

Airspace Control in the Combat Zone



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FOREWORD

The Air Force normally provides the preponderance of airpower and the capability to plan, task, and control air operations. However, all Service components have airspace requirements for their organic air arms. *Having a single commander responsible for developing, executing, and managing an integrated plan for the orderly use of airspace within the joint force commander's area of responsibility or joint operations area is a key element to successful air operations. It establishes a process for airspace requirements to be determined based on the joint force commander's objectives, rather than Service priorities. Airspace control is an enabler of air superiority, an Air Force core competency. It provides airspace for the freedom to attack and procedures to keep friendly forces free from enemy air attack.* This document provides doctrine for the Air Force to use in coordinating and integrating the use of airspace in a unified commander's area of responsibility or joint operating area.

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INTRODUCTION

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.

Doctrine for Joint Airspace Control in the Combat Zone
Joint Pub 3-52

PURPOSE

Air Force commanders and personnel will likely lead joint efforts to command and control airspace for joint force commanders; therefore, US Air Force training, equipment, and procedures must be formulated and implemented with joint operations in mind. This Air Force doctrine document (AFDD) details principles for conducting airspace control in the combat zone.

APPLICATION

This 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 not only the contents of this AFDD, but also the particular situation when accomplishing airspace control in the combat zone.

SCOPE

This airspace control doctrine is broad in nature and is adaptable to diverse geographic and force deployment situations. Although space-based assets will play an important role in the joint campaign or operation, airspace control in this publication will not include space-based assets. Future airspace control may also involve the deconfliction of space operations over an existing joint force area of responsibility or joint operations area in support of a single joint force commander. This doctrine of airspace control in the combat zone shall apply until superseded by doctrine on that specific subject.

CHAPTER ONE

CONSIDERATIONS FOR AIRSPACE CONTROL

On the night of 11 July 1943, during Operation HUSKY, 144 C-47s carrying approximately 2,000 U.S. paratroopers from Tunisia to Gela, Sicily, unexpectedly came under heavy naval gunfire from Allied ships. Since no safety corridor had been coordinated, 23 aircraft were destroyed and many others were badly damaged. Compounding this mistake, Allied troops on Sicily were alerted to defend against German parachutists and were unaware of the planned Allied airdrop. No restricted air operations area had been coordinated, resulting in exchanges of fire between U.S. paratroopers and other Allied ground troops. In the wake of this incident, General [Dwight D.] Eisenhower, the Supreme Allied Commander, appointed a special study board to investigate the matter. The board recommended that all ground and naval forces should be notified of planned air operations well in advance. Air operations planning should be centralized in one headquarters and, to simplify the problems of command and communications, the controlling agency should be under the direct control of the theater or regional air commander.

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 air defense missile systems, cruise missiles, and unmanned aerial vehicles increased the Services' theater airspace requirement. This increased demand requires a more complex airspace control system.*

OBJECTIVE

The goal of airspace control is to enhance combat operations effectiveness in accomplishing the joint force commander's (JFC) objective. The airspace in the combat zone is a crucial dimension of the battlespace and is used by all components of the joint and multinational

forces to conduct assigned missions. Joint Pub 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 of operations. Airspace control does not infringe on the authority vested in commanders to approve, disapprove, or deny combat operations. Also called combat airspace control; airspace control.” (This publication will also use the terms “airspace control,” “combat airspace control,” and “airspace control in the combat zone” synonymously.)

AIRSPACE CONTROL SYSTEM FUNDAMENTALS

To enhance combat operations effectiveness, the airspace control system must be developed considering the following fundamentals.

Unity of Effort

Unity of effort is essential to the system. Commanders view the battle through their own “lenses”; consequently, the objectives of the corps commander are not the same as 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 designated by the 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 components’ liaisons 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) or joint operations area (JOA).

For most operations, assigning the roles of ACA and Area Air Defense Commander (AADC) to a single commander, normally the joint force air 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, as the central authority for the air effort, develops strategies and plans, determines priorities, allocates resources, and controls assigned air and space forces to achieve that objective.* Having one commander with the responsi-

Airspace Control Fundamentals

Unity of Effort

Close Liaison and Coordination

Common Procedures

Simplicity

Reliable and Interoperable C⁴ Systems

Durable, Flexible and Redundant Systems

Figure 1.1. Airspace Control Fundamentals

bility and authority to coordinate and integrate air defense and airspace control greatly enhances the effort to gain and maintain control of the air and space environment. **Through central authority, an air component commander gives unity and coherency to the defensive effort and to controlling the aerospace environment.** *The planned and coordinated use of airspace gives flexibility to the self-defense of surface forces and helps prevent inadvertent attacks on friendly forces. Coordinated air defense and airspace control enables the execution of offensive attacks against an enemy's warfighting potential.*

Centralized control and decentralized execution of aerospace forces helps make those forces responsive, serves to ensure forces are properly used and integrated, and fosters initiative at the action level. *While centralized control guides actions to support a broad plan of action, decentralized execution provides flexibility for subordinate commanders to use ingenuity and initiative in attacking targets.*

Close Liaison and Coordination

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 combat airspace managers. **The primary reason for close coordination between airspace control, air traffic control, and area air defense elements is to reduce the risk of fratricide and balance those risks with the requirements for an effective air defense.** *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 within the AOR or 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 between land, maritime, special operations forces, and air operations and allow rapid concentration of combat power in a specific portion of airspace in minimum time.*

Simplicity

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

Reliable and Interoperable C² Systems

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

Durable, Flexible, and Redundant Systems

Airspace control systems need to be survivable, sustainable, and redundant because they are likely to be prime targets for an attacker. Positive airspace control must be backed by procedural control procedures. *The airspace control system in the combat zone needs to be responsive to evolving enemy threat conditions and to the evolving operation.* The system needs to be capable of supporting day, night, and all-weather operations.

INTEROPERABILITY AND ADAPTABILITY

Using current US national military objectives and assigned missions as a baseline, the air component commander develops for the JFC AOR- or JOA-specific concepts for airspace control. **Procedures to implement**

these concepts must consider the likelihood of multinational warfare. *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 considered.* US forces participating in multinational operations also may be subject to international agreements that address issues related to coalition command structure, interoperability and other relevant matters.

INFORMATION PROTECTION

Integral to airspace control is the ability to gather, disseminate, and protect information. *Defensive information operations integrate and coordinate protection of information, information processes, and information systems.* Education and training of all joint forces are crucial to successful defense of information related to airspace control. *Procedures must be formulated, published, and used by all forces participating in C² systems that make up the joint integrated airspace control system.* Aggressive intelligence collection, analysis and dissemination, effective counterintelligence, and proactive planning and execution are key to assuring the accuracy, integrity, reliability, and security of airspace control information.

SUMMARY

Total control of the aerospace environment is the aim of airspace control operations. Each of the joint force components has legitimate airspace requirements that must be melded into a comprehensive airspace control system. *Therefore, airspace control procedures must 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, and prevent fratricide.*

CHAPTER TWO

ORGANIZATION AND RESPONSIBILITIES

CONTROL OF AVAILABLE AIRPOWER MUST BE CENTRALIZED AND COMMAND EXERCISED THROUGH THE AIR FORCE COMMANDER IF INHERENT FLEXIBILITY AND ABILITY TO DELIVER A DECISIVE BLOW ARE TO BE FULLY EXPLOITED.

Command and Employment of Airpower
Field Manual 100-20

GENERAL

As the nation's only full-service air and space force, the Air Force is most often the dominant user of airspace in various AORs or JOAs. *Air Force commanders will likely be responsible for planning and integrating airspace control for joint forces in accordance with the guidance of JFCs. Air Force commanders must be knowledgeable of all the components' systems and procedures to be able to establish an airspace system that maximizes combat effectiveness of all forces while reducing risks of fratricide.* 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.

ORGANIZATION FACTORS

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

COMMANDERS' ROLE

The primary emphasis in command relationships is keeping the chain of command simple so it is easy to 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.* Definitions of key airspace management and fire support coordination agencies in the command structure are addressed in the definitions section of this document's glossary.

Joint Force Commander

The JFC is a general term applied to the combatant commander, subunified commander or joint task force commander authorized to exercise combatant command (i.e., command authority) over a joint force. The JFC may also exercise operational control or tactical control over attached forces based on the degree of authority granted in the establishing directive. *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 a functional command structure with air, land, maritime, and special operations component commanders,* while at the same time retaining the Service integrity of assigned forces through Service component commanders for Service-related administrative and logistical support.

Joint Force Air Component Commander

The JFACC derives authority from the JFC who has the authority to exercise operational control, assign missions, direct coordination among subordinate commanders, and redirect and organize forces to ensure unity of effort in the accomplishment of the overall mission. The JFC will normally designate a JFACC. The JFACC has the authority to exercise operational or tactical control over assigned and attached forces. *The JFACC's responsibilities are assigned by the JFC, but will normally include developing theater air strategy, 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 and AADC. 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. Because in most large-scale operations the Air Force will provide the preponderance of air assets and possess the necessary capabilities to exercise command and control over all theater air operations, the Air Force component commander will normally be designated the JFACC. (For additional details on the organization and function of the JFACC, see Joint Pub 3-56.1, *Command and Control for Joint Air Operations*.)

Commander of Air Force Forces

The Commander of Air Force Forces (COMAFFOR) is the Air Force officer designated as commander of the Air Force component command assigned to a JFC at the unified, subunified, and joint task force level. *Command and control of all Air Force forces assigned to the Air Force component is exercised through the COMAFFOR. When the JFC designates the COMAFFOR as the JFACC, he or she will report to the JFC for operations. When 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.* For the purposes of this document, it is assumed the COMAFFOR will be the JFACC. However, when a JFACC from another Service component is designated, the airspace control system may require modification based upon the JFACC's airspace control capabilities and C⁴ systems available for employment operations.

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.** 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 or JOA. *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. The ACA develops the airspace control plan (ACP) and, after obtaining JFC approval, pro-*

Airspace Control Authority Responsibilities

- ✦ Coordinate and integrate the use of the airspace control area.
- ✦ Develop broad policies and procedures for airspace control and for the coordination required among units within the area of responsibility or joint operations area
- ✦ Establish an airspace control system that is responsive to the needs of the joint force commander, provides for integration of the airspace control system with that of the host nation, and coordinates and deconflicts user requirements.
- ✦ Develop the airspace control plan and, after obtaining joint force commander approval, promulgate it throughout the area of responsibility or joint operations area.
- ✦ Provide the flexibility needed within the airspace control system to meet contingency situations that necessitate rapid employment of forces.
- ✦ Centralized direction by the airspace control authority does not imply assumption of operational control or

Figure 2.1. Airspace Control Authority Responsibilities

Source: Joint Pub 3-52

mulgates it throughout the AOR/JOA. Implementation of the ACP takes place through the airspace control order (ACO) which must be complied with by all components, as described in Joint Pub 3-56.1, *Command and Control for Joint Air Operations*, and Joint Pub 3-52, *Doctrine for Joint Airspace Control in the Combat Zone*. 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. *However, centralized direction by the ACA through the ACO and ACP does not imply assumption of operational or tactical control over any air assets.* 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 above.

Area Air Defense Commander

The JFC will normally designate an AADC, the single commander responsible for air defense (i.e., protection of friendly forces and other vital targets 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. Normally, this will be the component with the preponderance of air defense capability and 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 area air defense plan and, after obtaining JFC approval, promulgates it throughout the AOR or JOA. The responsibilities of the AADC are interrelated with those of the ACA.* For a detailed discussion of the AADC, see the 3-01 series of Joint Pubs.

Other Component Commanders

Each component commander advises the JFC on the employment of forces. The JFACC, in cooperation with other components, plans and executes AOR- or JOA-wide air 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 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 airspace control measures 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 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.*

THE AIRSPACE CONTROL PLAN

The ACA prepares the ACP, which is approved by the JFC, to establish procedures for the airspace control system in the joint force AOR or JOA. An example of the topics that should be considered when developing an ACP is provided in appendix A, "Airspace Control Plan." *The ACP must be coordinated with the area air defense plan and included in joint operations plans.* These documents must be coordinated to facilitate continued operations in the event of degraded command and control systems. *The ACP must consider procedures and interfaces with the international or regional air traffic systems necessary to facilitate the flow of air traffic into and out of the AOR or JOA.*

Coordination with the Host Nation

The ACP should be coordinated both with representatives of the host nation(s) in whose airspace the operations will take place and with representatives of civil air activities operating in or near the airspace. There also should be close planning and coordination between representatives of both offensive and defensive weapon systems of US and multinational armed services.

Integration with Civil and Military Air Operations

Broad areas of concern for developing the ACP include familiarity with the basic operation plan and 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. Airspace control activities must integrate surface-to-air defense weapons and air defense aircraft for maximum effectiveness.

Transitions from Peace to War and War to Peace

The ACP needs to support an orderly transition from peacetime to combat and back to peacetime operations. Such a transition could occur during a period of increasing tensions or suddenly without much warning.

Airspace Control Plan Considerations

- ✧ Procedures that include rules of engagement, disposition of air defense weapon systems, such as air defense fighters, air defense artillery, surface-to-air missiles, and air defense command and control operations.
- ✧ Air, land, and maritime situations in the area of responsibility or joint operations area such as existing equipment limitations, electronic warfare, and C⁴ requirements that may adversely affect adherence to the airspace control plan.
- ✧ Anticipated restricted areas based on initial deployment of friendly air, land, maritime, and special operations forces and bases.
- ✧ Existing air traffic control areas, base defense zones, controlled or uncontrolled airspace, and overflight of neutral nations.
- ✧ Mission profiles, combat radii, and IFF or other identification capability of aircraft that will operate in the area of responsibility or joint operations area.
- ✧ Enemy air defense weapons capabilities, deployment, and electronic attack and deception capabilities.
- ✧ Emergency procedures for aircraft experiencing difficulties (to include IFF problems).
- ✧ Procedures for day or night operations and for aircraft experiencing adverse weather.
- ✧ Procedures for en route and terminal-area air traffic control procedures for aircraft transitioning to and from the battle area that complement planned combat requirements.
- ✧ Procedures to support surge operations requiring high volumes of air traffic.
- ✧ Enemy offensive air capabilities. Additionally, the vulnerability of defensive counterair aircraft to enemy surface-to-air missiles and the vulnerability of friendly surface-based air defenses to enemy long-range artillery

Figure 2.2. Airspace Control Plan Considerations

Source: Joint Pub 3-52

Airspace Control Measures

Airspace control measures (ACMs) are the means to define controlled sub-areas within a given airspace. They are referred to as zones, areas, corridors, etc. in their descriptions and define airspace restrictions, access, and control and coordination procedures. A list of ACMs is at appendix B. *The ACP should specify what ACMs are to be used in the AOR or JOA and how these measures will be promulgated. The ACP also should include fire support coordination measures and all Service and component-unique airspace control measures and terms.*

Air Traffic Control Integration with Airspace Control

The ACP should provide procedures to fully integrate the resources of military air traffic control (ATC) 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 consistent with the ACP and operations in the combat zone. Airspace control and area air defense operations need to be capable of functioning in a degraded environment. Detailed engagement procedures and decentralized execution are key to operating in a degraded environment.*

CHAPTER THREE

DEVELOPING THE AIRSPACE CONTROL SYSTEM

GENERAL

Developing an airspace control system requires a great deal of planning by the ACA. The airspace will likely be used by all the Service components. Depending on the situation, the airspace environment may transition from combat to peacetime and back to combat. *As such, air defense methods of controlling and identifying aircraft within the airspace and enemy engagement must be addressed.*

OPERATIONAL REQUIREMENTS

Each AOR or JOA has specific operational requirements for air-space control. 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*

The ACO often exceeded 100 pages in length during DESERT STORM. There were as many as 980 daily sorties during DESERT SHIELD and over 2,800 sorties during the 100 hours of DESERT STORM. These sorties involved 122 different air refueling tracks, 660 restricted operating zones, 312 missile engagement zones, 78 strike corridors, 92 combat patrol points and 36 training areas alone, spread out over 93,600 square miles.

All of this had to be superimposed upon and thoroughly coordinated with the continually shifting civil airways of six independent nations. This civil coordination step involved placing 357 USAF controllers, 55 of which were liaison personnel at the air traffic control intercept facilities of the host nations in the Gulf region.

The First Information War: The Story of Communications, Computers, and Intelligence Systems in the Persian Gulf War
Armed Forces Communications and Electronics

important considerations. Rules of engagement, disposition of air defense weapons, fire support plans, and procedures for identifying US and multinational aircraft are also important items that should be considered. 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.

PLANNING CONSIDERATIONS

Planning Process

For situations requiring significant involvement of Air Force forces, the Air Force component should identify an appropriate commander, as soon as feasible, to the geographic unified commander. **Once appointed, this commander should rapidly assemble a joint staff representing all airspace control 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 air defense plan 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 to execute the air defense plan must be planned and integrated 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 air operations plan. *Input from all organizations involved in the conflict must be consolidated, and the final ACP must be devised and disseminated to users.* The ACP can be added as an appendix to the operations annex of the joint force operation plan or the overall air operations plan.

Volume of Air Traffic

Planning for airspace control in the combat zone must consider the aircraft traffic volume for the anticipated offensive operations and the timing constraints placed on those operations. *Planning must fully integrate combat airspace management, air traffic control, and air weapons control with air defense operations to respond to enemy actions quickly and with adequate force.*

Degraded Operations

Plans should anticipate the effects of information warfare and communications degradation on system operations. *An effective airspace control system needs to plan for the full spectrum from no degradation to full degradation of communications.* Plans also should consider the effects of weather and darkness.

TRANSITION FROM PEACETIME TO COMBAT OPERATIONS

JFCs should have both an ACP that is continually updated in peacetime and throughout the evolution of a campaign and a standing ACO to provide airspace control in the event of surprise attack. 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 military operations other than war, 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 structures may be overwhelmed by massed enemy attacks over small geographic areas. These massed attacks may be heavily supported by electronic and communications jamming. Once the scope and nature of enemy massed operations are determined, friendly air defenses can be massed within the AOR or JOA to counter the enemy threat.

INTEGRATION OF AIRSPACE CONTROL AND AIR DEFENSE OPERATIONS

Because the two functional areas of airspace control and air defense operations would conflict and interfere with each other if operating independently, prioritization and integration of each mission is 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 air operations center.



Surface-to-air weapons such as Theater High-Altitude Air Defense and Linebacker are used against ballistic missile threat.

Area Air Defense Commander—the Prime Integrator

In accordance with JFC guidance, the AADC must mesh all joint forces into an integrated air defense system that can respond to the array of enemy threats by optimizing employment of all friendly air defense forces. *The JFC, through the AADC, must ensure 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.

Surface-to-Air Weapons

Air defense units must be free to engage hostile aircraft within prescribed air defense procedures promulgated by the AADC. **ACMs should not unduly restrain surface-to-air weapons systems so as to put them at increased risk of enemy air attack.** *Procedures may 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, geographic, and maneuver 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.

Flexibility of Procedures

Air defense systems might be overwhelmed by massed enemy attacks across limited geographic areas along the front. **Highly flexible airspace control procedures are necessary to respond to potential threats.** *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.* The problem of identifying friendly and enemy aircraft during the heat of battle and employing air defense forces against these enemy elements is a highly complex task.

METHODS OF IDENTIFICATION

The methods of identification and levels of airspace control vary throughout the spectrum of military operations that include both combat and non-combat activities. *The methods of identification employed within an AOR or JOA are positive, procedural, and a combination of the two.* The airspace control structure needs to be responsive to evolving enemy threat conditions and changing tactical situations. It is up to the JFC, through the ACA, to decide the appropriate method to use based on the concept of operations.



The Airborne Warning and Control System electronically identifies friends through the use of identification friend or foe and selective identification feature interrogators.

★ *Positive identification: Identification is determined by visual recognition, electronic support systems, non-cooperative target recognition systems, identification friend or foe/selective identification feature 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 airspace control measures and rules. Identification is assumed to be friendly as long as rules are followed, but identification is assumed hostile if rules are not followed and the suspect vehicle is not otherwise positively identified.* Examples of procedural identification are minimum-risk routes 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 friends but are **not** used to identify hostiles. Visual and electronic systems may be used to identify friends and hostiles. Stated another way, procedural measures may be used to identify friends but positive techniques **must** be used to identify hostiles.*

LEVELS OF AIRSPACE CONTROL

The degree of control held at higher echelons of command is situation dependent and relies on the ability to maintain situational awareness and communicate orders.

- ✦ *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 or JOA. 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 negotiation, which progressively pulls authority back from subordinate echelons). In air defense, centralized control is the 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 centralized control operations.*
- ✦ *Decentralized Control. In air defense, decentralized control is the normal 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 hostile targets. Autonomous operations will be in accordance with the rules of engagement and weapons control status established by the AADC in the ADP.*

ENGAGEMENT OF ENEMY AIR THREATS

Engagement of enemy air threats by friendly air, land, and maritime assets must be fully coordinated and, if appropriate, 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 or JOA and in coordinating and disseminating 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 information flow. Also, joint planning and coordination are extremely important and necessary to optimally deploy air defense assets prior to the start of hostilities.

Joint Engagement Zone Operations

The joint engagement zone (JEZ) is airspace of defined dimensions within which multiple air defense systems (surface-to-air missiles and aircraft) are simultaneously employed to engage air threats. Operations in the JEZ involve air defense weapon systems of one or more Service components, simultaneously and in concert, engaging enemy airpower in the same airspace. Successful JEZ operations depend on correctly identifying friendly, neutral, and enemy aircraft and properly allocating and coordinating air defense systems to avoid duplication of effort. *Positive identification can ensure that real-time engagement tasks 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. Without effective command and control, a JEZ is extremely difficult to implement safely.* Combined fighter and missile en-

engagement zones operations present the enemy with the dilemma of defending against two entirely different weapon systems, greatly decreasing enemy survivability.

Fighter Engagement Zone Operations

In fighter engagement zone (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 (i.e., land and sea) and short-range air defense systems and are an alternative engagement operation if the detailed control aspects of joint engagement operations cannot be met. Situations that may require massed combat airpower to defeat enemy efforts are highly dependent on coordination and flexibility within the airspace control system in the combat zone. *Under FEZ operations, surface-to-air missile systems are not allowed to fire weapons unless targets are positively identified as hostile and assigned by higher authority, or unless they are firing in self-defense.*



Within the fighter engagement zone, fighters such as the F-15 (above) and the F-16 (right) engage hostile aircraft. Giving fighters engagement responsibility enhances flexibility.

offer great ability for the JFC to respond immediately with fighter assets to an enemy air offensive regardless of its location. *Within the airspace control area, FEZ operations should*



not result in undue restraints on the ability of surface-based air defense systems to engage the threat.

Missile Engagement Zone Operations

In missile engagement zone (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*



Patriot air defense missile systems engage hostiles within the missile engagement zone. Friendly aircraft avoid this zone to reduce possible fratricide.

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 or disrupt massed enemy air attacks prior to committing fighter assets. Properly employed, MEZ operations are effective across the full range of air defense operations and enemy threats; further, these 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

As discussed, the ACA and the AADC are normally the same person. This is extremely important in maintaining the 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 ACA can authorize deviations from established policies and procedures.* In these exceptional situations, the ACA should notify all affected air defense assets and airspace users prior to authorizing deviations. The JFC also should be informed as soon as possible.
- ★ *When the circumstances of a contingency situation necessitate 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 plan-

ning 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 air 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 development of procedural identification measures to compensate for this degradation.* Thorough planning is required to preclude electronic warfare efforts from unduly degrading air defense and airspace control efforts.

CHAPTER FOUR

AIRSPACE CONTROL FOR SPECIFIC MISSIONS

GENERAL

This chapter discusses missions that may be a sub-element of a larger operation or may not exactly fit into the category of full-scale combat operations. **To accomplish a specified mission or at the direction of the JFC, the ACA may assign a portion of airspace to a subordinate commander.** 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 minimal 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.*

CONTROL OF AN AMPHIBIOUS OBJECTIVE AREA

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 airspace of defined proportions to include the amphibious objective area (AOA).



The USS Essex conducting amphibious operations to support the commander, amphibious task force.

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. **To ensure unity of effort in overall air operations, 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.**

Transfer of Authority to the Commander, Landing Force

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 commander, landing force. At the discretion of the CATF, airspace control and the control of air operations in the AOA are passed to the commander, landing force, 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.

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 JFC's initiating directive. Approved missions will be reflected in the standard joint forces air tasking order (ATO) as described in Joint Pub 3-56.1, *Command and Control for Joint Air Operations*.

Other Information on Amphibious Operations

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

Maritime Airspace Sector Commander Coordination Responsibilities

- ✦ 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 commander.
- ✦ Procedures for deconfliction of operations during transitional operations and during operations in overlapping airspace areas.

**Figure 4.1. Maritime Airspace Sector Commander
Coordination Responsibilities**

Source: Joint Pub 3–52

MARITIME MISSIONS

The variety of organic weapons within the carrier battle group 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 carrier battle group 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 above in figure 4.1.

MILITARY OPERATIONS OTHER THAN WAR

US Air Force forces must be ready to undertake a variety of missions. Military operations other than war (MOOTW) are generally confined to a specific geographic area and are often characterized by constraints on the forces, weapons, tactics employed, and the level of violence permitted. **Depending on the environment, mission, and location throughout the range of military operations, the degree of control may need to be rigorous and the rules of engagement more restrictive.** This is especially true in an environment that can transition quickly from combat to noncombat and back again and has numerous constraints in place.

Any required changes or waivers to national regulations, as well as problems resulting from restrictions to military operations, should be forwarded to the JFC, who may refer them through diplomatic channels for resolution.

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 fratricide, all missions must appear on the ATO. However, in cases of high-density aircraft operations, such as an AOA, defined 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 identification friend or foe or selective identification feature modes and codes, which must be appropriately checked prior to mission start. This type of rigorous control is necessary because the mix of friendly, enemy, and neutral aircraft and mission constraints require the JFC to strictly control flights in the AOR or JOA.* The airspace control methods the ACA recommends to the JFC need to be continually evaluated for effectiveness and efficiency as the environment and mission change.

Foreign Internal Defense or Low Air-Threat Situations

When supporting foreign internal defense or low air-threat situations, the host nation is the primary agent in support activities.

- ✦ *Airspace control in a foreign internal defense situation is based on air traffic regulations and control of civil and military airspace users. In these situations, the ATC system of the host nation frequently provides the framework around which most of the airspace control in the combat zone 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 all flight operations be planned and coordinated with the appropriate ATC systems of the nations involved. Adherence to International Civil Aviation Organization regulatory procedures must also be considered.

Force Protection

A primary concern in force protection is safeguarding personnel, units, and facilities from asymmetrical threats (e.g., terrorist acts). The measures adopted and implemented by command directives dictate how airspace will be used and the airspace control function performed. Force protection operations will overlap all aspects of military operations to some degree. Force protection measures can have an impact on air traffic control and on the operations of air terminals, aerial ports, airfields, and heliports. The use of restricted areas around sensitive facilities is commonplace.

Other Types of Military Operations Other than War

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 adapt 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, and*
- ✦ *Timely and effective implementation of appropriate airspace control procedures if hostilities ensue.*

UNMANNED AERIAL VEHICLES

The established principles of airspace management used in manned flight operations will normally apply to unmanned aerial vehicle operations as well. *The unmanned aerial vehicle is generally difficult to*



The Predator's low observability requires special consideration in the airspace control order.

*acquire and does not provide a clear radar signature, presenting a potential hazard to high-performance aircraft; therefore, operations involving these vehicles must be included in the ATO and coordinated with all appropriate airspace control agencies to provide safe separation of unmanned and manned aircraft as well as preventing engagement by friendly forces. Specific information can be found in Joint Pub 3-55.1, *Unmanned Aerial Vehicles*.*

CHAPTER FIVE

AIRSPACE CONTROL EXECUTION: THE US AIR FORCE THEATER AIR CONTROL SYSTEM

For Operation DESERT STORM, “On the ground the Tactical Air Control Center at the air component level (under the JFACC) had overall responsibility for real-time force allocation. Two Control and Reporting Centers helped manage the air situation... Air Support Operations Centers were the Air Force planning elements located at the Corps... Airborne elements included the Airborne Warning and Control System, the EC-130 Airborne Battlefield Command and Control Center, and the Joint Surveillance Target Attack Radar System, as well as forward air control aircraft. The different elements had different functional and geographic responsibilities, which changed over time. Changes (to the airspace control order) were reported in the Special Instructions...” and control units “... could make on-the-spot decisions to execute the air tasking order.”*

**Note: The Tactical Air Control Center was the predecessor of the Air Operations Center.*

James A. Winnfield, Preston Niblack, and Dana J. Johnson

GENERAL

The Air Force airspace C² system is a reflection of the airpower tenet of centralized control and decentralized execution. The Air Force Theater Air Control System (TACS) provides the Air Force component commander with the means to achieve these principles. Elements of the TACS may be employed in garrison, deployed for contingencies, or deployed to augment theater-specific systems. Advances in communications and data-link capabilities have given the JFACC the ability to tailor the configuration of the TACS to meet the dynamics of an operation. *While sometimes configured differently in the various theaters of operations, the ba-*

sic functions performed by the TACS are the same. The TACS is the JFACC's executor for the air defense plan, ACP, and ACO.

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 following 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 Air Force Tactics, Techniques, and Procedures 3-1, Vol. 26, *Theater Air Control System*.

AIR OPERATIONS CENTER

The air operations center (AOC) is the senior element of the TACS. It provides centralized planning, direction, control, and coordination of air operations. *Within the AOC, the airspace management and control team coordinates and integrates the use of airspace in a combat area. Integrated into both the combat plans division and the combat operations division within the AOC, the airspace management and control team accomplishes combat airspace planning and execution.* Within the combat plans division, team members write the ACP and the ACO for the ACA. The combat operations division monitors the ACO and makes immediate changes to it as the progress of the battle 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. A diagram of a notional AOC organization is shown below.

Air Mobility Division

The air mobility division plans, tasks, coordinates, and executes air mobility missions. Located in the AOC, it is under the direction of the director of mobility forces. *While it does not have a direct role in airspace*

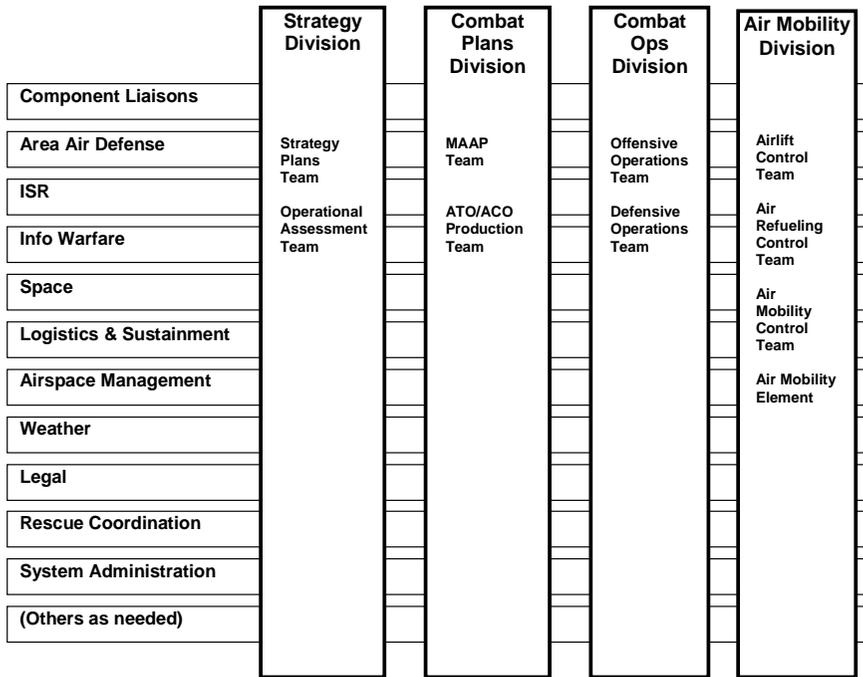


Figure 5.1. Notional Air Operations Center

Source: AFDD 2

control, it provides expertise to integrate the air mobility mission into the air-space control system and provides information for the development of airlift corridors and aerial refueling tracks that are incorporated into the ACP and ACO. Additionally, the air mobility division disseminates ACP and ACO information to inter-theater mobility assets. Its four elements are:

- ✦ Air Mobility Control Team—Serves as the director of mobility forces' centralized source of air mobility C³ during mission execution.
- ✦ Airlift Control Team—Plans, coordinates, manages, and executes inter-theater airlift operations in the JOA.
- ✦ Aerial Refueling Control Team—Coordinates aerial refueling planning, tasking, and scheduling to support combat air and strategic air bridge operations.
- ✦ Air Mobility Element—Integrates and coordinates Air Mobility Command inter-theater air mobility mission and assets supporting theater operations.

Component Liaisons

Each 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 ACP and ACO. **The special operations component commander is represented by the special operations liaison element. Additionally, the other Services have liaisons in the AOC. The battlefield coordination detachment represents the Army, while the Navy and amphibious liaison element articulates Navy and Marine interests, unless a separate Marine liaison officer is designated.**

GROUND TACS ELEMENTS

Control and Reporting Center

The control and reporting center (CRC) is directly subordinate to the AOC and is the senior TACS radar element responsible for the decentralized execution of air defense and airspace control. It also serves as the primary command, control, and surveillance facility within the TACS. The AOC assigns the CRC a geographic AOR within which the CRC 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 can be delegated to the CRC at the appropriate time 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, identi-



Communications and radar sets for the Ground Theater Air Control System enable Control and Reporting Centers and elements to perform their roles in airspace control.

fication, and link management within unit manning and equipment constraints. *In terms of airspace control, it accomplishes these responsibilities by:*

- ★ *Receiving and fusing surveillance data from organic and external sources and providing a recognized air picture to the AOC via data link(s);*
- ★ *Identifying all air tracks;*
- ★ *Assigning weapons to engage threat targets and scrambling or diverting counterair aircraft;*
- ★ *Providing positive control to aerial refueling and search and rescue missions; and*
- ★ *Complying with the ACO for air operations.*

Control and Reporting Element

The Control and Reporting Element (CRE) is a mobile radar unit subordinate to the CRC. It is used to extend surveillance radar coverage and provide positive control of aircraft. *The CRE may be capable of assuming CRC airspace control functions within unit manning and equipment constraints.*

Air Support Operations Center

The Air Support Operations Center (ASOC) is an element of the TACS directly subordinate to the AOC, but normally located with the Army corps. **The ASOC is responsible for the integration of aerospace operations that support the land component commander.** The center provides fast reaction to requests for air support and is also capable of conducting time-critical targeting within its area. The ASOC director, normally the corps liaison officer, exercises operational control of all subordinate tactical air control parties (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 the corps area of operations through the execution of joint airspace control measures, such as high-density airspace control zones and minimum-risk routes. Further, it deconflicts airspace usage with the corps' fire support element, G-3 Air, and Army Airspace Command and Control element.



The air liaison officer provides terminal attack control to close air support aircraft.

Tactical Air Control Parties

TACPs are the principal Air Force liaison elements aligned with Army maneuver units from battalion through corps and consist of air liaison officers and enlisted terminal attack controllers. TACPs advise ground commanders on the capabilities and limitations of aerospace power and provide the primary Air Force terminal attack control of close air support in support of ground forces. *They coordinate directly with Army airspace and fire support agencies to deconflict air operations in the ground sector and may employ both formal and informal fire support coordination measures to prevent fratricide or synchronize air operations with surface fire support.*

AIRBORNE ELEMENTS OF THE THEATER AIR CONTROL SYSTEM

Airborne Battlefield Command and Control Center

The primary role of the Airborne Battlefield Command and Control Center (ABCCC) is to provide C² of air assets that support the land component commander. **It can also act temporarily as an extension of the AOC for battle management and execution of the daily ATO in the close battle.** *The ABCCC can be employed in the absence of ground-based TACS elements unilaterally or with other airborne elements of the TACS. The ABCCC provides procedural (i.e., nonradar) aircraft control. It can also function in a limited role as a backup ASOC to assign or divert sorties to more lucrative targets, coordinating with the AOC and Army command and control centers.*



The abundance of communications and computer data links make the Airborne Battlefield Command and Control Center (left) an exceptional adjunct to the air operations center's command and control of the theater-wide air effort.



When working in tandem, the Airborne Warning and Control System (left) and Joint Surveillance Target Attack Radar System (right) provide the joint force air component commander the air and ground picture, enabling near real-time airspace control decisions.

Airborne Warning and Control System

The Airborne Warning and Control System (AWACS) is an airborne early warning and command and control battle management aircraft that provides a high degree of flexibility and survivability in the combat zone. It is normally one of the first battle management assets to arrive in the theater of operations. During this initial phase, it can provide airspace control and battle management functions for the AOC. **AWACS is normally subordinate to the CRC and can extend the TACS' surveillance radar coverage.** *It can also operate in lieu of the CRC, with some limitations. AWACS provides the same positive airspace control elements as the CRC.*

Joint Surveillance Target Attack Radar System

Joint Surveillance Target Attack Radar System (JSTARS) is an Air Force-Army command and control battle management system

subordinate to the AOC. It is designed to provide ground surveillance, target detection, and target-tracking capability to develop the enemy ground picture. It is used for identifying opportunities for rapid interdiction and retargeting of enemy ground forces. In terms of airspace control, the ability to continually monitor the evolving ground picture enables the AOC to establish airspace control measures such as restricted operations areas (also called restricted operations zones) in response to the threat.

OTHER ELEMENTS OF THE AIR CONTROL SYSTEM

The following elements, though not a part of the TACS, provide terminal coordination and control of air operations, therefore providing an airspace management service.

Forward Air Controller (Airborne)

The forward air controller (airborne) is an airborne extension of the TACP and has the authority to direct aircraft delivering ordnance to a specific target. It 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.

An A-10 (top) and a F-16 (bottom) functioning as a forward air controller (airborne) add great flexibility to time-critical air operations in support of ground forces.



Special Tactics Teams

Special Tactics Teams are a part of the theater special operations forces and are normally under operational control of the Joint Forces Special Operations Component Commander. Tactical control of these teams to support theater mobility operations may be delegated to the JFACC. **Special Tactics Teams establish visual and procedural terminal area airspace control (attack, command and control, and air traffic services) at remote assault (e.g., drop or landing) zones and austere or expeditionary airfields. They sustain these operations until relieved by other elements (e.g., TACP, transportable airlift control elements, or general-purpose air traffic services forces).**

RESPONSIBILITIES

The air control system can be tailored to support the Air Force tenet of centralized control-decentralized execution from the smallest MOOTW to full-scale combat operations during war. **The Air Force will provide the COMAFFOR with the resources necessary to function 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 will be distributed as a separate document or as an annex to the operations plan. It may even be incorporated into the ATO, depending on the theater. **The ACO is the implementation directive for the ACP and is disseminated either as part of the ATO or as a separate document.** *The ACO provides the details of ACMs for the next ATO-ACO cycle and includes fire support coordination measures and other information airspace users need.*

EXECUTION

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.



Aircraft with different missions have differing airspace requirements which must be resolved.

Airspace Deconfliction Procedures

The airspace management and control 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 achieved by time, altitude, space, refusal by one of the airspace users, or acceptance of the risk.*

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 identification are inherent in the TACS from the centralized facility at the AOC through the execution capability at the CRC, its subordinate units, and AWACS.*

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

Airspace control and air defense functions are integrated in both the combat planning and combat operations cells. In the combat plans division, the ground and airborne C³ *planning staff officers and other Service liaison officers integrate air defense considerations such as minimum-risk routes; identification friend or foe or selective identification feature modes and codes; fighter altitudes; and MEZ, FEZ, and JEZ areas for airspace control*



The Control and Reporting Center passes identification information to the Airborne Warning and Control System.

in publishing the ATO, ACO, and ACP. In the combat operations division, the senior operations duty officer is responsible for the execution of airspace control unless a senior air defense duty officer is appointed. In such a case, the senior air defense duty officer is responsible for the air defense portion of air operations. This organizational arrangement and further description of the specific duties of these positions in the AOC is found in AFTTP 3-1, Vol. 26.

COMMUNICATIONS AND INFORMATION MANAGEMENT

The TACS has undergone evolutionary changes 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 voice and data enhancements have enabled airborne elements of the TACS to operate directly under the AOC, with AWACS operating in lieu of the CRC and ABCCC functioning as an alternate ASOC. This provides the JFACC with a variety of employment options.*

Voice

The primary mode of communications between airspace command and control elements and airspace users is voice. Principal transmission means include very-high frequency (VHF), ultra-high frequency (UHF), high frequency, and secure communications. Recent communications improvements have improved antijam capabilities.



The communications for the Theater Air Control System include line of sight (left) and satellite (right) systems.

- ✦ *Have Quick is a frequency-hopping voice modification to the Air Force's UHF radio systems.* Many units have been fielded in Air Force aircraft and more will be incorporated as follow-on versions Have Quick II and Have Quick IIa.
- ✦ *Single-channel ground and airborne radio system, a VHF-frequency modulation family of jam-resistant radios,* is being fielded in Air Force ground TACS elements and fighter aircraft.

Data

Tactical digital information links 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 command and control of the air defense network.** Since the nodes for air defense are also the nodes for airspace control in the AOC, these rapid data transmission means can support airspace control as an ancillary function. AFTTP 3-1, Vol. 26, provides a detailed description of each link.

CHAPTER SIX

INTEGRATION OF AIR TRAFFIC SERVICES INTO THE AIRSPACE CONTROL SYSTEM

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

Doctrine for Joint Airspace Control in the Combat Zone
Joint Pub 3-52

AIR TRAFFIC CONTROL'S ROLE

The role of the terminal airfield operations element (air traffic control and airfield management) is to support combat flight operations. This information supplements guidance contained in Joint Pub 3-52, *Doctrine for Joint Airspace Control in the Combat Zone*, and Allied Tactical Publication 40, *Doctrine for Airspace Control in Times of Crisis and War*.

AIR TRAFFIC CONTROL'S FUNCTION IN THE AIRSPACE SYSTEM

Close coordination between airspace control, air defense, and air traffic control (tactical aspect of air traffic control) elements is required to maximize combat effectiveness while preventing fratricide and mutual interference. **Terminal area air traffic services and airfield management must be capable of supporting operations as required by the JFC.** US Air Force Deployable Air Traffic Control and Landing Systems (DATCALS) provide air traffic control in support of terminal flight operations. *DATCALS are designed to ensure safe, flexible, and efficient use of terminal airspace. DATCALS also provide continuity of control with the TACS and air base defense.* 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.

Flight Following Mechanisms

Normally, the air traffic control system 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.

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 means must be available.*

Airfield Management

Airfield management provides notice to airman receipt and flight planning. It also provides airfield criteria for inspections, markings, safety, security, parking plans, and munitions and hot fuel areas.

Airfield Operations

Airfield operations 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 special tactics teams by follow-on, general-purpose air traffic service forces.

PLANNING

Commanders must determine the forces required, the arrival sequence, and 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 because 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.

Air traffic controllers are assigned to the numbered air forces as combat airspace managers to support the Air Force or the JFC in the AOC. Their duties include ACO development and production, as well as planning for the full range of airfield operations to support deliberate and crisis-action planning, deployment, employment, sustainment, and redeployment of airfield operations forces.

Airfield operations personnel provide liaison support to the various worldwide cells or theater staffs to ensure the United States and its allies can quickly apply global power to crisis situations anywhere in the world by delivering combat air and ground forces.



The C-17 Globemaster's ability to operate on unimproved runways greatly enhances inter- and intratheater airlift.

Combat-Specific Training

Airspace control in the combat zone relies heavily on specific procedures and combat-ready personnel. Airspace control procedures and personnel must be trained and exercised in peacetime to be effective in combat. This is particularly true of air traffic control procedures and personnel. *Service component air traffic controller training should be augmented by combat-specific air traffic control training.*

CAPABILITIES

Airfield operations personnel and DATCALs provide the full range of support from initial visual flight rules and limited instrument flight rules capability to host nation liaison and augmentation. *General-purpose DATCALs and airfield operations personnel provide terminal area and airfield support from austere to fully supported host-nation air-*



Special Tactics Teams secure an area to establish airfield operations.

support in a bare-base environment, only special tactics teams are organized, trained, and equipped to provide the entire range of austere airfield operations to include aircraft marshaling, loading and off-loading, and forward area rearming and refueling point operations. The teams are tasked through the special operations component within the theater and execute special operations forces missions, strategic and theater airlift missions, and other missions with special operation and non-special operations forces. *Special tactics teams consist of combat controllers, pararescuers, and combat weathermen who are organized, trained, and equipped to establish and control the air-ground interface in the objective area. Functions include assault-zone assessment, establishment, and control; combat search and rescue; trauma medical treatment; special operations terminal attack control; and tactical weather observations and forecasting. Capabilities include visual control tower, navigational aids, and a precision-landing system (i.e., the Mobile Microwave Landing System).*

Bare-Base Support

Air Force general purpose (i.e., reserve and active duty) initial air traffic services may consist of a high mobility multipurpose wheeled vehicle with radios from either fixed base wing initial communication/mobility initial communication packages or com-

fields with mobile control tower, surveillance radar, precision-landing system, terminal navigational aids space- and ground-based capabilities, or any combination of these. Austere airfield operations can be provided by special tactics teams. General purpose (i.e., reserve and active duty) 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 a special tactics team core competency. While other forces have the ability to provide ATC



Radar approach control services may be available at more mature locations.

bat communication groups and Air National Guard squadrons. Its 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 and positive or procedural control measures as required by environmental factors and density and complexity of air traffic and airspace.

Mature Capabilities

General-purpose DATCALs equipment such as the control tower and radars are not considered to be a “first-in” capability because of its size, limited movement, and airlift constraints. However, as the location matures, this equipment may become available to enhance air traffic control capabilities.

Future Capabilities

Future capabilities should include automation; reliable, jam-resistant, secure radios; the full range of identification, friend or foe or selective identification feature; and the capability to interface electronically and digitally with both the TACS and ground-based air defense systems.

SAFETY AND STANDARDIZATION

To enhance safety and standardization, International Civil Aviation Organization air traffic phraseology shall be used to the maximum extent possible. **Terminal airspace control will follow procedures published**

in the ACP, amplified by the ACO and special instructions 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. In addition, Air Force controllers who augment a host service facility will comply with the procedures of the host service branch.

APPENDIX A

AIRSPACE CONTROL PLAN

1. Purpose

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

2. 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 area of responsibility (AOR) or joint operations area (JOA) within which the ACP applies.
- C. Appointment of the airspace control authority (ACA); location of ACA headquarters.
- D. List of the capabilities that exists within the joint force and in the AOR or JOA to provide airspace control (ground sites and airborne capability) and means of communicating with those elements.
- E. Description of the duties and responsibilities of:
 - (1) The ACA.
 - (2) Each airspace user within the joint force (to include requirements for liaison to and coordination with the ACA).
 - (3) Each element used in the airspace control system (site, facility, or airborne platform).
- F. Description of the interface between the joint force air component commander (JFACC), ACA, the area air defense commander (AADC), and fire support coordination elements and the proce-

- dures 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 International Civil Aviation Organization.
 - H. Description of the interface between the tactical air control system(s) and the elements within those systems for air traffic control.
 - 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 control measures and procedures for the joint force.
 - L. Description of the procedures to propose, approve, modify, and promulgate each procedural airspace control measure available for use within the AOR or JOA (high-density airspace control zone, joint engagement zone, fighter engagement zone, missile engagement zone, medium-risk route, low-level transit route, coordinating altitude, air routes, corridors, restricted operations zones, and other appropriate procedures).
 - M. Description of identification friend or foe or selective identification feature procedures.
 - N. Description of orbit procedures.
 - O. Description of procedures, systems to compile and promulgate the airspace control order that provides airspace control procedures and guidance in effect for the specified time period. The airspace control order would normally contain:
 - (1) Modifications to guidance and procedures contained in the ACP.
 - (2) Active or current identification friend or foe or selective identification feature procedures.
 - (3) Location and procedures associated with active procedural airspace control measures (high-density airspace control zone, joint engagement zone, fighter engagement zone, missile en-

gagement zone, medium-risk route, low-level transit route, coordinating altitude, air routes, corridors, restricted operations zones, and other appropriate procedures).

- (4) Procedures for entering and transiting active restricted operations zones (e.g., amphibious objective area, naval control zones).
- (5) Location of active orbit areas.
- (6) Active unmanned aerial vehicle launch and recovery areas and mission areas.

APPENDIX B

PROCEDURAL AIRSPACE CONTROL MEASURES

1. Air Corridor
 - A. Description. A restricted air route of travel specified for use by friendly aircraft and established to prevent engagement by friendly forces.
 - B. Uses. Air corridors are used to route air traffic, including airlift and civilian traffic, within the area of responsibility. Altitudes of air corridor(s) are established in the airspace control order (ACO).
 - C. Point of Contact (POC). ACA
2. Air Defense Action Area
 - A. 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.
 - B. 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.
 - C. POC. Area air defense commander (AADC).
3. Air Defense Area
 - A. Description. An air defense area is a specifically defined airspace for which air defense must be planned and provided.
 - B. Uses. An air defense area defines, in an area of operations, the area to be defended.
 - C. Considerations. An air defense area is a planning or division-of-responsibility aid; it is not used as an airspace control measure.
 - D. POC. AADC.
4. Air Defense Identification Zone
 - A. Description. An air defense identification zone (ADIZ) is airspace of defined dimensions within which the ready identification, lo-

cation, and control of airborne vehicles are required. This appendix provides a description, considerations, and uses of service measures for controlling airspace. The following airspace control measures are provided to aid in defining airspace control requests, orders, and plans. A sample airspace control request is provided in the annex to this appendix.

- B. Uses. Associated with nations or areas of operation, the ADIZ is normally the transition between procedural control areas (outside) and the positive control areas (inside). Typically, ADIZ is used for sovereign national boundaries, or in the case of areas of operations, for identification into the rear areas.
 - C. Considerations. See flight information publications and International Civil Aviation Organization publications for theater-specific ADIZ and associated procedures and limitations.
 - D. POC. AADC.
5. Air Defense Operations Area
- A. Description. An air defense operations area and the airspace above it is an area within which air defense procedures are specified. It may include designation of one or more of the following:
 - (1) Air defense action area.
 - (2) Air defense area.
 - (3) Air defense identification zone.
 - (4) Firepower umbrella.
 - B. Uses. Air defense operations areas are established to minimize mutual interference between air defense and other operations. These areas are not used for airspace control but aid planning and division of responsibilities. From an airspace control perspective, these areas provide airspace users with the location of air defense operations for mission planning purposes.
 - C. Considerations. See individual descriptions for air defense action area, air defense area, air defense identification zone, and firepower umbrella in this section.
 - D. POC. See individual descriptions for air defense action area, air defense area, air defense identification zone, and firepower umbrella in this section

6. Air Refueling Area
 - A. 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.
 - B. Uses. Establishes a separate block of airspace dedicated to aerial refueling operations
 - C. POC. ACA
7. Airspace Control Area
 - A. Description. An airspace control area is airspace that is laterally defined by the boundaries of an area of operations. The airspace control area may be divided into airspace control sectors.
 - B. Uses. Airspace control areas are a means of planning or dividing responsibility.
 - C. Considerations. Geographically defined, an airspace control area may include political boundaries.
 - D. POC. ACA.
8. Airspace Control Sector
 - A. 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.
 - B. 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.
 - C. Considerations. An airspace control sector interface with the airspace control system needs to be developed.
 - D. POC. Airspace control sectors are designated by the ACA in consideration of joint force component, host-nation, and multinational airspace control capabilities and requirements.
9. Airspace Coordination Area
 - A. Description. An airspace coordination area is a three-dimensional block of airspace of defined dimensions and used as a restrictive fire support coordination measure.
 - B. Uses. An airspace coordination area is used primarily in close air support situations for high-volume fire. Friendly aircraft are re-

sonably free from friendly surface fires with artillery, helicopters, and fixed-winged aircraft given specific timing, lateral, or altitude restrictions within which to operate.

- C. Considerations. Timely implementation of the area is dependent on the ground situation. The burden of deconfliction rests with the ground commander.
 - D. POC. An airspace coordination area is established by the ACA at the request of the appropriate ground commander.
10. Amphibious Defense Zone
- A. Description. An amphibious defense zone is the area encompassing the amphibious objective area (AOA) and additional adjoining airspace as needed for the accompanying naval force for the purpose of air defense.
 - B. Uses. An amphibious defense zone provides an anti-air warfare area for protection of the amphibious task force.
 - C. Considerations. If an amphibious defense zone overlaps other land-based air defense areas, appropriate coordination for division of responsibilities and boundaries must be conducted.
 - D. POC. Commander, amphibious task force (CATF).
11. Amphibious Objective Area
- A. 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.
 - B. Uses. With respect to airspace control, an AOA allows the CATF freedom of air operations within the AOA.
 - C. 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.
 - D. POC. Joint force commander (JFC) .

12. Base Defense Zone

- A. Description. A base defense zone (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 identification friend or foe procedures established.
- B. 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.
- C. Considerations. See short-range air defense engagement zone in this appendix.
- D. POC. AADC.

13. Coordinating Altitude

- A. Description. A coordinating altitude is a procedural method to separate fixed- and rotary-winged 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 forward line of own troops. The coordinating altitude does not restrict either fixed- or rotary-winged aircraft when operating against or in the immediate vicinity of enemy ground forces. Fixed- or rotary-winged 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.
- B. Uses. Coordinating altitude allows procedural separation of aircraft types.
- C. Considerations. See-and-avoid procedures are used during visual meteorological conditions.
- D. POC. The coordinating altitude is normally specified in the airspace control plan, which is approved by the JFC.

14. Falcon Radials

- A. Description. Falcon radials are the planned magnetic bearings along which aircraft depart or return to aircraft-capable ships.

B. Uses. Falcon radials provide tracking, control, and assistance to friendly aircraft within the anti-air warfare surveillance area of the battle group.

C. POC. Anti-air warfare commander.

15. Fighter Engagement Zone

A. Description: Fighter engagement zones (FEZ) 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. A FEZ is an air defense control measure.

B. Uses. From an air defense perspective, a 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, a FEZ provides airspace users with location of the engagement zone for fighter aircraft for mission-planning purposes.

C. Considerations. Coordination and flexibility within the combat airspace control system may be a limiting factor with a 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.

D. POC. AADC.

16. Firepower Umbrella

A. 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.

B. POC. Anti-air warfare commander.

17. Helicopter Corridor

- A. Description. A helicopter corridor is a restricted air route of travel specified for use by friendly—primarily Army—aircraft and established to prevent engagement by friendly forces.
- B. Uses. Helicopter corridor procedures are used to route aviation combat elements between such areas as forward arming and refueling points, holding areas, and battle positions. Altitudes of a helicopter corridor do not exceed the coordinating altitude, if established.
- C. POC. If a coordinating altitude has been established, an air corridor is implemented by the using authority and coordinated with the ACA. If a coordinating altitude has not been established, an air corridor is established by the ACA at the request of the appropriate ground commander.

18. High-Altitude Missile Engagement Zone

- A. Description. Normally applied to long-range surface-to-air missiles, a high-altitude missile engagement zone (HIMEZ) will limit the volume of airspace within which these weapons may conduct engagements without specific direction of the AADC. A HIMEZ is an air defense control measure.
- B. 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, a HIMEZ provides airspace users with location of the engagement zone of a high-altitude missile system for mission planning purposes.
- C. Considerations. Design of the HIMEZ is contingent on specific weapon system capabilities.
- D. POC. AADC.

19. High-Density Airspace Control Zone

- A. Description. A high-density airspace control zone (HIDACZ) is an area where there is a concentrated employment of numerous and varied weapons or airspace users. A HIDACZ has defined dimensions that usually coincide with geographical features or navigational aids. Access to and air defense weapons status within this zone is normally approved by the appropriate commander.

- B. Uses. A HIDACZ allows ground/Marine air-ground task force commanders to restrict a volume of airspace from users not involved with ongoing operations. This zone restricts use of the airspace because of the large volume and density of fires supporting the ground operations within the described geographic area.
- C. 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:
 - (1) Minimum risk routes into and out of the HIDACZ and to the target area.
 - (2) Air traffic advisory as required. Procedures and systems also must be considered for air traffic control service during instrument meteorological conditions.
 - (3) Procedures for expeditious movement of aircraft into and out of the HIDACZ.
 - (4) Coordination of fire support, as well as air defense weapons control orders or status within and in the vicinity of the HIDACZ.
 - (5) Location of enemy forces inside of and within close proximity to the HIDACZ.
- D. POC. A HIDACZ is nominated by the ground commander and approved by the ACA.

20. Joint Engagement Zone

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

21. Low-Altitude Missile Engagement Zone

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

22. Low-Level Transit Route

- A. Description. A low-level transit route (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 by the North Atlantic Treaty Organization (NATO) .
- B. Uses. A LLTR normally is used by high-performance aircraft. LLTR is an airspace control measure in NATO operations.
- C. Considerations. LLTR is a procedural method. See NATO Regional Airspace Control Plans.
- D. POC. ACA.

23. Minimum Risk Route

- A. Description. A minimum-risk route (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. These routes are established considering the threat, friendly operations, known restrictions, known fire support locations, and terrain.
- B. Uses. An MRR is an airspace control measure used primarily by cross-forward line of own troops operations. Close air support aircraft do not usually use MRRs in the vicinity of the target area.
- C. Considerations. MRRs are established based on known threats.
- D. POC. ACA.

24. Positive Identification Radar Advisory Zone

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

25. Restricted Operations Area

- A. Description. A restricted operation area 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.
- B. Uses. A restricted operations area is an airspace control measure used to separate and identify areas. For example, artillery, mortar, naval gunfire support, unmanned aerial vehicle operating areas, aerial refueling, concentrated interdiction areas, areas of search and rescue, special operations forces operating areas, and areas in which the AADC has declared "weapons free." Commonly used for drop zones, landing zones, search and rescue areas, unmanned aerial vehicle launch and recovery sites, unmanned aerial vehicle mission areas, and special electronics mission aircraft.
- C. Considerations. Restricted operations areas can adversely affect air defense operations; therefore, air defense missions generally have priority over them.
- D. POC. ACA.

26. Return To Force

- A. Description. A return to force is a planned route profile for use by friendly aircraft returning to an aircraft-capable ship.
- B. Uses. A return to force provides a means for easily identifying friendly aircraft.
- C. POC. AAWC.

27. Short-Range Air Defense Engagement Zone

- A. Description. Areas of short-range air defense engagement zone (SHORAD) deployment may fall within a LOMEZ or HIMEZ. It is

possible that SHORAD assets may solely defend some areas. A SHORAD engagement zone (SHORADEZ) can be established to define the airspace within which these assets will operate. Because centralized control over SHORAD weapons may not be possible, these areas must be clearly defined and disseminated so friendly aircraft can avoid them.

- B. 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.
- C. Considerations. Centralized control of SHORADEZ may not be possible.
- D. POC. AADC.

28. Special Use Airspace

- A. 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.
- B. Uses. Special use airspace is typically applied to BDZs and cap/orbit areas.
- C. 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.
- D. POC. ACA.

29. Standard Use Army Aircraft Flight Route

- A. Description. Standard use Army aircraft flight routes are established below the coordinating altitude to facilitate the movement of Army aviation assets and are normally located in the corps through brigade rear areas of operation.
- B. Uses. A SAAFR is an airspace control measure used by Army assets for administrative and logistic purposes.
- C. POC. If altitudes are at or below the coordinating altitude, the using authority implements a 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 FM 100-10, *Combat Service Support*, for additional information.

30. Weapons Engagement Zone

- A. Description. In air defense, a weapons engagement zone (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.
- B. Uses. A WEZ defines air defense areas by weapon system. From an airspace control perspective, a WEZ provides airspace users with location of the air defense engagement for mission planning purposes.
- C. Considerations. Design of a WEZ is dependent on specific weapon system capabilities.
- D. POC. AADC.

31. Weapons-Free Zone

- A. 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.
- B. 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 location of a weapons free area for mission planning purposes.
- C. POC. AADC declares weapons free with the ACA establishing the zone.

ANNEX A TO APPENDIX B

**AIRSPACE CONTROL MEASURE REQUEST
REPRESENTATIVE FORMAT**

TO:

FROM:

SUBJECT: Request for Airspace

- (A) Airspace Control Measure Requested
- (B) Location (Latitude/Longitude)
- (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 Joint Pub 6-04.10, US Message Text Formatting Program, Description of US Message Text Formatting Program, (to become Chairman of the Joint Chiefs of Staff Instruction 5725.02) and associated directives for detailed instructions.

SUGGESTED READINGS

Article

Cook, Nick. "Airspace Plan Paves Way for Safer Skies." *Jane's Defence Weekly* 28:57, Oct 8 1997. Twelve countries are participating in the Regional Airspace Initiative. All have received comprehensive studies from the US Air Force setting out how each should manage its airspace, both from an air traffic control perspective and with a view to "air sovereignty," a term that covers a nation's ability to guard its own airspace.

Book

Tillotson, David. *Restructuring the Air Operations Center: A Defense of Orthodoxy*. Maxwell AFB, Ala., Air University Press, 1993. (Air University, Airpower Research Institute 92-1)

Official Publications

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GLOSSARY

Abbreviations and Acronyms

AADC	area air defense commander
ABCCC	airborne battlefield command and control center
ACA	airspace control authority
ACM	airspace control measure
ACO	airspace control order
ACP	airspace control plan
ADIZ	air defense identification zone
AFDD	Air Force Doctrine Document
AOA	amphibious objective area
AOC	air operations center
AOR	area of responsibility
ASOC	air support operations center
ATC	air traffic control
ATO	air tasking order
AWACS	airborne warning and control system
BDZ	base defense zone
C ²	command and control
CATF	commander, amphibious task force
COMAFFOR	commander of air force forces
CRC	control and reporting center
CRE	control and reporting element
DATCAL	Deployable Air Traffic Control and Landing System
FEZ	fighter engagement zone
HIDACZ	high-density airspace control zone
HIMEZ	high-altitude missile engagement zone
JEZ	joint engagement zone
JFACC	joint force air component commander
JFC	joint force commander
JOA	joint operations area
JSTARS	Joint Surveillance and Target Attack Radar System
LLTR	low-level transit route
LOMEZ	low-altitude missile engagement zone

MEZ	missile engagement zone
MOOTW	military operations other than war
MRR	minimum-risk route
NATO	North Atlantic Treaty Organization
POC	point of contact
SHORAD	short-range air defense
SHORADEZ	short-range air defense engagement zone
TACP	tactical air control party
TACS	theater air control system
UHF	ultra-high frequency
VHF	very high frequency

Terms And Definitions

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

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

airspace control. See airspace control in the combat zone. (Joint Pub 1-02)

airspace control area. Airspace which is laterally defined by the boundaries of the area of operations. The airspace control area may be subdivided into airspace control sub-areas. (Joint Pub 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. (Joint Pub 1-02)

airspace control facility. Any of the several Service component, host nation, or allied facilities that provide airspace control in the combat zone. (Joint Pub 1-02)

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

airspace control order. An order implementing the airspace control plan that provides the details of the approved requests for airspace control measures. It is published either as part of the air tasking order or as a separate document. Also called **ACO**. (Joint Pub 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 area of responsibility/ joint operations area. Also called **ACP**. (Approved for inclusion in the next edition of Joint Pub 1-02)

airspace control sector. A subelement 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 allied airspace control capabilities and requirements. (Joint Pub 1-02)

airspace control system. An arrangement of those organizations, personnel, policies, procedures and facilities required to perform airspace control functions. (Joint Pub 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 free from friendly surface fires. The airspace coordination area may be formal or informal. (Approved for inclusion in the next edition of Joint Pub 1-02.)

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

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

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

amphibious objective area. A geographical 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 must provide sufficient area for conducting necessary sea, air, and land operations. (Joint Pub 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**. (Joint Pub 1-02)

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. (Joint Pub 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**. (Joint Pub 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. (Joint Pub 1-02)

centralized control. In aerospace employment, the vesting of authority in one commander for planning and directing 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 del-

egated to the regional air defense commander or sector air defense commander during joint engagement zone centralized control operations.

combat airspace control. See airspace control in the combat zone. (Joint Pub 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. (Joint Pub 1-02)

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

decentralized control. In air defense, decentralized control is the normal control 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. (Joint Pub 1-02)

drone. A land, sea, or air vehicle that is remotely or automatically controlled. (Joint Pub 1-02)

fighter engagement zone. See weapon engagement zone. (Joint Pub 1-02)

firepower umbrella. An area of specified dimensions defining the boundaries of the airspace over a naval force at sea within which the fire of ships' anti-aircraft weapons can endanger aircraft, and within which special procedures have been established for the identification and operation of friendly aircraft. (Joint Pub 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. (Joint Pub 1-02)

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

forward line of own troops. A line which indicates the most forward positions of friendly forces in any kind of military operation at a specific time. The forward line of own troops normally identifies the forward location of covering and screening forces. Also called **FLOT**. (Joint Pub 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. (Joint Pub 1-02)

high-altitude missile engagement zone. See weapon engagement zone. (Joint Pub 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. The maneuver commander normally controls access to a high-density airspace control zone. The maneuver commander can also direct a more restrictive weapons status within the high-density airspace control zone. Also called **HIDACZ**. (Joint Pub 1-02)

identification, friend or foe. A system using electromagnetic transmissions to which equipment carried by friendly forces automatically re-

sponds, for example, by emitting pulses, thereby distinguishing themselves from enemy forces. Also called **IFF**. (Joint Pub 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. (Joint Pub 1-02)

joint engagement zone. See weapon engagement zone. (Joint Pub 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 commander authorized to exercise operational control. (Joint Pub 1-02)

joint force air component commander. The joint force air component commander derives authority from the joint force commander who has the authority to exercise operational control, assign missions, direct coordination among subordinate commanders, redirect and organize forces to ensure unity of effort in the accomplishment of the overall mission. The joint force commander will normally designate a joint force air component commander. The joint force air component commander's responsibilities will be assigned by the joint force commander (normally these would include, but not be limited to, planning, coordination, allocation, and tasking based on the joint force commander's apportionment decision). Using the joint force commander's guidance and authority, and in coordination with other Service component commanders and other assigned or supporting commanders, the joint force air component commander will recommend to the joint force commander apportionment of air sorties to various missions or geographic areas. Also called **JFACC**. (Joint Pub 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**. (Joint Pub 1-02)

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

minimum-risk level. A specific altitude or altitude block that allows homebound aircraft to return in a homebound direction without lateral restrictions. Also called **MRL**. (Joint Pub 1-02)

point defense. The defense or protection of special vital elements and installations; e.g., command and control facilities, air bases. (Joint Pub 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. (Joint Pub 3-52)

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 hostile if rules are not followed and the suspect vehicle is not otherwise positively identified. (Joint Pub 3-52)

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. (Joint Pub 1-02)

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

short-range air defense engagement zone. See weapon engagement zone. (Joint Pub 1-02)

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**. (Joint Pub 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**. (Joint Pub 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**. (Joint Pub 1-02)

- 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**.

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. (Joint Pub 1-02)

