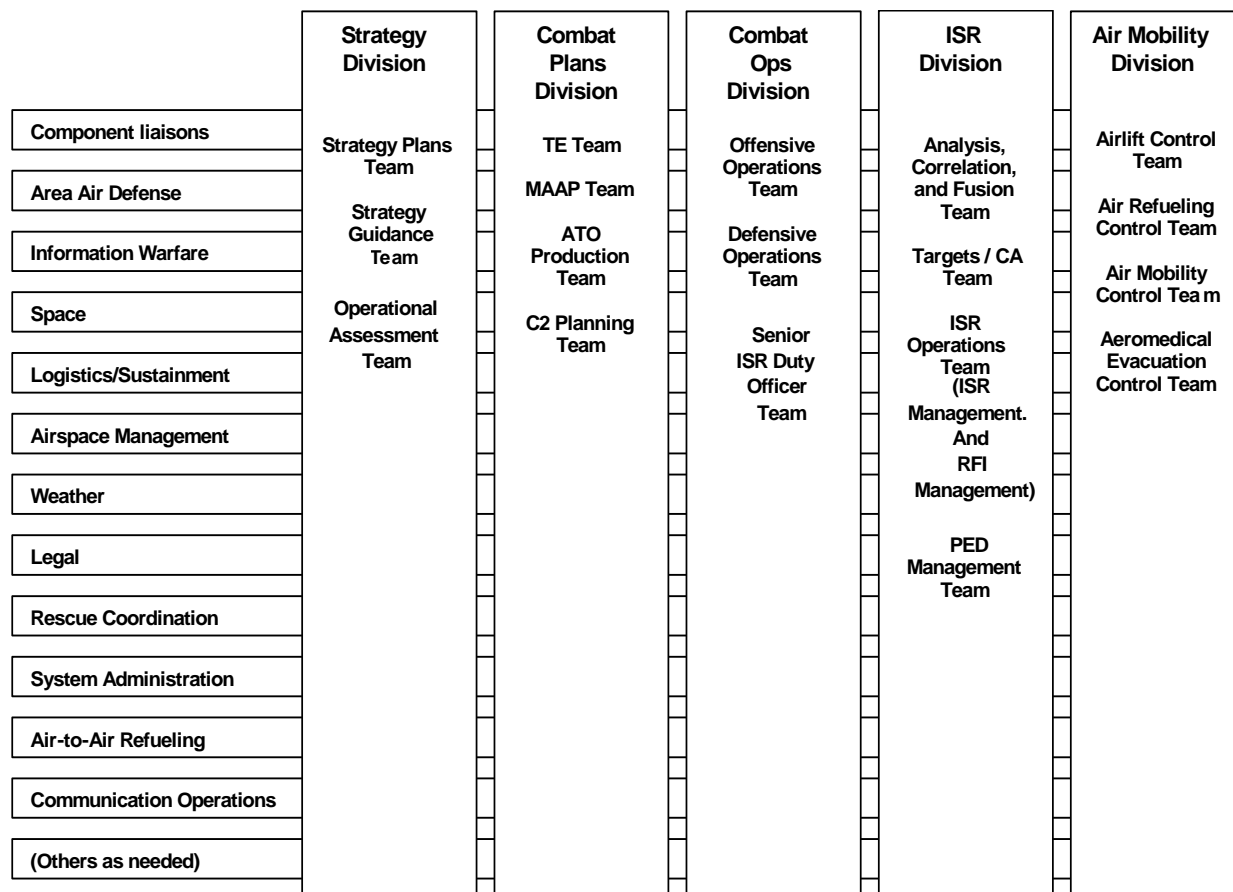


Figure 5.1. Basic Structure of a Notional AOC

The AOC is the senior element of the TACS. It is an Air Force weapon system, known as the Falconer. It is the air and space operations planning and execution focal point for the JFACC, exercising OPCODE and TACON. It is where centralized planning, direction, control, and coordination of air and space operations occur. AOC personnel are responsible for planning, executing and assessing air and space operations and directing changes, as the situation dictates. The AOC provides the air and space component commander the capability to plan, execute, and assess air and space operations. The AOC is nominally designed and organized to conduct intense air operations consistent with a major theater war. The JFACC retains the flexibility to organize and man the AOC as necessary to meet the operational requirements of the contingency for which air operations are being conducted. Each AOC is uniquely

tailored to the local environment, resource availability, operational demands, and command relationships of the military and civilian hierarchy. As such, AOC operations can be defined more by functions than by manning. In addition, although the Air Force provides the core manpower for the AOC, other components contributing air and space forces also provide personnel as necessary.

The AOC is organized under a director, with five divisions (strategy; combat plans; combat operations; intelligence, surveillance, and reconnaissance; and air mobility), and multiple support/specialty teams. Each integrates numerous disciplines in a cross-functional team approach to planning and execution. Figure 5.1 depicts a notional AOC organization.

Component Liaisons

Each Service or functional component commander involved in the operation normally provides a liaison element to the AOC to articulate component requirements for airspace and to provide expertise in the development and execution of the AADP, ACP, and ACO. The special operations component commander is represented by the special operations liaison element (SOLE) to coordinate, deconflict, and integrate special operations forces (SOF) operations, strategy, and plans with conventional air. The other Services have a liaison presence in the AOC. The battlefield coordination detachment (BCD) represents the Army, while the naval and amphibious liaison element (NALE) articulates Navy and Marine interests, unless a separate Marine liaison officer (MARLO) is designated. For related discussion, see AFDD 2, *Operations and Organization*.

Air Component Coordination Element (ACCE)

For large operations, the JFACC may establish an ACCE with the JFC's or the surface component commander's headquarters to better integrate air and space operations with surface operations, and with the JTF headquarters to better integrate air and space operations within the overall joint force. When established, these elements act as the JFACC's primary representatives to the respective commanders and facilitate interaction between the respective staffs. This element facilitates integration by exchanging current intelligence, operational data, and support requirements and coordinating the integration of JFACC requirements for airspace coordinating measures, joint fire support coordinating measures, and close air support. Element expertise includes plans, operations, intelligence, airspace management, and air mobility. The ACCE also communicates the surface commander's decisions and interests to the JFACC. However, the ACCE should not replace, replicate, or circumvent normal request mechanisms already in place in the component/JTF staffs. The ACCE director's rank should be commensurate with the rank of the component or JTF commander to which he/she is attached.

Airspace Coordination Within the AOC

The airspace management specialty team leader coordinates and integrates the use of airspace within the AOR, assisted by the airspace managers within each division. Integrated into the combat plans, combat operations, and air mobility divisions within the AOC, the airspace managers accomplish combat airspace planning and execution. Within the combat plans and air mobility divisions, team members, in coordination with the airspace management specialty team leader, write the ACP and the ACO for the ACA. The combat operations division monitors the ACO and makes immediate changes to it as the situation dictates. Depending on the degree of integration of effort with other Services, host nations, and allied forces, component liaison officers may be assigned to assist in the development of airspace control documents.

Regional Air Movement Control Center (RAMCC)

The RAMCC provides the ACA and AADC with a centralized function to help deconflict both military and civilian air traffic in a particular airspace control area. The RAMCC is a specialty team, not necessarily co-located with the AOC, reporting directly to the AOC Director. The goal of the RAMCC is to provide a safe and efficient operating environment through managing the complex interaction of military and civil aircraft attempting to access or transit the airspace control area. This includes combat, combat support, humanitarian, and commercial air operations. It also provides a way for the AADC to have visibility over non-AOC directed users operating in the airspace control area. The RAMCC is responsible for coordinating operational requirements with ICAO, and disseminating airspace and airfield information to operators. The RAMCC may include liaison officers from the coalition and neutral nations and will have interface with NGOs and civil or commercial users of the airspace. For more information on RAMCC, see Appendix C.

THE THEATER AIR-GROUND SYSTEM (TAGS)

The JFC has a theater-wide system to control air operations, during the different maneuver phases of the conflict. The Army air-ground system, the Naval tactical air control system, and the Marine air command and control system combine with the TACS to support the JFC's air objectives in planning and execution. To fully understand the relationship of the TACS to the TAGS, planners must understand each Service's system and its composition and structure. The TAGS combines each Service's C2 and airspace management system that supports the JFC. It provides the framework that allows each service system to exist in a joint and coalition force environment and support the JFC. The TAGS is discussed in the paragraphs below.

Army Air-Ground System (AAGS)

The AAGS provides the control system for synchronizing, coordinating, and integrating air operations with the land component commander's (LCC) scheme of maneuver. The AAGS provides the means to initiate, receive, process, and execute requests for air support and to disseminate information and intelligence produced by

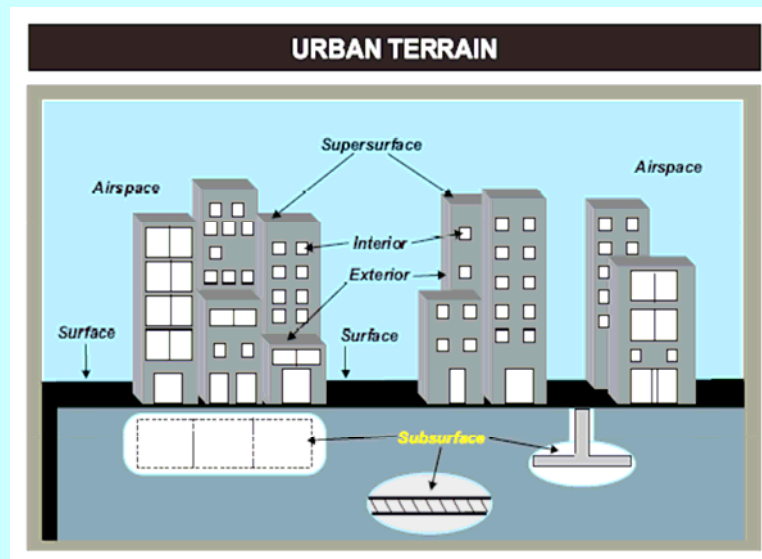
aerial assets. Some elements attached to the AAGS are liaisons provided by the Air Force. These elements are the air mobility liaison officer (AMLO), the Tactical Air Control Party (TACP), and the ASOC. They function as a single entity in planning, coordinating, deconflicting, and integrating the air support operations with ground elements. The principal Army agencies are command posts (CPs), fire support elements, air defense elements, A2C2 elements, and coordination and liaison elements, such as the BCD, theater Army air and missile defense coordinator, and ground liaison officers (GLOs).

Navy Tactical Air Control Center (TACC)

The senior Navy amphibious air control agency is the Navy TACC. The functions of the TACC may be spread across several ships. The Navy TACC possesses the functionality of future plans and current operations. During amphibious operations, the Navy TACC coordinates the types of airspace coordinating measures and controls all air operations within the operational area until a land-based air control agency is established ashore. Once a land-based air control agency receives control of all landing force air operations, the Navy TACC becomes a tactical air direction center (TADC), supporting the land-based air control agency. Ideally, the Navy TACC is collocated with the supporting arms coordination center (SACC).

Marine Corps Tactical Air Command Center

The Marine TACC is the senior agency of the Marine air command and control system (MACCS). When established ashore, it provides the facilities for the aviation combat element (ACE) commander and staff to conduct amphibious air operations. If the ACE is afloat, the Marine TACC may be incrementally phased ashore. Initially, a Marine TADC is established ashore subordinate to the Navy TACC and is responsible for air operations in the landward sector of the operational area. Upon completion of its build-up and when airspace management functions are passed from afloat to ashore the Marine TADC assumes the title and responsibilities of the Marine TACC. The Navy TACC then becomes a TADC, in support of the Marine TADC.



General Moseley explained how it would all work. There “will be a 24-hour presence of forward air controllers both on the ground and in the air, plus a 24-hour presence of a mix of aircraft and ordnance,” he said. Munitions options—from guns to Mavericks to five hundred-pound LGBs—would let operators “truly select the right weapon for the right situation.”...It was a carefully diagrammed plan. The bull’s-eye center was the Baghdad Restricted Operations Zone or B-ROZ. V Corps had already done detailed intelligence preparation of the battlefield for Baghdad. In addition, standard killbox and keypad control measures applied. Forty miles out, aircraft approaching the zone checked in with ground controllers. Inbound aircraft were kept separate from egressing aircraft by altitude as well as heading separations. They then joined one of four CAS stacks on different radials over the city. Ten strike aircraft and four airborne Forward Air Controllers filled each stack. Bombers were available, too. Specific guidance to aircrews included instructions on compensating for smoke and debris, and how to fly the safest attack angles. They carried a variety of ordnance ranging from laser-guided bombs to inert bomb shapes and ammunition for their guns. The idea was to minimize “rubbling” and ensure that weapons could be delivered very close to friendly forces....

—General T. Michael Moseley, discussing
 Urban CAS operations during Operation
 IRAQI FREEDOM, in The First 600 Days of
 Combat by Rebecca Grant

GROUND TACS (GTACS) ELEMENTS

Control and Reporting Center (CRC)

The CRC is a deployable battlespace management platform employed at the tactical level to support air operations planning and execution across the entire spectrum of operations, from stability operations to a major combat operation. The CRC is directly subordinate to the AOC. As a tactical C2 element, it can operate independently or in combination with other tactical C2 elements (e.g., AWACS, joint surveillance targeting and attack radar system [JSTARS]) The AOC assigns the CRC a geographic area, within which it manages all air defense, offensive air and airspace management activities, and assists in the execution of offensive operations. Execution of both airspace control and air defense operations can be delegated to the CRC, if the situation requires it, by the AOC. The CRC is also responsible for recommending changes in air defense warning conditions based on the air situation. The CRC provides battle management, weapons control, surveillance, identification, and link management within unit manning and equipment constraints. In terms of airspace control/management, it accomplishes these tasks by providing management and deconfliction of airspace use in support of theater air operations. Operating continuously, the CRC is uniquely capable of delegated airspace control plan/order execution including the control of FEZ/MEZ, MRR, air refueling tracks, restricted operating zones (ROZ), DCA, combat air patrol (CAP), kill boxes, and high value airborne assets (HVAA) orbits by:

- ✦ Receiving and fusing surveillance data from organic and external sources, and providing a recognized air picture (RAP) to the AOC via data link(s).
- ✦ Identifying all air tracks.
- ✦ Assigning weapons to engage targets and scrambling or diverting counterair aircraft.
- ✦ Providing positive control to aerial refueling and search and rescue missions.
- ✦ Compliance with ACP / ACO.

CRC Remote Radars

The CRC may deploy mobile radars and associated communications equipment to expand radar coverage and communications range within its assigned operating area. These remote radars are capable of providing early warning, surveillance, weapons control, and identification functions.

Air Support Operations Center (ASOC)

The ASOC is an element of the TACS directly subordinate to the AOC, but normally located with the senior army tactical level of command. The ASOC coordinates with the corps (or the senior army tactical level of command, as applicable) for the integration of air operations within the corps area of operations (AO). The ASOC

provides fast reaction to requests for air support and is also capable of conducting time sensitive targeting within its area. The ASOC and subordinate TACPs are provided in direct support to their associated Army unit(s). Operational control of the supporting effort will be exercised through the ASOC director to the subordinate TACPs. The ASOC has communications links to the TACPs and disseminates ATO mission data to them. The ASOC plays a major role in airspace control in their area of operations through the execution of joint airspace coordinating measures, such as high density airspace control zones (HIDACZ) and MRR. It deconflicts airspace usage with the Army's fire and effects coordination cell (FECC), G-3 air, and Army A2C2 element.

Tactical Air Control Parties (TACPs)

TACPs are the principal Air Force liaison elements, aligned with Army maneuver units from battalion through corps, and consist of air liaison officers (ALOs) and terminal attack controllers (TACs). TACPs advise ground commanders on the capabilities and limitations of air power and provide the primary Air Force terminal attack control of CAS in support of ground forces. They coordinate directly with Army airspace and fire support agencies to deconflict air operations in the ground sector. They may employ both formal and informal fire support coordinating measures to prevent fratricide or synchronize air operations with surface fire support. *TACP members are recognized as joint terminal attack controllers (JTAC)*. They are qualified and current joint terminal attack controllers who are recognized across the DOD as capable and authorized to provide terminal attack control. They are qualified to direct the action of combat aircraft engaged in close air support and other offensive operations.

AIRBORNE ELEMENTS OF THE THEATER AIR CONTROL SYSTEM (AETACS)

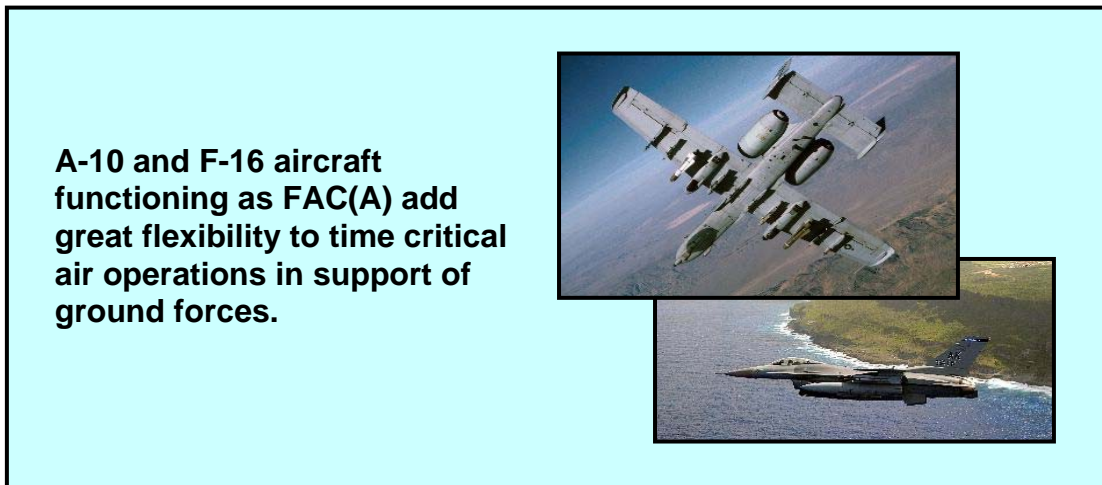
Airborne Warning and Control System (AWACS). The AWACS is an airborne radar control element of the TACS and is normally one of the first battle management assets to arrive in theater. As such, it is tasked with tactical C2 by providing early warning, surveillance, battle management, combat ID, and weapons control functions. It has the ability to detect and control aircraft below and beyond the coverage of ground-based radars and enables a more accurate air picture through various tactical data links (TDLs), also referred to as tactical digital information links (TADILs) in joint publications. The AWACS' range, flexibility, and C2 system capabilities enable it to operate directly subordinate to the AOC. The AWACS is capable of performing many of the capabilities of the CRC, depending upon mission configuration and the needs of the theater.

Joint Surveillance Targeting and Attack Radar System (JSTARS). JSTARS is a command and control battle management system often subordinate to the AOC. It is designed to provide ground surveillance, target detection, and target-tracking capability to develop the enemy ground picture. Joint STARS provides the supported commander(s) a means for battle management and support to offensive air operations by providing intelligence, surveillance, and reconnaissance (ISR) support; support to offensive air operations; and command and control that contribute to an understanding

of the enemy situation and assist commanders to delay, disrupt, and destroy enemy forces in accordance with the JFC's overall objectives. It is used for identifying opportunities for rapid interdiction and retargeting of enemy ground forces. It can also function in a limited role as a backup ASOC to assign or divert sorties to more lucrative targets, coordinating with TACP, Army command and control centers, and the AOC.



Forward Air Controller (Airborne) (FAC[A]). The FAC(A) is an airborne extension of the TACP and has the authority to direct aircraft delivering ordnance to a specific target cleared by the ground commander. The FAC(A) provides additional flexibility in the battlespace by enabling rapid coordination and execution of air operations. It also enhances the TACS' situational awareness by disseminating information on the flow of aircraft on target.



Strike Coordination and Reconnaissance (SCAR) Operations. SCAR operations, also called killer scout operations, are similar to those performed by a FAC (A). SCAR-qualified aircrew can control the flow of fighters in and out of working areas and provide targeting guidance and BDA reports. They are not, however, formally trained or qualified for release authority for CAS operations (i.e., when friendly troops are in close proximity to the target). Not all air-to-ground aircrews are SCAR-trained or certified.

C2 ELEMENTS THAT INTERFACE WITH THE TACS

Air Mobility Liaison Officer (AMLO). *AMLOs are rated air mobility officers supporting the Army through corps, division, and separate brigade, or regiment levels.* AMLOs advise ground commanders, commanders' staffs, and the ALO on the capabilities, limitations, and use of air mobility resources. They also assist in planning, requesting, and using airlift resources.

Airborne Command Element (ACE). The ACE is an optional element composed of a single officer or team of mission experts who fly on board airborne C2 platforms and function as the JFACC's representative. When required, the ACE conducts the air battle in accordance with the latest command guidance.

Expeditionary Operations Center (EOC). EOC is the key command and control center that bridges the C2 gap between operational planning and tactical execution. This center provides the AEW commander with a rapidly deployable, tailorable, single source C2 center that contains all the C2, information, and expeditionary combat support elements necessary to effectively establish an airbase, bed down the force, generate the mission, sustain the force, and redeploy the force. The EOC provides functional experts to receive, schedule, plan, and direct execution of the ATO. As required, the EOC is capable of connecting with the AOC, CRC, and the ASOC through voice and data communications. From the EOC the AEW commander can respond to airbase attack or emergency incidents while maximizing mission execution. The EOC provides a clear C2 entity for the entire expeditionary base. This is especially effective when working with host nation representatives, tenant organizations, joint, and coalition forces

Special Tactics Teams (STTs). Although not part of the TACS, special tactics teams are a part of the theater special operations forces and normally under OPCON of the joint force special operations component commander. TACON of STTs to support theater mobility operations may be delegated to the JFACC. STTs establish visual and procedural terminal area airspace control (attack, command and control, and air traffic services at remote drop/landing zones and austere or expeditionary airfields. They sustain these operations until relieved by other elements (TACP, tanker airlift control element, or general purpose air traffic service forces).

AIRSPACE CONTROL PROCEDURES

Responsibilities

The C2 system can be tailored to support the Air Force tenets of centralized control-decentralized execution of forces from the smallest stability operation to full-scale combat operations. The Air Force will provide the COMAFFOR with the resources necessary to meet responsibilities as the ACA and AADC during small scale operations that do not require a JFACC, and as the JFACC during large scale operations that include air and space power from the other Services. Under either circumstance, the

Air Force will support the JFACC to ensure unity of effort in all aspects of theater air operations.

Implementation

The ACP provides specific planning guidance and procedures for the airspace control system for the JOA, including airspace control procedures. The ACP will be distributed as a separate document or as an annex to the operations plan. The ACO, implementation directive of the ACP, is normally disseminated as a separate document. The ACO provides the details of ACMs for the next ATO/ACO cycle and includes fire support coordinating measures and other information that airspace users need.

The elements of the TACS along with other components' forces use the ACO to execute the airspace control function. Changes to the ACO are published on an as-needed basis.

Airspace Deconfliction Procedures

The airspace management team in the AOC deconflicts airspace. The combat plans division usually resolves conflicts during the planning cycle. The combat operations division handles real-time conflicts. Deconfliction is executed by elements of the TACS capable of providing airspace control functions and achieved by time, altitude, space, and other procedural means.

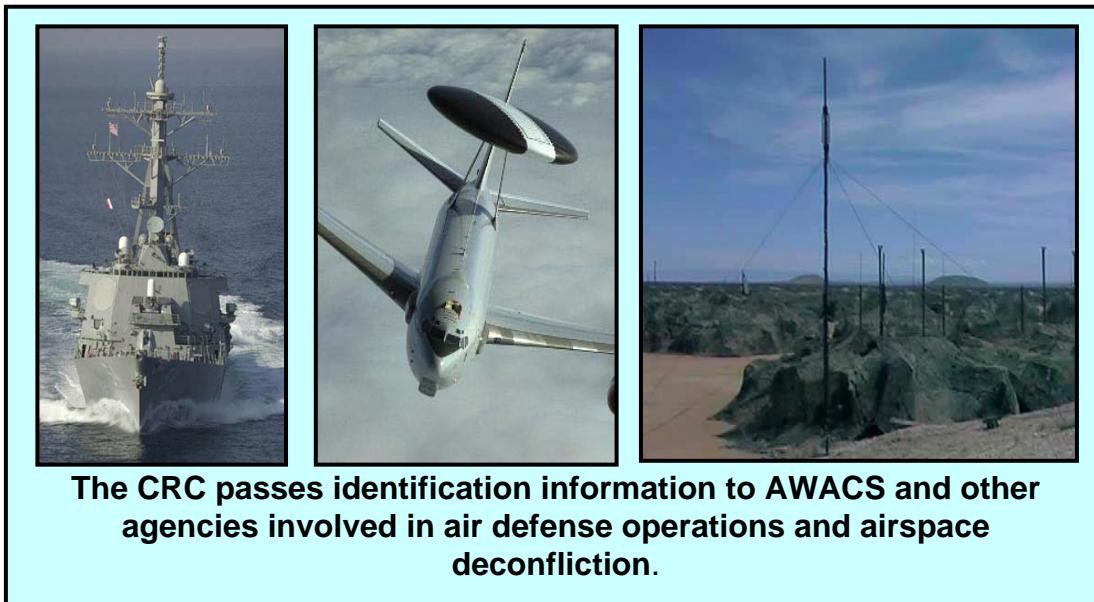


Integration with Air Defense

To minimize the risk of friendly air defense weapons engaging friendly aircraft, the Air Force C2 organization is structured to accommodate air defense operations coincident with airspace control. Air defense functions of weapons control, surveillance, and ID are inherent in the TACS, from the oversight and direction provided by the AOC, down through the execution capability of the AWACS and the CRC.

Integration of Air Defense and Airspace Control in the Air and Space Operations Center

Airspace control and air defense functions are integrated in both the combat plans and combat operations divisions. In the combat plans division, the ground and airborne C2 planning staff officers and other Service liaison officers (LNOs) integrate air defense considerations such as MRR; IFF/SIF modes and codes; fighter altitudes; and MEZ, FEZ, and JEZ areas for airspace control in publishing the ATO, ACO, and ACP. In the combat operations division, the chief of combat operations (CCO), through the airspace manager, is responsible for the execution of airspace control while the senior air defense duty officer (SADO) is responsible for the air defense portion of air operations. This organizational arrangement and further description of the specific duties of the positions in the AOC are found in AFI 13-1AOC, Vol 3, *Operational Procedures-Air and Space Operations Center* and AFOTTP 2-3.2, *Air and Space Operations Center*.



INTEGRATION AND SYNCHRONIZATION WITH SURFACE OPERATIONS

Airspace control procedures increase in complexity and detail when air forces operate in proximity with, or in conjunction with, surface forces. To prevent both air-to-surface and surface-to-air fratricide, joint operations must be synchronized and integrated within this portion of the battlespace. The Army's BCD in the AOC enables exchange of information and integration of Army air defense forces in direct support of the LCC into the JFACC's plan for an integrated air defense. The BCD also provides visibility of Army air defense assets in direct support of the LCC engaged in maneuver and aids in preventing fratricide.

Each AO may be defined with specific boundaries. Within each AO you may have a fire support coordination line (FSCCL), forward line of own troops (FLOT), FSCMs, ACMs, or multiples of these during nonlinear operations. Another boundary

definition is to use a coordination altitude to vertically separate rotary wing and UAV traffic from faster moving aircraft. One method to define AOs is a kill box grid that covers the entire theater.

Kill Box Operations

Kill boxes are normally used when a support relationship already exists between two or more functional or service components. The goal is to reduce the coordination required to fulfill support requirements with maximum flexibility, while preventing fratricide. A kill box is a three-dimensional area reference that enables timely, effective coordination and control and facilitates rapid attacks. US Central Command, US European Command, and US Forces Korea typically define kill boxes by 30x30 minute squares, further divided into nine 10x10 minute sections. Each section is commonly referred to as a “keypad,” in comparison to a telephone keypad.

Common Geographic Reference System

End Point

Origin Point

Common Grid Reference System

During Operation ENDURING FREEDOM, Air Force aircrews and forward air controllers improved upon a system to deconflict aircraft and other weapon systems in the congested airspace over Afghanistan. Reference systems to help manage and ID the battlespace are not new. During the siege of Khe Sanh in Viet Nam, pre-established restricted and free fire zones were used. During Operation DESERT STORM, a grid overlay system known as a "kill box" was developed. The kill box concept was also adopted in Operation DELIBERATE FORCE in Kosovo, then further defined in Operations ENDURING FREEDOM and IRAQI FREEDOM. The Air Force is developing a standardized grid reference system for adoption in all theaters, known as the common geographic reference system (CGRS). The CGRS is a two-dimensional construct to improve joint weapons integration over the battlespace. Some applications of the CGRS can be made three-dimensional by adding altitude restrictions. The development of battlespace control measures is an evolutionary process.

For further detail see AFTTP(I) 3-2.59 MTP for Kill Box Employment

The authority over kill box status, whether short or beyond the FSCL, rests with the supported commander. Concurrence of the LCC is mandatory for opening any kill box short of the FSCL to ensure that all land forces are clear of the designated area. Since the ASOC is deployed with the land force and is normally the TACS element responsible for airspace short of the FSCL, it is the ideal agency to coordinate the opening and closing of kill boxes in that zone. For operations beyond the FSCL, AWACS, the CRC, or the AOC will likely be the agencies to contact to determine kill box status. Integration of air-to-surface and surface-to-surface fires requires application of appropriate restrictions: altitude, time separation, or lateral separation. The supported commander will determine which of these is appropriate for the mission and ensure dissemination through the appropriate C2 nodes.

Kill boxes are complementary to, and do not preclude or conflict with, other fire support coordinating measures, and may be employed on either side of the FSCL. To use kill boxes in this manner, it is critical that the same common geographic reference system is used throughout the JOA. The Air Land Sea Application Center is responsible for the multi-Service tactics, techniques, and procedures for conducting kill box operations.

When integrating, TACS liaison elements consider the employment of long-range surface weapons systems, fratricide risks, operational requirements, the battlefield framework, as well as fire support coordinating measures that are in use. Airspace control and operational considerations while operating in proximity with or in conjunction with surface forces are further discussed in AFDD 2-1.3, *Counterland*.

COMMUNICATIONS AND INFORMATION

The TACS has undergone evolutionary changes in order to maintain the flexibility and responsiveness necessary to support highly mobile forces using more lethal weapons on a larger, nonlinear battlefield. Although the C2 infrastructure has remained fairly stable, the communications network has improved significantly, enhancing the reliability, security, and timeliness of information flow in the theater of operations. These enhancements (voice and data) have enabled AETACS to operate directly under the AOC, with JSTARS assuming some functions of the ASOC. This provides the JFACC with a variety of employment options. Secure voice (UHF, VHF, and HF) is a highly reliable means of communication. It was used as the primary means to communicate among airborne elements during Operations ENDURING FREEDOM and IRAQI FREEDOM.



Communications for the TACS include line-of sight and satellite systems.

Communications Planning

Planning is an essential element of effective airspace command and control. The need to communicate effectively demands that planners analyze the warfighter's requirements and translate those needs into workable solutions. These needs are normally met by installing a combination of organic and commercial communications systems prioritized to meet the commander's mission. The goal is to maximize the use of organic military capabilities and expand with commercial systems to increase capacity and reliability and to generate greater freedom of action.

Airspace Communications Systems

The primary means of communications between airspace command and control elements and airspace users is voice. Principal transmission should be through secure and anti-jam radio equipment. The TACS includes line of sight and satellite systems, but planners should also ensure that radio relays are considered to enhance over-the-horizon radio communications.

Data

TDLs (also referred to as TADILs) are standardized communication links, approved by the Joint Chiefs of Staff, suitable for transmission of digital information. All Services, including the Air Force, use these links primarily for C2 of the air defense network. Since the nodes for air defense are also the nodes for airspace control, these rapid data transmission means can support airspace control as an ancillary function. Link 16 has been designated as the primary data link for use in the combat air forces (CAF). Examples of links that may be used to facilitate executing the airspace function are:

- ✦ Army Tactical Data Link 1.
- ✦ Link-11/11B (TADIL A/TADIL B).
- ✦ Link 14 (Maritime, UHF or HF).
- ✦ Link 16 (TADIL J).

CJCSM 6120.01C, *Joint Multi-Tactical Data Link Operating Procedures* provides a detailed description of each link shown above.

Other tools exist for extending the TDL network. The situation awareness data link (SADL) integrates Air Force close air support aircraft with the digitized battlefield via the Army's enhanced position location reporting system. It provides fighter-to-fighter and air-to-ground/ground-to-air secure communications. The data link gateway is a Navy system that provides TDL connectivity to a wide variety of users. Ships, aircraft, ADA units and fixed C2 sites use either a host emulator or a terminal emulator to pass data via TADIL J links, if not TADIL J-equipped. Some AETACS and GTACS elements

have this capability. The data link gateway can also be used for exercises and for operational training.

CHAPTER SIX

INTEGRATION OF AIR TRAFFIC SERVICES INTO THE AIRSPACE CONTROL SYSTEM



Though missions vary widely across the range of military operations, the framework and process for C2 of joint air operations are consistent. Control of joint air operations... is complicated by the possible use of airspace by civilian airlines, national and international agencies, governmental and NGOs, allied and coalition forces, and other participating entities. Joint air operations may be integrated within an existing air structure, or one may have to be established by the joint force.

—JP 3-30, *Command and Control for Joint Air Operations*

AIR TRAFFIC CONTROL'S FUNCTION IN THE AIRSPACE SYSTEM

Close coordination among airspace control, air defense, and air traffic control elements is required to maximize combat effectiveness while preventing fratricide and mutual interference. At the core of this concept is a full-spectrum safety and risk management focus, including the implementation of a sound risk management plan. Commanders must ensure risks are balanced against mission requirements and mitigate the risks or stop operations when those risks become too great. Air traffic control operations are required during every stage of a conflict to ensure a safe flying environment. Military-managed airspace control and air defense operations are only employed when the need arises. The air traffic control system must be able to accommodate an increased operations tempo and to support air defense and airspace control requirements as they are levied by the JFC and dictated by the operational situation. The ATC system must also deconflict air base defense/force protection operations that may extend into the terminal traffic area.

PLANNING

In a deteriorating situation, commanders determine the forces required, the arrival sequence, and to what level of risk they are willing to expose the airfield operations forces. Additionally, deployed airfield operations forces must be prepared to be self-sufficient during the early stages of an operation since the logistics system may not be in place. Initial airfield operations should plan to deploy with adequate capability and supplies to maintain operations until the theater is capable of supporting operations, and the resupply pipeline is established.

Airfield operations officers and/or air traffic controllers who are qualified airspace planners are assigned to numbered Air Forces as combat airspace managers in the AOC. Oversight of all AOC airspace managers is provided by the airspace management specialty team leader. Combat plans' airspace manager's duties include ACP and ACO development and production. The airspace management specialty team is responsible for representing the JFC's interests in international and host nation agreements, such as those required to establish the JFACC as the ACA and to ensure integration of all flight operations. They also coordinate with the terminal airfield operations element to support deliberate and crisis action planning, deployment, employment, sustainment, and redeployment of airfield operations forces.

Airspace management specialty team members and liaison positions will be filled by airfield operations-qualified personnel. The liaison personnel provide support to various worldwide cells or theater staffs to ensure the US and its allies can quickly apply global power to crisis situations anywhere in the world.

Terminal Area Air Traffic Services/Airfield Management

Terminal area air traffic services and airfield management must be capable of supporting operations as required by the JFC. Normally aligned under the COMAFFOR's A3, the role of the airfield operations element is to support combat flight operations. Air Force deployable air traffic control and landing systems (DATCALs) provide equipment and personnel to support terminal area flight operations. DATCALs are designed to ensure a safe, flexible, and efficient use of terminal airspace. DATCALs also provide continuity of control with the TACS and air base defense forces. Air traffic control and airfield management personnel will deploy, operate, and sustain DATCALs to support operations at bare base or host nation locations. While the focus of the capabilities is on deploying large-scale forces into a bare base scenario, airfield operations packages can also be adapted to small unit and/or single mission deployments.

Airfield operations packages must also be adaptable to steady state operations in an ongoing combat zone after major hostilities have ceased. Terminal area air traffic controllers must be knowledgeable in arrival and departure procedures designed for threat mitigation, communications brevity codes and code words, and capabilities limitations of aircraft using the airfield that may affect arrival procedures.

En Route Airspace Management. The airspace management specialty team coordinates airspace requirements with US and coalition force military users to provide for integration of the airspace control system with that of the host nation. The airspace management specialty team ensures airspace and air traffic control issues are handled effectively. It also provides oversight of airspace management personnel working within the AOC divisions.

The terminal airfield operations element, or ATC cell, ensures integration of the host nation civil ATC system with the military ATC systems to include host nation agreements for international and national air traffic, and coordination with the ICAO, NGOs, and aid organizations for integration of humanitarian air missions. Internal to the AOC, the team plans for the full range of ATC operations to support deliberate and crisis action planning, deployment, employment, sustainment, and redeployment of ATC forces, and collaborates with combat plans to integrate airspace design in development of the airspace control plan.

Flight Following Mechanisms. The air traffic control system normally uses an automated flight planning system to assist air traffic controllers in maintaining positive control of the terminal area. The ATO can be used in lieu of a flight planning system to provide separation.

Procedural Control versus Radar Control. Environmental and equipment factors may preclude radar control of all air traffic in the combat zone. Because of this potential constraint, appropriate procedural methods must be available.

Collision and Avoidance Systems. Technological advances have improved aircraft safety and separation and can aid in airspace control in the combat zone. The traffic alert/collision avoidance system (TCAS) is an airborne system developed by the Federal Aviation Administration that operates independently from the ground-based ATC system. TCAS was designed to increase cockpit awareness of proximate aircraft and to serve as a "last line of defense" for the prevention of mid-air collisions. There are two levels of TCAS systems. TCAS I was developed to accommodate the general aviation community and the regional airlines. This system issues traffic advisories to assist pilots in visual acquisition of intruder aircraft. TCAS II is a more sophisticated system which provides the information of TCAS I, and also analyzes the projected flight path of approaching aircraft and issues resolution advisories to the pilot to resolve potential mid-air collisions. The international community adopted these standards for the airborne collision avoidance system and it is now mandated throughout most of Europe and other countries such as Japan and Australia.

Airfield Management. Airfield management provides notices to airmen and flight planning services. In coordination with deployed civil engineering and aircraft logistics, airfield management provides airfield criteria for inspections, markings, safety/security, parking plans, and munitions and hot fuel areas.

Airfield Operations. The ATC cell will coordinate, integrate, and regulate the air traffic services and airfield management assets provided by each of the Services to increase operational effectiveness. The air component commander will coordinate and plan appropriate relief of the Air Force STTs by follow-on, general-purpose air traffic control forces.

CAPABILITIES

Airfield operations personnel and DATCALs provide the full range of support from initial visual flight rules (VFR) and limited instrument flight rules (IFR) capability to host nation liaison/augmentation. General purpose DATCALs and airfield operations personnel provide terminal area and airfield support from austere to fully supported host nation airfields with mobile control tower, surveillance radar, precision landing system, terminal navigational aids, and space/ground based capabilities or any combination of the above. Austere airfield operations can be provided by STT. General purpose air traffic controllers are capable of providing an initial bare base ATC capability, but generally these forces are not capable of autonomous operations and require additional base support.

Austere Airfield Operations

Austere airfield operations have been identified as an STT core competency. STTs are Air Force special operations forces organized, trained, and equipped to integrate, synchronize, and control the elements of air and space power. Specifically, as an advance tactical enabling force, STTs conduct austere airfield control, assault zone assessment and establishment, combat weather observations, and combat weather forecasting. Capabilities include a visual control tower, navigational aids, and a precision landing system. While other forces have the ability to provide ATC support in a bare base environment, only STTs provide the entire range of austere airfield operations to include aircraft marshaling, load/off-load, and forward area rearming and refueling point operations. STTs are tasked through United States Special Operations Command and execute SOF missions, airlift missions, and other missions with SOF and non-SOF forces.



Bare Base Support

Air Force general purpose (reserve and active duty) initial air traffic services capabilities include limited visual control tower and tactical air navigational aids. Initial air traffic controllers can provide separation and sequencing of arriving and departing aircraft, positive or procedural control measures as required by environmental factors, density, complexity of air traffic, and airspace.

Due to the typical requirement of maintaining 24-hour operations at an airfield at home station when a major Air Force unit deploys, it is normally not possible to deploy airfield operations and air traffic control personnel from the same base as a flying unit, but will consist of qualified personnel from across the Air Force.

Mature Capabilities

General purpose ATC equipment such as the control tower and radars are not considered to be a "first-in" capability due to size, limited movement, and airlift constraints. However, as the location matures, this equipment may be deployed to enhance air traffic control capabilities. Close coordination with the ATC cell is required to ensure the appropriate systems are requested and deployed in a timely manner.

SAFETY AND STANDARDIZATION

The airspace control environment should enable all Airmen to balance combat opportunity, necessity, effectiveness, efficiency, and the impact on accomplishing assigned objectives against the associated risk to friendly air and space forces. To enhance safety and standardization, ICAO air traffic phraseology should be used to the maximum extent possible. Terminal airspace control for uncontrolled airfields follows procedures published in the ACP, and can be amplified by the ACO and SPINS as required. However, if such criteria are not sufficiently responsive to mission requirements, the ACA may direct alternative standards. Reduced criteria and procedures must be authorized by the ACA in consideration of the degree of risk deemed acceptable by the JFC.

Host nation regulations and procedures apply to Air Force controllers who augment a civil or foreign ATC facility. The Aeronautical Information Publication is a source for host nation ATC and airspace information such as terminal instrument procedures and other critical data for effective operations. In addition, Air Force controllers who augment a host Service facility will comply with the procedures of the host Service branch.

US Air Force Hazardous Air Traffic Reports (HATR)

The Air Force HATR program provides a means for personnel to report all near midair collisions (NMAC) and alleged hazardous air traffic conditions. The HATR program is applicable during contingencies as well as during peacetime and should be used to enhance airspace and ATC safety in the combat zone. Reports cover events that occur during aircraft operations. Reportable events include those which, in the observer's opinion, create a potential for injury to personnel or damage to aircraft resulting from ATC services or procedures, landing systems, rules of the air (IFR and VFR operations), and airspace management (i.e., hazards associated with the use of military operations areas, military training routes, or local terminal airspace).

To employ airborne close air support as the primary supporting fires for...[Operation ANACONDA], CJTF Mountain needed two items: a supply of fighters and bombers over the battle area; and a way to prioritize and deconflict requests...while staying in line with the USCENTCOM-imposed rules of engagement. The first was never a major concern... the CFLCC-Fwd staff realized they could count on about 60 sorties per day. But the second item, an efficient way to work with the air component to control airstrikes, was left far more to chance and the efforts of a few individuals. CJTF Mountain's OPORD set up a very small battle area ringed with ground troops that were operating independently but supported with conventional and other assets. While all but one set of these teams were technically under CJTF Mountain's control, the design for Operation ANACONDA made for the most complex airspace control arrangements yet seen in Afghanistan. The battle space was "extremely constrained," [CAOC Director] [Major] General [John D.W.] Corley said later. The CAOC would have "B-52s at higher altitudes dropping Joint Direct Attack Munitions; B-1s at lower altitudes; unmanned vehicles such as Predator flying through there; P-3s, aircraft contributing to the ISR assets; helicopters down at the ground; fast-moving aircraft, F-14s, F/A-18s, F-16s, F-15Es; tanker aircraft that are flying through there. So you begin to see and sense the degree of difficulty of deconfliction," General Corley explained.

On top of all this "we had three civil air routes opened up," added [CFACC/COMAFFOR] [Lieutenant] General Moseley. Passengers generated up to three million dollars' worth of revenue a month for Afghan civil carriers. As the CFACC, [I] put "bombers above the civil routes, bombers below the civil routes." NGO relief flights used the airspace as did Army helicopters, of which General Moseley said "if they were going to be on the ATO to do strike stuff, we knew what they were doing, but if they weren't, we didn't." Omitted from Generals' Corley and Moseley lists were AC-130 gunships, operating at night under the tactical control of SOF units, providing CAS.

**—Operation ANACONDA, An Airpower Perspective;
The Office of Air Force Lessons Learned
Task Force Enduring Look**

Suggested Readings

Air Force Publications (Note: All Air Force doctrine documents (AFDDs) are available at <https://www.doctrine.af.mil> and Air Land Sea Application documents (AFTTP(I)s) are available at <https://wwwmil.alsa.mil/index.html>)

AFDD 1, *Air Force Basic Doctrine*

AFDD 2, *Operations and Organization*

AFDD 2-1, *Air Warfare*

AFDD 2-1.3, *Counterland*

AFDD 2-8, *Command and Control*

AFI 13-1AOC, Vol. 3, *Operational Procedures-Air and Space Operations Center*

AFPD 13-201, *Air Force Airspace Management*

AFPD 13-203, *Air Traffic Control*

AFOTTP 2-3.2, *Air and Space Operations Center*

AFTTP 3-1, Vol. 26, *Theater Air Control System*

AFTTP 3-1.1, *General Planning and Employment Considerations (Classified)*

AFTTP(I) 3-2.17, *Multi-Service Tactics, Techniques, and Procedures (MTTP) for the Theater Air-Ground System*

AFTTP (I) 3-2.31, *MTTP for an Integrated Air Defense System*

AFTTP (I) 3-2.59, *MTTP for Kill Box Employment*

Joint Publications

CJCSI 6241.04, *Policy and Procedures for Using United States Message Text Formatting*

CJCSM 6120.01C, *Joint Multi-Tactical Data Link Operating Procedures*

JP 0-2, *Unified Action Armed Forces (UNAAF)*

JP 1-02, *DOD Dictionary of Military and Associated Terms*

JP 3-01.1, *Aerospace Defense of North America*

JP 3-02, *Joint Doctrine for Amphibious Operations*

JP 3-02.1, *Joint Doctrine for Landing Force Operations*

JP 3-30, *Command and Control for Joint Air Operations*

JP 3-52, *Doctrine for Joint Airspace Control in the Combat Zone*

Department of Defense Publications

DODD 5100.1, *Functions of the Department of Defense and its Major Components*

Office of the Secretary of Defense, Unmanned Aerial Vehicles Roadmap, 2002-2027, Office of the Secretary of Defense (Acquisition, Technology, & Logistics), Air Warfare, 2002

NATO Publications

Standardization Agreement (STANAG) 3805, *Doctrine for Airspace Control in Time of Crisis and War, ATP-40 (B)*

Other Publications

Federal Aviation Administration Handbook 7610.4, *Special Military Operations*

Articles

Burgess, Mark. *Killing Your Own: The Problem of Friendly Fire During the Afghan Campaign*. Center for Defense Information. 2002.

Eflein, Dawn R. A. *Case Study of Rules of Engagement in Joint Operations: The Air Force Shootdown of Army Helicopters in Operation PROVIDE COMFORT*. Air Force Law Review, Vol. 44. 1998.

Books

Ashmore, E.B., Major-General, R.A.F., *Air Defence* (Longmans, Green and Co.). 1929.

Futrell, Robert F., *The United States Air Force in Korea 1950-1953* (Revised Edition). (Office of Air Force History). 1983.

Grant, Rebecca., *The First 600 Days of Combat; The US Air Force in the Global War on Terrorism* (IRIS Press). 2004.

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Harmer, Todd P., Lieutenant Colonel, USAF and Colonel C.R. Anderegg, USAF (Ret.). *The Shootdown of Trigger 4; Report of the Project Trigger Study Team*. (Headquarters United States Air Force). 2001.

Nalty, Bernard C. *Air Power Over South Vietnam, 1968-1975*. (Air Force History and Museums Program). 2000.

Owen, Robert C., Colonel, USAF. *Deliberate Force, A Case Study in Effective Air Campaigning*. (Air University Press). 2000.

Tillotson, David. *Restructuring the Air Operations Center: A Defense of Orthodoxy*. (Air University Press). 1993.

Werrell, Kenneth P. *Archie, Flak, AAA, and SAM: A Short Operational History of Ground-Based Air Defense*. (Air University Press). 1988.

Westenhoff, Charles M., Lt Col, USAF. *Military Air Power, The CADRE Digest of Air Power, Opinions and Thoughts*. (Air University Press). 1990.

Research Reports

Djuric, Teresa A. H., Lt Col, USAF. Future Command and Control of Aerospace Operations. Carlisle Barracks, PA, 2001. (US Army War College). US Army War College Strategy Research Project.

Dorward, Alan C. Federal Aviation Administration Impact on Military Air Traffic Control Force Projection. Fort Leavenworth, KS, (U S Army Command and General Staff College), 1996.

Drumm, Michael W. Army Airspace Command and Control (A2C2) and the Contingency Tactical Air Control System Automated Planning System (CTAPS): Is There a Joint Method to this Parochial Madness? Fort Leavenworth, KS, (U S Army Command and General Staff College), 1995. (School of Advanced Military Studies. Monograph)

Hallion, Richard P., Ph.D., SES, USAF. Control of the Air: The Enduring Requirement. Bolling AFB, Washington DC. Air Force History and Museums Program. September, 1999.

Headquarters United States Air Force, Office of Air Force Lessons Learned, AF/XOL. Operation ANACONDA: An Air Power Perspective. February 7, 2005.

Kauffman, Larry R., Col, IDANG. Guarding America's Sky: Effective Use of Interagency. Carlisle Barracks, PA, 2002. (US Army War College). US Army War College Strategy Research Project.

Sink, J. Taylor. Rethinking the Air Operations Center: Air Force Command and Control in Conventional War. Maxwell AFB, AL, 1994. (Air University. Air Command and Staff College, School of Advanced Airpower Studies student thesis.)

United States Defense Science Board. Report of the Defense Science Board Task Force on Combat Identification. Washington, DC, 1996. Office of the Under Secretary of Defense for Acquisition and Technology.

Wessner, David, et al. Joint Air Operations Center: C4I Structure Study. Maxwell AFB, AL, 1995 (Air University. Air Command and Staff College research paper.)

Chief of Staff of the Air Force (CSAF) Reading List

CSAF's professional reading list, with links to book reviews, is available on the Air Force web site at: <http://www.af.mil/lib/csafbook/readinglist.shtml>. The list is subject to revision. Readers are encouraged to check the website for the most current information.

APPENDIX A

NOTIONAL AIRSPACE CONTROL PLAN¹

1. Purpose

Provide considerations for development of an Airspace Control Plan (ACP).

2. Airspace Control Plan Considerations

Every ACP must be based on the objectives of the military operations, the capabilities and shortcomings of both friendly and enemy forces, and the contributions and complexities introduced by host-nation and multinational forces, as well as the access required to the airspace by non-belligerent aircraft. ACP considerations include:

- a. Description of the conditions under which the guidance and procedures in the ACP are applicable (e.g., the exercise, operation plan, operation order, military operation).
- b. Description of the AOR within which the ACP applies.
- c. Appointment of the ACA; location of ACA headquarters.
- d. List of the capabilities that exist within the joint force and in the AOR to provide airspace control (ground sites, airborne capability) and means of communicating with those elements.
- e. Description of the duties and responsibilities of:
 - The airspace control authority.
 - Each airspace user within the joint force (to include requirements for liaison to and coordination with the ACA).
 - Each element used in the airspace control system (site, facility, or airborne platform).
- f. Description of the interface between the JFACC, ACA, the AADC, and fire support coordination elements and the procedures adopted to coordinate and deconflict air defense and operational requirements.
- g. Description of interface with the Federal Aviation Administration, host-nation air traffic control system, and/or ICAO.
- h. Description of the interface between the theater air control system and the elements within the system for air traffic control.

¹ JP 3-52

- i. Description of the interfaces between US and multinational forces to coordinate and deconflict airspace requirements, as required.
- j. Plans to provide for airspace control operations under degraded conditions (alternate headquarters, alternatives for key radar or command and control nodes, and other required capabilities).
- k. Description of positive airspace coordinating measures and procedures for the joint force.
- l. Description of the procedures to propose, approve, modify, and promulgate procedural airspace coordinating measures available for use within the AOR (HIDACZ, JEZ, FEZ, MEZ, MRR, low level transit routes (LLTRs), coordinating altitudes, air routes, corridors, restricted operations zones, and other appropriate procedures).
- m. Description of IFF/SIF procedures.
- n. Description of orbit procedures.
- o. Description of procedures and systems to compile and promulgate the airspace control order. Description of the ACO. Provides airspace control procedures and/or guidance in effect for the specified time period. The airspace control order would normally contain:
 - Modifications to guidance and/or procedures contained in the ACP.
 - Active or current IFF/SIF procedures.
 - Location and procedures associated with active procedural airspace coordinating measures such as those in item "l" above.
 - Procedures for entering and transiting active restricted operations zones (e.g., amphibious objective area, amphibious defense zone, firepower umbrella).
 - Location of active orbit areas.
 - Active UAV launch and recovery areas and mission areas.
- p. Description of procedures for air refueling areas (to include emergency, on-call air refueling area, and/or tracks as required for the combat zone airspace).
- q. Description of alternate routes of entry into the combat zone (to be prepared for the case where neutral nations do not allow overflight of their nation which is en route to the combat zone).
- r. Consider IFF outages and improper (sour) IFF code procedures, to be included in the SPINS.
- s. Consider AWACS (or equivalent C2 node) off-station procedures.

APPENDIX B

PROCEDURAL AIRSPACE COORDINATING MEASURES²

This appendix provides a description, considerations, uses and a few graphic representations of Service measures for controlling airspace. The following airspace coordinating measures are provided to aid in defining airspace control requests, orders, and plans. A sample airspace control request is provided as Annex A to this appendix.

a. Air Corridor

- Description. A restricted air route of travel specified for use by friendly aircraft and established to prevent engagement by friendly forces.
- Uses. Air corridors are used to route air traffic, to include airlift and civilian traffic, within the AOR. Altitudes of air corridor(s) are established in the ACO.
- Point of Contact (POC): ACA.

b. Air Defense Action Area

- Description. An air defense action area and the airspace above it is an area within which friendly aircraft or surface-to-air weapons are normally given preference to conduct air defense operations except under specific conditions.
- Uses. An air defense action area is an engagement area used for preference of a specific weapon system over another without excluding the other from use under certain operational conditions. From an airspace control perspective, an air defense action area provides airspace users with location of air defense areas for mission planning purposes.
- POC: AADC.

c. Air Defense Area

- Description. An air defense area is a specifically defined airspace for which air defense must be planned and provided.
- Uses. An air defense area defines, in an area of operations, the area to be defended.
- Considerations. An air defense area is a planning or division-of-responsibility aid; it is not used as an airspace coordinating measure.
- POC: AADC.

d. Air Defense Identification Zone (ADIZ)

- Description. An ADIZ is airspace of defined dimensions within which the ready identification, location, and control of airborne vehicles are required.
- Uses. Associated with nations or areas of operation, the ADIZ is normally the transition between procedural control areas (outside) and positive control areas (inside). Typically, ADIZ is used for sovereign national boundaries, or in the case of areas of operation, for identification into the rear areas.

² JP 3-52

- Considerations. See flight information publications/ICAO for theater-specific ADIZ and associated procedures and limitations.
- POC: AADC.

e. Air Refueling Area

- Description. An air refueling area is airspace defined by lateral and altitude limits for the purpose of conducting aerial refueling operations. Also known as refueling track, refueling orbit or refueling anchor. Block altitudes are normally required for multiple cell refueling operations.
- Uses. Establishes a separate block of airspace dedicated to aerial refueling operations
- POC: ACA.

f. Airspace Control Area

- Description. Airspace that is laterally defined by the boundaries of the operational area. The airspace control area may be divided into airspace control sectors.
- Uses. Airspace control areas are a means of planning or dividing responsibility.
- Considerations. Geographically defined, an airspace control area may include political boundaries.
- POC: ACA.

g. Airspace Control Sector

- Description. An airspace control sector is a sub-element of the airspace control area established to facilitate the control of the overall area. Airspace control sector boundaries normally coincide with air defense organization subdivision boundaries.
- Uses. An airspace control sector provides airspace control of an area by a component or other airspace control-capable entity best able to provide control in that geographic area.
- Considerations. An airspace control sector interface with the airspace control system needs to be developed.
- POC: Airspace control sectors are designated by the ACA in consideration of joint force component, host nation, and multinational airspace control capabilities and requirements.

h. Airspace Coordination Area

- Description. An airspace coordination area is a three-dimensional block of airspace of defined dimensions and used as a restrictive fire support coordinating measure.
- Uses. An airspace coordination area is used primarily in close air support situations for high-volume fire. Friendly aircraft are reasonably free from friendly surface fires, with artillery, helicopters, and fixed-winged aircraft given specific timing, lateral or altitude restrictions within which to operate.
- Considerations. Timely implementation of the area is dependent on the ground situation. Burden of deconfliction rests with the ground commander.

- POC: An airspace coordination area is established by the ACA at the request of the appropriate ground commander.

i. Amphibious Defense Zone

- Description. An amphibious defense zone is the area encompassing the AOA and additional adjoining airspace as needed for the accompanying naval force for the purpose of air defense.
- Uses. An amphibious defense zone provides an anti-air warfare area for protection of the amphibious task force.
- Considerations. If an amphibious defense zone overlaps other land-based air defense areas, appropriate coordination for division of responsibilities and boundaries must be conducted.
- POC: CATF.

j. Amphibious Objective Area (AOA)

- Description. An AOA is a geographic area delineated in the initiating directive for purposes of command and control, within which is located the objective(s) to be secured by the amphibious task force. This area must be of sufficient size to ensure accomplishment of the amphibious task force's mission and provide sufficient area for conducting necessary sea, air, and land operations. The airspace associated with this area is included in the AOA. When dissolved, airspace control passes to the ACA.
- Uses. With respect to airspace control, AOA allows the commander, amphibious task force, freedom of air operations within the AOA.
- Considerations. Coordination with non-organic aircraft for entry, exit, and deconfliction operations within the AOA with operations just outside the AOA normally requires continuous, active involvement of the affected commanders and staffs.
- POC: JFC.

k. Base Defense Zone (BDZ)

- Description. BDZ is an air defense zone established around an air base and limited to the engagement envelope of short-range air defense weapon systems defending that base. BDZs have specific entry, exit, and IFF procedures established.
- Uses. From an airspace control perspective, a BDZ provides airspace users with location of the engagement zone for the air defense systems defending a base for mission planning purposes.
- Considerations. See short-range air defense engagement zone (SHORADEZ) in this section.
- POC: AADC.

l. Coordinating Altitude

- Description. A coordinating altitude is a procedural method to separate fixed- and rotary-wing aircraft by determining an altitude below which fixed-wing aircraft normally will not fly and above which rotary-wing aircraft normally will not fly. It

may include a buffer zone for small altitude deviations and extend from the forward edge of the communications zone to the FLOT. The coordinating altitude does not restrict either fixed- or rotary-wing aircraft when operating against or in the immediate vicinity of enemy ground forces. Fixed- or rotary-wing aircraft planning extended penetration of this altitude will notify the appropriate airspace control facility. However, approval acknowledgment is not required prior to fixed-wing aircraft operating below the coordinating altitude or rotary-wing aircraft operating above the coordinating altitude. See Figure B-3 for a graphic representation of a coordinating altitude.

- Uses. Coordinating altitude allows procedural separation of aircraft types.
- Considerations. See-and-avoid procedures are used during visual meteorological conditions.
- POC: The coordinating altitude is normally specified in the ACP, which is approved by the JFC.

m. Falcon Radials

- Description. Falcon radials are the planned magnetic bearings along which aircraft depart or return to aircraft-capable ships.
- Uses. Falcon radials provide tracking, control, and assistance to friendly aircraft within the anti-air warfare surveillance area of the battle group.
- POC: Anti-air warfare commander (AAWC).

n. Fighter Engagement Zone (FEZ)

- Description: FEZs normally will be established in those areas where no effective surface-to-air capability is deployed. These operations usually take place in airspace above and beyond the engagement ranges of surface-based (land and sea), short-range air defense systems, and are an alternative type of engagement operation if the detailed control aspects of joint engagement operations cannot be met. FEZ is an air defense control measure.
- Uses. From an air defense perspective, FEZ normally is used when fighter aircraft have the clear operational advantage over surface-based systems. These advantages could include range, density of fire, rules of engagement, or coordination requirements. From an airspace control perspective, it provides airspace users with location of the engagement zone for fighter aircraft for mission planning purposes.
- Considerations. Coordination and flexibility within the combat airspace control system may be a limiting factor with FEZ. Under fighter engagement zone operations, surface-to-air missile systems will not be allowed to fire weapons unless targets are positively identified as hostile and assigned by higher authority, or unless they are firing in self defense.
- POC: AADC.

o. Firepower Umbrella

- Description. Firepower umbrella is an area of specified dimensions defining the boundaries of the airspace over a naval force at sea within which the fire of a ship's anti-aircraft weapons can endanger aircraft, and within which special

procedures have been established for the identification and operation of friendly aircraft.

- POC: AAWC.

p. **High-Altitude Missile Engagement Zone (HIMEZ)**

- Description. Normally applied to long-range surface-to-air missiles, a HIMEZ will limit the volume of airspace within which these weapons may conduct engagements without specific direction of the AADC. HIMEZ is an air defense control measure. See Figure B-3 for a graphic representation of a HIMEZ.
- Uses. From an air defense perspective, HIMEZ normally is used when a high-altitude missile system has a clear operational advantage over using aircraft. These advantages could include range, command and control, rules of engagement, or response time. From an airspace control perspective, it provides airspace users with location of the engagement zone of a high-altitude missile system for mission planning purposes.
- Considerations. Design of the HIMEZ is contingent on specific weapon system capabilities.
- POC: AADC.

q. **High-Density Airspace Control Zone (HIDACZ)**

- Description. HIDACZ is an area in which there is a concentrated employment of numerous and varied weapons or airspace users. A high-density airspace control zone has defined dimensions that usually coincide with geographical features or navigational aids. Access to a HIDACZ and air defense weapons status within the HIDACZ is normally approved by the appropriate commander. See Figure B-1 for a graphic representation of a HIDACZ.
- Uses. HIDACZ allows ground/Marine air-ground task force commanders to restrict a volume of airspace from users not involved with ongoing operations. It restricts use of the airspace because of the large volume and density of fires supporting the ground operations within the described geographic area.
- Considerations. The volume of air traffic demands careful coordination to limit the potential conflict among aircraft needed for mission essential operations within the HIDACZ and other airspace users. When establishing a HIDACZ, consider the following:
 - MRRs into and out of the HIDACZ and to the target area.
 - Air traffic advisory as required. Consider also procedures and systems for air traffic control service during instrument meteorological conditions.
 - Procedures for expeditious movement of aircraft into and out of the HIDACZ.
 - Coordination of fire support, as well as air defense weapons control orders or status within and in the vicinity of the HIDACZ.
 - Location of enemy forces inside of and within close proximity to the HIDACZ.
- POC: HIDACZ is nominated by the ground commander and approved by the ACA.

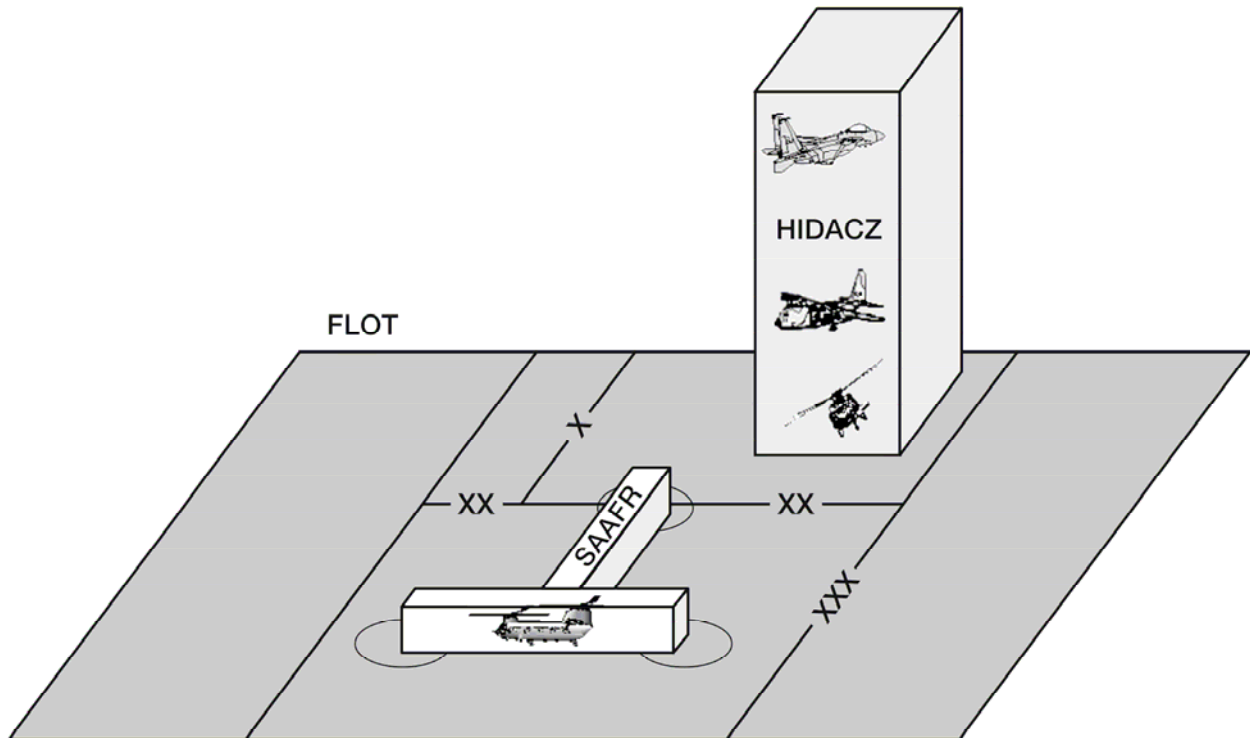


Figure B-1. HIDACZ and SAAFR

r. **Joint Engagement Zone (JEZ)**

- Description. JEZ is airspace of specified dimensions within which multiple air defense weapon systems (surface-to-air missiles and fighters) of one or more Service components are simultaneously employed and operated.
- Uses. From an airspace control perspective, JEZ provides airspace users with location of the joint engagement zone for mission-planning purposes.
- Considerations. JEZs are highly dependent on correct differentiation between friendly, neutral, and enemy aircraft.
- POC: AADC.

s. **Kill Box**

- Description. A kill box is a generic term for a three-dimensional block of the battlespace defined by theater-determined parameters.
- Uses. A kill box is a preplanned or immediate fire support coordinating measure used by the joint force to integrate and synchronize air and surface operations and deconflict joint fires in an expedient manner or on an asymmetric battlefield.
- Considerations. The theater/joint force determines the parameters and procedures for kill box use considering terrain, component operations, command relationships, and operational necessity.
- POC: As determined by theater procedures.

t. **Low-Altitude Missile Engagement Zone (LOMEZ)**

- Description. LOMEZ is a volume of airspace established to control engagements of low- to medium-altitude surface-to-air missiles. Subject to weapon system capabilities, the LOMEZ normally will extend beyond the forward edge of the battle area.
- Uses. From an airspace control perspective, LOMEZ provides airspace users with location of the engagement zone of low-altitude missile systems for mission planning purposes.
- Considerations. The design of the LOMEZ is contingent on specific weapon system capabilities.
- POC: AADC.

u. Low-Level Transit Route (LLTR)

- Description. LLTR is a temporary bidirectional corridor of defined dimensions that facilitates the low-level passage of friendly aircraft through friendly air defenses and controlled or restricted airspace. LLTR currently is used only within the North Atlantic Treaty Organization (NATO).
- Uses. LLTR normally is used by high performance aircraft. LLTR is an airspace coordinating measure in NATO.
- Considerations. LLTR is a procedural method. See NATO regional airspace control plans (MIKE-Plans).
- POC: ACA.

v. Minimum Risk Route (MRR)

- Description. An MRR is a temporary corridor of defined dimensions recommended for use by high-speed, fixed-wing aircraft that presents the minimum known hazards to low-flying aircraft transiting the combat zone. MRRs are established considering the threat, friendly operations, known restrictions, known fire support locations, and terrain. See Figure B-2 for a graphic representation of a MRR.
- Uses. MRR is an airspace coordinating measure used primarily by cross-FLOT operations. Close air support aircraft do not usually use MRRs in the vicinity of the target area.
- Considerations. MRRs are established based on known threats.
- POC: ACA.

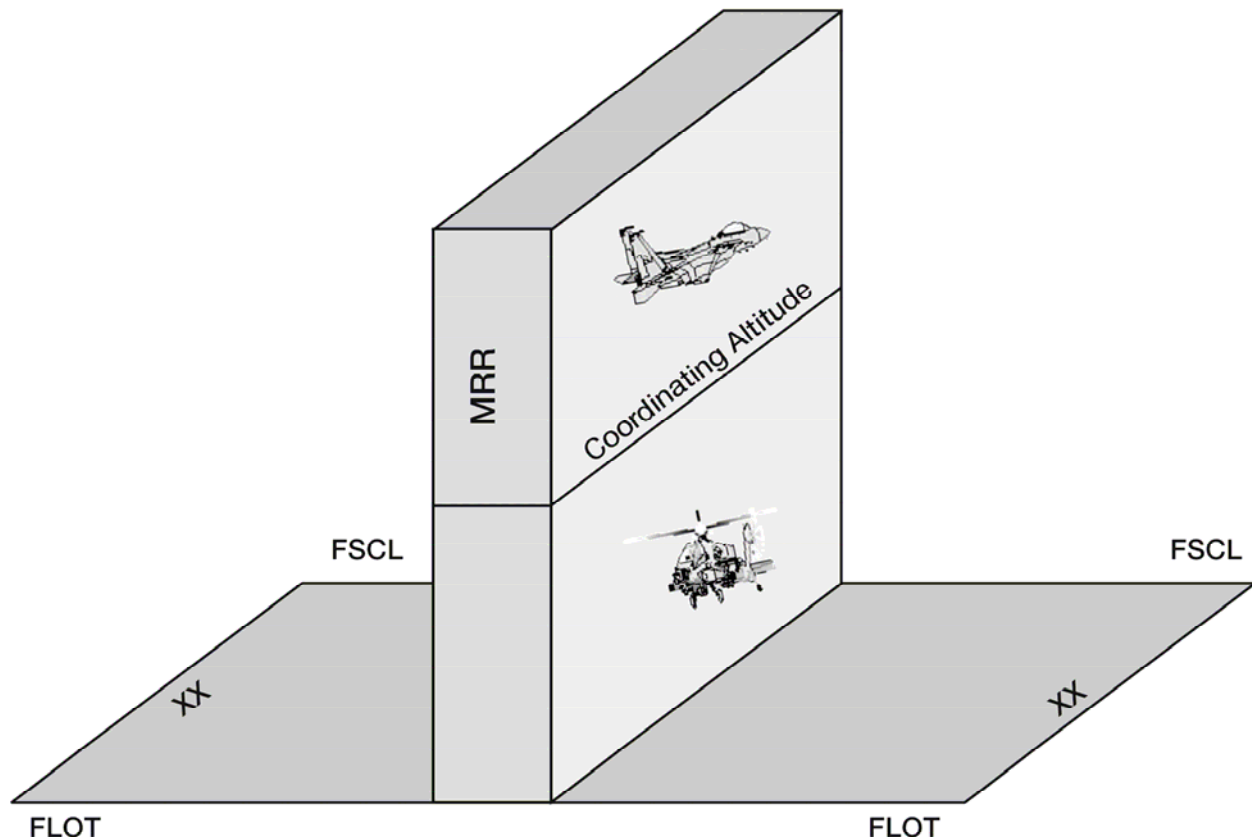


Figure B-2. Minimum Risk Routes

w. **Positive Identification Radar Advisory Zone (PIRAZ)**

- Description. PIRAZ is a designated area within which Navy ships (usually naval tactical data systems equipped) separate friendly from hostile aircraft.
- Uses. PIRAZ provides tracking, control, and assistance to friendly aircraft within the anti-air warfare surveillance area of the battle group.
- POC: AAWC.

x. **Restricted Operations Area (ROA)**

- Description. ROA is airspace of defined dimensions created in response to specific operational situations or requirements within which the operation of one or more airspace users is restricted. Also known as a restricted operations zone. Also known as a Restricted Operations Zone (ROZ). See Figure B-3 for a graphic representation of a ROA (ROZ).
- Uses. An ROA is an airspace coordinating measure used to separate and identify areas. For example, artillery, mortar, naval gunfire support, UAV operating areas, aerial refueling, concentrated interdiction areas, areas of search and rescue (SAR), SOF operating areas, and areas in which the AADC has declared "weapons free." It is commonly used for drop zones, landing zones, SAR areas, UAV launch and recovery sites, UAV mission areas, and special electronics mission aircraft.

- Considerations. ROA can adversely affect air defense operation; therefore, air defense missions generally have priority over ROAs.
- POC: ACA.

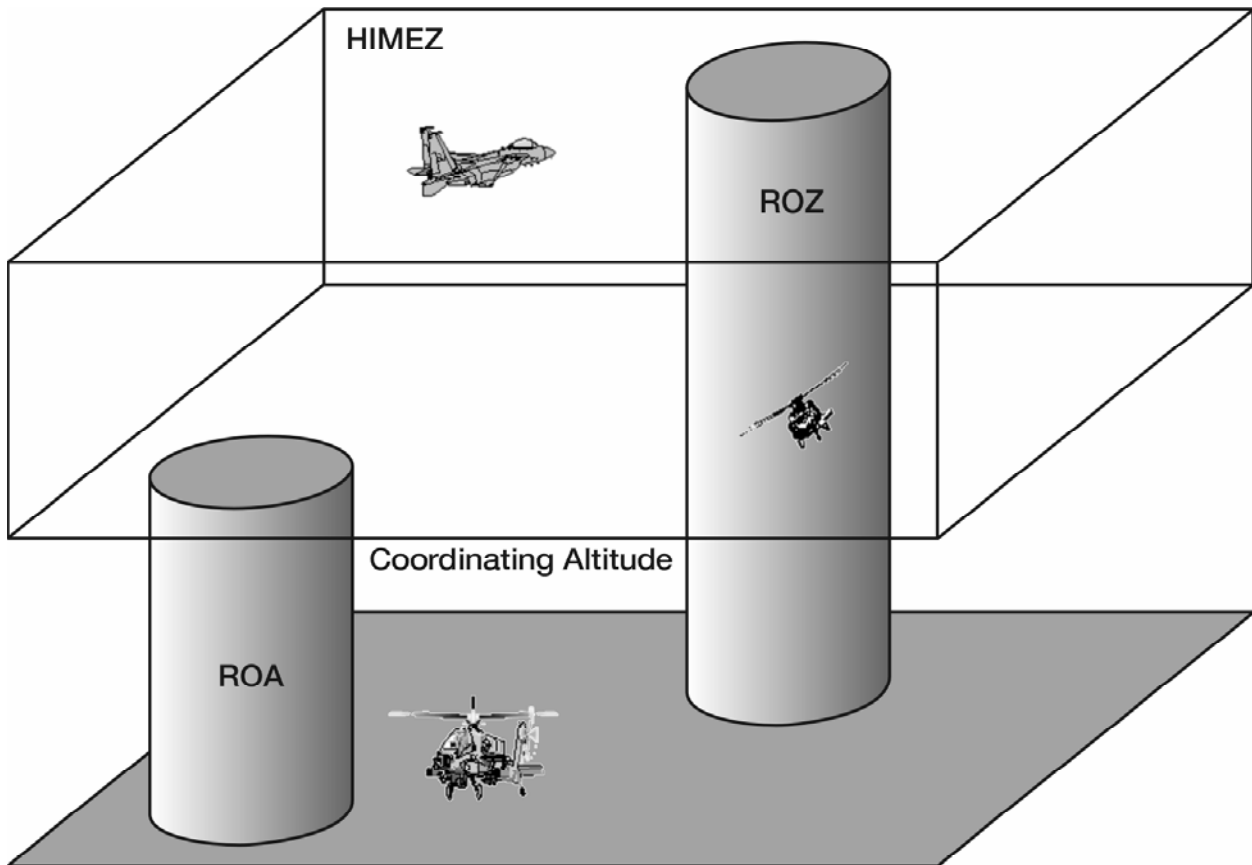


Figure B-3. Coordinating Altitude, HIMEZ, ROA, and ROZ (also known as a ROA)

y. **Return To Force (RTF)**

- Description. RTFs are planned route profiles for use by friendly aircraft returning to an aircraft-capable ship.
- Uses. RTF provides a means for easily identifying friendly aircraft.
- POC: AAWC.

z. **Short Range Air Defense Engagement Zone (SHORADEZ)**

- Description. Areas of short-range air defense (SHORAD) deployment may fall within a LOMEZ or HIMEZ. It is possible that SHORAD assets may solely defend some areas. A SHORADEZ can be established to define the airspace within which these assets will operate.
- Uses. SHORADEZ is normally established for the local air defense of high-value assets. From an airspace control perspective, SHORADEZ provides airspace users with the location of the engagement zone of short-range air defense systems for mission planning purposes.

- Considerations. Because centralized control over the SHORAD weapons may not be possible, these areas must be clearly defined and disseminated so friendly aircraft can avoid them.
- POC: AADC.

aa. **Special Use Airspace**

- Description. Special use airspace is a term used to define airspace for a specific purpose. It may also designate airspace in which no flight activity is authorized. General subdivisions (regions, sectors, and AOA) are not special use airspace.
- Uses. Special use airspace is typically applied to BDZs and cap/orbit areas.
- Considerations. Special use airspace typically is a peacetime term contained in Federal Aviation Administration Handbook 7610.4 (Special Military Operations) to include military operating areas, Air Traffic Control Assigned Airspace, and other airspace.
- POC: ACA.

bb. **Standard Use Army Aircraft Flight Route (SAAFR)**

- Description. SAAFR are routes established below the coordinating altitude to facilitate the movement of Army aviation assets and normally located in the corps through brigade rear areas of operation. See Figure B-1 for a graphic representation of a SAAFR.
- Uses. SAAFR is an airspace coordinating measure used by Army assets for administrative and logistic purposes.
- POC: If altitudes are at or below the coordinating altitude, the using authority implements SAAFR. If a coordinating altitude has not been established, an air corridor is established by the ACA at the request of the appropriate ground commander. See AFTTP(I) 3-2.17, Multi-Service Tactics, Techniques, and Procedures for the Theater Air-Ground System for additional information.

cc. **Weapons Engagement Zone (WEZ)**

- Description. In air defense, WEZ is airspace of defined dimensions within which the responsibility for engagement normally rests with a particular weapon system. These include FEZ, HIMEZ, LOMEZ, SHORADEZ, and JEZ.
- Uses. WEZ defines air defense areas by weapon system. From an airspace control perspective, WEZ provides airspace users with the locations of the air defense engagement systems for mission planning purposes.
- Considerations. Design of the WEZ is dependent on specific weapon system capabilities.
- POC: AADC.

dd. **Weapons Free Zone**

- Description. A weapons free zone is an air defense zone established for the protection of key assets or facilities, other than air bases, where weapons systems may be fired at any target not positively recognized as friendly.
- Uses. A weapons free zone is an air defense control measure normally used for high-value assets defense and in areas with limited command and control

authority. From an airspace control perspective, this zone provides airspace users with the location of a weapons free area for mission planning purposes.

- POC: AADC declares weapons free with the ACA establishing the zone.

Airspace Control Request Representative Format

TO:

FROM:

SUBJECT: Request for Airspace

(A) Airspace Coordinating Measure Requested

(B) Location (Lat/Long)

(C) Altitude(s)

(D) Valid/Void Times (normally ZULU)

(E) Type Aircraft/Mission

(F) Controlling Agency

(G) Comments

NOTE: This format is representative of the appropriate US Message Text Format. Refer to Chairman of the Joint Chiefs Instruction (CJCSI) 6241.04, Policy and Procedures for Using United States Message Text Formatting for detailed instructions.

APPENDIX C

REGIONAL AIR MOVEMENT CONTROL CENTER

Used in Operations ALLIED FORCE, ENDURING FREEDOM, and IRAQI FREEDOM, the RAMCC is typically established when significant military forces operate in an area with an inadequate air traffic control infrastructure. Under these circumstances, the ACA must deconflict aircraft directed by the AOC with other aircraft participating in the contingency (e.g., United Nations, Red Cross, NGO, and commercial operators). This becomes even more critical when the ACA must operate in an ICAO flight information region in a sovereign nation with limited airspace control capabilities.

Safe operations in the airspace control area may require coordination among a multitude of users and air traffic facilities, beyond those the AOC normally directs or considers in an air tasking order, airspace control order, and/or airspace control plan. Non-AOC directed users may include some military airlift, special operations and other services, along with United Nations or other peacekeepers, humanitarian relief organizations, host nation or coalition aircraft and scheduled commercial air services. Many of these operations are beyond the purview of ATO/ACO/ACP deconfliction, yet frequently transit airfields in the airspace control area where conflicts are most prevalent.

Air traffic volume increases dramatically after initial military strikes. Combat, combat sustainment, and non-AOC directed airlift missions might transit airspace or arrive at airfields simultaneously. Civil entities conducting humanitarian or commercial air operations may further congest airspace and airfields. This can lead to increased hazardous air traffic reports and maximum-on-ground problems, and undermine the operation unless integrated air traffic management measures are implemented.

The ACA may elect to establish airfield and airspace scheduling, granting authority to the RAMCC to issue or deny slot times at airfields and control points in order to deconflict aircraft in the airspace control area/ICAO flight information region. Slot times are normally based on an assessment of an airfield's limitations (onload/offload rate, parking capacity, etc.) and, as applicable, air traffic control separation capability. With RAMCC scheduling in effect, all US military aircraft operating in the control area must participate and adhere to slot times to ensure adequate margins of safety. The RAMCC issues Mode 3 IFF codes to non-AOC military and civilian aircraft desiring to transit the airspace control area, and includes them in the daily ATO/SPINS if necessary. Thus RAMCC is the centralized information source providing the AADC with the identity of civil and other military aircraft operating in the control area. Despite gaining a certain level of procedural control through these advanced scheduling schemes, most aircraft movements are still conducted under Visual Flight Rules (i.e., "see and avoid"), unless air traffic control separation is instituted. By managing ramp capacity at theater airfields, the RAMCC ensures the maximum capacity for parking aircraft at an airfield or that the maximum on ground capability for aircraft is not exceeded.

Organization

The RAMCC is a separate specialty team, not necessarily collocated with the AOC, reporting directly to the AOC Director. It deals with a variety of civil organizations and matters of great political sensitivity, such as determining the priority of various military airlift missions in relation to civil relief or other high-visibility missions. The RAMCC director is normally a senior officer (O-6) because of the scope of responsibility and seasoned leadership expertise required. The RAMCC serves a function distinct from the combat plans division or the air mobility division by dealing with a wider-range of users, deconflicting terminal operations and sometimes being involved in current operations (e.g., en route deconfliction). Its members work closely with divisions within the AOC but its members are not spread across them.

Ideally, the RAMCC should have a wide variety of specialties, services and allied nation (coalition operation) representation to reflect the user-base of the organization. Specialties include, but are not limited to, rated crewmembers, air traffic controllers, transportation and aerial port specialists, command and control specialists, communication/computer technicians, and administrative support. Diverse manning during coalition operations allows the RAMCC to execute its mission as an honest broker, given the broad range of RAMCC customers.

The RAMCC organization is typically subdivided into long-range plans, current operations, airfield operations, and a mission support section. The long-range planning cell manages activities beyond 24 hours of execution including military and civilian users' arrivals and departures at airfields as well as aircraft transiting through the airspace controlled by the ACA. The current operations cell takes the long-range plan and makes short-notice changes, including adjusting the plan during execution in near real time. The RAMCCs in Afghanistan and Iraq created a combined website for both military and civil users to contact them before transiting the country. Sites such as this have detailed procedures for filing airspace/slot requests and restrictions for flying in-country.

GLOSSARY

Abbreviations and Acronyms

A2C2	Army airspace command and control
AADC	area air defense commander
AADP	area air defense plan
AAGS	Army air-ground system
AAMDC	Army Air and Missile Defense Command
AAWC	antiair warfare commander
ACA	airspace control authority
ACCE	air component coordination element
ACE	airborne command element (USAF), aviation combat element (Marines)
ACM	airspace coordinating measure
ACO	airspace control order
ACP	airspace control plan
ACS	airspace control system
ADA	air defense artillery
ADCON	administrative control
ADIZ	air defense identification zone
AETACS	airborne elements of the theater air control system
AETF	air and space expeditionary task force
AFDD	Air Force doctrine document
AFTTP(I)	Air Force tactics, techniques, and procedures (interservice)
ALO	air liaison officer
AMD	air mobility division
AMLO	air mobility liaison
ANG	Air National Guard
AO	area of operations
AOA	amphibious objective area
AOC	air and space operations center
AOR	area of responsibility
APAM	antipersonnel/antimaterial
APOD	aerial port of debarkation
ASOC	air support operations center
ATACMS	Army tactical missile system
ATC	air traffic control
ATO	air tasking order
AWACS	Airborne Warning and Control System
BCD	battlefield coordination detachment
BDZ	base defense zone

C2	command and control
CALCM	conventional air launched cruise missile
CAP	combat air patrol
CAS	close air support
CATF	commander, amphibious task force
CCO	chief of combat operations
CGRS	Common Geographic Reference System
CLF	commander, landing force
COE	common operating environment
COMAFFOR	commander, Air Force forces
COMARFOR	commander, Army forces
COMSEC	communications security
COP	common operational picture
CP	command post
CRC	control and reporting center
CSG	carrier strike group
DAADC	deputy area air defense commander
DATCAL	deployable air traffic control and landing system
DCA	defensive counterair
DOD	Department of Defense
EOC	expeditionary operations center
FAC	forward air controller
FAC(A)	forward air controller (airborne)
FECC	fire and effects coordination cell
FEZ	fighter engagement zone
FID	foreign internal defense
FIR	flight information region
FLOT	forward line of own troops
FSCL	fire support coordination line
FSCM	fire support coordinating measures
GLO	ground liaison officer
GTACS	ground theater air control system
HATR	hazardous air traffic report
HIDACZ	high-density airspace control zone
HIMEZ	high-altitude missile engagement zone
HVAA	high value airborne asset
IA	information assurance
IADS	integrated air defense system
ICAO	International Civil Aviation Organization

ICO	interface control officer
ID	identification
IFF	identification, friend or foe
IFF/SIF	identification, friend or foe/selective identification feature
IFR	instrument flight rules
ISR	intelligence, surveillance, and reconnaissance
JAOC	joint air operations center (JP 1-02); joint air and space operations center (USAF)
JASSM	joint air-to-surface standoff missile
JCS	Joint Chiefs of Staff
JEZ	joint engagement zone
JFACC	joint force air component commander (JP 1-02); joint force air and space component commander (USAF)
JFC	joint force commander
JOA	joint operations area
JP	joint publication
JSTARS	Joint Surveillance Target Attack Radar System
JTAC	joint terminal attack controller
JTF	joint task force
LCC	land component commander
LOF	lack of friendly
LLTR	low-level transit route
LNO	liaison officer
LOMEZ	low-altitude missile engagement zone
MACCS	Marine Air Command And Control System
MARLO	Marine liaison officer
MCC	maritime component commander
MEZ	missile engagement zone
MRR	minimum-risk route
MTTP	multi-Service tactics, techniques, and procedures
NALE	naval and amphibious liaison element
NCTR	non-cooperative target recognition
NGO	nongovernmental organization
NATO	North Atlantic Treaty Organization
NMAC	near mid-air collision
NOTAM	notice to Airmen
NTACS	Navy Tactical Air Control System
OPCON	operational control
OPLAN	operation plan
OPORD	operation order

PHID	positive hostile identification
PIRAZ	positive identification and radar advisory zone
POC	point of contact
RAMCC	regional air movement control center
RAP	recognized air picture
ROA	restricted operations area
ROZ	restricted operations zone (Also see ROA)
ROE	rules of engagement
RTF	return to force
SAAFR	standard use Army aircraft flight zone
SACC	supporting arms coordination center
SADL	situation awareness data link
SADO	senior air defense officer
SAR	search and rescue
SCA	space coordinating authority
SCAR	strike coordination and reconnaissance
SHORAD	short-range air defense
SHORADEZ	short-range air defense engagement zone
SIF	selective identification feature
SOF	special operations forces
SOLE	special operations liaison element
SPINS	special instructions
STT	special tactics team
TAAMDCOORD	theater Army air and missile defense coordinator
TAC	terminal attack controller
TACC	tanker airlift control center (USAF); tactical air control center (USN); tactical air command center (USMC)
TACP	tactical air control party
TACON	tactical control
TACS	theater air control system
TADC	tactical air direction center
TADIL	tactical digital information link
TAGS	theater air-ground system
TAMD	theater air and missile defense
TAOC	tactical air operations center (USMC)
TCAS	traffic alert/collision avoidance system
TDL	tactical data links
TMD	theater missile defense
UAV	unmanned aerial vehicle
UNAAF	Unified Action Armed Forces

VFR	visual flight rules
WEZ	weapon engagement zone

Definitions

active air defense. Direct defensive action taken to destroy, nullify, or reduce the effectiveness of hostile air and missile threats against friendly forces and assets. It includes the use of aircraft, air defense weapons, electronic warfare, and other available weapons. See also **air defense.** (JP 1-02)

airborne early warning. The detection of enemy air or surface units by radar or other equipment carried in an airborne vehicle, and the transmitting of a warning to friendly units. Also called **AEW.** (JP 1-02)

air component coordination element. An Air Force component element that interfaces and provides liaison with the joint force land component commander, or commander, Army forces. The air component coordination element is the senior Air Force element assisting the joint force land component commander, or commander Army forces in planning air component supporting and supported requirements. The air component coordination element is responsible to the joint force air component commander and coordinates with the joint force land component commander's staff, representing the joint force air component commander's needs in either a supporting or supported role. Also called **ACCE.** (JP 1-02)

air corridor. A restricted air route of travel specified for use by friendly aircraft and established for the purpose of preventing friendly aircraft from being fired on by friendly forces. (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 attack. Also called **AD.** (JP 1-02)

air defense action area. An area and the airspace above it within which friendly aircraft or surface-to-air weapons are normally given precedence in operations except under specified conditions. (JP 1-02)

air defense area. 1. **overseas** —A specifically defined airspace for which air defense must be planned and provided. 2. **United States** — Airspace of defined dimensions designated by the appropriate agency within which the ready control of airborne vehicles is required in the interest of national security during an air defense emergency. (JP 1-02)

air defense identification zone. Airspace of defined dimensions within which the

ready identification, location, and control of airborne vehicles are required. Also called **ADIZ**.

air refueling area. Airspace defined by lateral and altitude limits for the purpose of conducting aerial refueling operations. Also known as a refueling track, refueling orbit, or refueling anchor. (AFDD 2-1.7)

airspace control. See **airspace control in the combat zone.** (JP 1-02)

airspace control area. Airspace that is laterally defined by the boundaries of the operational area. The airspace control area may be subdivided into airspace control sectors. (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**. See also **airspace control; airspace control area, airspace control system.** (JP 1-02)

airspace control boundary. The lateral limits of an airspace control area, airspace control sector, high density airspace control zone, or airspace restricted area. (JP 1-02)

airspace control center. The airspace control authority's primary airspace control facility, including assigned Service component, host nation, and/or multinational personnel and equipment. (JP 1-02)

airspace control facility. Any of the several Service component, host nation, or allied facilities that provides airspace control in the combat zone. (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 reduce the risk of friendly fire, 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 **airspace control; combat airspace control.** (JP 1-02)

airspace control order. An order implementing the airspace control plan that provides the details of the approved requests for airspace coordinating measures. It is published either as part of the air tasking order or as a separate document. Also called **ACO**. (JP 1-02)

airspace control plan. The document approved by the joint force commander that provides specific planning guidance and procedures for the airspace control system for the joint force operational area. Also called **ACP**. See also **airspace control system; joint operations area.** (JP 1-02)

airspace control procedures. Rules, mechanisms, and directions that facilitate the

control and use of airspace of specified dimensions. See also airspace control authority; airspace control in a combat zone; airspace control order; airspace control plan. (JP 1-02)

airspace control sector. A sub-element of the airspace control area, established to facilitate the control of the overall area. Airspace control sector boundaries normally coincide with air defense organization subdivision boundaries. Airspace control sectors are designated in accordance with procedures and guidance contained in the airspace control plan in consideration of Service component, host-nation, and multinational airspace control capabilities and requirements. See also **airspace control area**. (JP 1-02)

airspace control system. An arrangement of those organizations, personnel, policies, procedures, and facilities required to perform airspace control functions. Also called **ACS**. (JP 1-02)

airspace coordinating measures. Measures employed to facilitate the efficient use of airspace to accomplish missions and simultaneously provide safeguards for friendly forces. Also called ACMs. See also airspace control area; airspace control boundary; airspace control sector; airspace coordination area; high-density airspace control zone; weapons engagement zone. (JP 1-02)

airspace coordination area. A three-dimensional block of airspace in a target area, established by the appropriate ground commander, in which friendly aircraft are reasonably safe from friendly surface fires. The airspace coordination area may be formal or informal. Also called **ACA**. (JP 1-02)

airspace management. The coordination, integration, and regulation of the use of airspace of defined dimensions. (JP 1-02)

airspace restrictions. Special restrictive measures applied to segments of airspace of defined dimensions. (JP 1-02)

air tasking order. A method used to task and disseminate to components, subordinate units, and command and control agencies projected sorties, capabilities and/or forces to targets and specific missions. Normally provides specific instructions to include call signs, targets, controlling agencies, etc., as well as general instructions. Also called **ATO**. (JP 1-02)

air traffic control facility. Any of the component airspace control facilities primarily responsible for providing air traffic control services and, as required, limited tactical control services. (JP 1-02)

amphibious objective area. A geographical area (delineated for command and control purposes in the order initiating the amphibious operation) within which is located the objective(s) to be secured by the amphibious force. This area must be of sufficient size

to ensure accomplishment of the amphibious force's mission and must provide sufficient area for conducting necessary sea, air, and land operations. Also called **AOA**. (JP 1-02)

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

Army air-ground system. The Army system which provides for interface between Army and tactical air support agencies of other Services in the planning, evaluating, processing, and coordinating of air support requirements and operations. It is composed of appropriate staff members, including G-2 air and G-3 air personnel, and necessary communication equipment. Also called **AAGS**. (JP 1-02)

autonomous operation. In air defense, the mode of operation assumed by a unit after it has lost all communications with higher echelons. The unit commander assumes full responsibility for control of weapons and engagement of hostile targets. (JP 1-02)

base defense zone. An air defense zone established around an air base and limited to the engagement envelope of short-range air defense weapons systems defending that base. Base defense zones have specific entry, exit, and identification, friend or foe procedures established. Also called **BDZ**. (JP 1-02)

campaign plan. A plan for a series of related military operations aimed at accomplishing a strategic or operational objective within a given time and space. (JP 1-02)

centralized control. 1. In air defense, the control mode whereby a higher echelon makes direct target assignments to fire units. 2. In joint air operations, placing within one commander the responsibility and authority for planning, directing, and coordinating a military operation or group/category of operations. See also **decentralized control**. (JP 1-02) *[In air and space employment, the vesting of authority in one commander for planning and directing operations of all air forces throughout the area of operations. This centralized planning and direction enables timely allocation and tasking of assets to exploit the speed, range, and flexibility of air capabilities across the entire area. Centralized tasking and allocation of resources is accompanied by progressive decentralization of tasks' execution to the lowest command echelons capable of accomplishment. In centralized control, authority may be progressively delegated to subordinate echelons (as opposed to command by negation which progressively pulls authority back from subordinate echelons, as required). In air defense, centralized control is the control mode whereby a higher echelon makes direct target assignments to fire units. Identification and engagement authority may be delegated to the regional air defense commander (RADC) or sector air defense commander (SADC) during joint*

engagement zone (JEZ) centralized control operations.] {Italicized words in brackets apply only to the Air Force and are offered for clarity.}

combat airspace control. See **airspace control in the combat zone.** (JP 1-02)

combat zone. 1. That area required by combat forces for the conduct of operations. 2. The territory forward of the Army rear area boundary. (JP 1-02)

combined operation. An operation conducted by forces of two or more Allied nations acting together for the accomplishment of a single mission. (JP 1-02)

common operating environment. Automation services that support the development of the common reusable software modules that enable interoperability across multiple combat support applications. This includes segmentation of common software modules from existing applications, integration of commercial products, development of a common architecture, and development of common tools for application developers. Also called **COE.** (JP 1-02)

common operational picture. A single identical display of relevant information shared by more than one command. A common operational picture facilitates collaborative planning and assists all echelons to achieve situational awareness. Also called **COP.** (JP 1-02)

concept of operations. A verbal or graphic statement, in broad outline, of a commander's assumptions or intent in regard to an operation or series of operations. The concept of operations frequently is embodied in campaign plans and operation plans; in the latter case, particularly when the plans cover a series of connected operations to be carried out simultaneously or in succession. The concept is designed to give an overall picture of the operation. It is included primarily for additional clarity of purpose. Also called **commander's concept** or **CONOPS.** (JP 1-02)

coordinating altitude. A procedural airspace control method to separate fixed- and rotary-wing aircraft by determining an altitude below which fixed-wing aircraft will normally not fly and above which rotary-wing aircraft normally will not fly. The coordinating altitude is normally specified in the airspace control plan and may include a buffer zone for small altitude deviations. (JP 1-02)

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

decentralized control. In air defense, the normal mode whereby a higher echelon monitors unit actions, making direct target assignments to units only when necessary to ensure proper fire distribution or to prevent engagement of friendly aircraft. See also **centralized control.** (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. (JP 1-02)

drone. A land, sea, or air vehicle that is remotely or automatically controlled. See also remotely piloted vehicle; unmanned aerial vehicle. (JP 1-02)

fighter engagement zone. See **weapon engagement zone.** (JP 1-02)

fire support coordination. The planning and executing of fire so that targets are adequately covered by a suitable weapon or group of weapons. (JP 1-02)

fire support coordination line. A fire support coordinating measure that is established and adjusted by appropriate land or amphibious force commanders within their boundaries in consultation with superior, subordinate, supporting, and affected commanders. Fire support coordination lines (FSCs) facilitate the expeditious attack of surface targets of opportunity beyond the coordinating measure. An FSC does not divide an area of operations by defining a boundary between close and deep operations or a zone for close air support. The FSC applies to all fires of air, land, and sea-based weapons systems using any type of ammunition. Forces attacking targets beyond an FSC must inform all affected commanders in sufficient time to allow necessary reaction to avoid fratricide. Supporting elements attacking targets beyond the FSC must ensure that the attack will not produce adverse attacks on, or to the rear of, the line. Short of an FSC, all air-to-ground and surface-to-surface attack operations are controlled by the appropriate land or amphibious force commander. The FSC should follow well-defined terrain features. Coordination of attacks beyond the FSC is especially critical to commanders of air, land, and special operations forces. In exceptional circumstances, the inability to conduct this coordination will not preclude the attack of targets beyond the FSC. However, failure to do so may increase the risk of fratricide and could waste limited resources. Also called **FSC**. (JP 1-02)

fire support coordinating measure. A measure employed by land or amphibious commanders to facilitate the rapid engagement of targets and simultaneously provide safeguards for friendly forces. Also called **FSCM**. See also fire support coordination. (JP 1-02)

foreign internal defense. Participation by civilian and military agencies of a government in any of the action programs taken by another government or other designated organization to free and protect its society from subversion, lawlessness, and insurgency. Also called **FID**. (JP 1-02)

forward line of own troops. A line that indicates the most forward positions of friendly forces in any kind of military operation at a specific time. The forward line of own troops (FLOT) normally identifies the forward location of covering and screening forces. The FLOT may be at, beyond, or short of the forward edge of the battle area. An enemy FLOT indicates the forward-most position of hostile forces. Also called **FLOT**. (JP 1-02)

functional component command. A command normally, but not necessarily, composed of forces of two or more Military Departments, which may be established across the range of military operations to perform particular operational missions that may be of short duration or may extend over a period of time. See also **Service component command.** (JP 1-02)

high-altitude missile engagement zone. See **weapon engagement zone.** (JP 1-02)

high-density airspace control zone. Airspace designated in an airspace control plan or airspace control order, in which there is a concentrated employment of numerous and varied weapons and airspace users. A high-density airspace control zone has defined dimensions, which usually coincide with geographical features or navigational aids. Access to a high-density airspace control zone is normally controlled by the maneuver commander. The maneuver commander can also direct a more restrictive weapons status within the high-density airspace control zone. Also called **HIDACZ.** (JP 1-02)

identification, friend or foe. A device that emits a signal positively identifying it as a friendly. Also called **IFF.** See also **air defense.** (JP 1-02)

identification, friend or foe/selective identification feature procedures. The directives that govern the use of identification, friend or foe selective identification feature equipment. See also **identification, friend or foe.** (JP 1-02)

joint engagement zone. See **weapon engagement zone.** (JP 1-02)

joint force. A general term applied to a force composed of significant elements, assigned or attached, of two or more Military Departments operating under a single joint force commander. (JP 1-02)

joint force air component commander. The commander within a unified command, subordinate unified command, or joint task force responsible to the establishing commander for making recommendations on the proper employment of assigned, attached, and/or made available for tasking air forces; planning and coordinating air operations; or accomplishing such operational missions as may be assigned. The joint force air component commander is given the authority necessary to accomplish missions and tasks assigned by the establishing commander. Also called **JFACC.** (JP 1-02) [*The joint force air and space component commander (JFACC) uses the joint air and space operations center to command and control the integrated air and space effort to meet the joint force commander's objectives. This title emphasizes the Air Force position that air power and space power together create effects that cannot be achieved through air or space power alone.*] (AFDD 2) {Words in brackets apply only to the Air Force and are offered for clarity.}

joint force commander. A general term applied to a combatant commander, subunified commander, or joint task force commander authorized to exercise combatant command

(command authority) or operational control over a joint force. Also called **JFC**. (JP 1-02)

joint operations area. An area of land, sea, and airspace, defined by a geographic combatant commander or subordinate unified commander, in which a joint force commander (normally a joint task force commander) conducts military operations to accomplish a specific mission. Joint operations areas are particularly useful when operations are limited in scope and geographic area or when operations are to be conducted on the boundaries between theaters. Also called **JOA**. (JP 1-02)

joint terminal attack controller. A qualified (certified) Service member who, from a forward position, directs the action of combat aircraft engaged in close air support and other offensive air operations. A qualified and current joint terminal attack controller will be recognized across the Department of Defense as capable and authorized to perform terminal attack control. Also called **JTAC**. (JP 1-02)

kill box. A three-dimensional area reference that enables timely, effective coordination and control and facilitates rapid attacks. (JP 1-02) [*A kill box is a three-dimensional fire support coordinating measure used to facilitate the expeditious air-to-surface lethal attack of targets, which may be augmented by or integrated with surface-to-surface fires.*] (AFDD 2-1.3) {The definition in brackets applies only to the Air Force and is offered for clarity.}

low-altitude missile engagement zone. See **weapon engagement zone**. (JP 1-02)

low level transit route. A temporary corridor of defined dimensions established in the forward area to minimize the risk to friendly aircraft from friendly air defenses or surface forces. Also called **LLTR**. (JP 1-02)

marine air command and control system. A system that provides the aviation combat element commander with the means to command, coordinate, and control all air operations within an assigned sector and to coordinate air operations with other Services. It is composed of command and control agencies with communications-electronics equipment that incorporates a capability from manual through semiautomatic control. Also called **MACCS**. (JP 1-02)

minimum-risk route. A temporary corridor of defined dimensions recommended for use by high-speed, fixed-wing aircraft that presents the minimum known hazards to low-flying aircraft transiting the combat zone. Also called **MRR**. (JP 1-02)

multinational operations. A collective term to describe military actions conducted by forces of two or more nations, usually undertaken within the structure of a coalition or alliance. (JP 1-02)

operational area. An overarching term encompassing more descriptive terms for geographic areas in which military operations are conducted. Operational areas include, but are not limited to, such descriptors as area of responsibility, theater of war, theater

of operations, joint operations area, amphibious objective area, joint special operations area, and area of operations. (JP 1-02)

operational risk management (ORM). The systematic process of identifying hazards, assessing risk, analyzing risk control options and measures, making control decisions, accepting residual risks, and supervising/reviewing the activity for effectiveness. (AFI 90-901)

point defense. The defense or protection of special vital elements and installations; e.g., command and control facilities or air bases. (JP 1-02)

positive control. A method of airspace control that relies on positive identification, tracking, and direction of aircraft within an airspace, conducted with electronic means by an agency having the authority and responsibility therein. (JP 1-02)

positive identification. Identification is determined by visual recognition, electronic support systems, non-cooperative target recognition systems, identification friend or foe systems or other physics-based identification techniques. Positive identification does not assume identity solely based on location or adherence to airspace procedures. (AFDD 2-1.7)

procedural control. A method of airspace control which relies on a combination of previously agreed and promulgated orders and procedures. (JP 1-02)

procedural identification. Identification is based on adherence to airspace control measures and rules. Identification is assumed to be friendly as long as rules are followed, but identification is assumed unknown if rules are not followed and the suspect vehicle is not otherwise positively identified. (AFDD 2-1.7)

restricted operations area. Airspace of defined dimensions, designated by the airspace control authority, in response to specific operational situations/requirements within which the operation of one or more airspace users is restricted. Also called **ROA**. (JP 1-02)

rules of engagement. Directives issued by competent military authority that delineate the circumstances and limitations under which United States forces will initiate and/or continue combat engagement with other forces encountered. Also called **ROE**. (JP 1-02)

Service component command. A command consisting of the Service component commander and all those Service forces, such as individuals, units, detachments, organizations, and installations under that command, including the support forces that have been assigned to a combatant command or further assigned to a subordinate unified command or joint task force. See also **functional component command**. (JP 1-02)

short-range air defense engagement zone. See **weapon engagement zone.** (JP 1-02)

space coordinating authority. The single authority designated, by the supported combatant commander or JFC, to coordinate joint theater space operations and to integrate space capabilities thereby facilitating unity of the theater/JOA space effort. Also called **SCA.** (AFDD 2-2.1)

standard use Army aircraft flight route. Routes established below the coordinating altitude to facilitate the movement of Army aviation assets. Routes are normally located in the corps through brigade rear areas of operation and do not require approval by the airspace control authority. Also called **SAAFR.** (JP 1-02)

tactical air control center. The principal air operations installation (ship-based) from which all aircraft and air warning functions of tactical air operations are controlled. Also called **Navy CC.** (JP 1-02)

unmanned aerial vehicle. A powered, aerial vehicle that does not carry a human operator, uses aerodynamic forces to provide vehicle lift, can fly autonomously or be piloted remotely, can be expendable or recoverable, and can carry a lethal or nonlethal payload. Ballistic or semiballistic vehicles, cruise missiles, and artillery projectiles are not considered unmanned aerial vehicles. Also called **UAV.** (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. Also called **WEZ.** a. **fighter engagement zone.** In air defense, that airspace of defined dimensions within which the responsibility for engagement of air threats normally rests with fighter aircraft. Also called **FEZ.** b. **high-altitude missile engagement zone.** In air defense, that airspace of defined dimensions within which the responsibility for engagement of air threats normally rests with high-altitude surface-to-air missiles. Also called **HIMEZ.** c. **low-altitude missile engagement zone.** In air defense, that airspace of defined dimensions within which the responsibility for engagement of air threats normally rests with low- to medium-altitude surface-to-air missiles. Also called **LOMEZ.** d. **short-range air defense engagement zone.** In air defense, that airspace of defined dimensions within which the responsibility for engagement of air threats normally rests with short-range air defense weapons. It may be established within a low- or high-altitude missile engagement zone. Also called **SHORADEZ.** e. **joint engagement zone.** In air defense, that airspace of defined dimensions within which multiple air defense systems (surface-to-air missiles and aircraft) are simultaneously employed to engage air threats. Also called **JEZ.** (JP 1-02)

weapons free zone. An air defense zone established for the protection of key assets or facilities, other than air bases, where weapon systems may be fired at any target not positively recognized as friendly. (JP 1-02)

