

Airspace Control in the Combat Zone



Air Force Doctrine Document 2-1.7
9 May 2001

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

SUMMARY OF REVISIONS

Corrects references to area of responsibility (AOR) to area of operations (AO), joint operations area (JOA), or sector where appropriate (throughout document); combines sections regarding amphibious and maritime operations (Chapter Four); adds section on integration and synchronization with surface operations (Chapter Five); updates Figure 5.1 (notional air operations center (AOC) organization) IAW AFDD 2 (Chapter Five); updates discussion of air support operations centers (ASOCs) to mirror AFDD 2 and AFDD 2-1 discussions (Chapter Five); adds details to bare-base and Deployable Air Traffic Control and Landing Systems (DATCALs) discussion (Chapter Six); adds killbox reference to airspace control plan (ACP) (Appendix A); adds detailed killbox reference to procedural airspace control measures (Appendix B); adds the following definitions: killbox, positive identification, and procedural identification.

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FOREWORD

A key element to successful joint air operations is 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 operations area. All Service components have airspace requirements for their organic air arms and for weapons that transit the aerial medium. It is important for the joint force to establish a process that coordinates airspace requirements based on the joint force commander's objectives as well as Service priorities. The Air Force normally provides to the joint force the preponderance of aerospace power and the capability to plan, task, and control aerospace operations and is therefore normally assigned responsibility for airspace control by the JFC. *Airspace control is a key enabler of air superiority, an Air Force core competency. Air superiority provides airspace for the freedom to attack and procedures to keep friendly forces free from enemy air attack.* Effective and efficient airspace control is vital to successful aerospace operations. This document provides doctrine for the Air Force to coordinate and integrate the use of airspace in a unified commander's area of responsibility or joint force commander's 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.

Joint Publication (JP) 3-52, Doctrine for Joint Airspace Control in the Combat Zone

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

AFDD 2-1.7 is broad in nature and adaptable to diverse geographic and force deployment situations. Although space-based assets play an important role in the joint campaign or operation, this publication does not address space-based assets. Future airspace control may also involve the deconfliction of space operations over an existing unified commander's 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.

**FOUNDATIONAL DOCTRINE STATEMENTS FOUND IN AFDD 2-1.7,
*AIRSPACE CONTROL IN THE COMBAT ZONE***

- ✦ The goal of airspace control is to enhance combat 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.
- ✦ Unity of effort is essential for effective airspace control. For most operations, assigning the roles of the airspace control authority (ACA) and area air defense commander (AADC) to a single commander, normally the joint force air component commander (JFACC), ensures unity of effort across the spectrum of airspace use.
- ✦ 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 system.
- ✦ Common airspace control procedures throughout the joint operations area (JOA) enhance the effectiveness of air operations.
- ✦ Airspace control structure and procedures need to be simple to execute for both ground operations personnel and aircrews.
- ✦ The airspace control system should have a reliable, jam-resistant, and secure command and control (C2) network.
- ✦ Airspace control systems need to be survivable, sustainable, and redundant because they are likely to be prime targets for an attacker.
- ✦ Airspace control procedures should facilitate combat operations, expedite air defense identification, safely accommodate and expedite the flow of all air traffic in the theater of operations, prevent mutual interference from all users of the airspace, and prevent fratricide.

CHAPTER ONE

CONSIDERATIONS FOR AIRSPACE CONTROL



On the night of 11 July 1943, during OPERATION HUSKY, 144 C-47s carrying approximately 2,000 US 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 US paratroopers and other Allied ground troops. In the wake of this incident, General 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

World War II introduced large joint operations both in and through the aerial environment, creating the need for an airspace control system. Before World War II, airspace control and deconfliction were rarely issues. The planes, airships and balloons of the day were few in number, slow and easy to identify. *The advent of air defense missile systems, cruise missiles, and unmanned aerial vehicles to the modern battlefield increased the Services' theater airspace control requirements. The modern challenges of joint air operations require a more complex and dynamic 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. JP 1-02, *DOD Dictionary of Military and Associated Terms*, defines airspace control in the combat zone as “[a] process used to increase combat effectiveness by promoting the safe, efficient, and flexible use of airspace. Airspace control is provided in order to prevent fratricide, enhance air defense operations and permit greater flexibility 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.” Like joint doctrine, this publication uses the terms “airspace control,” “combat airspace control” and “airspace control in the combat zone” synonymously.

AIRSPACE CONTROL SYSTEM FUNDAMENTALS

To enhance combat effectiveness, the airspace control system should be developed considering the fundamentals as listed in Figure 1.1.

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

Unity of Effort

Unity of effort is essential to the system. Each commander has his own perspective; consequently, the objectives of the corps commander may not be 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.* To the maximum extent possible, planning and control should be coordinated with other components prior to hostilities. The ACA must integrate information flow throughout the system to provide necessary information for airspace control throughout the 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. Having one commander with the responsibility and authority to coordinate and integrate air defense and airspace control greatly enhances the effort to gain and maintain control of the air environment. *The air component commander, as the central authority for the air effort, develops strategies and plans, determines priorities, allocates resources, and controls assigned air forces to achieve the assigned joint objectives.* **Through centralized authority, an air component commander gives unity and cohesion 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 enable the execution of offensive attacks against an enemy's warfighting potential.*

Applying centralized control and decentralized execution of aerospace forces helps make the forces responsive, serves to ensure forces are properly employed and integrated, and fosters initiative at the tactical 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 when 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 are 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 system.** *Identification requirements for airspace control must be compatible with those for air defense. Airspace control, air defense, military air traffic control, and supporting command and control (C2) procedures, equipment, and terminology need to be compatible, mutually supporting, and interoperable.*

Common Procedures

Common airspace control procedures within the JOA enhance the effectiveness of air operations. These procedures need to allow maximum flexibility through an effective mix of identification and control measures. *The control structure needs to permit close coordination between land, maritime, special operations forces, and air operations and to allow rapid concentration of combat power at a specific location in minimum amount of time.*

Simplicity

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

Reliable and Interoperable Command and Control (C2) Systems

The airspace control system should have a reliable, jam-resistant, secure C2 network. Coordinated and detailed planning is required to *ensure communication systems and procedures are radio frequency (RF) compliant, 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 should be backed by procedural control methods. *The airspace control system in the combat zone needs to be responsive to changing 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 area of responsibility (AOR) or JOA specific concepts for airspace control. **Procedures to implement these concepts should consider the likelihood of multinational warfare.** *Commanders should consider procedures that are compatible and interoperable with potential allies or coalition members.* 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 should 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 should be melded into a comprehensive airspace control system. *Therefore, airspace control procedures should facilitate combat operations, expedite air defense identification, safely accommodate and expedite the flow of all air traffic in the theater of operations, prevent mutual interference from all users of the airspace, 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.

**Field Manual 100-20, Command and Employment of Airpower
(Historical Reference)**

GENERAL

As the nation's only full-service aerospace force, the Air Force is most often the dominant user of airspace in various areas of operations or JOAs. *Air Force commanders will likely be responsible for planning and integrating airspace control for joint forces in accordance with the JFCs guidance. 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 the 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 JP 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 course of action selected, and the capability and strength of the joint or combined force's component elements.* Consequently, the organizational form of the airspace control system may vary.

COMMANDERS' ROLES

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 (JFC)

The JFC is a general term applied to the combatant commander, subunified commander, or joint task force commander. The combatant commander exercises combatant command (COCOM) over the assigned joint forces. Subunified commanders and joint task force commanders exercise operational control or tactical control over assigned or attached forces based on the degree of authority granted in the establishing directive. *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.*

Joint Force Air Component Commander (JFACC)

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 JFACC is normally delegated 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 should normally designate the JFACC as both the ACA and AADC.* To accomplish these missions, the JFACC interfaces with the JFC and other components to establish a theaterwide command and control system that will meet the JFC's objectives. *Because in most large-scale operations the Air Force provides the preponderance of air assets and possesses the necessary capabilities to exercise command and control over 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 JP 3-56.1, *Command and Control for Joint Air Operations*.)

Commander, Air Force Forces (COMAFFOR)

The COMAFFOR is the Air Force officer designated as commander of the Air Force component command assigned to a JFC at the unified, subunified, or joint task force levels. *Command and control of all Air Force forces assigned and attached to the air 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 command, control, communications, and computers (C4) systems available for employment operations.

Airspace Control Authority (ACA)

The ACA is the commander designated to assume overall responsibility for the operation of the airspace control system in the airspace control area. Designated by the JFC, the broad responsibilities of the ACA include coordinating and integrating the use of the airspace control area. With 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 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, promulgates it throughout the JOA.* Implementation of the ACP takes place through the airspace control order (ACO) which must be followed by all components, as described in JP 3-56.1, *Command and Control for Joint Air Operations*, and JP 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 require 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. Figure 2.1 displays a summary of the ACA responsibilities.

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 tactical control over any air assets.

Figure 2.1. Airspace Control Authority Responsibilities (Source: JP 3–52)

Area Air Defense Commander (AADC)

Normally designated by the JFC, the AADC is the single commander responsible for air defense. This includes, but is not limited to, defensive measures designed to destroy attacking enemy air and missiles or to nullify or reduce the effectiveness of such attacks should they escape destruction. *The 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 (ADP) and, after obtaining JFC approval, promulgates it throughout the 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 JPs.

Other Component Commanders

Each component commander advises the JFC on the employment of forces. The JFACC, in cooperation with other components, plans and executes 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 (ACP)

The airspace control authority prepares the ACP, which is approved by the JFC, to establish procedures for the airspace control system in the joint operations area. An example of the topics that should be considered when developing an ACP is provided in appendix A, "Airspace Control Plan" and displayed in Figure 2.2. *The ACP must be coordinated with the area ADP and included in joint operations plans.* These documents must be coordinated to facilitate continued operations in the event of degraded C2 systems. The ACP should be developed in accordance with the international or regional air traffic systems necessary to facilitate the flow of air traffic into and out of the JOA.

Airspace Control Measures (ACMs)

ACMs define controlled subareas within a given airspace and are often referred to as zones, areas, corridors, etc. In their descriptions, ACMs define in detail the airspace restrictions, access, and control and coordination procedures. Appendix B is a list of basic ACMs. *The ACP should specify what ACMs are to be used in the 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.*

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/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 / 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 are important planning and execution considerations.

Figure 2.2. Airspace Control Plan Considerations (Source: JP 3-52)

Air Traffic Control (ATC) Integration with Airspace Control

The ACP should provide procedures to fully integrate the resources of military ATC facilities with terminal-area airspace control responsibilities. *ATC facilities should be integrated 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 vital to an effective ACP. The area ADP 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 since the airspace will likely be used by all the Service components. Depending on the situation, the airspace environment may transition between combat and peacetime. *As such, the ACA must address air defense methods of controlling and identifying aircraft within the airspace and during enemy engagement.*

OPERATIONAL REQUIREMENTS

Each JOA has specific operational requirements for airspace control. These requirements should be determined as early as possible to be incorporated in the overall joint force planning effort. *When developing the ACP, planners consider political constraints, national and military airspace control procedures, air traffic control systems, and the capabilities and limitations of these systems. Rules of engagement, disposition of air defense weapons, fire support plans, and procedures for identifying US and multinational aircraft are also important items that must be considered.* Every joint force is different depending on the mission, 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.

Operation ALLIED FORCE

The JFACC, [as the Airspace Control Authority,] is responsible for the Airspace Control Plan (ACP) that allows aircraft to flow efficiently through the battle space without running in to each other. At the onset of *Operation Allied Force*, however, the ACP was a contributor to numerous near mid-air collisions for several reasons:

- ✦ The ACP was basically a modified peacetime plan from *Deliberate Forge*. As *Allied Force* grew, the ACP rapidly became obsolete, and commanders did not augment the airspace management team with sufficient, qualified, airspace planners to keep pace.
- ✦ The ACP depended on procedural control, thus it relied on pilots to maintain visual separation and radar to separate them from conflicting traffic. Notably, the airspace plan restricted air-refueling to visual conditions only. However, pilots often conducted air-refueling operations in the weather, without defining instrument procedures for aircraft separation and control. Control and reporting centers and their elements, mobile battle management and radar units subordinate to an AOC, have the mission of airspace management. Most of the mobile centers did not deploy to the war until April, and some set up at sites not ideally positioned to provide optimum coverage. Also, the CAOC was reluctant to transfer airspace management to the control and reporting centers after they were operational. Rather, the CAOC continued to depend on surveillance aircraft such as the Airborne Warning and Control System (AWACS) and NATO's airborne early warning aircraft. However, AWACS was heavily saturated with their primary mission of battle management, and the NATO aircraft are neither equipped nor trained for air traffic control.
- ✦ The Airspace was dangerously crowded until the US negotiated more space. Pilots and controllers filed 17 hazardous air traffic reports between 24 March and 1 May 1999. Although the air war started on 24 March, the CAOC used the peacetime airspace control plan until 1 May, when it activated an ACP designed for combat operations. Thereafter, the situation improved, and the number of hazards reported in *Allied Force* airspace dwindled.

The Air War Over Serbia: Aerospace Power in Operation Allied Force
HQ USAF

PLANNING CONSIDERATIONS

Planning Process

For situations requiring significant involvement of Air Force forces, the appropriate Air Force component commander should be identified to the geographic unified commander as soon as feasible. **Once appointed, this commander should rapidly assemble a staff representing all airspace control and air defense forces involved in the operations.** *This staff should complete the remaining phases of crisis action planning including ACP and ADP development 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 ADP 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 should be consolidated and integrated into the final ACP prior to its dissemination.* The ACP can be added as an appendix to the operations annex of the joint force operation plan and/or the overall air operations plan.

Volume of Air Traffic

Planning for airspace control in the combat zone should consider the aircraft traffic volume throughout the operation. The volume of traffic when conducting offensive operations greatly increases the complexity of airspace control planning. Airspace planners must anticipate potential choke points and develop airspace control solutions accordingly. *Planners 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 appropriate 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 degraded communications. Plans also should consider the effects of weather and darkness.

TRANSITION FROM PEACETIME TO COMBAT OPERATIONS

JFCs should have an ACP and ACO that are continually updated in peacetime and throughout the evolution of a campaign. Standing ACOs provide appropriate airspace control in the event of surprise attack for both combat and noncombat operations. The Air Force component will likely develop and coordinate such plans in most theaters. Peacetime airspace rules and organizations change during actual conflict, and the nature of these changes is different from theater to theater. During 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 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 with each other if operated independently, prioritization and integration of each mission are essential. Ultimately, the airspace control function must be integrated with air defense operations. *Airspace control procedures should 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.

AADC—the Prime Integrator

In accordance with JFC guidance, the AADC should 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 air operations center (AOC) is essential for the coordination necessary to ensure unity of effort.

Surface-to-air Weapons

Air defense units should 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 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.



Surface-to-air weapons such as theater high-altitude air defense (THAAD) used against ballistic missile threat (left) and the LINEBACKER (above) employed for short-range air defense (SHORAD).

Flexibility of Procedures

Highly flexible airspace control procedures are necessary to respond to potential threats. Air defense systems might be overwhelmed by massed enemy attacks across limited geographic areas along the forward line of own troops (FLOT). *Airspace control procedures should allow coordinated and, if appropriate, integrated employment of air, land, and maritime air defense systems against the threat and should 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 remains a complex task.

METHODS OF IDENTIFICATION

The methods of identification and levels of airspace control vary throughout the spectrum of military operations. *There are three methods of identification employed within a JOA: positive identification, procedural identification, and a combination of positive and procedural identification.* The airspace control structure needs to be responsive to evolving enemy threat conditions and changing tactical situations. The JFC, through the ACA, decides the appropriate method to use based on the concept of operations and situation.



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

- ★ *Positive Identification: Identification is determined by visual recognition, electronic support systems, noncooperative 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.

The JFC, through the AADC, will establish theater criteria to identify friendly or hostile forces. The criteria will often be an unambiguous combination of positive and procedural identification methods based upon the specific situation and course of action.

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. There are three general levels of airspace control: centralized, decentralized, and autonomous.

- ★ *Centralized Control. 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 (JEZ) 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 air defense plan (ADP).*

ENGAGEMENT OF ENEMY AIR THREATS

Engagement of enemy air threats by friendly air, land, and maritime assets must be fully 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 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 the exchange of liaison personnel are necessary for information flow. Also, joint planning and coordination are important and necessary to effectively deploy air defense assets prior to the start of hostilities.

Joint Engagement Zone (JEZ) Operations

The JEZ is airspace of defined dimensions within which multiple air defense systems (surface-to-air missiles and aircraft of one or more Service components) simultaneously engage air threats. Combined fighter and missile engagement zones present the enemy with the dilemma of defending against two entirely different weapon systems, greatly decreasing enemy survivability. 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 taskings are based on comprehensive situational awareness. Under procedural identification, all air defense systems and aircraft must be capable of accurately discerning between enemy, neutral, and friendly air vehicles in a highly complex environment before full, joint engagement operations occur. If these conditions cannot be met, separate zones for missile and fighter engagement should be established.* Without effective command and control, a JEZ is extremely difficult to safely implement.

Fighter Engagement Zone (FEZ) Operations

In FEZ operations, the responsibility for engagement lies with the fighter. These operations may take place in airspace above and beyond the engagement ranges of surface-based (i.e., land and sea) and short-range air defense systems. FEZs provide 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 assigned by higher authority and positively identified as hostile, or unless they are firing in self-defense.* These operations 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.*

Within the FEZ, fighters such as the F-15 and the F-16 engage hostile aircraft. Giving fighters engagement responsibility enhances flexibility.



Missile Engagement Zone (MEZ) Operations

In MEZ operations, responsibility for engagement lies with surface-to-air missile commanders. *These operations are ideal for point defense of critical assets, protection of maneuver units in the forward area, and area coverage of rear operations.* MEZ operations offer the JFC the ability to meet the enemy with a high and low altitude, all-weather capability. Advanced surface-to-air missile systems have long-range, high-firepower capability that can engage enemy aircraft and missiles beyond the forward line of own troops 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. *MEZ operations within the airspace control area should not unduly restrain flexibility and responsiveness of air assets or result in attacks on friendly forces.*



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

Coordination of Enemy Engagement Operations

The dynamic nature of enemy engagement operations often introduces friction between airspace control and air defense responsibilities. As previously discussed, the ACA and the AADC should be 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 planning and coordination requirements to modify or adjust the system as the nature of the participating force changes.

Integration of Friendly Electronic Warfare and Suppression of Enemy Air Defense

The JFC integrates 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 subelement of a larger operation or may not exactly fit into the category of full-scale combat operations. Airspace control involving amphibious operations, maritime operations, and MOOTW often require special considerations and coordination. **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 temporarily designates 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.*

AMPHIBIOUS AND MARITIME OPERATIONS

Amphibious operations will require volumes of airspace for offensive and defensive air operations. Since these operations may occur before theaterwide procedures are established, the commander of the amphibious task force (CATF) should determine airspace requirements. However, when the amphibious operations are conducted in an established theater, **to attend to the principles of simplicity and unity of effort, there should be one set of procedures** (ACO, ADP, Communications Plan, to include IFF/SIF assignment) **promulgated by the ACA (normally the JFACC).** If subordinate tactical commanders such as the CATF have specific airspace requirements for the AOA, those should be articulated, resolved, and consolidated into the joint aerospace operations plan (JAOP).

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 variety of organic weapons within the carrier battle group allows for defense options other than airborne defense. Control and defense procedures and measures may differ from those in land-based operations. The maritime airspace sector commander should coordinate with the ACA on the areas listed in figure 4.1.

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 commanders.**
- ★ **Procedures for deconfliction of operations during transitional operations and during operations in overlapping airspace areas.**

Figure 4.1. Maritime Airspace Sector Commander Coordination Responsibilities

MILITARY OPERATIONS OTHER THAN WAR (MOOTW)

MOOTW offer a unique challenge to airspace control and are generally confined to a specific geographic area, often characterized by constraints on the forces, weapons, tactics employed, and level of violence permitted. Depending on the environment and mission, the degree of airspace control may need to be rigorous and the rules of engagement restrictive. This is especially true in environments that transition quickly from combat to noncombat and back again and that have numerous political 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.

Peace Operations

Peace operations, to include peacekeeping and peace enforcement operations, are the missions most likely to fluctuate between combatant and noncombat operations. They can involve all air missions from every component, including both fixed- and rotary-wing aircraft from air or surface forces. **To reduce the risk of mutual interference and fratricide, all missions should appear on the air tasking order (ATO).** *Every aircraft involved in the operation should 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 may require the JFC to strictly control flights in the JOA.* When conducting peace operations, the ACP should account for international considerations, nongovernmental (NGOs) and private voluntary organizations (PVOs) and the available airspace control infrastructure. These considerations may directly interfere with the ACA's ability to effectively ensure airspace control and the AADC's ability to ensure adequate air defense. Airspace control methods need to be continually evaluated for effectiveness and efficiency in response to a changing environment.

Foreign Internal Defense or Low Air-Threat Situations

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

- ✦ *Airspace control in a foreign internal defense situation is usually based on local air traffic regulations.* In these situations, the ATC system of the host nation frequently provides the framework for airspace control in the combat zone. 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 a low air-threat 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 should also be considered.

The host nation may not have an adequate airspace control system to support significant military operations. This will significantly influence the ACA and may require significant augmentation with deployable systems.

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 MOOTW

Joint forces may be called on to participate in operations that may preclude implementation of the airspace control procedures described in this publication. *These operations may involve US security for intelligence missions, raids, rescue missions, or other limited uses of military forces.* 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.*
- ✧ *Timely and effective implementation of appropriate airspace control procedures if hostilities ensue.*

Operation ATLAS RESPONSE

In February 2000, a natural disaster hit the southern region of Africa creating a humanitarian crisis that challenged the integration of responding US forces into an area of minimal air traffic control resources. Operation ATLAS RESPONSE was the US contribution to international relief efforts following torrential rains and flooding in southern Mozambique. The joint task force's mission was to provide military-specific assistance to the governments in the Southern African region and humanitarian relief agencies to minimize human suffering. The JTF established its headquarters and civilian-military operations center in Maputo, Mozambique, but a majority of the flying operation sortied out of Air Force Base Hoedspruit, South Africa. At Hoedspruit, ATLAS RESPONSE air traffic controllers integrated with the South Africans at the Lowveld Air Space Sector control center to: help manage the flow of C-130 Hercules, MH-53M Pave Low IV helicopters and other international relief aircraft in Mozambique and South Africa; help manage the C-5 flow in and out of South Africa; and help coordinate the C-5 and KC-10 air refueling track over western South Africa. This proved to be a critical operations center as large airlift support facilities were unavailable elsewhere in the region and ATC radar coverage was non-existent in Mozambique. As a HUMRO, the JTF was not given the authority to dictate airspace control procedures within its area of operations. Rather, ATLAS RESPONSE was allowed to create airspace control standard operating procedures that deconflicted military operations between one another and host nation flow of operations. The integration of airspace control efforts proved essential to safely integrate military, international and private relief efforts, and to provide significant relief to the flood stricken areas.



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 visually acquire and does not provide a clear radar signature, presenting a potential hazard to high-performance aircraft. 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 JP 3-55.1, *Unmanned Aerial Vehicles*.



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

CHAPTER FIVE

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

Combat Airspace Control: Capabilities, Requirements, and Context

Airspace Control Authorities employ the Theater Air Control System in combat based on the capabilities available, requirements and context of the combat situation. Airborne assets provided air traffic control in both DESERT STORM and ALLIED FORCE, but with varying degrees of success:

Operation DESERT STORM

[The AWACS] ...primary mission at the start of the war had been air defense, identifying the location and heading of Iraqi aircraft, directing Coalition interceptors against them, and alerting allied aircraft to threats. After the Iraqis stopped flying, AWACS acted as a traffic controller, clearing strike aircraft in and out of zones, linking them up with tankers, and managing other support aircraft. ... As the campaign evolved, AWACS view of the air situation and lack of an air threat enabled the Tactical Air Control Center [precursor to the AOC] to use AWACS controllers to help manage the combat airspace in the Kuwaiti Theater of Operations.

A League of Airmen: US Airpower in the Gulf War

Operation ALLIED FORCE

Coupled with their air defense and observation responsibilities, surveillance aircraft also performed the role of airspace management throughout the area of operations. These forces included both AWACS and NATO's airborne early warning aircraft. But unlike DESERT STORM, the threat, traffic volume, weather, and constraints saturated AWACS with their primary battle management function and the NATO aircraft proved inadequate regarding effective air traffic control. Within the context of air operations over Kosovo, the use of airborne assets for airspace management introduced significant friction against the effective employment of aerospace forces.

The Air War Over Serbia: Aerospace Power in Operation Allied Force HQ USAF

GENERAL

The Air Force airspace C2 system reflects 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 basic functions performed by the TACS are the same.*

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 for efficient employment. On the other hand, quickly directing the actions of many widely separated units requires 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 (AFTTP) 3-1, Vol 26, *Theater Air Control System*.

AIR OPERATIONS CENTER (AOC)

The 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. It is integrated within the AOC into both the combat plans division and the combat operations division. *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 airspace control authority. The combat operations division monitors the ACO and makes immediate changes to it as the progress of the battle dictates.* While it does not have a direct role in airspace control, the air mobility division provides expertise to integrate the air mobility mission into the airspace control system. It also 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 intertheater mobility assets.

AOC 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 (SOLE). Additionally, the other Services have liaisons in the AOC: the battlefield coordination detachment (BCD) represents the Army and the naval and amphibious liaison element (NALE) articulates Navy and Marine interests, unless a separate Marine liaison officer is designated. Figure 5.1 details a notional AOC organization to include a strategy, combat plans, combat operations, and air mobility divisions. An emerging concept is the intelligence, surveillance, and reconnaissance (ISR) division that presents consolidated intelligence support throughout the AOC.

GROUND TACS ELEMENTS

Control and Reporting Center (CRC)

The 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 sector within which the CRC manages all air defense, offensive air, 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*



Communications and radar sets for the ground theater air control system enable control and reporting centers and elements to perform their roles on airspace control.

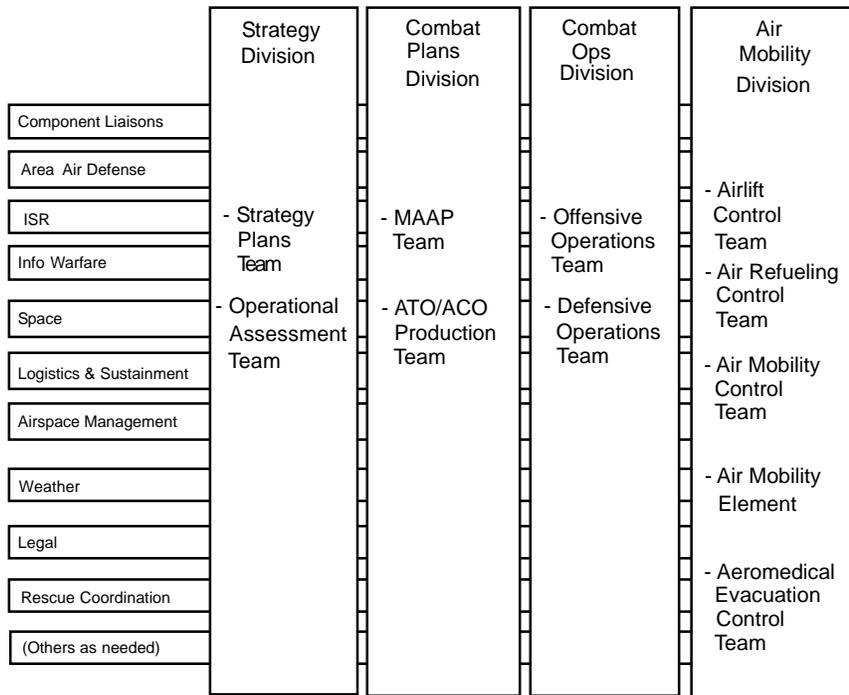


Figure 5.1. Notional Air Operations Center

the JFACC. The CRC is also responsible for recommending changes in air defense warning conditions based on the air situation. The CRC provides battle management, weapons control, surveillance, identification, and link management within unit manning and equipment constraints. *In terms of airspace control, 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 (CRE)

The CRE is a mobile radar unit, subordinate to the CRC, 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 (ASOC)

The ASOC is the primary control agency of the TACS directly subordinate to the AOC. **Normally located and aligned with the senior Army tactical level of command, the ASOC coordinates and directs aerospace support at corps level and below.** The center provides fast reaction to requests for air support and is also capable of conducting time-sensitive 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, minimum-risk routes, and airspace coordination areas. Further, it deconflicts airspace usage with the corps' fire support element, G-3 Air and Army airspace command and control element.

Tactical Air Control Parties (TACPs)

TACPs are the principal Air Force liaison elements aligned with Army maneuver units from battalion through corps and consist of air liaison officers 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 missions.

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 and/or synchronize air operations with surface fire support.



A qualified terminal attack controller directs close air support aircraft ensuring integration and preventing fratricide.

AIRBORNE ELEMENTS OF THE TACS

Airborne Battlefield Command and Control Center (ABCCC)

The primary role of the 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.

Airborne Warning and Control System (AWACS)

The AWACS is an airborne early warning and command and control battle management aircraft providing 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 may be subordinate to either the AOC or a 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.



The abundance of communications and computer data links make the airborne battlefield command and control center (top left) an exceptional adjunct to the air operations center's command and control of the theaterwide air effort. When working in tandem, the Airborne Warning and Control System (above left) and Joint Surveillance Target Attack Radar System (above right) provide the joint force air component commander the air and ground picture, enabling near-real-time airspace control decisions.

Joint Surveillance Target Attack Radar System (JSTARS)

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 and provide an airspace management service.

Forward Air Controller (Airborne)

The forward air controller (airborne) [FAC(A)] is a specially trained and qualified airborne extension of the TACP and has the authority to direct aircraft delivering ordnance to a specific target. FAC(A)s provide additional flexibility in the battlespace by enabling rapid



An O/A–forward air controller (airborne) adds flexibility to time critical air operations in support of ground forces.

coordination and execution of air operations.

They also enhance the TACS' situational awareness by disseminating information on the flow of aircraft on target. Along with the TACPs, FAC(A)s help minimize the risks of fratricide.

Special Tactics Teams

Special tactics teams are a part of the theater special operations forces and are normally under operational control of the joint force special operations component commander. **When special tactics teams are required to support conventional operations, operational control may be passed to the JFACC/COMAFFOR.** 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).



Aircraft with different missions, capabilities, and support requirements will likely have conflicting airspace requirements that must be resolved. Airspace control challenges often arise considering aircraft orbits, refueling tracks, combat air patrols, and minimum risk routes.

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 airspace control plan is 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 airspace control order is the implementation directive for the ACP and is disseminated either as part of the air tasking order or as a separate document.** *The ACO provides the details of airspace coordination measures for the next ATO-ACO cycle and includes fire support coordination measures and other information required by airspace users.*

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.

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. *During execution, controllers deconflict by time, altitude, space, refusal by an airspace user or acceptance of 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.*



The control and reporting center combines with airborne warning and control system to distribute information and execute the ACP.

Integration of Air Defense and Airspace Control in the AOC

Airspace control and air defense functions are integrated in both the combat planning and combat operations divisions. In the combat plans division, the ground and airborne *command, control, and communications (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 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, *Tactical Employment TACS.*

Integration and Synchronization with Surface Operations

Airspace control procedures increase in complexity and detail when aerospace forces operate in the vicinity of the forward line of own troops (FLOT). To prevent both air-to-surface and surface-to-air fratricide, joint operations must be synchronized and integrated within this portion of the battlespace. When synchronizing and integrating, TACS liaison elements consider surface operations, the employment of long-range surface weapons systems, fratricide risks, operational requirements, the battlefield framework, and theater fire support coordination measures (i.e. fire support coordination line (FSCL) placement and killbox use). Airspace control and operational considerations along the forward edge of the battle area are further discussed in AFDD 2-1.3, *Counterland.*

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.*



Communications for the theater air control system include line of sight (left) and satellite (right) systems.

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), and high frequency (HF) communications. Recent communications improvements have improved antijam capabilities.

- ★ *HAVE QUICK is a frequency-hopping voice modification to the Air Force's UHF radio systems.* This provides our forces a countermeasure to several jamming techniques, ensuring effective communications during combat operations.
- ★ *The single-channel ground and airborne radio system (SINCGARS), 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, *Tactical Employment TACS*, provides a detailed description of each link.

Operation Allied Force

The communications plan, a vital piece of the airspace plan, was similar [to the initial airspace control plan] in that it was a peacetime plan that could not accommodate the increased tempo of Operation Allied Force. First, it did not have enough frequencies. Of the frequencies assigned for combat, several conflicted with civilian users. Second, frequency changeover times did not synchronize with the ATO changeover. Some frequency documents changed at midnight while others changed with the 0300 ATO changeover, causing confusion and frustration. Third, code word lists were neither standardized nor distributed from a single source.



The Air War Over Serbia: Aerospace Power in Operation Allied Force
HQ USAF

CHAPTER SIX

INTEGRATION OF AIR TRAFFIC SERVICES INTO THE AIRSPACE CONTROL SYSTEM

The ACP [airspace control plan] 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.

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

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 complements information contained in JP 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 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 air tasking order can be used in lieu of a flight planning system for combat operations or where minimum ATC support is available.

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 (NOTAM) and flight planning support. It also provides airfield criteria for inspections, markings, safety, security, parking plans, munitions, and hot fuel areas.

Airfield Operations

Airfield operations should 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 should coordinate and plan appropriate relief of the Air Force special tactics teams by follow-on, general-purpose air traffic service forces.

PLANNING

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. Commanders should determine the forces required, the arrival sequence, and the level of acceptable risk for airfield operations.

Air traffic controllers and air defense controllers may be assigned to the air component as combat airspace managers to support the COMAFFOR/JFACC. Their duties include assisting in ACP/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.



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

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.

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. *Combat-specific air traffic control training should augment service component air traffic controller training.*

DEPLOYABLE 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 airfields with mobile control tower, surveillance radar, precision-landing system, terminal navigational aid, space- and ground-based capabilities, or any combination of these.* Special tactics teams can provide austere airfield operations. General purpose air traffic controllers are capable of providing an initial bare-base ATC capability, but generally these forces are not capable of autonomous operations and require additional base support.

Special Tactics Teams

While other forces have the ability to provide ATC 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.

Austere airfield operations have been identified as a special tactics team core competency. While special tactics teams are initially assigned to the special operations component, operational control may be passed to the COMAFFOR/JFACC when they are conducting missions in support of conventional operations such as support to mobility operations, combat search and rescue, and airborne assault operations. Special tactics teams consist of combat controllers, pararescuemen, 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 (MMLS)).



Special Tactics Teams secure area to establish airfield operations.

General Purpose Air traffic Control Services

Initial Air Force general-purpose air traffic services may consist of wheeled vehicles with radios from either fixed base communication, deployable initial communication packages, or combat communication groups and Air National Guard squadrons. Deployable capabilities include limited visual control tower, tactical air navigational aids, precision landing system (i.e. the MMLS), and conventional approach control (non-radar). The 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 including the density and complexity of air traffic and airspace.



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

Bare-Base Support

General-purpose DATCALs equipment such as the control tower and radar 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. These capabilities include a deployable control tower, terminal approach control radar, and precision approach systems. With this equipment, air traffic controllers can provide the air traffic services normally expected at a fixed-base operating location.

Future Capabilities

Future capabilities should include better automation; reliable, jam-resistant, encrypted 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 should 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.

Suggested Readings

- Air Force Instruction 13-201: *US Air Force Airspace Management*. 19 July 1994.
- Air Force Policy Directive 13-1: *Theater Air Control System*. 11 May 1995.
- Allied Tactical Publication 40 [A]: *Doctrine for Airspace Control in Times of Crisis and War*, US Office of Naval Operations. January 1977. An update was published in February 1997.
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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 nonbelligerent 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 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 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), the airspace control authority (ACA), the area air defense commander (AADC), fire support coordination elements and the procedures adopted to coordinate and deconflict air defense and operational requirements.
 - g. Description of interface with the Federal Aviation Administration, host-nation air traffic control system, and 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 JOA (high-density airspace control zone, JEZ, fighter engagement zone, missile engagement zone, medium-risk route, low-level transit route, coordinating altitude, air routes, corridors, restricted operations zones, killboxes, and other appropriate procedures).
 - m. Description of identification friend or foe or selective identification theater procedures.
 - n. Description of orbit procedures.
 - o. Description of procedures and the 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, JEZ, 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).
- (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 (ACMs)

This appendix provides descriptions, considerations, and uses of Service measures for controlling airspace. The following ACMs are provided to aid in defining airspace control requests, orders, and plans. The ACMs are listed in alphabetical order. A sample airspace control request is provided in the annex to this appendix.

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). Airspace control authority (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, within the joint operations area, 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, location, and control of airborne vehicles are required.
 - 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 appendix.
 - d. POC. See individual descriptions for air defense action area, air defense area, air defense identification zone, and firepower umbrella in this appendix.
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 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.
 - 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 should 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 reasonably free from friendly surface fires since artillery, helicopters, and fixed-winged aircraft are 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 antiair 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. However, in a mature theater with an established airspace control area, the amphibious defense area and amphibious objective area are conducted in an assigned sector of the JFC's airspace control area.
 - 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 antiair 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 to support mission planning.
- 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. **Killbox.**

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

22. **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.

23. **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. High-performance aircraft normally use an LLTR. 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.

24. **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.

25. **Positive Identification Radar Advisory Zone.**

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

26. **Restricted Operations Area.**

- a. Description. A restricted operations 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." ROAs may also be 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.
- d. POC. ACA.

27. **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.

28. **Short-Range Air Defense Engagement Zone.**

- a. Description. Areas of short-range air defense engagement zone (SHORADEZ) deployment may fall within a LOMEZ or HIMEZ. It is possible that short-range air defense (SHORAD) assets may solely defend some areas. A SHORADEZ can be established to define the airspace within which these assets will operate. Because centralized control over 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.

29. **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 combat air patrol (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.

30. **Standard Use Army Aircraft Flight Route.**

- a. Description. Standard use Army aircraft flight routes (SAAFRs) 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 US Army, FM 100-10, *Combat Service Support*, for additional information.

31. **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.

32. **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 become Chairman of the Joint Chiefs of Staff Instruction 5725.02 and associated directives for detailed instructions.

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
ADP	air defense plan
AFDD	Air Force Doctrine Document
AFTTP	air force tactics, techniques, and procedures
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
C2	command and control
C3	command, control, and communications
C4	command, control, communications, and computers
CAP	combat air patrol
CATF	commander, amphibious task force
COMAFFOR	Commander, Air Force Forces
CRC	control and reporting center
CRE	control and reporting element
DATCALs	deployable air traffic control and landing system
FEBA	forward edge of the battle area
FEZ	fighter engagement zone
FLOT	forward line of own troops
FSCL	fire support coordination line
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, 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
NOTAM	notice to airmen
POC	point of contact
SAAFR	standard use Army aircraft flight route
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
WEZ	weapons engagement zone

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. (JP 1-02)

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

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

air defense. All defensive measures designed to destroy attacking enemy aircraft or missiles in the Earth's envelope of atmosphere, or to nullify or reduce the effectiveness of such attack. (JP 1-02)

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

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

air defense identification zone. Airspace of defined dimensions within which the ready identification, location, and control of airborne vehicles are required. Also called **ADIZ**. (JP 1-02)

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

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

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

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

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

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**. (JP 1-02)

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

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

airspace coordination area. A three-dimensional block of airspace in a target area, established by the appropriate ground commander, in which friendly aircraft are reasonably free from friendly surface fires. The airspace coordination area may be formal or informal. (JP1-02)

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

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

air tasking order. A method used to task and disseminate 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**. (JP 1-02)

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

amphibious objective area. A geographical area delineated 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. (JP 1-02)

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

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. (JP 1-02)

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

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

centralized control. In air defense, the control mode whereby a higher echelon makes direct target assignments to fire units. (JP 1-02) *[In aerospace employment, centralized control is the vesting of authority in a single commander for planning and directing operations. Centralizing the planning and directing of operations that enables timely allocation and tasking of assets to exploit the speed, range, and flexibility of air capabilities across the entire area. Centralizing the tasking and allocating 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 that progressively pulls authority back from subordinate echelons, as required). In air defense, centralized control is the control mode whereby a higher echelon makes direct target assignments to fire units. Identification and engagement authority may be delegated to the regional air defense commander or sector air defense commander during joint engagement zone (JEZ) centralized control operations.]* {Italicized definition in brackets applies only to the Air Force and is offered for clarity.}

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

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

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

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. (JP 1-02)

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

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. (JP 1-02)

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

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

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

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**. (JP 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**. (JP 1-02)

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

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

high-density airspace control zone. Airspace designated in an airspace control plan or airspace control order, in which there is a concentrated employment of numerous and varied weapons and airspace users. A high-density airspace control zone has defined dimensions, which usually coincide with geographical features or navigational aids. 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**. (JP 1-02)

identification, friend or foe. A system using electromagnetic transmissions to which equipment carried by friendly forces automatically responds, for example, by emitting pulses, thereby distinguishing themselves from enemy forces. Also called **IFF**. (JP 1-02)

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

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

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

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

killbox. A generic term for a preplanned airspace control measure and/or a fire support coordination measure used by the joint force to integrate and synchronize air and surface operations and deconflict joint fires in an expedient manner or on an asymmetric battlefield.

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

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

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

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**. (JP 1-02)

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

positive identification. Identification is determined by visual recognition, electronic support systems, noncooperative 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.

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.

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. (JP 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**. (JP 1-02)

Service component command. A command consisting of the Service component commander and all those Service forces, such as individuals, units, detachments, organizations and installations under 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. (JP 1-02)

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

unmanned aerial vehicle. A powered, aerial vehicle that does not carry a human operator, uses aerodynamic forces to provide vehicle lift, can fly autonomously or be piloted remotely, can be expendable or recoverable, and can carry a lethal or nonlethal payload. Ballistic or semiballistic vehicles, cruise missiles, and artillery projectiles are not considered unmanned aerial vehicles. Also called **UAV**. (JP 1-02)

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

