AIRSPACE CONTROL

Air Force Doctrine Document 3-52
2 February 2011

This document complements related discussion found in Joint Publication 3-52, *Joint Airspace Control*

BY ORDER OF THE
SECRETARY OF THE AIR FORCE

AIR FORCE DOCTRINE DOCUMENT 3-52
2 February 2011

SUMMARY OF CHANGES

This document is substantially revised and must be completely reviewed. This revision updates commander's roles and responsibilities, incorporates indirect fire systems as airspace users, and increases the discussion of air traffic control throughout. The format of the publication has changed to adhere to the LeMay Center doctrine document template. Chapter one discusses airspace fundamentals; chapters two and three discuss command and organization and then planning, execution, assessment respectively. In-depth discussions on homeland operations were added to both chapters two (page 29) and three (page 46). These chapters discuss in detail the considerations for planning and executing an airspace control system across the range of military operations.

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Commander, Curtis E. LeMay Center for Doctrine Development and Education

FOREWORD

Military operations in the 21st century are highly complex and require detailed planning across components to be both effective and efficient. Recent conflicts have demonstrated the need for airspace control in varying levels of conflict, from major operations and campaigns to stability operations. We share airspace during military operations with civil users, nongovernmental organizations, coalition military forces, and host nation users. We must ensure the safety of all users, even if combat operations are ongoing while civil aviation continues. The doctrine outlined in this document enables combat effectiveness while promoting the safe, efficient, and flexible use of airspace with a minimum of restraint placed upon airspace users.

Our doctrine for airspace control rests upon the Air Force tenet of centralized control and decentralized execution. The Air Force theater air control system provides the commander, Air Force forces the ability to conduct theater-wide air operations and typically forms the backbone of the theater air ground system. This system integrates the efforts of all components to maximize the efficiency of air operations throughout the theater.

The joint force commander (JFC) normally designates the commander of Air Force forces as the joint force air component commander, airspace control authority, and area air defense commander. The air component commander, as the airspace control authority, develops the airspace control plan (ACP) on behalf of the JFC. The airspace control authority cannot restrict combat operations by other components. However, should the JFC decide to enact restrictions on air operations during certain phases of the operation, the ACP will detail those restrictions. The ACP, when signed by the JFC, contains policies and procedures that flow directly from the JFC's authority.[1]

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

DAVID S. FADOK
Major General, USAF
Commander, LeMay Center for Doctrine Development and Education

[1] JP 3-52, *Joint Airspace Control*

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PREFACE

Air Force Doctrine Document (AFDD) 3-52, *Airspace Control*, is the Air Force's foundational doctrinal publication on Air Force airspace control operations and organization. AFDD 3-52 presents Air Force-sanctioned ideas, lessons learned, and best practices to help Airmen[2] conceptualize and articulate their role in airspace control operations. The publication introduces and develops the Air Force's role in integrating controlling agencies and joint airspace users into the theater-wide mission of the joint force commander. It establishes the foundations for developing Air Force education on airspace control and the subsequent development of sound tactics, techniques, and procedures.

Chapter 1, Airspace Control Fundamentals, places into context airspace control's role within the range of military operations. In doing so, the chapter acknowledges the complexity of the modern airspace environment while simultaneously noting the critical role airspace control plays in the integration, deconfliction, and risk management of joint operations. It discusses the unique perspective Airmen bring to airspace control and the general policy guiding their actions. The chapter describes airspace control's cross-domain effects and how the enduring principles of war and tenets of airpower relate to its operations. Finally it details how this publication integrates with corresponding joint and sister-Service doctrine.

Chapter 2, Command and Organization, describes organization and command relationships within the Air Force command architecture and how these forces are presented to a joint force commander as part of the commander, Air Force forces' air and space expeditionary task force. It details the roles and responsibilities of Air Force structure as well as the corresponding organizations of the other Services and Components. Finally, the chapter details the homeland organizational structure and the intertwined complexity of military and agency governing and regulation.

Chapter 3, Planning and Execution, describes how airspace control operations are designed, planned, and executed across the range of military operations.

Two appendices complement the document. The first appendix outlines considerations when developing an ACP. The second appendix, "Regional Air Movement Control Center," describes the organization, its reason for existence, and its structure.

Not only is Air Force doctrine compatible with existing joint doctrine, it also expands and elaborates upon it. This publication links airspace control doctrine to joint operations, most notably through Joint Publication 3-52. AFDD 3-52 should influence

[2] For the purposes of AFDD 3-52, the term "Airmen" does not include Air Force civilians or other members of the Air Force not in uniform. The law of armed conflict drives the exclusivity of the term's use in not formally including Department of the Air Force civilians or other members of the United States Air Force not in uniform. Differentiating the nuances of when civilians are addressed as Airmen is vital for leaders at all levels to ensure all Air Force members are accorded their proper status during times of conflict. For more information on the law of armed conflict, see <http://www.au.af.mil/au/awc/awcgate/awc-law.htm#low>.

the creation of corresponding joint and North Atlantic Treaty Organization doctrine and may influence other Service doctrine as well.

AFDD 3-52's principal audience is airspace control professionals, middle, and senior leadership of both Air Force and joint commanders and their staffs. It is applicable to all Airmen as an authoritative guide for conducting airspace control operations across the spectrum of military operations.

CHAPTER ONE
AIRSPACE CONTROL FUNDAMENTALS

There are still those who fail to stand back and reflect on the fact that air assets operate in the one medium that surrounds the earth and that touches 100 percent of the earth's population, political capitals, and centers of commerce. Because of the long history of surface warfare and, perhaps, of our very existence on land, air power is not an easy concept to grasp.

— Gen Ronald R. Fogleman

DESCRIPTION

The complexity of today's airspace environment grows with each advance in technology. Clearly defined airspace control concepts, forces, and capabilities help identify how best to use them for commanders at the strategic, operational, and tactical levels of military operations. The growth of military integrated air defense systems and the advent of cruise missiles and unmanned aircraft systems (UAS) continue to complicate theater airspace control requirements.[3] In addition to military users, current and future operations can expect a multitude of other air-intense operations either near or within a joint operations area (JOA). Within this paradigm, civilian users, nongovernmental organizations (NGOs), and relief agencies may require the use of combat zone airspace to conduct operations. Complicating matters, indirect fire systems (e.g., artillery), are recognized airspace users and today range higher, farther, and with greater volume of fire than ever before.[4] These increased user demands require an integrated airspace control system to enable flight safety and prevent fratricide while enabling mission accomplishment and minimizing risk.

Airspace control is the coordination, deconfliction, integration, and regulation of airspace to increase operational effectiveness. Properly employed, airspace control maximizes the effectiveness of combat operations while minimally impacting and without unduly restricting the capabilities of any Service or functional component. Never static, airspace control operations may begin prior to combat operations, continue after,

[3] UAS is the official US Department of Defense term for an unmanned aircraft system. Air Force group 4 and 5 unmanned aircraft (UA), such as the Predator, Reaper and Global Hawk, are referred to as remotely piloted aircraft (RPA). For definitions of UAS categories, refer to JP3-30, *Command and Control for Joint Air Operations*

[4] Air Force Tactics, Techniques, and Procedures (AFTTP) 3-2.78, *MTTP for Airspace Control*

and may transition through varying degrees of civil and military authority. The airspace control procedures within the JOA are approved by the joint force commander (JFC) and are derived entirely from the JFC's authority. Airspace control does not infringe on the authority vested in commanders to approve, disapprove, or deny combat operations (Joint Publication [JP] 3-52, *Joint Airspace Control)*.

Airspace control is extremely dynamic and situational, but to optimize airspace use, that control should accommodate users with varied technical capabilities.[5] In addition to expected threat levels, the available surveillance, navigation, and communication technical capabilities of both the airspace users and controlling agencies often determine the nature of the airspace coordination measures used. Generally, limited technical capabilities result in increased airspace coordination measure requirements with an implied decrease in airspace management efficiency. Similarly, higher technical capabilities normally result in decreased airspace coordination measure (ACM) requirements and an associated increase in airspace efficiency. Areas with the greatest air traffic congestion and risk of mid-air collisions often correspond to heavily accessed points on the ground (e.g., navigation aids, airports, drop zones, targets, and ground firing systems). Adherence to the JFC's guidance on ACMs should prevent airspace planners from exceeding the JFC's risk tolerance. This integration of ACMs into operations deconflicts airspace usage while decreasing potential fratricide. Planners should acknowledge these issues and allocate resources accordingly.

Airspace control is essential to accomplishing the JFC's objectives across the range of military operations. It allows all users to access needed airspace while preventing conflicts among those competing users. To better organize operational airspace three characterizations exist:

- Permissive combat airspace: a low risk exists for US and coalition aircraft operations within the airspace of interest. Operations can expect little to no use of adversary electronic warfare, communications jamming, anti-aircraft systems, or aircraft. Air superiority or air supremacy has been achieved.

- Contested combat airspace: a medium risk exists to US and coalition aircraft within the airspace of interest. Expect the enemy to employ fighters, anti-aircraft systems, and electronic jamming. US and coalition aircraft can achieve localized air superiority for operations within portions of the airspace. Enemy air defense assets are neither fully integrated nor attrited.

- Denied-access Combat Airspace: a high risk exists for many, but not all, US and coalition aircraft from integrated air defense systems, radars, anti-aircraft systems, electronic warfare, and fighter aircraft. The airspace is characterized by pervasive enemy activity. Expect operations to result in high losses or denial of sustained operations until a measure of air superiority can be achieved.

[4] AF/A9 L2, Integration *of Airpower in Operational Level Planning Report*

AIRSPACE CONTROL AUTHORITY

Normally, the JFC designates a joint force air component commander (JFACC) as the commander for joint air operations. The JFC may also concurrently designate an airspace control authority (ACA) and area air defense commander (AADC). The ACA is "the commander designated to assume overall responsibility for the operation of the airspace control system (ACS) in the airspace control area" (JP 3-52). The AADC, on the other hand, is the commander assigned overall responsibility for air defense with the preponderance of air defense capability and the command, control, and communications capability to plan and execute integrated air defense operations (JP 3-52). Because these related authorities are so integral to air operations, the JFACC is normally assigned ACA and AADC responsibilities.

As the ACA, the JFACC is responsible for planning, coordinating, and developing airspace control procedures and operating the ACS. The ACA does not have the authority to approve, disapprove, or deny combat operations. That authority is vested only in operational commanders. However, airspace control procedures within the JOA are approved by the JFC and are derived entirely from JFC authority. If the ACA and an affected component commander are unable to obtain agreement on an airspace issue, the issue should be referred to the JFC for resolution.

In most operations, the commander of Air Force Forces (COMAFFOR) is multihatted as the JFACC, ACA, and AADC. This is largely due to the Air Force's ability to concurrently command and control (C2) these activities. In those joint operations where separate commanders are designated, close coordination is essential for unity of effort, fratricide prevention, and joint air operations deconfliction.[6] Because such separate arrangements are rare, the remainder of this publication assumes the COMAFFOR has been multihatted as the JFACC, ACA, and AADC. This, in fact, is the preferred Air Force construct for which Airmen are trained.

THE AIRSPACE CONTROL SYSTEM

The ACS is an arrangement of those organizations, personnel, policies, procedures, and facilities required to perform airspace control functions (JP 3-52*)*. A system of systems, the ACS enables multiple component air-ground systems to support the JFC's planning and execution of air-ground operations.[7] The ACS combines each component's C2 and airspace control system supporting the JFC.[8] Into this arrangement, the Air Force brings its theater air control system (TACS) with deployable air traffic control and landing system (DATCALS) elements. The Air Force TACS, along with the Army, Navy, Marine, and Special Operations air ground systems combine to form the military's portion of the ACS. In many operations, wide-ranging interagency

[6] JP 3-52, *Joint Airspace Control*

[7] Air Force tactics, techniques, and procedures (AFTTP) 3-2.23, *TAGS -- MTTP for the Theater Air Ground System*

[8] The TACS is composed of the following elements: Air and Space Operations Center (AOC), Air Support Operations Center (ASOC), Tactical Air Control Party (TACP), Terminal Attack Control (TAC) Team, Forward Air Controller (Airborne) (FAC-A), Control and Reporting Center (CRC), the E-8C Joint Surveillance Target Attack Radar System (JSTARS), and the E-3 B/C Airborne Warning and Control System.

and NGO operations may be involved and challenge unity of command. Because any action taken by one airspace user may impact other users, a coordinated and integrated combat ACS is essential to the conduct of successful operations. An ACA-established ACS supports JFC objectives and facilitates unity of effort.

Airspace control should be executed through a responsive ACS capable of real time control that includes surface and airborne assets, as necessary (e.g., control and reporting center [CRC] and airborne warning and control system [AWACS]). The ACS requires timely exchange of information through reliable, secure, and interoperable communications networks. Elements of the ACS may have dual roles as defensive counterair assets. For example, a control and reporting center (CRC) can be a regional or sector air defense commander responsible for air and missile defense in addition to their airspace control duties. [9]

The ACA normally delegates airspace control authority to elements of the ACS. Each component normally provides airspace control elements to an ACS. Their associated air traffic control (ATC) functions provide ICAO approved traffic and separation standards as required. All of these separate agencies are ultimately governed by the host nation's rules and regulations. However, as operations transition between peace time and combat operations, peacetime airspace rules and organizations change. The nature of those changes will vary from theater to theater. [10]

Airspace Control System Fundamentals

A common ACS facilitates accurate and timely coordination of airspace operations among friendly forces. Common equipment, a common understanding of Service and joint doctrine, and familiarity with procedures through joint exercises and training can enhance airspace control operations within the JOA.[11] Standardized airspace procedures rely upon an effective mix of identification and control measures. Identification requirements for airspace control should be integrated with those for air defense. Airspace control, air defense, air traffic control, and supporting C2 procedures, equipment, and terminology should be compatible, mutually supporting, and integrated to ensure commonality of procedures for airspace users and control agencies.[12] Airspace control agencies should work out procedural agreements and establish required communication links to ensure effective interagency coordination.

Effective airspace control means securing the systems enabling that control. The systems comprising our airspace control system include, but are not limited to, sensors, communications, data processing, and common operating databases. Information assurance programs such as communications security, physical security, emissions security, and network defense are methods to protect airspace control systems and information. Due to the US military's dependence on and the general vulnerability of electronic information and its supporting systems, information assurance is essential to

[9] JP 3-01 *Countering Air and Missile Threats*
[10] JP 3-52, *Joint Airspace Control*
[11] AF/A9 L2, *Integration of Airpower in Operational Level Planning Report*
[12] JP 3-52, *Joint Airspace Control*

airspace control. Additionally, when developing communication policies and procedures, it is imperative operations security (OPSEC) practices are applied.

Airspace Control Procedures

Airspace control is a mix of procedural and positive control. Airspace control procedures provide maximum flexibility through an effective mix of positive and procedural control measures. The capabilities of the organization executing control over a given section of airspace normally drive the composition's mix. The control structure should encourage close coordination among joint force components allowing a rapid concentration of combat power. An ACS should be adaptable to changing requirements and priorities as operations progress through various operational phases.

Procedural control is a method of airspace control relying on a combination of previously agreed and promulgated orders and procedures (JP 3-52). It establishes the basic common criteria and concepts for airspace control. This form of control relies on common procedures, designated airspace, and promulgated instructions by an authorized control agency to deconflict and activate air traffic control areas, airspace coordinating measures, fire support coordination measures (FSCM), and air defense control measures. Controlling agencies activate airspace with a defined time and volume through standard airspace coordination measures or weapons control statuses. These procedures deconflict both aircraft and airspace use from other airspace users. When appropriate communications exist, an authorized airspace control agency can provide procedural control instructions in real time to increase operational flexibility for airspace users. Considered effective for low density airspace saturations and in areas lacking positive control coverage, this method is not normally as efficient as positive control. Procedural control measures should be uncomplicated, readily accessible to all forces, and disseminated through the airspace control order (ACO) and special instructions (SPINS) of the air tasking order (ATO). Use of these single-source documents is essential for integrating rotary-wing, fixed wing, fires, and unmanned aircraft operations.

Positive control is a method of airspace control relying on the positive identification, tracking and direction of aircraft within a given airspace. It is normally conducted by electronic means by an agency having the authority and responsibility therein (JP 3-52). This form of control relies on surveillance, accurate identification, and effective communications between a designated airspace control agency and the airspace user. It is normally conducted by agencies equipped with radar; identification friend or foe (IFF) interrogators and receivers; beacons; track processing computers; digital data links; and communications equipment. Positive airspace control requires the means to locate and identify airspace users in real time, and the ability to maintain continuous communications with them to pass required control instructions. This positive control method still requires predetermined, standing transition procedures to procedural control should positive control systems become degraded or made unavailable. Those procedures should also account for the differences between civil and military communications and surveillance systems.

Cost versus Risk

When discussing procedural and positive control, there is a continuum of efficiency, level of effort, resources required, and risk to be addressed (see figure 1.1). The minimum requirements for surveillance, identification, and communications equipment can vary by theater and operation, but are likely to be driven by a combination of military and civil aviation regulations and the level of risk the JFC is willing to accept. Assuming a constant air traffic volume, uncontrolled airspace exerts a small drain on resources, but carries increased risk. For that same airspace, standing airspace procedures, such as a restricted operations zone (ROZ), not only incrementally increase control and resources required, but also reduce risk. Full military or civilian positive control provides the greatest risk mitigation, but exerts a significant drain on resources. Ideally, the entire airspace control area would be under positive control with radar and communication coverage. However, limited resources or other factors, such as terrain, may make this goal unrealistic. Airspace planners should determine where the JFC's risk tolerance is lowest, or the needs for efficiency are highest, and establish positive control in those areas. In areas where positive control is not feasible, standing airspace coordinating measures should be the primary minimum standard for airspace control. These standing procedural control measures form a crucial backup in the event positive control capability is diminished.

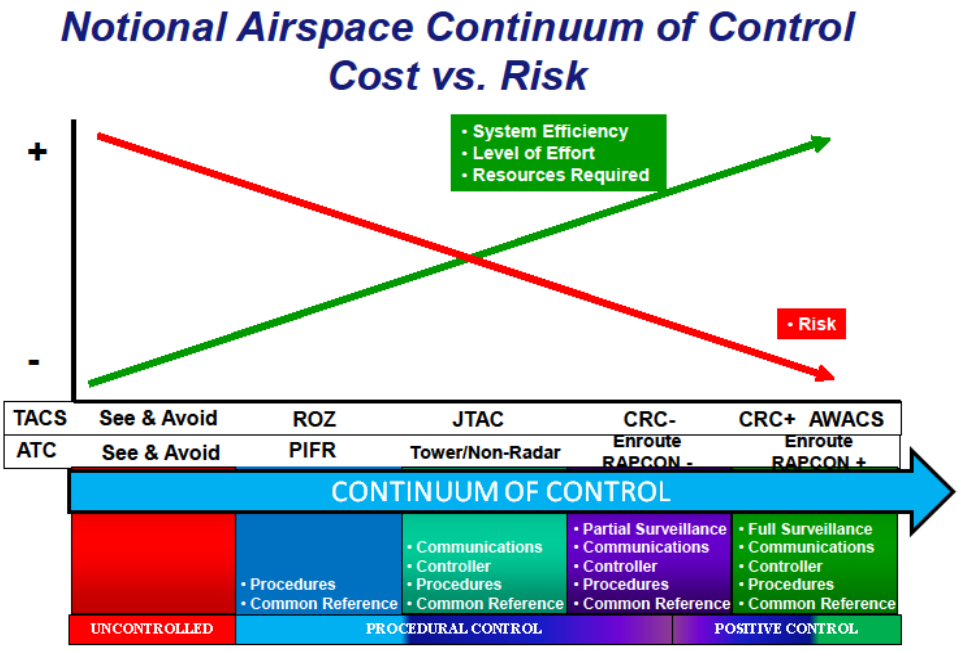

Figure 1.1. Notional Airspace Continuum of Control

POLICY GUIDANCE

The National Military Strategy addresses airspace control at the national level. It states that "the Department (of Defense) must work to secure strategic access to key regions, lines of communication, and the global commons of international waters,

airspace, space and cyberspace." To gain and maintain this strategic access, the US military and associated agencies are tasked with "making the best use of the tools at hand within the US Government and among our international partners." The US military "must harness and integrate all aspects of national power and work closely with a wide range of allies, friends and partners." The implications of this policy are captured throughout this document and emphasized with the inclusion of non-combat operations thus fully exploring the entire range of military operations.

Specific to airspace control, high seas freedoms of navigation and overflight include the right of aircraft of all nations to use the airspace over the high seas. Foreign sovereign airspace extends to the outer limits of the territorial seas; aircraft of all nations enjoy high seas freedoms of overflight in the airspace above exclusive economic zones of coastal states beyond the territorial seas. Aircraft of all nations also enjoy freedom of overflight through straits used for international navigation and through archipelagic sea lanes. Consistent with customary international law, this freedom must be exercised with due regard for the safety of navigation of civil aircraft.[13] Air Force procedures governing operations in international or foreign national airspace recognize the right of a foreign government to establish and enforce procedures for operations within its sovereign airspace[14].

AIRMAN'S PERSPECTIVE

Airmen think and operate on theater and global dimensions. Comprehensive awareness at these levels is fundamental to an Airman's way of thinking. A RPA flown over Iraq during Operation IRAQI FREEDOM, controlled through a regional air and space operations center (AOC) while providing direct support to the JFC and multiple ground units is an example of the Airman's perspective applied operationally. Airmen share the JFC's theater-wide focus. While exploiting airpower's speed, range, and flexibility, Airmen provide capabilities from outside an area of responsibility (AOR) (globally in some cases). They then provide control for those capabilities where and when they are required in a given operation. This has direct implications for airspace control because airspace control plans (ACPs) should be developed, integrated, and possibly implemented across adjacent regions while supporting several operations simultaneously. Airspace has many users and uses which should be carefully integrated, coordinated, and deconflicted to ensure safe and effective operations; this demonstrates the need for some form of centralized control. This is the key reason airspace control authority is normally vested in a single commander. The need for effective integration is greatest in major combat operations, where manned and unmanned fixed-, tilt- and rotary-winged combat aircraft, military airlift, missiles, artillery, and commercial airspace users all vie for the same airspace.

[13] DODI 4540.01, *Use of International Airspace by U.S. Military Aircraft and for Missile/Projectile Firings*
[14] AFI 13-201, *Airspace Management*

Airpower's Contributions

Airpower has added a vertical flank to the modern battlefield creating a maneuver space throughout a given theater to be taken and exploited.[15] Few missions (land, sea or air) can be accomplished without at least localized air superiority. Fundamental to discussing airspace is the understanding that *air superiority* is implicit in establishing even the most limited forms of airspace control. If enemy aircraft target friendly aircraft or ground troops, deconfliction measures between friendly airspace users are irrelevant until those threats have been neutralized. Airpower operations such as close air support (CAS), interdiction, and other supporting efforts are likewise compromised without first establishing at least localized air superiority.

Recent operations highlighted a number of important capabilities to both the Air Force and airspace users as a community. Primary among these capabilities is the positioning, navigation, and timing (i.e., global positioning system [GPS] satellites) made possible by the Air Force's space force enhancement. The precision made possible by space superiority allows employment of small diameter bombs within a metropolitan area, reducing the potential for collateral damage.

Frequently overlooked during these discussions was airspace control's contribution to the multiple missions occurring in the Baghdad area during Operation IRAQI FREEDOM. At the time, Baghdad airspace was some of the world's busiest airspace.

Deconfliction involved combat, transport, and civilian aircraft transiting airspace with intelligence, surveillance, and reconnaissance (ISR) platforms interspersed throughout the region. Without appropriate airspace coordination measures in place, each of these aircraft types, manned and remotely piloted aircraft, would pose a threat to both the mission and the lives of the personnel involved. Because such control measures were in place, globally integrated ISR platforms were free to find, fix, track, and target high value targets while coordinating with fixed-wing and rotary-wing aircraft to complete each operation. An example of deconfliction complexity is provided in figure 1.2.

[15] Givens, Robert P., "*Turning the Vertical Flank, Airpower as a Maneuver Force in the Theater Campaign*", CADRE Paper No. 13, Air University Press, Maxwell AFB, AL June 2002, p. 85.

Operation ANACONDA

An example of failing to effectively plan and integrate airspace use occurred during Operation ANACONDA in 2002. Very little planning for use of airpower was conducted prior to commencement of the operation; hence airspace coordination measures were ad hoc and very rudimentary. The lack of airspace planning prior to commencing Operation ANACONDA did not simply complicate air traffic management; it compromised the safety and welfare of warfighters and noncombatants in the air and on the ground. For example, after initiating operations, it took three days to first close and move civilian airline traffic routes running directly over the conflict area; normal airspace planning would have accounted for this earlier. Also, because planners did not adequately prepare for airspace management requirements, they did not foresee the potential threat fighters pulling up after ordnance delivery posed to the airliners above them. Similarly, those same planners did not allow for B-52s dropping 2000 pound bombs through multiple levels of air traffic stacked below them.

(Not depicted are the air refueling routes required to keep the air effort flying or the impact on commercial airspace users). In the end, Airmen backfilled airspace planning needs and provided clear, controlled airspace over the ground operation.

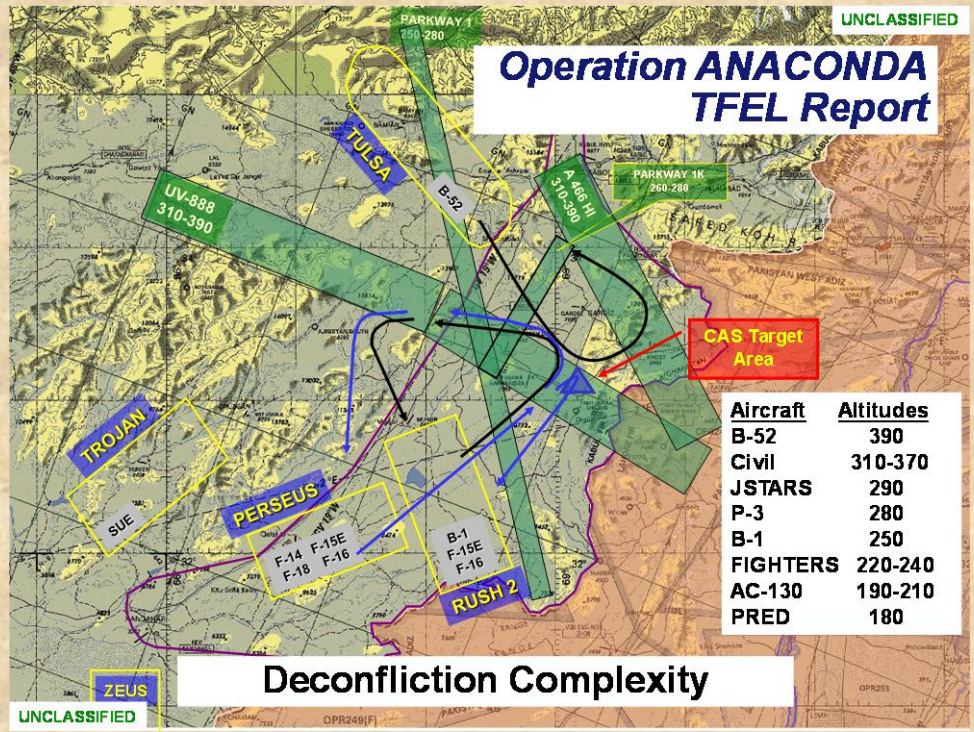

Figure 1.2. Anaconda Airspace

CROSS-DOMAIN INTEGRATION

Airpower produces synergistic effects (AFDD 1).[16] The Air Force leverages asset capabilities from multiple domains to create this effect. As the focal point for air operations, the Air Force's AOC integrates air, space, and cyberspace capabilities into airspace operations. The ACP, produced within the AOC, is a product of that integration. Space capabilities resident within the AOC enable the communication necessary to develop and disseminate the ACP to the joint force.

Operation DESERT STORM brought space capabilities to the forefront of airspace control. The precise navigation made possible by the recent deployment of GPS satellites enabled kill boxes and their more refined keypads. These fire support coordination measures and their associated airspace coordination measures would not have been possible without first integrating space capabilities into airspace control's operations. The coordination process establishing these procedures deconflicted a combat-intense airspace while simultaneously reducing the chances of fratricide.

Airspace control relies heavily on space based capabilities. Space based systems provide the positioning, navigation, and timing airspace users across the Department of Defense (DOD) take for granted. Airspace coordination measures can become marginalized if airspace users cannot establish their position. The controlling agencies and their systems should be capable of locating, identifying, tracking, and communicating with airspace users within their area of control. As users travel across our mountains, oceans and deserts these capabilities diminish. In these cases, the benefits space brings to airspace control increase in proportion to the relative isolation of the airspace.

The capabilities inherent within the cyberspace domain enable the AOC's coordination process. The integration of the cyberspace domain into airspace control is intuitive. The networked systems and constantly updated information on display are made possible because of this integration. Airspace control's impact upon the cyberspace domain is not as obvious. Airspace control creates effects within cyberspace because the assets using the airspace are free to execute their mission. For example, the kinetic destruction of a cell tower can create some of the same effects as a malicious virus. Both can limit a network's capability to transmit information between users. Likewise, the purposeful jamming of specific frequencies can temporarily disable the triggering system on explosives intended for US forces.

Airspace control also plays a large part within the maritime domain. The Navy controls the airspace around its battle groups. Aircraft carriers, while offering a platform

[16] AFDD 1, *Air Force Basic Doctrine*.

to project national power also simultaneously control and defend the airspace around the battle group. While defending the battle group, airborne assets allow supported assets the freedom to conduct operations. The battle group's success depends on being able to control who enters and exits their airspace, where those users interact, and when those interactions take place. The fact these activities are a normal part of daily operations does not diminish their importance.

The most obvious domain integrated into airspace control is the land domain. Whether planning surveillance orbits, establishing air-refueling tracks, executing kill box procedures, or protecting remote special operations teams, airspace control impacts land domain operations. Operations IRAQI FREEDOM and ENDURING FREEDOM highlight the synergistic effect of airspace deconfliction with respect to UAS and other airspace users on the land domain. Identification of UAS orbits as a priority and allocating airspace control organizations and resources against that problem allowed controlling agencies to deconflict multiple airspace users. The increased margins of safety allowed UAS platforms expanded target development and the subsequent capture or elimination of high value targets in theater.

Airspace management and control procedures enhance effective airspace operations in support of JFC objectives. All joint air and space force components have legitimate mission requirements for airspace that should be integrated, coordinated, and deconflicted within the airspace control system. Airspace control is required to prevent fratricide, enhance air defense operations, facilitate fire support, and maximize the effectiveness of operations conducted from and through the air to accomplish JFC mission objectives. Airspace planning should be integrated into the joint air operation planning process as early as possible.

CHAPTER TWO
COMMAND AND ORGANIZATION

To conquer the command of the air means victory; to be beaten in the air means defeat and acceptance of whatever terms the enemy may be pleased to impose.

—Italian General Giulio Douhet

Air Force and joint doctrine supports the command and control of joint air operations around three options; a functional component commander, (e.g., a JFACC), a Service component commander, or a staff option.[17] Additionally, both Air Force and joint doctrine support command of airpower through a theater-level COMAFFOR/JFACC, a joint task force (JTF)-level COMAFFOR/JFACC, or a mix of the two. The latter requires careful consultation between the respective JFCs and their COMAFFOR/JFACCs. The geographic combatant commander (CCDR) should provide guidance for the interaction between theater-level components and subordinate JTFs.[18] This should include clarity of supported and supporting command relationships between the JTFs and theater COMAFFOR/JFACC, together with clear priorities of effort and support, and apportionment. The theater COMAFFOR/JFACC should then allocate effort across the AOR using CCDR guidance and priorities. The CCDR sets the conditions for success by clearly stating and emphasizing the supported command status of subordinate JTFs and the supporting command role of a theater-level COMAFFOR/JFACC. The CCDR is the ultimate arbiter for prioritization and apportionment decisions among subordinate JTF commanders and the theater COMAFFOR/JFACC to provide sufficient guidance for the theater COMAFFOR/JFACC's subsequent allocation decisions. [19]

The AOC is organic to the Air Force and is the senior Air Force command and control (C2) node for command and control of air, space, and cyberspace forces.[20] When employed for joint or coalition operations, the AOC is known as a joint air operations center (JAOC) or combined AOC (CAOC) for coalition operations. In the case of a single JFACC, airpower's inherent flexibility can be leveraged through a single commander and subsequently controlled by a single JAOC. This is true even if that C2 is exercised over multiple JOAs across a single AOR. However, key personal relationships become harder to maintain under this organization due to heavy reliance

[17] JP 3-30, *Command and Control for Joint Air Operations*
[18] AFDD 2, *Operations and Organization*
[19] AFDD 3-12, *Cyberspace Operations*
[20] AFDD 2

on virtual vice physical presence and a greater geographical distance between the JAOC and the joint theater headquarters.[21]

ROLES AND RESPONSIBILITIES OF THE COMMANDER, STAFF, AND SUBORDINATE ORGANIZATION(S)

Airmen, in conjunction with joint and coalition partners, are responsible for planning and integrating airspace control systems in accordance with JFC guidance. Airspace control systems should maximize the combat effectiveness of all forces while reducing the risk of fratricide. To do this, Air Force commanders train their personnel to employ risk management principles and to be knowledgeable of all component systems and procedures. The primary purpose of command relationships is to establish a chain of command so all involved understand who is in charge, who is supported, and who is supporting.[22]

Joint Force Commander

The JFC is responsible for airspace control within the JOA[23]. Although components may use portions of airspace to accomplish the mission, they do so only with the approval of the JFC and in accordance with the JFC's policies and procedures. The control procedures and authorities for the airspace within the JOA are codified in the JFC's ACP and executed by the ACA.[24] The ACP in combination with the ACO expresses how airspace will be used to support mission accomplishment. The air operations directive (AOD) then establishes the priorities among airspace users and missions.

Commander, Air Force Forces

The COMAFFOR provides the Air Force TACS and airspace control expertise and resources to the JFC.[25] The JFC normally designates the COMAFFOR as the JFACC. Each airspace control system can be tailored to support centralized control and decentralized execution of air forces throughout the range of military operations. The Air Force provides the COMAFFOR with the resources necessary to assume the roles of ACA and AADC. Unifying the roles of ACA and AADC ensures unity of effort in all aspects of theater airspace operations. If the JFACC is designated from another component, the COMAFFOR ensures Air Force forces are employed in accordance with the JFACC's guidance and tasking. If the JFC decides not to organize functionally, the COMAFFOR should expect to fulfill the roles of ACA and AADC.[26]

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[21] AF/A9 L2, *Integration of Airpower in Operational Level Planning Report*
[22] AFDD 6-0, *Command and Control Systems*
[23] JP 3-52, *Joint Airspace Control*
[24] JP 3-52; AFDD 3-52, *Airspace Control*
[25] JP 3-52
[26] AFDD 3-52

Joint Force Air Component Commander

The JFC normally designates the COMAFFOR as the JFACC and assigns responsibilities accordingly. The JFACC is normally designated by the JFC as the AADC and ACA since air defense and airspace control are an integral part of joint air operations. By design, the AOC is a natural command and control node to integrate these operations. Although the separation of the AADC and the ACA function is not routine, the JFC may designate a separate AADC and ACA (e.g., when a single commander is not capable of performing both roles).

Airspace Control Authority

The component commander designated as the ACA assumes overall responsibility for the operation of the ACS in the JOA and should be the commander with the preponderance of airspace management and control capability, including the ability to plan, promulgate, execute, and assess integrated airspace control operations. The ACA, on behalf of the JFC, develops broad policies and procedures for airspace control and for the coordination required among units within the operational area. When approved by the JFC, these policies and procedures are promulgated via the JFC's ACP.

A key responsibility of the ACA is to provide an effective and adaptive airspace control system to meet contingency situations and necessitate the rapid employment of forces in support of the JFC's mission. Matters on which the ACA is unable to obtain agreement are referred to the JFC for resolution. Key ACA responsibilities include, but are not limited to:

- Identifying and coordinating airspace access required for the JFC's mission.
- Providing effective and timely integration of the airspace control system with that of the host nation; coordinating and deconflicting airspace user requirements[27] to include conduct of operations in support of normal air commerce operators as governed by host nation and International Civil Aviation Organization (ICAO) guidance.[28]
- Developing the ACP in accordance with JFC guidance.
- Developing ACOs in accordance with the ACP.
- Disseminating the ACP and ACO in a timely manner to all associated joint and coalition units.
- Integrating Service and joint airspace management and control personnel and systems to support required JFC mission.

[27] LeMay Center Handbook 10-01, *Commander's Handbook for the JFACC*
[28] JP 3-52; *Air and Space Power Journal* (04 Oct 05), The Miracle of Operation Iraqi Freedom Airspace Management

- Establishing liaison with interagency, host nation, regional, or international airspace agencies as required for the deconfliction of civil and military airspace use.[29]

- Delegating control of a portion of airspace to a commander to accomplish a specified mission or to facilitate decentralized execution (e.g., an amphibious objective area [AOA] or air defense sector).

- When delegating airspace, retaining overall responsibility for specified airspace and recalling that airspace when required for higher JFC priorities or when the delegated commander can no longer exercise command and control over the delegated airspace.

Airspace Control Authority Products

To execute airspace control effectively, the ACA provides guidance on airspace use and prioritization through the ACP, ATO, ACO, and AOD. The ACP establishes airspace control procedures throughout the JOA. Refer to JP 3-52, *Joint Airspace Control, or* Appendix A of this document, for topics to consider when developing an ACP.[30] The ACP establishes the airspace control system, the control nodes, and airspace procedures. The ACO executes the ACP and could contain airspace priorities discussed in the AOD. The AOD, like the ACP, is directive in nature.

The ACP and area air defense plan (AADP) should complement each other to provide effective airspace control. The ACP should consider procedures and interfaces with the international or regional air traffic systems necessary to effectively support air operations, augmenting forces, and JFC objectives. Ideally, the ACP should be developed prior to an expected operational phase to provide advance information to other component and coalition planners. These documents should support continued operations with degraded command and control capabilities. The ACP also supports an orderly transition from peacetime operations to combat operations and back to peacetime. Such a transition could occur during a period of increasing tensions or suddenly without warning.

Activation of the airspace specified in the ACP is through the ACO. While the ACP provides general guidance for the control of the airspace, the ACO implements specific control procedures for established time periods. The ACO is published either as part of the ATO or as a separate document. The ACO defines and establishes airspace for military operations. It contains the details of the structure and effective time of activation for the airspace to be used. The ACO includes airspace coordination measures, air traffic control areas, air defense areas, and fire support coordination measures.

The AOD provides JFACC guidance for each ATO and the successive planning steps. Significantly, this document conveys JFC guidance concerning acceptable levels

[29] JP 3-52
[30] JP 3-52

of risk, usually based on mission type orders. In doing so, the AOD provides operational level planners the information required for sortie allocation necessary to meet JFC objectives within imposed risk constraints.[31]

Area Air Defense Commander

The JFC designates the AADC. The AADC is responsible for defensive counterair (DCA) operations, which includes both air and missile defense. The AADC should identify those volumes of airspace and control measures that support and enhance DCA operations, identify required airspace management systems, establish procedures for systems to operate within the airspace, and ensure they are incorporated into the airspace control system. The AADC may also designate regional air defense commanders and sector air defense commanders to allow for ease of command and control of airspace based on the size and scope of the mission/operation. The successful conduct of air defense operations requires the integrated operation of all available air, land and maritime-based defense systems. [32] The AADC develops the AADP in coordination with the ACP and after JFC approval ensures it is promulgated.

Other Component Commanders

In support of JFC airspace management guidance, component commanders may be required to:

- Provide airspace control in areas designated in the ACP
- Forward requests for airspace coordination measures to the ACA in accordance with the ACP
- Develop component-specific airspace control instructions, plans, and procedures in accordance with guidance in the ACP; coordinate these plans and procedures with the ACA to ensure consistency with JFC-approved airspace control guidance
- Provide facilities and personnel for airspace control functions in assigned operational areas and identify those facilities and personnel to the ACA for inclusion in the ACP
- When required, provide component airspace liaison personnel to the JFACC or senior air control facility

[31] JP 3-52
[32] JP 3-52

JOINT AIR GROUND INTEGRATION CELL (JAGIC)

Historically, the Army/Land Component utilized the idea of a "Senior Tactical Echelon" which had the responsibility for developing the overarching plans for subordinate units. The TACS was built with Air Force representation at these various Army echelons; however, the primary concentration of air component personnel resided at the "Senior Tactical Echelon" - historically the corps headquarters in an Air Support Operations Center (ASOC).

During the conduct of irregular warfare in Operations ENDURING FREEDOM and IRAQI FREEDOM, the Army recognized that the majority of operational planning took place at echelons beneath the corps level. Often this planning does not require coordination with other surface units in adjoining areas, thus no requirement for a higher headquarters to synchronize efforts. Compounding these irregular warfare issues is the proliferation of warfighter technologies and resources such as UAS, maneuvering munitions, and future weapons systems. Such technologies increase the demand for integrated, versus deconflicted, joint air-ground command and control operations.

In order to adapt to these changes, the Air Force is modifying the TACS structure by moving the ASOC from the corps level to the division level. The ASOC residing within the division headquarters brings a new level of responsibility/decision making, pertaining to the execution of air-ground integration, for the Division Commander.

A new organizational construct is emerging that centralizes the decision making authorities from the land and air components with the highest levels of situational awareness to support the maneuver commander's concept of operations. This organizational construct is currently labeled the Joint Air Ground Integration Cell or JAGIC. JAGIC is aimed at providing a modular, scalable, and tailorable cell designed to fully integrate and coordinate fires and air operations over and within a division commander's area of operations.

-- AF/A9L2 July 2009, *Total Force Integration Air Support Operations Center Tactical Air Control Party (ASOC – TACP) Efficacy*
-- USAF/ARMY *Joint Air-Ground Integration Cell Tactical Operating Concept*

COMMAND AND ORGANIZATION CONSIDERATIONS ACROSS THE RANGE OF MILITARY OPERATIONS

Consistent with the provisions of JP 1-0, *Doctrine for the Armed Forces of the United States*, a JFC has the authority to organize forces to accomplish the assigned mission based on the JFC's concept of operations. The organization of forces will depend on the mission assigned, the manner in which the mission is to be fulfilled, and the

capabilities and strength of the component elements of the forces assigned. Consequently, the organizational form of the ACS may vary.[33] Generally speaking, command arrangements for airspace control do not vary across the range of military operations. Force composition offers an exception when forces are tailored to specific operations. Homeland operations, by definition, offer an exception to this statement and are dealt with later in the chapter.

The Airspace Control System

Historically, when the Air Force TACS is combined with Army, Marine, and Navy air control systems, the combined system is called the theater air ground system (TAGS). This did not always include the DATCALS and host nation airspace control systems. This use of multiple acronyms to describe ever increasingly complex airspace control systems has led to confusion even among airspace professionals. To alleviate this confusion, the generic term airspace control system (ACS) is used throughout this publication and in JP 3-52.

Airspace control systems should be interoperable, integrated, survivable, sustainable, and have redundancy because they are likely to be prime targets for an attacker. The design, responsiveness, and procedures of the ACS employed in the combat zone should support the rapid massing of combat power. Therefore, the structure of the airspace control system should be responsive to developing enemy threats and to the unfolding operation. Emphasis should be placed on simple, flexible airspace management procedures. Provisions should allow for control capability degradation. In this manner, flexibility and battlefield responsiveness are preserved.

Airspace control systems, especially voice radio communications, are susceptible to interference from frequency jammers, data emitters, and other radio transmitters operating in the same segment of the electromagnetic spectrum. Care should be exercised to avoid control procedures that rely heavily on voice communications. Such interference can result in degraded communications between airspace control agencies and users, creating potential safety of flight hazards.[34] Coordinated and detailed planning ensures both communications systems and their associated procedures are compatible among all airspace managers and users. The JFACC's communications staff and the theater frequency manager should determine potential sources of interference and coordinate with the Directorate for Command, Control, Communications, and Computer Systems to allocate alternate frequencies as required. The timely integration of sensor data and networked inputs between airspace control agencies and C2 nodes within a common operating picture (COP) provides crucial situational awareness for airspace agencies, users, and command decision makers.[35]

Airspace control functions rely on airspace management resources, but these functions are separate and distinct from real-time control of air vehicles and the terminal air traffic control environment. Air traffic control equipment, procedures and personnel

[33] JP 3-52
[34] AFDD 3-13.1, *Electronic Warfare*
[35] AF/A9 L2, *Integration of Airpower in Operational Level Planning Report*

should coordinate and communicate effectively with all ACS components. The system developed for combat airspace control is generally based on compromises between a wide variety of conflicting demands for airspace use. Flexibility and simplicity should be emphasized throughout to maximize the effectiveness of forces operating within the system. This flexibility should include the ability to incorporate a civil air traffic structure where no host nation capability exists. Airspace control should be capable of supporting 24-hour operations in all weather and environmental conditions (figure 2.1).

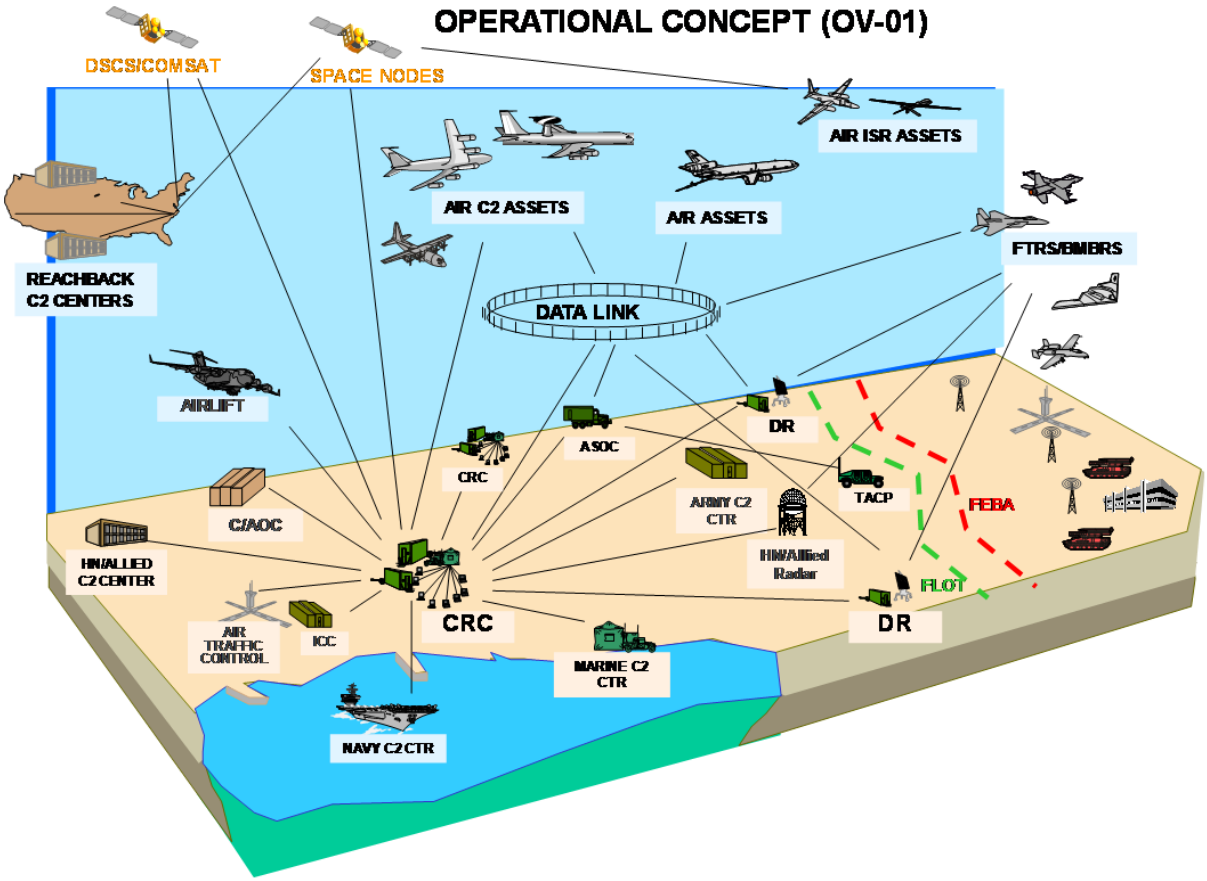

Figure 2.1. Notional Military Airspace Control System

The ACS combines each Service component's C2 and airspace control system supporting the JFC's mission. The Army Air-Ground System (AAGS), the Naval Tactical Air Control System (NTACS), the Marine Air Command and Control System (MACCS), and the Special Operations Air Ground System (SOAGS) combine with the Air Force Forces (AFFOR) TACS and/or airspace control agencies to support the JFC's air objectives in planning and execution. The JFC/ACA uses the area air defense plan, airspace control plan, and airspace control order to orchestrate the airspace control agencies within the ACS. These efforts seek to maximize each controlling agency's capabilities to provide a safe and effective airspace control system. To understand fully the relationship of the TACS to the airspace control system, planners should know each component's system, its composition, and structure. For more information on the airspace control system see Air Force Tactics, Techniques, and Procedures (AFTTP) 3-

2.17*, TAGS, Multiservice Tactics, Techniques, and Procedures* [*MTTP] for the Theater Air Ground System.*

The Air Force Theater Air Control System

The Air Force TACS is the C2 mechanism providing the COMAFFOR with the means to achieve the tenet of centralized control and decentralized execution.[36] TACS elements may be employed in garrison, deployed for contingencies, or deployed to augment theater-specific systems. While sometimes configured differently in the various theaters of operation, the basic functions performed by the TACS are the same. The COMAFFOR executes the ATO, ACO, ACP, and AADP, via the TACS. The Air Force TACS in combination with other Service airspace control elements constitute the theater air ground system (TAGS) which executes operations for the JFC (via the ASOC).

The AOC is the senior element of the TACS. It is where centralized planning, direction, control, and coordination of air, space, and cyberspace operations occur. The AOC is organized under a commander, while a C/JAOC is organized under a director (for joint forces) and a commander (for Air Force forces).[37] The AOC commander is normally dual-hatted as the C/JAOC director.[38] The AOC has five divisions: strategy; combat plans; combat operations; ISR; and air mobility, along with multiple support/ specialty teams. Each division integrates numerous disciplines in a cross-functional team approach to planning, execution, and assessment. For a full description of the AOC, see AFDD 1, *Air Force Basic Doctrine*; and AFTTP 3-3.AOC, *Operational Employment—Air and Space Operations Center*.

Joint Air Component Coordination Element (JACCE)

To better integrate air, space, and cyberspace operations, the JFACC may establish a JACCE at the JFC's or other functional component headquarters. When established, these elements act as the JFACC's primary representatives to the respective commanders and facilitate interaction between the respective staffs. The JACCE also communicates the component commander's decisions and interests to the JFACC. The JACCE performs a liaison function and does not act as a JFACC C2 node. The JACCE normally has no authority to direct or execute operations, unless given that authority by the JFACC.[39] The JACCE may include plans, operations, intelligence, airspace management, logistics, space, and air mobility expertise, as needed. The JACCE may represent the JFACC to a host nation following major combat operations. To do so, the JFC should authorize direct liaison between the host nation and JFACC on air operations issues.

Component Liaisons

Each Service or functional component commander involved in joint air operations normally provides a liaison element to the AOC. Among other duties, these liaison elements articulate component requirements for airspace and provide expertise in the

[36] AFDD 6-0, *Command and Control Systems*
[37] AFTTP 3-3.AOC *Operational Employment – Air and Space Operations Center*
[38] AFDD 6-0
[39] AFDD 6-0

development and execution of the AADP, ACP, and ACO. The joint force special operations component commander (JFSOCC) is represented by the special operations liaison element (SOLE) which coordinates, deconflicts, and synchronizes special operations of air and surface operations with conventional air. Liaisons representing the other Services include the Army's battlefield coordination detachment (BCD) and the Navy's naval and amphibious liaison element (NALE) to articulate Navy and Marine interests, unless a separate Marine liaison element (MARLE) is designated.

AOC Airspace Coordination

In the AOC, airspace management expertise is organic to the combat plans and combat operations divisions. Additional airspace management expertise may reside in the strategy or air mobility divisions, multiple support/specialty teams and other Service or functional component liaisons (e.g., BCD, SOLE) as their airspace requirements dictate. Combat plans airspace managers are the personnel responsible for the development and promulgation of the ACP and ACO. The combat plans division is responsible for near-term air and space operations planning within 48 hours prior to air tasking order execution, while combat operations airspace managers are responsible for changes to and execution of the promulgated ACO as well as other real-time AOC airspace coordination issues. The combat operations division is responsible for the execution of the current ATO (i.e., the 24 hours encompassing the effective period of the air tasking order). The time involved from identification of a time-critical target to execution is often too short to develop and deconflict an airspace coordination measure and generate an ACO change. C2 agencies should provide real-time deconfliction of airspace coordination measures developed in support of dynamic targeting cells.[40]

Based on the complexity of the airspace environment, the ACA may designate a senior airspace management specialty team leader to coordinate development, integration, use, and transition of airspace control within the operational area. This specialized team is in addition to other AOC airspace teams. When designated, the airspace management specialty team leader acts as the senior airspace manager and coordinates directly with the host nation and officials in adjacent countries on civil and military airspace control matters. The airspace management specialty team leader is a senior ranking airspace manager supported by a small staff that works ACA responsibilities; including memoranda of understanding with the host nation and international agencies, host nation and international aeronautical information publications, host nation notices to Airmen (NOTAMs), procedures of reintroduction of civil aviation into the operational area, and strategy development for airspace control transition from the ACA back to host nation authorities. The airspace management team may work through the JACCE to coordinate with host nation authorities, and as a minimum should keep the JACCE informed. Use of coalition airspace management specialists can provide a wealth of expertise on international airspace issues.

Installation Control Center (ICC)

Each Air Force installation maintains and operates an installation control center (ICC) to provide C2 for all resident units and organizations on the installation. The ICC

[40] AFTTP 3-3.AOC

provides the installation commander a single, consolidated C2 center from which to monitor and execute the installation's missions; including tenant, joint, and combined missions for which the commander bears supporting responsibility. The USAF ICC provides a standardized, functional organization for all installations; facilitating the installation-level C2 across the full spectrum of operations.

The ICC is scalable and tailorable at the installation commander's direction to provide the exact C2 capability required for the unique location, mission and operational situation of each installation. In addition to the CP function, the ICC may include provisions for a battle staff, mission planning function, operations planning and execution monitoring functions, maintenance operations, a logistics readiness center, and an emergency operations center (EOC). The ICC is linked to on-base support facilities such as the deployment control center, security forces, fire department, and hospital; as well as group and squadron unit control centers. The ICC is also linked to off-base C2 nodes including, but not limited to, the MAJCOM command center; Air Force component headquarters, AOC, and civilian EOCs, which are elements of the national incident management system.

The ICC supports the installation commander and tenant commanders, as well as transient or expeditionary forces hosted on a fixed installation, either in the continental US (CONUS) or overseas. As the installation commander for an expeditionary base, an air expeditionary wing (AEW) commander also uses the ICC to provide the required C2 capability. ICCs provide insight to activities required to execute the installation's mission at both fixed and expeditionary locations. The ICC consists of the following functional areas: the operations control function, the maintenance coordination function, the aerial port coordination function, reports, battle management, and incident response.

The ICC interfaces with the AOC as well as the AFFOR staff and is the key C2 center that bridges the C2 gap between operational planning and tactical execution. The ICC provides functional experts to receive, schedule, plan, and direct execution of the ATO. As required, the ICC is capable of connecting with elements of the TACS through voice and data communications. The ICC is especially effective when working with host nation representatives, tenant organizations, joint, and coalition forces.[41]

[41] AFDD 6-0

Combined Airspace Planning Group (CAPG) Airspace Specialty Team in Operations ENDURING FREEDOM and IRAQI FREEDOM

The combined forces air component commander (CFACC), in his role as ACA, assumed responsibility for all host nation airspace control functions in both Afghanistan and Iraq after the completion of major operations in those countries. Given the large scope and complexity of those responsibilities and host nation/civil aviation pressure to open and expand airfields and overflight routes for revenue generation, the CFACC established the CAPG consisting of a US Air Force ATC officer, a Royal Air Force ATC officer and a Royal Australian Air Force ATC officer. The CAPG developed interagency working group charters and coordinated quarterly meetings between the deputy CFACC (DCFACC)/deputy ACA (DACA), ACCE, regional air movement control center (RAMCC), Department of State, Federal Aviation Administration (FAA), component, coalition, host nation, and international airspace agencies and users to address and resolve key airspace issues.

Key CAPG responsibilities included international operating memoranda, host nation aeronautical information publications, civil aviation safety report responses, host nation NOTAMs, JFC airspace policy or waiver determination for civil operations, and representing the CFACC in regional aviation forums. The CAPG was aligned under AFFOR/A-3 (air, space and information operations staff directorate) in the AFFOR airfield operations division office outside of the AOC and initially obtained mixed results given the difficulty of direct coordination with the DCFACC/DACA and other AOC airspace offices; distraction from AFFOR airfield operations responsibilities; and short duration tour lengths of only four months. These limitations were corrected with the collocation of the CAPG with the combat plans division airspace managers in the AOC to allow improved access to the DCFACC/DACA, providing close working coordination with ACP developers. CAPG strategy and policy continuity with host nation agencies was strengthened through tour length extensions to 365-day rotations.

—Interview with Col Randy J. Davis, former Air Forces Central Chief of Air C2 and Airfields

Regional Air Movement Control Center (RAMCC)

The RAMCC is a separate specialty team, not necessarily co-located with the AOC, which reports directly to the AOC commander. The goal of the RAMCC is to provide a safe and efficient operating environment by managing the complex interaction of air assets not assigned or attached to the joint force and civil aircraft attempting to access or transit the JOA. It also provides a way for the AADC to have visibility over non-

military air traffic not depicted on the ATO. The RAMCC is responsible for coordinating operational requirements with the international civil aviation organization (ICAO) and disseminating airspace and airfield information to civil operators. The RAMCC may include liaison officers from coalition or neutral nations and maintains regular interfaces with NGOs and civil or commercial users of the airspace. For more information on RAMCC, see Appendix B.

Control and Reporting Center (CRC)

The CRC is a persistent deployable battle management command and control platform employed at the tactical level to support air operations planning and execution. Execution of both airspace control and air defense operations can be delegated to the CRC, and it operates independently or in combination with other C2 elements. Close coordination between the CRC, AWACS, JSTARS, and DATCALS units is required to ensure effective and safe deconfliction of airspace operations under control of these agencies. Within its assigned airspace control sector, the CRC conducts battle management, weapons control, surveillance, identification, and tactical data link (TDL) management operations.[42] The CRC is not certified to perform ATC services.

Airborne Warning and Control System (AWACS)

The E-3 AWACS is an airborne command and control element and is normally one of the first battle management assets to arrive in theater.[43] As such, it is tasked with tactical C2 by providing early warning, surveillance, battle management, combat identification, and weapons control functions. It has the ability to detect and control aircraft below and beyond the coverage of ground-based radars and enables a more accurate air picture through various TDLs. The AWACS' range, flexibility, and C2 system capabilities enable it to operate directly subordinate to the AOC. The AWACS is capable of performing many of the capabilities of the CRC, depending upon mission configuration and the needs of the COMAFFOR and JFACC. The AWACS is not certified to perform ATC separation services.

Joint Surveillance Target Attack Radar System (JSTARS)

The E-8 JSTARS is an airborne battle management and C2 platform which coordinates direct fires against enemy ground and surface targets. It provides procedural airspace control to coordinate, deconflict, and integrate AI, CAS, personnel recovery, offensive counter air (OCA), joint theater missile defense and special missions as required. JSTARS is fully integrated into the TACS and closely coordinates with AWACS and CRC to ensure appropriate deconfliction of airspace.

JSTARS can conduct limited CAS battle management as an alternate ASOC supporting ground operations at brigade and below levels when required. It also acts as an extension of the ASOC/DASC (direct air support center) as needed to relay battle management C2 information to airborne assets operating beyond normal communications coverage of ground elements.[44]

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[42] AFDD 2-1.1 *Counterair Operations* 4; AFDD 2-8, *Command and Control*
[43] AFTTP 3-2.17 *MTTP for the Theater Air Ground System*
[44] AFTTP 3-2.2 *The Joint Surveillance Target Attack Radar System*

Air Support Operations Center (ASOC)

The ASOC is the principle C2 node for integrating airpower with land component operations. It processes and coordinates airspace coordination measures, fire support coordination measures, and air support requests requiring integration with the land component. It controls air component missions operating in areas identified in the ACO. The ASOC normally requests airspace coordination measures required for CAS operations, to include minimum risk routes and air control points used for contact points and initial points. The ASOC coordinates operations with TACPs, the Army fire support cell, airspace C2 cell, and the AOC. Normally, the ASOC is collocated with the senior Army tactical echelon. However, during irregular operations, Army planning is accomplished at lower levels (division, brigade, battalion, and company).[45] For better airpower integration into joint operations, shifting ASOC associations to lower level organizations may be appropriate.[46]

Tactical Air Control Party (TACP)

A TACP is the principle Air Force liaison element aligned with Army maneuver units from battalion through corps level. For airspace management, TACPs integrate with the fires cells and the airspace C2 cells. To better integrate air and ground operations, TACPs assist ground maneuver units in the planning and requesting of both fire support coordination measures and airspace coordination measures. Additionally, TACPs assist the ASOC and joint terminal attack controllers (JTACs) with tactical control of CAS and forward air controller (airborne), or FAC(A), aircraft transiting from the ASOC contact point to the JTAC contact point.

Air Liaison Officer (ALO)

An air liaison officer leads, plans, organizes, and supervises both TACP and ASOC operations and personnel in garrison and while deployed. The ALO represents the JFACC on the supported Army commander's staff. As required, the ALO provides the subject matter expertise to lead, plan, and execute C2 and terminal execution of airpower operations in direct support of land component forces. The ALO utilizes advanced technologies and weapon systems to direct lethal and non-lethal fires and effects in close proximity to friendly forces as a JTAC.

Joint Terminal Attack Controller (JTAC)

A Service member who directs the action of combat aircraft engaged in CAS and other offensive air operations from a forward position. A qualified (certified) JTAC is recognized across the Department of Defense and participating nations as capable and authorized to perform terminal attack control.

Forward Air Controller (Airborne) (FAC(A))

The FAC(A) is an airborne extension of the TACP and has the authority to direct aircraft delivering ordnance to a specific target cleared by the ground commander. The FAC(A) is a specially trained pilot who is qualified, capable, and authorized to provide coordination and terminal attack control for CAS and other direct air support missions.

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[45] AF/A9 L2, *Integration of Airpower in Operational Planning Report*
[46] AF/A9 L2

The FAC(A) provides additional flexibility in the operational area by enabling rapid coordination and execution of air operations. It also enhances the TACS' situational awareness by disseminating information on the flow of aircraft on target.

ATC Operation Elements

ATC operation elements can provide air traffic control services from fixed sites or deployable facilities. The services include procedural, radar, tower, approach, and en route control. As the situation permits, host nation personnel and facilities may benefit operations by reducing force demands and expediting return to normal ATC operations; however, as the situation dictates, service ATC personnel with deployable capabilities can provide the required ATC services. Coalition ATC capabilities may also be leveraged to provide air traffic control services. It is important to note that coalition partners are not only able to provide garrison ATC services, but often have the additional skills to provide a wide range of tactical battlefield airspace control and contested/non-contested airspace management expertise.

Air Force deployable air traffic control and landing systems (DATCALS) capabilities include deployable control towers, airport surveillance radars, precision approach radar, tactical air navigation aids, mobile microwave landing systems, and a limited number of very high frequency omni-directional range station/distance measuring equipment systems. Air Force ATC personnel and DATCALS are normally aligned under units within an AEW. The AFFOR/A-3 (or the Air Force Flight Standards Agency when no AFFOR/A-3 expertise is assigned) provides functional oversight for unit level ATC operations including policy guidance, waiver approval, flight check coordination, and resource requests. Air traffic control units provided by other components or coalition partners fall under their organizational chain of command unless otherwise coordinated. Close coordination between ATC (especially ATC radar units), AWACS, and CRC units is required to ensure effective airspace integration. Air traffic control services may be provided by contract personnel during certain phases of military operations.

Air Mobility Liaison Officer (AMLO)

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

Special Tactics Teams (STTs)

STTs establish visual and procedural terminal area airspace control, C2, and air traffic services at remote drop/landing zones and austere or expeditionary airfields. They conduct these operations until relieved by other elements (TACP, contingency response group [CRG], or general purpose air traffic service forces). Special tactics combat controllers are certified as air traffic controllers, and a portion are qualified as JTACs. STTs are a part of the theater special operations forces and normally under the operational control of the JFSOCC. Depending on mission requirements, and upon JFC direction, STTs may be tasked under tactical control to the COMAFFOR or JFACC.

Contingency Response Groups (CRG)

The CRG is the Air Force's standing initial airfield-opening response force. These units are designed as organic, rapid response, initial airfield-opening units.[47] As such, CRGs are continually engaged with the respective COMAFFOR and A-staff's contingency planning process helping to ease the transition from airbase opening planning to airbase opening execution. For additional information, see AFDD 2-4.4, *Airbase Establishment and Mission Generation.*

Combat Communications Groups (CCG)

The Air Force has DATCALS assigned at 3 CCGs and 10 Air National Guard (ANG) ATC squadrons across the country. These units can deploy as an entire airfield systems/support package or as individual DATCALS packages (tower, TACAN, radar, etc.). They are the Air Force's interim airfield-opening response force and are designed to provide an initial cadre of associated maintenance personnel. As such, they are continually engaged with the respective COMAFFOR and A-staff's contingency planning process helping to ease the transition from airbase opening planning and execution to airbase sustainment. CCGs and ANG ATC squadrons can provide a full range of ATC service and procedural and positive control capabilities. For additional information see AFDD 4-1, *Bases, Infrastructure, and Facilities*.

Service Component Airspace Control Systems

As a system of systems, the airspace control system has multiple parts. Listed below are the DOD Service airspace systems. Depending upon the size of the operation, inclusion of one or more of these systems into the operation may be appropriate.

Army Air-Ground System (AAGS). The AAGS is the Army's organic airspace control system designed to operate both autonomously and jointly. The AAGS provides the means to initiate, receive, process, and execute requests for air support. It enables the synchronizing, coordinating, and integrating of air operations with the joint force land component commander's (JFLCC's) scheme of maneuver. The AAGS also disseminates information and intelligence produced by aerial assets. Some elements attached to the AAGS are liaisons provided by the Air Force. These elements are the AMLO, the TACP, and the ASOC. They function as a single entity in planning, coordinating, deconflicting, and integrating air support operations with ground elements. The principal Army agencies are command posts, fires cell, Army C2, air defense airspace management/brigade aviation elements, Army airspace C2 elements, and coordination and liaison elements, such as the BCD, theater Army air and missile defense coordinator, and ground liaison officers. Additionally, the joint fires observer (JFO) is a trained Service member who can request, adjust, and control surface-to-surface fires, provide targeting information in support of CAS terminal attack controls, and perform autonomous terminal guidance operations.[48] For more information on JFOs, see *Joint Fires Observer Memorandum of Agreement.*

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[47] AFDD 4-0, *Combat Support*
[48] AFTTP 3-2.6, *MTTP for the Joint Application of Firepower*

Navy Tactical Air Control System (NTACS). The principle naval warfare commanders involved in airspace control are the air defense commander, who is normally located on an Aegis cruiser/destroyer, and the strike warfare commander, who is normally the air group commander aboard an aircraft carrier. The Navy uses coordinators to allocate and distribute air assets. Pertinent coordinators include the air resource element coordinator, responsible for carrier aircraft, and the naval force ACA responsible for managing the use of airspace by the naval force. Other coordinators include the Tomahawk land attack missile (TLAM) strike coordinator and TLAM launch area coordinator. The Navy also uses airborne C2 nodes including the E-2C Hawkeye, which can provide C2 services similar to AWACS, JSTARS, CRC and United States Marine Corps tactical air operations center (TAOC) and airborne DASC.[49] See AFTTP 3-2.17 for a more detailed description of the NTACS.

Marine Air Command and Control System (MACCS). The senior air C2 agency for the MACCS is the tactical air control center (TACC). It provides the facility from which the Marine air-ground task force (MAGTF) commander and battle staff plan, supervise, coordinate, and execute all current and future MAGTF air operations. The TACC has the capability to plan, produce, and execute an ATO/ACO. The principle air defense agency for the Marine Corps is the TAOC which may be assigned sector air defense commander duties. It provides positive airspace control and navigational assistance to friendly aircraft. The TAOC may forward deploy an early warning/control (EW/C) element to extend its radar and radio coverage. The EW/C provides a similar function as the TAOC but on a smaller scale. The DASC is the principal agency responsible for control and direction of air operations directly supporting ground forces. The DASC uses procedural control methods to control airspace users. At the tactical level, the Air and Naval Gunfire Liaison Company (ANGLICO) provides small unit teams specializing in all aspects of fire support. See AFTTP 3-2.17 for a more detailed description of the MACCS.[50]

Special Operations Air Ground System. Special operations forces operate under a dynamic unity of command architecture that is often tailored for specific mission needs and thereby have unique TAGS requirements. The integration of special operations forces (SOF) into the TAGS requires a comprehensive and cohesive process that incorporates and supports uniquely trained Airmen and surface forces and specially equipped aircraft, increased operational security measures, trained SOF joint fires elements, and extensive liaison among components. SOF may provide their own air support, use air support of another Service or Coalition component, or provide air support for use by conventional forces. Special operations airspace integration and deconfliction issues are worked in the AOC by members of the SOLE. Special operations airspace managers may be located in the joint special operations air component, joint special operations task force, and joint special operations air detachment that coordinate airspace issues through the SOLE.[51] See AFTTP 3-2.17 for a more detailed description of the SOAGS.

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[49] AFTTP 3-2.17, *MTTP for the Theater Air Ground System*
[50] AFTTP 3-2.17
[51] AFTTP 3-2.17

Engagement, Cooperation, and Deterrence Operations

During this stage of operations, the likely mix of economic, commercial, stability, and combat air traffic activities may increase the complexity of the airspace environment more than during major combat activities. Airspace control resources should be allocated accordingly. For further information on this stage of operations see chapter 3.

Homeland Operations

The US homeland represents a complex political-military environment different from any other combatant commander's AOR. Within the United States, the FAA owns US airspace. The FAA is granted statutory authority over managing airspace by Title 49 of the United States Code. Title 49 directs the Administrator of the FAA to develop plans and policy for the use of the navigable airspace and assign by regulation or order the use of the airspace necessary to ensure the safety of aircraft and the efficient use of airspace.[52] With this authority, the FAA directs and controls all air traffic within the United States.

Complicating the FAA's control of US airspace, two separate commands share the responsibility of defending the US. The operational missions of North American Aerospace Defense Command (NORAD) and United States Northern Command (USNORTHCOM) intersect within the homeland AOR. Subsequently, the continental United States NORAD region and First Air Force (Air Force Northern [1 AF AFNORTH]) combine to function as part of the United States theater air control system. The Secretary of Defense assigns forces to NORAD and USNORTHCOM's assigned homeland defense and civil support missions. Unity of effort is achieved by ensuring a clear division of geography and labor with a spirit of mutual support and cooperation among these commands.[53]

AFNORTH achieves unity of effort with ANG leadership by providing air component planning, deconfliction and coordinating capabilities to state ANG organizations through the AOC. This coordination also provides commander Untied States Northern command (CDRUSNORTHCOM) and the JFACC situational awareness of the affected air, space, and cyberspace domains even before National Guard units are federalized under Title 10, U.S.C., authority. 1AF AFNORTH works within a civilian interagency environment composed of government and civilian organizations (FAA, Federal Emergency Management Agency, US Secret Service, etc.) to apply air and space effects prior to (crisis management) and after (consequence management) manmade and natural disasters.

Unlike the federalized model where National Guard units operate under Title 10 orders, normally the National Guard operates under the command authority of the state governor and The Adjutant General (TAG) in state active duty status (Title 32 U.S.C. authority). First Air Force (AFNORTH) uses an approved legal model based on

[52] United States Code, Title 49, Subtitle VII, Part A, subpart I, Ch 401, Section 40103

[53] Information *derived from JP 1, Doctrine for the Armed Forces of the United States, Ch IV, Section A(2) US Code Section 162(a)*

memoranda of understanding with the governors to receive ANG volunteers for short notice federal missions.

When Title 10 forces are called to assist in a disaster, state governors and TAGs are generally reluctant to relinquish control of state forces to other military/federal organizations. Parallel operations within a JOA by uncoordinated forces are potentially unsafe and inefficient. In rare circumstances such operations can result in opposing objectives and activities. Seeking unity of effort, AFNORTH provides a trained Air Force air component headquarters staff and associated capabilities to state joint force headquarters and interagency partners before Title 10 forces are introduced into the JOA.

The ACA is the designated military commander responsible for operations of the military side of the airspace control system in the designated area. The ACA coordinates with the FAA for approval of all issues involving the national airspace system. This partnership ensures immediate implementation of dynamic solutions while minimizing mission impact on the national airspace system. Military air operations are normally designed to coexist with civilian operations. Airspace deconfliction and coordination are accomplished through the CAOC and approved by the FAA. For additional information, see JP 3-27, Homeland Defense.

Crisis Response and Limited Contingency Operations

Non-combat activities across the range of military operations, such as disaster relief or other support to government activities, share many of the same characteristics of post major combat activities. For instance, a disaster may destroy a nation's airspace control capability and the US Government may elect to provide assistance until the capability can be restored. Many of the same considerations which apply in the combat zone would also apply equally well to non-combat activities. The ICAO has guidelines for airspace practices in the event of a disaster or significant non-combat events and these should be referenced together with existing host nation procedures. Coordination with the host nation; determination of authorities; interfacing with joint, interagency, and multinational organizations; providing service; and deconflicting military and civilian traffic are all applicable to operations other than combat.

CHAPTER THREE
PLANNING AND EXECUTION

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

—General Carl A. "Tooey" Spaatz

POLICY AND OTHER GUIDANCE

In general, airspace policy ascribes two responsibilities to the Air Force and DOD airspace users, to protect the public from flight operations and to return unused airspace back to the pubic when no longer required. Specifically, Air Force Instruction (AFI) 13-201, *Airspace Management*, directs the Air Force to "protect the public to the maximum extent practicable from the hazards and effects associated with flight operations."[54] Internationally, DODI 4540.01, *Use of International Airspace by US Military Aircraft and for Missile/Projectile Firings*, directs US military aircraft operating in international airspace to observe ICAO flight procedures.[55] Furthermore, DOD Directive (DODD) 5030.19, *DOD Responsibilities on Federal Aviation and National Airspace System Matters,* directs that airspace "not required by the Department of Defense, shall be made available to the FAA for civil use."[56] AFI 13-201 extends those same courtesies to host nations when using their airspace.

Specific to homeland operations, the FAA owns the national airspace system. However, DODD 5030.19 and Executive Order 11161, "*Relating to Certain Relationships between the Department of Defense and the Federal Aviation Agency*," directs the DOD to "ensure policies and procedures are in place in anticipation of the transfer of FAA responsibilities to the Department of Defense in case of war."[57]

BASIC CONSIDERATIONS

Airspace control provides joint and coalition forces air domain advantages to create effects across multiple domains. The unmatched speed, range, and flexibility of airpower enables the joint force to create asymmetric and synergistic effects while

[54] AFI 13-201, *Airspace Management*
[55] DODI 4540.01, *Use of International Airspace by US Military Aircraft and for Missile/Projectile Firings*
[56] DODD 5030.19, *DOD Responsibilities on Federal Aviation and National Airspace System Matters*
[57] DODD 5030.19

providing the concentration and priority called for by the JFC via the ATO. Consequently, potential airspace control system modifications should be considered during all planning phases. Airspace control considerations should be integrated into contingency and crisis action planning (CAP) to ensure joint/combined force effectiveness. The ACP should be consistent with specific operation plans (OPLANs) and operation orders developed by the JFC.

While referred to separately throughout this publication the phasing construct is a useful guide to generalize airspace control responsibilities, activities, systems, documents, and liaison requirements across the range of military operations. For reference, the phases of operations include Phase 0 (Shape), Phase 1 (Deter), Phase 2 (Seize the Initiative), Phase 3 (Major Combat Operations) and the post traditional warfare phases, Phase 4 (Stability), and Phase 5 (Enable Civil Authorities) operations. For further information on the airspace control execution by phases, refer to JP 3-52, *Joint Airspace Control.*

Contingency Planning

The OPLAN serves as the foundational employment concept for an operational area. Airspace planners should consider that all operations will not smoothly transition between operational phases. Depending on the nature of the conflict, national political objectives, and JFC intent, operations may cease prior to the beginning of engagement, cooperation, and deterrence operations. Transferring airspace control authority from civilian to military control, adapting the airspace control system to the JFC's needs during each phase, and eventually returning it to civil authority are complex tasks requiring joint military, diplomatic, and interagency efforts. Since a crisis may occur unexpectedly, airspace control and management activities should be a part of contingency and crisis action planning from the beginning. For instance, moving C2 and airspace control equipment (e.g., CRC or ATC) is a time-phased force and deployment data consideration. Since much of this equipment is subject to deployment airlift (or other lift) constraints, a coherent plan from the beginning is required to ensure critical airspace control capability is available at the appropriate time/phase of the operation.

Following major combat operations, the likely mix of combat, stability operations, and commercial activity may introduce a complexity to the airspace environment uncharacteristic of even the most demanding combat airspace. Compounding this, the ACA may transfer airspace control to the host nation during these later stages, giving the JFC and ACA a muted voice in control of airspace.[58] Figure 3.1 depicts a notional airspace control authority and the differing priorities and intent between civil and military airspace procedures. Notional operational phases are depicted at the bottom, reflecting the dominance of military activity during combat operations and the dominance of civil procedures leading into and out of those same operations.

[58] JP 5-0, *Joint Operations Planning*

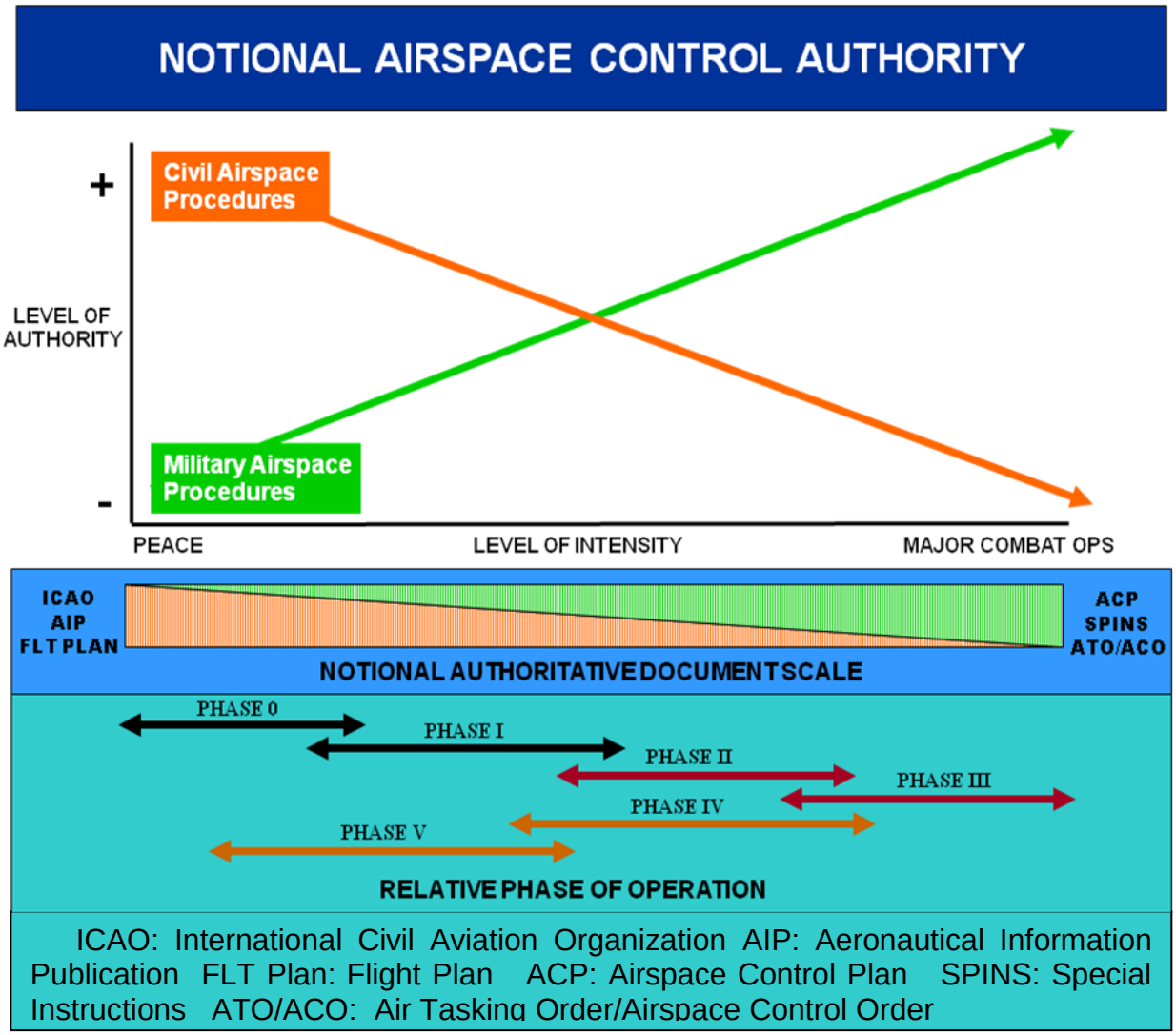

Figure 3.1. Notional Airspace Control Authority

Crisis Action Planning

Unlike contingency planning, CAP is based on emerging events and is conducted in time-sensitive situations. Plans are based on existing circumstances at the time planning occurs.[59] Contingency planning supports CAP by anticipating potential crises and facilitating development of joint operation plans to facilitate the rapid development and selection of a course of action (COA). This is especially crucial for certain airspace control operations that may need substantial coordination in advance with host nation or regional and international airspace or aviation agencies. Required airspace control actions should be fully integrated into the development of all courses of action. During course of action development, planners should identify tasks for airspace access and airspace control systems to support operational objectives. In addition, planners should

[59] JP 3-52

examine the role and contributions of airspace control functions through all phases of an operation.

Joint Operation Planning

The joint operation planning process (JOPP) is an orderly analytical process that consists of a logical set of steps to analyze a mission; develop, analyze, and compare alternative COAs against criteria of success and each other; select the best course of action; and produce a joint operation plan or order (JP 1-02). A major element of the JOPP is campaign planning, which is the process whereby combatant commanders and subordinate JFCs translate national or theater strategy into operational concepts through the development of an OPLAN for a campaign. Campaign planning may begin during contingency planning when the actual threat, national guidance, and available resources become evident, but is normally not completed until after the President or Secretary of Defense selects the course of action during crisis action planning. Campaign planning is conducted when contemplated military operations exceed the scope of a single major joint operation (JP 1-02). Airspace control should be integrated throughout the JOPP and campaign planning to ensure joint air operations support the JFC's plan.[60]

Airspace Control Planning

The following paragraphs discuss airspace planning considerations consistent with the phases of conflict described in JPs 3-0, *Joint Operations*, and 5-0, *Joint Operation Planning*. The discussion is based on a major campaign involving pre-hostilities activities, major combat activities, and stabilization and enabling activities. To facilitate discussion, this publication assumes theater-wide major operations and campaigns. However, planners should be familiar with the full details of the OPLAN in concept format or other operations that may take place.

CONSIDERATIONS ACROSS THE RANGE OF MILITARY OPERATIONS

As a guiding principle for all operations, the host nation retains airspace control authority and the joint forces primarily use existing international or host nation aeronautical information publications for airspace procedures or guidelines. Airspace and navigation services are the sovereign right and responsibility of the host nation. General considerations when addressing airspace functions across the range of military operations include:

- Command and Control/Air traffic control/airspace planners should be involved from the outset in planning and executing C2, air traffic control, and airspace management. This ensures airspace requirements are coordinated and approved by the proper agencies.

- Planning should consider the establishment of an ATC cell to liaise with the current host nation infrastructure. Establishing relationships with key host

[60] JP 3-52

nation and neighboring nations' air traffic control is critical. Establishing an aircraft diplomatic clearance process (e.g., for US Embassy personnel) should be accomplished as early as possible during the planning process. Key issues to resolve during this planning include:

- ✪ ✪ Identifying key personnel identification and contact information.
- ✪ ✪ Identifying existing agreements (e.g., aeronautical information publications and site surveys).
- ✪ ✪ Identifying rules, regulations, and existing international, multilateral, or bilateral agreements or arrangements governing proposed operations (e.g., ICAO, FAA, regional organization, or host nations). For planning purposes, this type of information may be located in the *Foreign Clearance Guide* (authorized by DODD 4500.54E).
- ✪ ✪ Identifying special operating rules or waivers needed for certain types of aircraft or operations that will need to operate within the host nation airspace (e.g., rules for UAS).

✪ Establishing requirements to integrate liaison officers, equipment, processes, and functions.[61]

Airspace Implementation

The ACP provides specific planning guidance and procedures for the airspace control system throughout the JOA. The ACP may be distributed as a separate document or as an annex to the operations plan. The airspace control order, which implements the ACP, is normally disseminated as a separate document. The ACO provides the details of airspace coordination measures for the next air tasking cycle and includes FSCMs, air defense areas, and air traffic areas along with other airspace information. Changes to the ACO are published on an as-needed basis.

Airspace Deconfliction Procedures

Airspace deconfliction normally occurs within the AOC. The AOC's combat plans division usually resolves airspace conflicts during the theater air tasking cycle pre-ATO/ACO publication while the combat operations division handles post ATO/ACO publication and real-time airspace control order changes. Deconfliction at other levels is executed by elements of the airspace control system capable of providing airspace control functions (e.g., CRC, AWACS, JSTARS, TACP, ATC) and achieved by directing time, position, altitude, and other deconfliction methods to airspace users.

[61] AFTTP 3-2.78 *MTTP for Airspace Control*

Integration with Air Defense

The air defense functions of weapons control, surveillance, and identification are inherent in the TACS, from the oversight and direction provided by the AOC, down through the execution capability of the AWACS and the CRC. The area air defense plan should provide detailed engagement procedures consistent with the ACP; the area air defense plan should incorporate air defense capabilities from all functional components and airspace control system elements. Airspace control and area air defense operations should be capable of functioning in a degraded C2 environment.[62] Detailed engagement procedures and clear delegation of authority to subordinate commanders are keys to success in a degraded environment.

Integrated Air and Missile Defense (IAMD)

Integrated Air and Missile Defense is the integration of capabilities and overlapping operations to defend the Homeland and US national interests, protect the joint force, and enable freedom of action by negating an adversary's ability to achieve adverse effects from their air and missile capabilities. IAMD activities include direct actions such as ballistic missile defense, counter rockets, artillery and mortars, OCA attack operations and air and cruise missile defense, as well as foundational support functions such as intelligence, networking, command and control and logistics.

JP 3-01 lays out the counterair missions within a framework that addresses all requirements for gaining control of the air domain. Through the counterair framework, the JFACC ensures that items on the JFCs defended asset list and critical asset list are protected from attack while simultaneously minimizing fratricide risk between friendly forces. The JFACC integrates joint air and missile defense sensor and shooter platforms through effective command and control, to include positive and procedural airspace deconfliction procedures. In accordance with unity of command as a principal of war, the JFACC and his staff should fulfill the roles of AADC and ACA. This enables a fully synchronized effort to employ Counterair capabilities in support of JFC objectives, and fully supports the command and control requirements to effectively manage IAMD. Planning products that support the joint air operations plan (JAOP) and ensure integrated operations among joint air and missile defense platforms are the AADP and the airspace control plan (ACP). The AADP contains the specific supporting relationships that the Army, Navy, and Marine Corps agree to fulfill by providing forces for either OCA or DCA. The ACP details guidance and restrictions that support the efficient and effective use of airspace by all joint counterair players. In joint operations, the AADP and ACP are JFC-approved documents that flow directly from the commander's authority.

For further information on this subject reference JP 3-01 *Countering Air and Missile Threats*, AFDD 3-01 *Counterair Operations*, and AFTTP 3-2.31 *IADS, Integrated Air Defense System.*

[62] JP 3-52

Airspace Coordinating Measures

Airspace coordinating measures are employed to facilitate the efficient use of airspace to accomplish missions and simultaneously provide safeguards for friendly forces. Examples include restricted operation areas, air-to-air refueling areas, and corridors. Airspace coordinating measures provide the three-dimensional description of the airspace, associated restrictions, requests for access, and other applicable coordination procedures (e.g., effective times). The ACP should list the categories of airspace coordinating measures in use for the joint operations along with the coordination and promulgation methods. The ACP should also include fire support coordinating measures and any coalition or host nation airspace coordinating measures in use.

The coordinating altitude (CA) is a type of airspace coordinating measure. It represents a vertical boundary that delineates airspace to facilitate the coordination and deconfliction of operations between airspace users and controlling agencies. The decision on where to place (or even to use) a CA requires careful consideration due to its impact on the integration of C2 agencies, fires, and maneuver. Placement should strike a balance between maximizing the effectiveness of air component and organic forces while not unduly inhibiting those same operations. The optimum CA (specified as above ground level) varies with specific operational area circumstances but should address the following: the respective C2 agencies' ability to provide airspace C2 below the designated CA, the anticipated ground scheme of maneuver during the effective time period established for the CA, and affected indirect fire support systems' range and altitude limits. The CA may change from one phase of an operation (or campaign) to the next, depending on the scale and scope of each component's requirement during that phase. The ACA establishes the CA through consultation with supported and supporting commands, specified in the ACP, published in the ACO, and may include a buffer zone. All airspace users should coordinate with the appropriate airspace control.[63]

A more complex airspace coordination measure is the high density airspace control zone (HIDACZ). A HIDACZ is airspace designated in an ACP or ACO in which there is a concentrated employment of numerous and varied weapons and airspace users.[64] Access is normally controlled by the maneuver commander directing a more restrictive weapons status because of the large volume and density of fires within the described HIDACZ. The volume of air traffic demands careful coordination to limit the potential conflict among mission essential aircraft and other airspace users.[65]

[63] JP 3-52
[64] JP 3-52
[65] AFTTP 3-2.78, *MTTP for Airspace Control*

Fire Support Coordination Measures[66]

FSCMs are measures employed by land, amphibious or special operations commanders to facilitate the rapid engagement of targets and simultaneously provide safeguards for friendly forces (JP 1-02). FSCMs are usually activated for a limited time and refer to areas where indirect fires may be active, restrictive, or prohibited. FSCMs define a boundary area on the ground and relate to airspace because of ordnance flight paths. The requirement to deconflict airspace in support of ground fire missions requires the determination of the firing locations, the impact location, and the airspace impacted by the projectile during flight. Those projectile parameters are deconflicted with other airspace users. Service liaisons and airspace control agencies work closely to ensure that appropriate airspace coordination measures and FSCMs deconflict surface operations and other airspace operations. See AFTTP 3-2.78, *Airspace Control*, for a more detailed example of HIDACZ planning.

Providing an Air Picture for the Joint Force

The JFACC is normally expected to incorporate data from various air, ground, and space sensors into a recognized air picture, to enable planning and decision making for air operations in the JOA. Feeds from data links are managed by the joint interface control officer (JICO) at the AOC and combined with other sources into a common operating picture. This fused picture is shared for mission planning and execution at all appropriate levels of command.

Integration of Air Defense and Airspace Control in the AOC

Airspace control and air defense functions are integrated in both the combat plans and combat operations divisions of the AOC. In the combat plans division, the C2 plans officers integrate air defense considerations such as minimum-risk route; identification friend or foe/selective identification feature (IFF/SIF) procedures, and missile, fighter, and joint engagement zones. In the combat operations division, the airspace manager is responsible for the execution of airspace control while the senior air defense duty officer is responsible for the execution of air defense operations. This organizational arrangement and further description of the specific duties of the positions in the AOC are found in AFI 13-1 AOC, Vol 3, *Operational Procedures-Air and Space Operations Center,* and AFTTP 3-3.AOC, *Operational Employment—Air and Space Operations Center.*

Integration and Synchronization with Surface Operations

Airspace control procedures increase in complexity and detail when air forces operate in proximity to, or in conjunction with, surface forces. To prevent both air-to-surface and surface-to-air fratricide, integrated joint operations are necessary. Liaison elements are vital when integrating air and surface elements in close proximity. Each surface component's area of operations (AO) may be defined with specific boundaries. These boundaries are normally defined by maneuver control measures including fire

[66] Planners should be aware that US Forces Korea employ the joint fires area construct (similar to the kill box construct) as a three-dimensional FSCM to facilitate the engagement of targets with respect to location and time in an effects area and concurrent airspace.

support coordination line, forward line of own troops, fire support coordination measures, airspace coordination measures, or multiples of these during nonlinear operations. [67]

Deconfliction of airspace and joint fires normally occurs during mission planning when fire support coordination measures and airspace coordination measures are disseminated through command and fire support channels. Combat dynamics make the real time coordination, deconfliction, and integration of airspace and joint fires C2 nodes essential. Projectile parameters should be integrated with other airspace users. Within the AOC, the Army's BCD monitors and interprets the land battle for the JFACC staff and AOC. The BCD also helps integrate defensive counterair operations with ground air defense systems. Airspace planners in the SOLE also keep the JFACC staff abreast of their ongoing surface operations. See JP 3-09, *Joint Doctrine for Fire Support,* for further details.

Global Area Reference System (GARS)

GARS is the DOD standard area reference system as established in Chairman of the Joint Chiefs of Staff Instruction (CJCSI) 3900.01C, *Position (Point and Area) Reference Procedures*. GARS is an operational-level administrative measure used to coordinate geographic areas for rapid operational deconfliction and synchronization. While providing a common language between the Services and components, GARS is not a replacement for position-reference procedures or systems. It is not used to describe exact geographic locations or to express precise positions for guided weapon employment, or to describe areas smaller than five minutes by five minutes. It simply provides the two-dimensional construction from which control and coordination measures can be constructed. GARS uses a grid system with a simple, universal identifier recognizable by each component and their associated C2 and attack assets. Three numbers followed by two letters describe a unique 30-minute by 30-minute area. The areas are read right (west to east, 1-720) then up (south to north, AA-QZ).[68] A detailed discussion of GARS is located in JP 2-03, *Geospatial Intelligence Support to Joint Operations.*[69]

[67] JP 3-52
[68] JP 2-03, *Geospatial Intelligence Support to Joint Operations*
[69] AFTTP 3-2.17 *MTTP for the Theater Air Ground System*

Common Geographic Reference System (CGRS)

In addition to GARS, there is another standardized geographic reference system known as the CGRS. CGRS predates GARS and may still be in use. This system uses a theater determined origin/starting point vice the global point referenced by GARS. Because both CGRS and GARS reference common terms with different meanings, there is a high risk of confusion. The ACP should define the theater-specific area reference system in use, as well as procedures for definition and activation of airspace dimensions.

CGRS is a two-dimensional construct to improve joint weapons integration over the battlespace. The system divides airspace into cells which are then further divided into nine keypads, which can be further subdivided into quadrants.[70] Some applications of the CGRS can be made three-dimensional by adding altitude restrictions. Forces in Korea define CGRS airspace by 30x30 minute squares, further divided into nine 10x10 minute sections. Each section is commonly referred to as a "keypad," similar to a telephone keypad. For further details see AFTTP(I), 3-2.59, *MTTP for Kill Box Employment.*

Common Geographic Reference System

During Operation ENDURING FREEDOM, Air Force aircrews and forward air controllers improved upon a system to deconflict aircraft and other weapon systems in the congested airspace over Afghanistan. Reference systems to help manage the battlespace are not new. During the siege of Khe Sanh in Viet Nam, pre-established restricted and free fire zones were used. During Operation DESERT STORM, a common grid overlay system known as a "kill box" was developed. The kill box concept was also adopted for air operations over the Balkans, then further refined in Operations ENDURING FREEDOM and IRAQI FREEDOM.

Theater Specific Area Reference System

If GARS is not used, the ACP should define the theater-specific area reference system in use, as well as procedures for definition and activation of airspace dimensions. Normally airspace boundaries between component or coalition airspace control agencies coincide with GARS boundaries. However, in certain situations (such as amphibious objective areas), the ground forces may request to control the airspace over its AO with the airspace boundary corresponding to a terrain feature (such as a river). In those circumstances, procedures for airspace control and handoffs between the adjacent airspace control agencies should be clearly coordinated to prevent loss of situational awareness and potential conflicts.

Procedures and authority for activating GARS airspace vary from theater to theater, based on the needs and intent of the JFC. The type of system used is less important

[70] AFTTP 3-2.78, *MTTP for Airspace Control,*

than ensuring all components use the same reference system and procedures. GARS airspace may include associated FSCMs. Other FCSMs and ACMs may also be used in addition to GARS.

Integration of Expeditionary Airfields

As an operation flows through its various phases, expeditionary airfields normally open and close as forces reposition. These airfield changes should be integrated and synchronized with ongoing airspace control and RAMCC procedures. An AFFOR airfield operations cell normally stands up to facilitate the opening of new airfields. Their key actions include installation of required airfield systems, sourcing of personnel, and the development and inspection of flight procedures. The timely establishment of all weather instrument procedures is crucial for base logistics and operations.

Communication and Information

Although the airspace C2 infrastructure has not changed much over time, the communications network has improved significantly, enhancing the reliability, security, and timeliness of information flow. Information that might previously have stopped at the AWACS or CRC is now sent to the AOC enhancing situational awareness. In addition, broad-bandwidth communications using satellite and internet protocol communications have substantially increased both the ACS C2 coverage and 'reachback' capabilities.[71] This provides the JFACC with a variety of employment options. Secure voice systems (ultra-high, very high, and high frequencies) are highly reliable means of communication. They were used as the primary means to communicate among airborne elements during Operations ENDURING FREEDOM and IRAQI FREEDOM.

Communications Planning

Planning is an essential element of effective airspace C2. Detailed radar and radio signal analysis ensures that surveillance and communications systems provide appropriate coverage within the airspace using a combination of fixed and mobile systems. Detailed analysis of joint network and joint infrastructure requirements is crucial in order to enable system integration across component and allied operational capabilities. These needs are normally met by installing a combination of organic and commercial communications systems prioritized to meet the commander's mission. The goal is to maximize the use of military capabilities and expand use of commercial systems to increase capacity and reliability and to generate greater freedom of action. Communications planners should perform an operational security (OPSEC) vulnerability analysis to determine procedures that will protect sensitive unclassified information from exploitation.[72]

Airspace Communications Systems

Airspace control agencies primarily communicate with airspace users via voice communications. Principal transmission should be through secure and jam-resistant radio equipment. The TAGS communication capabilities include line of sight, beyond

[71] AFTTP 3-3.AOC *Operational Employment-Air and Space Operations Center*
[72] AFDD 3-13, *Information Operations*

line of sight and satellite systems, but planners should also ensure that radio relays are considered to enhance over-the-horizon radio communications. Networking technologies may also increase the capabilities of C2 nets to disseminate information with unprecedented speed and accuracy. Additionally, increased reliance on internet relay chat requires specific configurations, protocols, and tactics, techniques, and procedures to ensure effective communications among internet relay chat users. Specific procedures for the use of internet relay chat or other non-voice communication systems for airspace coordination should be included in the ACP. When communications cannot be secured through technical means, OPSEC should be applied to all forms of unsecured communications.

Data

TDLs are standardized communication links suitable for transmission of digital information. All Services, including the Air Force, use these links for situational awareness to support battle management, C2, and combat airspace integration. Since air defense nodes also provide airspace control, they enhance the situational awareness and effectiveness of link-equipped aircraft. Rapid data transmission means they can also support airspace control as an ancillary function.

Gateways

With the debut of ASOC Gateway machines, ASOCs have increased situational awareness and the technological means to digitally communicate vital combat airspace information to appropriately equipped aircraft. Gateways provide the means to translate and forward tactical data to allow interoperability/information exchange among disparate TDL systems.

Joint Interface Control Officer.

The JICO works with the AOC's C2 plans division and component liaisons to develop and publish the theater's integrated data link architecture and operations guidance. Circumstances may allow or require the delegation of some data link management functions to regional levels. Chairman of the Joint Chiefs of Staff Manual (CJCSM) 6120.01D, *Joint Multi-Tactical Data Link Operating Procedures,* provides a detailed description of data links. AFTTP 3-2.23 *Multiservice Procedures for Joint Air Traffic Control,* AFTTP 3-2.17 *TAGS-Theater Air-Ground System*, and AFTTP 3-2.31 *IADS Integrated Air Defense System* provide further information on data links and the key role they play enabling effective airspace control and air defense.

Engagement, Cooperation, and Deterrence Operations

While normal and routine, operations designed around engagement, cooperation and deterrence discourage potential adversaries and assure or solidify relationships with friends and allies.[73] Various joint, multinational, and interagency airspace activities are executed with the intent to enhance international legitimacy and gain cooperation in support of defined military and national strategic objectives. They are designed to assure success by shaping perceptions and influencing the behavior of both adversaries and allies, developing allied and friendly military capabilities for self-defense

[73] JP 3-0, *Joint Operations*

and coalition operations, improving information exchange and intelligence sharing, and providing US forces with peacetime and contingency airspace access.

Additionally, the host nation may retain overall airspace control or the ACA may transfer airspace control to the host nation giving the JFC and ACA a less direct voice in the daily conduct of airspace control for continuing JFC operations. As part of theater security cooperation, the tasks and responsibilities of the ACA become crucial to ensuring access and enabling strategic and operational partnerships.[74]

Coordination with the Host Nation, Regional Authorities, and International Civil Aviation Organizations

When the host nation retains airspace control authority, joint forces primarily use existing international, host nation, or DOD aeronautical information publications for airspace procedures or guidelines. Airspace and navigation services are the sovereign right and responsibility of the host nation.[75] Joint forces operating within the airspace of any host nation use these airspace services with the sovereign consent of that nation, under the provisions of respective national aeronautical information publications or other appropriate agreements.

Although combat operations may not be in execution, the JFC should consider appointing an ACA, (normally the COMAFFOR) for airspace management, air traffic control, and navigation aids issues within the AOR/JOA. The commander, Navy forces is normally assigned responsibility for airspace procedures applicable to fleet air operations over international waters within the operational area and only advises the JFC's lead agent as appropriate. As lead agent, the COMAFFOR is delegated the authority to develop joint force airspace requirements in coordination with the other Service components and represent those joint force airspace requirements to the DOD, interagency, international, or host nation authorities as appropriate.[76] Additionally the executive agent normally serves as the focal point to:

- Provide assistance to the JFC, components, Services, and supporting commands on airspace, air traffic, and navigation aid matters.
- Develop appropriate airspace coordinating measures in support of JFC contingency planning to include airspace requirements for UAS.
- Ensure current and future airspace and navigation aid availability for components and supporting commands through joint mission essential task listing inputs.
- Coordinate host nation navigation aids inspections with HQ Air Force Flight Standards Agency, FAA/ICAO aviation system standards, and the DOD program management office for flight inspection.

[74] JP 3-52 *Joint Airspace Control*
[75] JP 3-52
[76] JP 3-52

- Ensure navigation aids are included on the DOD essential foreign-owned navigation aids list if deemed an enduring requirement.
- Develop and establish procedures for airspace actions or issues that cannot be resolved by component commands consistent with applicable DOD, JFC, component, international, and host nation guidance.
- Ensure altitude reservations are coordinated for all DOD aircraft transiting or operating within the operational area.
- Develop friendly host nation airspace capabilities through the joint force theater engagement plan, training, and exercises.
- Submit changes to DOD aeronautical/flight information publications to the National Geospatial-Intelligence Agency on a timely basis.

Normal and Routine Military Airspace Considerations

In addition to ensuring the continuation of routine DOD flight operations, joint force airspace planners should establish effective relationships with key AO airspace authorities, develop specific ACPs in preparation for future operations, and build airspace planning expertise.[77] Regular DOD or joint force interaction with host nation authorities and participation in regional airspace conferences establishes relationships with the host nation for quick resolution of issues and effective coordination of airspace requirements.

Development of ACPs should include airspace control considerations from peace to combat operations and through all follow-on phases of the operations plan. Additionally, the ACP should integrate known international or host nation air traffic airspace and air defense capabilities. Primary planning considerations include identification of airspace required for joint force operations and the proposed coordination process for obtaining that airspace.[78] Joint operation planning should consider procedures to transfer airspace control authority from the host nation to the ACA, rerouting of airways, ACA responsibilities for continuity of civil aviation operations, and host nation notification of ACA areas of control through NOTAMS or aeronautical information publication entries.

Developing joint force airspace control expertise for the design of airspace control systems and procedures is also crucial during normalized operations. Airspace managers should receive formal training prior to arriving at an Air Force component headquarters or AOC, preferably at the AOC formal training unit. Additionally, theater-specific training on airspace control ensures full mission qualification. Exercises provide key opportunities for airspace control planners to practice joint C2 procedures and familiarize themselves with the basic operation plan. Bilateral or regional exercises with

[77] AFTTP 3-2.23, *MTTP for Joint Air Traffic Control*
[78] JP 3-52

host nations are effective in improving cooperation and understanding on host nation capabilities for improved planning accuracy and interoperability.

Transition to Deterrence

The transition to deterrence operations begins with the identification and determination of a crisis situation requiring joint force action and crisis action planning to develop appropriate plans with ACPs. Available joint force airspace planners develop or revise the ACPs for airspace actions required in the initial execution of operations as well as considerations and planning for follow-on operations.

Deterrence

Normally a demonstration of joint force capabilities and resolve, deterrence seeks to avert undesirable adversary action. Largely characterized by preparatory actions, deterrence operations specifically facilitate the execution of consecutive operations or theater campaigns. Airspace control contributes to these operations by supporting the combatant commander's (CCDR) deterrence strategy. Specific airspace actions may include developing the finalized ACP and airspace database for ACO publication; obtaining initial overflight and airspace permission; and assignment of joint force airspace liaison personnel to Department of State, US embassies, multinational, or host nation organizations to coordinate airspace requirements for subsequent phases of the operation. Liaisons can facilitate a timely exchange of airspace control information, especially in a multinational environment where language barriers can impede crucial cross-communication necessary for safe and effective airspace control.

The JFACC (or JFC's executive agent for airspace management) establishes a dedicated airspace planning team to finalize the ACP and area air defense plan, and develops airspace control orders for current and future operations. The ACP and area air defense plan should complement each other and ensure the orderly transition from peacetime operations to combat operations. The JFACC (executive agent) may:

- Coordinate with the JFC, components, interagency, coalition, and host nation to define airspace boundaries for inclusion in the ACP (if granted liaison authority from the JFC).
- Request airspace planning augmentation from components, Services, interagency or multinational organizations as required for planning efforts, AOC operations, or liaison functions.
- Establish key relationships or agreements with appropriate international and regional airspace control agencies concerning ACA authority and coordination during joint force operations.
- Identify required joint force airspace control systems and personnel required to support airspace control through phased operations and deploy those assets as required.

- Coordinate DOD/FAA/ICAO NOTAM system availability to support intertheater dissemination of flight operating information and Air Force/FAA flight check aircraft for air traffic facility inspection.

- Identify the desired concept for the airspace control system in post major combat operations and consider placing critical components of the enemy air control system on the restricted target list to preserve them for future use.

Airspace Considerations

For deterrence, the ACP should contain procedures to fully integrate the resources of military and civil air traffic control facilities responsible for terminal-area airspace control or en route air traffic control. Airspace management personnel should coordinate the ACP with representatives of the host nations in whose airspace the operations will take place and with civil air activities that may occur in or near the airspace. Broad areas of concern for developing the ACP include familiarity with the basic OPLAN, knowledge of host and multinational capabilities, procedures of military and civil airspace control and air traffic control systems, and general locations of friendly and enemy forces.

Additionally, planners should be familiar with any host nation agreements that could impact air operations. They should be prepared to identify any new requirements to negotiate and formalize with the host nation. Host nation agreements concerning airspace control may only be negotiated by authorized personnel in accordance with Air Force instructions and ICAO protocols. Planners should integrate surface-to-air weapons and air defense aircraft for maximum effectiveness. Proper coordination with civil air operations is especially important during transitions into or out of wartime status or during non-wartime periods of heightened tensions. Political constraints, national and military airspace control systems and procedures, and the capabilities and limitations of these systems are important considerations in planning for required joint force airspace control. Applicable information from the ACP should be distributed to joint and coalition forces as well as host nations, allies, and international organizations such as ICAO.

Homeland Operations

Natural or man-made disasters and special events can temporarily overwhelm local, tribal, state, and non-military federal responders. The DOD has a long history of supporting civil authorities in the wake of catastrophic events. When directed by the President or the Secretary of Defense, USNORTHCOM and Service components respond to the requests of civil authorities to save lives, prevent human suffering, and mitigate great property damage. The Joint Strategic Capabilities Plan 2008 (JSCP) directs CDRUSNORTHCOM to prepare a plan to support the employment of DOD forces to provide defense support of civil authorities (DSCA) in accordance with the National Response Framework, applicable federal law, DODDs, and other policy guidance. The plan should include those hazards defined by the national planning

scenarios not addressed by other JSCP tasked plans. DSCA is a subset of DOD civil support that is performed within the parameters of the National Response Framework.[79]

Authorities

The FAA governs US airspace. Title 49, U.S.C., directs the administrator of the FAA to "develop plans and policy for the use of the navigable airspace and assign by regulation or order the use of the airspace necessary to ensure the safety of aircraft and the efficient use of airspace. The administrator may modify or revoke an assignment when required in the public interest." Title 49 also directs the administrator to prescribe air traffic regulations on the flight of aircraft (including regulations on safe altitudes) for:

- Navigating, protecting, and identifying aircraft.
- Protecting individuals and property on the ground.
- Using the navigable airspace efficiently.
- Preventing collision between aircraft, between aircraft and land or water vehicles, and between aircraft and airborne objects.

Additionally, the administrator establishes security provisions to encourage and maximize the use of navigable airspace by civil aircraft consistent with national security and in consultation with the Secretary of Defense. These responsibilities require the administrator to establish areas in the national airspace where in the interest of national defense, by regulation or order, restrict or prohibit flight of civil aircraft that the administrator cannot identify, locate, and control with available facilities in those areas.[80] Finally, Title 5, U.S.C., sections 551–559, *Administrative Procedure Act,* requires public notice before the FAA can carry out certain airspace management actions, including military actions.[81]

Incident Awareness and Assessments (IAA)

IAA is similar to the DOD's definition of ISR. However, ISR is conducted outside the United States over foreign territory or within the United States during homeland defense events, while IAA is conducted within the United States in support of DSCA operations. The different terminology is necessary to make it clear the DOD does not collect intelligence on American citizens. IAA operations focus on providing timely and usable information to all levels of command and to local, state, civil, and federal leaders in order to save lives, reduce human suffering and protect property. The three mission sets of IAA are broad area coverage, damage assessment, and situational awareness.[82]

First AF AFNORTH's tasks in support of IAA include:

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[79] *First AF Defense Support of Civil Authorities Air Support Handbook* 2009
[80] United States Code, Title 49, Section 40103 *Sovereignty and use of airspace*
[81] AFI 13-201, *Airspace Management*
[82] *First AF Defense Support of Civil Authorities Air Support Handbook 2009*

- Assisting USNORTHCOM in identifying, sourcing, sustaining and employing airborne IAA assets. Additionally, if the DSCA situation requires dynamic movement and tactical control of airborne assets, 1AF AFNORTH also assists USNORTHCOM in identifying the need for a dynamic ground control capability (like a JTAC).

- Executing collection operations management for assigned airborne IAA through the AFNORTH AOC.

- Coordinating and integrating DOD IAA collection efforts with non-DOD federal, state government, local government, and non-government airborne collection assets to increase efficiencies. This effort is greatly facilitated when all parties elect to participate in the contingency response air support schedule process.[83]

Homeland Defense Airspace Operations

Operation NOBLE EAGLE, the defense of America's skies after the attacks of September 11, 2001, and military support operations after Hurricane Katrina demonstrated the need for a clear understanding of responsibilities and effective coordination between civil and military airspace control agencies during homeland defense or civil support operations. Specific information for homeland airspace coordination considerations is included in JP 3-27, *Homeland Defense;* JP 3-28, *Civil Support;* and AFDD 3-27, *Homeland Operations.*

MAJOR OPERATIONS AND CAMPAIGNS

Traditional Warfare

According to JP 1, *Doctrine for the Armed Forces of the United States*, traditional war is characterized as a confrontation between nation-states or coalitions/alliances of nation-states. This confrontation typically involves small-scale to large-scale, force-on-force military operations in which adversaries employ a variety of conventional military capabilities against each other in multiple physical domains and the environment (including cyberspace). Normally, traditional war focuses on an adversary's armed forces with the ultimate objective of influencing the adversary's government. In contrast, "what makes war 'irregular' is the focus of its operations – a relevant population – and its strategic purpose – to gain or maintain control or influence over, and the support of that relevant population through political, psychological, and economic methods."[84] The genesis of the military's role in airspace control lies within the realm of traditional warfare. The current TACS organization is optimized for theater-level traditional warfare.[85] For clarity and understanding, the following sections presume deterrence operations have failed and hostilities have progressed to open warfare in the traditional sense.

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[83] *First AF* Defense *Support of Civil Authorities Air Support Handbook 2009*
[84] JP 1, *Doctrine for the Armed Forces of the United States*
[85] AFDD 3-24, *Irregular Warfare*

Transitioning to traditional combat operations from a position of deterrence may be accomplished on the JFC's initiative or in response to an enemy attack. During combat operations, peacetime airspace rules and organizations change and the nature of these changes will vary from theater to theater. The ACP should contain instructions to transition from peacetime to combat in simple, clear steps. The ACP should include the airspace control concepts for transition to combat operations and robust procedural control methods for potential degraded operations.[86] Airspace planners should be integrated into development of the master air attack plan to ensure required airspace is designed for combat operations and the transition from peacetime to combat airspace control is seamless.

At the onset of combat operations, every effort should be made to sanitize and exclude civil aviation operations from the affected JOA. Redesign of airspace or notification of impending changes to airspace control could signal adversaries of a pending operation so timing for airspace transition to potential combat should be considered. Advanced or open notification of airspace changes should be integrated into information operations for OPSEC or tactical deception considerations.

During this transition period, the air component plays a critical role in any JFC's course of action to shock, demoralize, disrupt, or gain access to a theater or joint operating area. In seizing the initiative, "the JFC seeks decisive advantage through the use of all available elements of combat power to seize and maintain the initiative, deny the enemy the opportunity to achieve its objectives, and generate in the enemy a sense of inevitable failure and defeat. Against adversaries with a credible air and air defense threat, efforts to seize the initiative will likely be more sequential than simultaneous because many operations may require air superiority as a precondition for success" (JP 3-52).[87] Additionally, "the JFC should coordinate with other governmental agencies to facilitate coherent use of all instruments of national power in achieving national strategic objectives" (JP 3-0, *Joint Operations*).[88] In combat operations, this involves executing offensive operations at the earliest appropriate time, forcing the enemy to offensive culmination and setting the conditions for decisive operations.

Integration of Airspace Control and Air Defense Operations

During combat operations the JFACC, acting as the ACA and AADC, normally unifies the functions of airspace control and air defense within the joint operating area. This integration prevents these two functional areas from conflicting and interfering with each other and enables prioritization and integration of air assets. Integrating the airspace control function with air defense operations is especially critical during the initial efforts to control enemy airspace and gain air superiority. Effective airspace control procedures assist in aircraft and missile identification, facilitate engagement of enemy aircraft and missiles, and provide safe passage of friendly air vehicles.

Planning Considerations

[86] JP 3-52
[87] JP 3-52
[88] JP 3-0

In the opening stages of combat, effective airspace control hinges on understanding the operations plan, JFC intent, the airspace environment, and the requirements to effectively control it. During these initial stages of major combat operations the JFACC is typically the supported commander for the theater-wide counterair effort and integrates offensive and defensive counterair with air defense assets to achieve air superiority.[89] Against countries with a credible air and air defense threat, efforts to "seize the initiative" have historically been more sequential than simultaneous because air superiority is a precondition for most operations' success. For operations where the US already has access and air superiority, the ACP and the area air defense plan may be less restrictive and operations to establish the required access may be either sequential or simultaneous.

Until air superiority is achieved, the initial ACP may restrict friendly military and civil airspace users. Operating airborne systems with limited identification and communications equipment places those aircraft at risk and also complicates counterair operations by increasing the risk of fratricide and the probability of successful enemy air or missile attacks. Certain friendly airborne systems (e.g., cruise missiles, UAS) may be mission-essential and yet lack identification, communications equipment or autonomous sense-and-avoid capability. Specific airspace measures are required for these users to minimize the impact to the counterair fight while maximizing efforts to seize the initiative.[90]

- Systems that cannot be positively identified as friendly may be restricted during the opening stages of combat operations prior to obtaining air superiority.

- At commencement of combat operations the JFACC should immediately execute plans and procedures to reduce civil aviation to levels most compatible with combat operations. Some level of civil aviation, especially commercial airlift flying in support of coalition operations, will probably continue throughout all the phases. Where they operate and under what restrictions will be fluid. The JFACC may assign to the director of air mobility forces the responsibility to manage these operations.

- The ACP should be continuously updated during the operation and for each of its phase transitions.

The JFACC should ensure the ACP and ACO are fully coordinated with supporting components, coalition partners, and host nation air and air defense forces, even if the host nation is not participating in combat operations.[91] This coordination should also include all SOF elements who participate in access operations. Because some of these plans are highly sensitive, the JFACC should ensure alternate communication means are available to pass information to friendly organizations that do not have access to

[89] AFDD 3-1, *Air Warfare*
[90] JP 3-52, *Joint Airspace Control*
[91] JP 3-52

normal military communications. In addition, consideration should be given to how airspace control system elements will interface and coordinate with civil air traffic control agencies just outside of the joint operating area for follow-on operations.[92]

Integration with Fires

Planning airspace control for combat operations should fully integrate fires from all friendly and coalition forces. Failure to integrate all fires in initial planning significantly increases the potential for fratricide and may delay execution of combat operations. Early integration of airspace and fires prevents costly decisions which result when two components plan to use the same airspace, at the same time, for different missions.[93] Air component airspace managers and airspace control system elements should coordinate with the JFLCC's senior fires element, ANGLICO, SOF, and TLAM planners to identify conflicting airspace requirements and quantify risk.

The JFACC, working with the JFC and other components, should clearly identify the risk of combining fires and aircraft operations (manned and unmanned), particularly at the outset of the campaign where airspace may be more constrained due to the higher density of air and land operations. These risks should be codified in the ACP, along with the level of risk the JFC is willing to accept for each phase. Risk is further discussed later in this chapter.

Some component fires systems such as conventional air-launched cruise missile, TLAM, Army tactical missile system, and other future systems, have small radar cross sections and are difficult to track with typical surveillance and ATC radar systems. As a result, these systems do not lend themselves to positive control and should be deconflicted with procedural airspace coordination measures. The ACP should establish procedures to include procedural control and coordination of fires. These procedures should also include real-time deconfliction measures for missions in the air tasking order, airspace control order, and SPINS.

The JFACC normally serves as the supported commander for the JFC's overall air interdiction effort.[94] Airspace control, to include deconfliction with fires, is critical to the success of interdiction. The JFACC should ensure that all interdiction operations use common reference systems and TTPs. The JFACC should advise the JFC and clearly define these reference systems and TTPs in the ACP, area air defense plan, and ACO. These plans should also include real time airspace control procedures for time-sensitive interdiction events and fires.

Theater Air Control System

During the initial stages of major combat operations, the airspace control system may be predominantly airborne e.g., AWACS and JSTARS and elements such as

[92] JP 3-52
[93] JP 3-52
[94] AFDD 3-1, *Air Warfare*

ASOCs and CRCs may not be fully deployed due to cargo transport capabilities.[95] When this occurs, airborne elements of the TACS and NTACS will accomplish C2 functions until appropriate TAGS is established. Planning for follow-on basing of the Air Force TACS should occur either before or during the early stages of combat and be coordinated with other components and coalition forces (including support of SOF). Failure to conduct this planning may prevent critical TACS elements from deploying to the theater at the appropriate time and will result in a less-than-optimum long-term airspace control capability. When practical, collocating key air C2, fire support coordination elements, ASOCs, and SOF airspace planning and operations nodes significantly eases coordination and increases the effectiveness of airspace control procedures.[96]

Integration of Unmanned Aircraft Systems (UAS) Plan

The use of UA over the battlefield has increased significantly in recent years. UA compete for airspace with manned aircraft, particularly in the vicinity of high value targets. In order to minimize risk and maximize the effectiveness of UAS, the ACP should direct the deconfliction of joint, Service, and coalition UA platforms operating at all altitudes. Unlike their manned counterparts, the vast majority of UAs do not have on-board sense-and-avoid capabilities. Therefore, other means of aircraft separation should be employed to reduce the risk of mid-air collisions. UAS deconfliction is critical to all phases and requires detailed planning and coordination.

Integration of UAS and Theater Intelligence, Surveillance, and Reconnaissance Plan

Prior to and during a joint force's operation, the JFC and components should conduct thorough intelligence preparation of the operational environment.[97] Part of this intelligence preparation includes information gained through the use of ISR platforms. Many ISR platforms are airspace users and may be vying for the same airspace.[98] The JFC's ISR priorities should be widely disseminated to authorized airspace control system elements responsible for airspace control to facilitate required airspace planning and execution deconfliction for mission accomplishment. Prior to the JFACC achieving air superiority, friendly airborne ISR platforms that do not meet identification or control requirements increase the difficulty of counterair operations and increase the risk of successful enemy air attack. If the JFC decides to restrict the use of friendly platforms without sufficient identification or communications systems, the ACP should clearly delineate which operating areas are restricted, and what capabilities (e.g., IFF) are required to operate within them.[99] If the JFC elects not to restrict operations by these systems, the ACA should clearly outline the increased risk to the JFC for approval.

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[95] AFTTP 3-2.17, *MTTP for the Theater Air Ground System*
[96] 3-52
[97] JP 2-01.3 *Joint Intelligence Preparation of the Operational Environment*
[98] AFDD 3-1, *Air Warfare*
[99] JP 3-52

ISR asset congestion in airspace over high interest areas may be mitigated through integration of joint collection management board airborne ISR collection plan into airspace planning and control documents. Multiple, component-organic, airborne ISR assets viewing the same objective area add complexity to airspace control operations and may delay fire support to forces on the ground. For more information, see AFDD 2-0, *Globally Integrated Intelligence, Surveillance, and Reconnaissance Operations;* and JP 2-0, *Joint Intelligence*.

Air Operations in Conjunction with Land Component Operations

Regardless of whether the theater campaign is sequential or simultaneous, normally a JFLCC will become the supported commander for one or more AO[100] as friendly forces gain the initiative. Ideally, the air component will have achieved at least localized air superiority over the AO, but this may not always be the case.

Once air superiority is achieved, the JFC may allow increased operations by airborne systems with limited identification and communications capabilities. A theater-wide COP is still a significant contributor to both air defense and airspace control. The JFC's ACP may employ fewer restrictions on certain systems which are visible on the airspace COP, whereas systems with less identification and communications equipment may require more restrictions and coordination.

When one or more land component commanders become supported commanders for their areas of operations, the ACS should be modified to meet this mission. The JFACC normally remains the supported commander for counterair and air interdiction efforts, and may be a supporting commander for other operations. It is critical that the ACP acknowledge this transition and provide guidance for integrating airspace control with airspace control elements from other component commanders. The JFACC, in the AADC and ACA roles, provides air defense and airspace control for the JOA.[101] During this portion of operations the initial placement of both Air Force TACS and other component airspace control system elements is critical to the success of the ACP. The JFACC should consider the following when creating the operational transition portion of the ACP:

- The C2 plan for the initial employment of ground forces.
- Adequate communications within theater to execute the plan.
- TACS elements required to meet the scheme of maneuver for other component commanders.
- Delegation of airspace control authority to components (e.g., joint special operations area, amphibious objective area, HIDACZ, or sectors) and integration of component airspace control agencies.

[100] JP 3-0
[101] JP 3-0

- Location and required phased movements of the air support operations center, the command and reporting center, the tactical air operations center (Marines), the direct air support center, and DATCALS.

- Planned use of enemy personnel or systems for the post-hostility airspace control system (consider which, if any, facilities should be placed on the restricted target list for preservation).

- Authorities and procedures for real-time airspace control execution in the JFLCC's area of operations including integration of JFLCC fires and ISR planning.

Airspace Coordinating Measures

A key role of the ACP is to define the processes to propose, approve, modify, and promulgate airspace coordination measures. As the ACA, the JFACC defines theater-wide airspace coordination measures with components and coalition airspace users and provides recommended airspace control procedures for JFC approval and publication in the ACP. Once approved, these ACP airspace coordination measures are promulgated throughout the joint and coalition forces via the airspace control order, air tasking order, and special instructions. For effective airspace control it is critical that all joint and coalition airspace users, including indirect fires platforms, understand the theater-wide airspace coordination measures including:

- Airspace coordination measures that should also be considered as fire support coordination measures to deconflict them from ground fires.

- Activation of theater-wide fire support coordination measures including fire support coordination line, coordinated fire line, kill box, etc.

- Establishment of the coordinating altitude (if used).

- Promulgation of airspace coordination measures required for special missions (e.g., air assaults, airborne operations).

- Establishment of areas that will become high density airspace and the type of control procedures used to mitigate risk.

- Provision for automated tools and systems that ensure promulgation of the airspace coordination order and changes to airspace users.

Major Combat Operations and Risk

Risk is a fundamental consideration of airspace control. Joint doctrine recognizes the need for each Service and functional component to use the airspace with maximum availability consistent with the JFC's acceptable level of risk. The JFC's acceptable level of risk for all airspace users (including fires) should be clearly delineated in the ACP. The ACP should include a risk matrix that is agreed upon by components prior to commencement of combat operations. At a minimum, this matrix should include the types of risk shown in figure 3.2 (the actual risk levels shown are notional).

From Major Combat Ops Risk	To Platforms	Acceptable Level of Risk
Indirect fires vs.	UA	High
	Fighter/attack fixed wing	Medium
	Manned rotary wing	Low
	Tanker/airlift/civilian	Low
UA vs.	UA	High
	Fighter/attack fixed wing	Medium
	Manned rotary wing	Medium
	Tanker/airlift/civilian	Low
Fighter/attack fixed wing vs.	UA	Medium
	Fighter/attack fixed wing	Medium
	Manned rotary wing	Low
	Tanker/airlift/civilian	Low
Manned rotary wing vs.	UA	Medium
	Fighter/attack fixed wing	Low
	Manned rotary wing	Medium
Tanker/airlift/civilian vs.	UA	Low
	Fighter/attack fixed wing	Low
	Manned rotary wing	Low
	Tanker/airlift/civilian	Low

Figure 3.2. Notional risk assessment matrix

During all operational phases, the assumption of risk is a command decision. Definitions of high, medium, and low risk vary from theater to theater based on commander's guidance. In general terms, high risk prioritizes mission accomplishment

over the preservation of resources; medium risk seeks to balance mission accomplishment with potential resource losses and may require slight mission adjustments to achieve desired effects; and low risk prioritizes the preservation of resources and may require substantial mission adjustments to achieve desired effects.

During major combat operations the risk matrix assumes the JFC has the authority to deny access to civil aviation in the joint operating area. If that is not the case, then civil aviation should be added to the matrix. The risk of fratricide with civil aviation may be a decision that exceeds the authority of theater commanders. As the volume of airspace users increases, control should be enhanced to keep the level of risk acceptable to the JFC. The ACP should specify areas where high volumes of airspace users are projected and plan for increased control capability (i.e., positive versus procedural control). If an enhanced control capability is not an option, then commanders should understand they are accepting a higher risk of mid-air collisions and fratricide with indirect fires, manned systems, and UAS.

Transition from "Seize the Initiative" to "Dominate"

Having established a foothold from where combat operations can commence, the dominate phase includes the full employment of joint force capabilities and continues the appropriate sequencing of forces into the operational area as quickly as possible. When a campaign is focused on conventional enemy forces, this phase normally concludes by achieving the JFC's operational objectives. Operations may involve ground forces bringing a large number of manned and unmanned aircraft into the theater. Additionally, the volume of fires assets using airspace will likely increase, requiring additional planning, deconfliction, and airspace control actions. The ACP should include updates and changes that will occur as the JFC transitions the force to this stage of combat.

Planning Considerations

Prior to initiating this next phase in operations, the JFACC should ensure a fully operational TACS is in place. Additionally, component portions of the ACS required for the operation should also be functional. Both the Air Force TACS and ACS elements should be able to move forward with surface elements. Because airspace control is a critical C2 function, elements of the TACS and ACS should be given appropriate movement priority. At the commencement of decisive combat operations, a reliable and jam-resistant communications system should be available within the entire JOA for airspace control. While the COMAFFOR is normally responsible for the majority of this system, Service component contributions can significantly increase its capability.

During this stage in combat operations, the ACP, ACO, ATO, and SPINS should be updated to include responsibilities and authorities (including SOF and coalition) for the following:

- Unassigned areas within the JFLCC AO.
- Procedures for forward operating bases and airfields.

- DATCALS/air traffic control/air traffic service at forward operating bases.
- Air traffic control/air traffic service at captured airfields.
- Placement of the CRC, Marine tactical air operations center, and air defense radars to provide coverage and sharing of coverage pictures, if required.
- Area air defense and short-range air defense integration behind the fire support coordination line and forward line of troops.
- UA and rotary wing deconfliction methods.
- Continued integration of the air support operations center, tactical air control parties, and direct air support center with the ACS.

As operations prepare to transition towards stabilization efforts, the JFC may terminate kill box procedures. If portions of a kill box have been considered during airspace control or deconfliction, the ACP should be updated to detail the changes. The global area reference system, or theater-specific area reference system, is still a valid reference system for airspace control even if the fire support coordination measures have been removed.

Airspace Control System

At the beginning of decisive combat operations the airspace control system will build upon the system the JFACC used to prosecute the initial combat operations. When ground AOs are established, key C2 nodes may move forward to support JFLCC or SOF components. Airspace control system elements in direct support of the JFLCC, SOF, or other component commanders play a key role in airspace control. These elements control close air support, ISR, and interdiction in the affected area of operation, and are the primary control node for deconfliction of fires.

Integration with Fires

During decisive operations, airspace control elements should expect a significant increase in the number of indirect fires in the JFLCC AO. Indirect fire systems are airspace users; however, current airspace control TTP and FSCMs do not lend themselves to seamless integration. Airspace coordination measures do not normally prevent fires from entering the airspace, only FSCMs serve to restrict fires. To effectively integrate fires and airspace control, airspace control elements should determine which airspace coordination measures should also be fire support coordination measures and coordinate accordingly. As an example, an air to air refueling area is an airspace coordination measure which would prevent other aircraft from entering the area without coordination with the controlling agency. Without an appropriate FSCM; however, nothing prevents fires from passing through the air to air refueling area. Integrating fires with other airspace users requires careful consideration of risk and user priority as well as an understanding of the joint area operations plan and land component fires plan.

Airspace planners should minimize the number of combined airspace coordination measure/fire support coordination measure requests so as not to overly restrict fires. In the same manner, fires planners should understand there are some areas in which the JFC cannot accept the risk of mixing fires and manned aircraft. Effective real-time execution can solve many of these issues by moving either fires or aircraft to allow both systems to operate. Deconfliction of fires and aircraft is a critical part of planning airspace control for decisive combat operations.

Airspace Command and Control of Special Missions

Missions such as air assaults, airborne assaults, and other excursions into enemy territory require specific airspace control coordination. These events may require airspace coordination measures such as HIDACZ, restricted operations zones, minimum risk routes or low-level transit routes. These missions may require specific command and control relationships, organizations, and authorities that should be planned for and included in ACP, ACO, ATO, and SPINS.

IRREGULAR WARFARE

Irregular warfare is defined as "a violent struggle among state and non-state actors for legitimacy and influence over the relevant populations. Irregular warfare favors indirect and asymmetric approaches, though it may employ the full range of military and other capacities, in order to erode an adversary's power, influence, and will."[102] Because irregular warfare is a complex and nuanced type of warfare, it does not lend itself easily to a concise universal definition. Irregular warfare is not a lesser-included form of traditional warfare. Rather, irregular warfare encompasses a spectrum of warfare where the nature and characteristics are significantly different from traditional war. It includes, but is not limited to, activities such as counterterrorism, unconventional warfare, foreign internal defense, counterinsurgency, and stability operations.[103]

Traditional warfare and irregular warfare are not mutually exclusive; both forms of warfare may be present in a given conflict. Airmen should understand that the nature of war will often change in the course of a conflict. This is especially true in irregular warfare where the conflict is often protracted. Traditional warfare can rapidly evolve into an irregular war and vice versa, requiring the military force to adapt from one form to the other. The Air Force forces play an important role in irregular warfare, but just as with more traditional operations, their most effective employment requires careful study of the environment and appreciation for the unique characteristics of the conflict.[104]

For more information on irregular warfare see AFDD 3-24, *Irregular Warfare;* AFDD 3-22, *Foreign Internal Defense*; JP 3-07.2, *Antiterrorism*; and JP 3-24, *Counterinsurgency Operations.*

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[102] JP 1
[103] AFDD 3-24, *Irregular Warfare*
[104] AFDD 3-24

Irregular Warfare Operations

Recognizing that aspects of irregular warfare can occur both before and after traditional combat operations, this document addresses airspace considerations across the range of military operations during all phases of operations to include Phase 0 (Shape), Phase 1 (Deter), Phase 2 (Seize the Initiative), Phase 3 (Major Combat Operations) and the post traditional warfare phases, Phase 4 (Stability) and Phase 5 (Enable Civil Authorities) operations.

As combatants conclude major combat operations and transition to a legitimate government, military operations may continue with the goal of reducing the threat (military or political) to a level manageable by the host nation's authorities. During this operational phase, the joint force may be required to perform local governance until legitimate local entities are functioning. The JFACC could be required to perform roles traditionally associated with a host nation aviation authority and may include the development of aeronautical information (e.g., instrument procedures, publications, NOTAMs), civil flight planning procedures, certification of procedures, aviation safety investigation, training of host nation or contract personnel, or operation of airspace infrastructure systems. The RAMCC can play the critical lead role during these phases as the volume of non-military traffic increases (see Appendix B).

A key JFACC requirement is the development of a plan to establish host nation capabilities to affect a successful transfer of airspace control from the joint force to the host nation in post-hostility operations. This phase is typically characterized by a change from sustained combat operations to stability operations with increased requests for airspace and airfield access by host nation or other non-JFC supporting organizations. The ACP should address airspace access criteria for non-JFC organizations, joint force to civil airspace priority, and identification and acceptance of associated civil airspace operating risks. A thorough review of all written guidance should be conducted when the transition to host nation governmental operations is anticipated. Documents such as the joint air operations plan, air and space operations directive, ACP, area air defense plan, special instructions (SPINs), rules of engagement, aeronautical information publications, letters of agreement, and international agreements may significantly change during this phase. Priorities for airspace control should be redefined to address increasing civil authority for the airspace environment. Inextricably linked to this review of priorities is a clear determination of what level of risk will be accepted. The impacts of a catastrophic event involving a civil aircraft could significantly damage the strategic objectives of the JFC and the governments involved in the joint operation. Assistance from the Department of State, FAA, ICAO, or a contracted agency should be considered in assisting to establish host nation capabilities.

Threats and Security

Reducing the threats to air operations and establishing security are required to set conditions to transfer airspace control authority to the host nation government. During this phase in particular, the airspace environment is dynamic and may transition rapidly

between varying levels of stability. The JFACC should continuously balance military operational needs against increased civil airspace access and affect the transfer of airspace control authority to a legitimate host nation entity. Transition of airspace control to the host nation should be considered carefully with regard to continuing JFC military operations. Reduced military airspace control authority may result in decreased flexibility for operations with increased coordination and approval requirements from the host nation. The main transition planning concepts include:

- Improved efficiency and effectiveness in host nation control of the airspace until transition
  - Installation or increased use of commercial systems
  - Consolidation and reduction of JFC manpower/systems footprint
  - Use of contracted airspace control capabilities
  - Joint force airspace control system linkage to host nation systems
  - Leveraging host nation capabilities and systems
  - Transfer of contracts or excess systems to the host nation
  - Decrease in joint force airspace control support requirements
- Planning to ensure a successful airspace turnover to the host nation
  - Ensuring required host nation capabilities exist
  - Developing a clear agreement and timelines for airspace control transfer
  - Ensuring continuing joint force airspace mission needs are supported

Interagency Considerations

Interagency coordination and development of an airspace transition plan with key transition milestones are required to reduce friction among the JFC, US government, and international and host nation agencies that may be involved in the airspace transition process. The identification and agreement toward establishing milestone criteria, as well as establishing the airspace infrastructure end-state by the various stakeholders, are key to a successful transition plan. Normally, a government or civil organization would handle the planning and requirements for reconstituting the host nation airspace control system. However, the JFACC may be the only one able to assume this primary leadership role, especially in seriously degraded or failed state scenarios. The JFACC may be required to provide training for host nation personnel before enabling a successful transition to host nation control. The JFACC's responsibilities as the acting host nation airspace control authority should be detailed in

an appropriate delegation document from the host nation and referenced in the host nation aeronautical information publication.

Transition Plan

The pre-conflict host nation airspace control structure (civilian or military controlled) should provide the basic airspace end-state concept unless destroyed or deemed ineffective. Simplicity and basic effectiveness of the host nation airspace system should be a primary goal of the JFACC's transition plan. Additionally, the JFACC should focus specifically on the airspace control system to prevent excessive requirements or delays from other aviation related issues such as airfield construction or certification issues. The host nation or other supporting agencies may also desire to modify or upgrade the airspace control system which will most likely increase the timelines for the end-state transition milestone. Ideally, the final host nation end-state airspace infrastructure plan should meet the minimum requirements for ICAO certification (unless post-conflict situations dictate otherwise) and also take into account host nation airspace sovereignty requirements. Interim transfer of airspace control to host nation military forces or contracted airspace control services should be considered to allow the redeployment of joint force airspace control forces.

Interoperability between military and civil airspace users and control agencies is crucial for safe and effective integration of airspace control including air defense, joint fires, air effects, and civil aviation. Use of military liaison teams embedded in host nation control facilities may be required to ensure the adequate coordination and representation of continuing joint force airspace requirements. Civil documents that govern the host nation airspace system may become more authoritative for all airspace users and by the end of this stage of conflict should be the primary source of guidance and regulation. The joint force should ensure that proper agreements exist between the host nation and adjacent nations to enable the effective air defense of the country as well as the safe and efficient flow of air traffic across borders. Management and guidance of information assurance and spectrum management should be accounted for in the transition plan. The proliferation of devices that exploit, interrupt, or use the frequency spectrum is likely during this phase as a result of increased activity of other international and host nation agencies and general increase in economic communications activities.

End State of Transition Airspace

The milestone marking the end of stabilization operations and the beginning of enabling operations is reached when the framework of the host nation airspace control system is in place and the host nation is ready to assume airspace control authority. This stage in operations is characterized by the processes and events that take place during that transition as joint force personnel and equipment are redeployed and host nation personnel and equipment take control.

Enabling Civil Authorities

This stage is predominantly characterized by joint force support to legitimate civil governance in theater. Depending upon the level of indigenous state capacity, joint force activities may be at the behest of that authority or they may be under its direction. The joint force will perform key airspace functions either as the delegated ACA or as supporting airspace service provider under the host nation aviation authority. The JFACC can expect frequent coordination and interaction on airspace issues with host nation, multinational, interagency, and other airspace system participants. The JFACC is in a supporting role to the legitimate civil aviation authority in the region throughout this stage. Normally, operations are concluded when joint force redeployment is complete; however, continued joint force support and involvement with the host nation and other agencies, beyond the termination of the joint operation, may be required to achieve the desired end state.

Airspace Authority Transition

Enabling operations could result as a normal transition from stability operations or as joint force support to a humanitarian relief effort, natural disaster, or other catastrophic event. During such operations, host nation aviation regulations and guidance are the authoritative source for airspace control procedures. To the maximum extent possible, original host nation aviation and airspace documents should be used by the joint force to comply with host nation aviation authority intent. If derivative host nation guidance is required for dissemination or amplification within joint force documentation (e.g., ACP, ACO, ATO, or SPINS) the information should be included verbatim and refer to the original source document. In situations where host nation procedures must be modified by the military for airspace access or use, host nation authorities should be consulted and provide appropriate approval of the deviation. Formal agreement or understanding should be coordinated between joint forces and the host nation authority to ensure clarity on exact airspace control responsibilities. Frequent and extensive coordination among the joint force, host nation, and other agency personnel on airspace control issues may require close proximity of staffs or use of liaisons.

JFC Air Control Assets in Support of the Host Nation

Based on the level of required support, airspace control personnel may be required to deploy Service-specific controllers, airspace control systems, liaisons, or trainers to support host nation authorities. Senior JFACC staff personnel should ensure that an agreement is in place with the host nation authorizing DOD personnel or equipment to provide air traffic services in sovereign host nation airspaces. Joint force personnel may be required to use systems provided by the host nation or other agencies. Joint force personnel may also be embedded with host nation or other agency personnel to provide airspace control services. In these situations, training, and certification for joint forces personnel or systems should be determined by the host nation authority. Given that few organizations have the deployable airspace control personnel and systems, it should be expected that joint forces support airspace operations using Service airspace control systems. A combined FAA/Air Force system certification flight check is a unique capability often requested to certify host nation radar or navigation aids that have been

installed or returned to service. The JFACC may have to orchestrate special procedures (e.g., ground patrols in vicinity of approach path, escorts, night-only operations, etc.) to accomplish flight checks in hostile airspace.

Setting the conditions and milestones for the relief of joint forces and the reestablishment of effective host nation airspace control is crucial for successful termination of joint operations. Host nations with limited capabilities may rely on joint forces for long term airspace control functions and divert available resources to other higher priority host nation programs. In such situations, international, NGO, or contracted services may provide a bridging alternative to take airspace control functions from joint forces until the host nation is prepared to accept them.

LIMITATIONS OF AIRSPACE CONTROL

Despite the exponential growth in airspace control capabilities across the DOD, airspace control is not without its flaws and limitations. Because of the complexity of most modern airspace control systems, multiple factors can affect the overall effectiveness of any particular system. Factors limiting the airspace control system's effectiveness are the environment, communications, and politics.

Environmental characteristics can have a large impact on airspace control. Afghanistan's mountains presented problems to US and coalition forces conducting airspace control for Operation ENDURING FREEDOM. Radars can only image visible objects. If targets are over the horizon or behind terrain, they will not be identified. Major storms (sand, snow, and rain) can also present issues if the particulate is numerous and dense enough. Intense solar activity, because of its effects on electronics, can also negatively impact airspace control.

Communications at all levels can affect the airspace control systems' performance.[105] Airspace control system personnel and equipment have their own limitations. A lack of proper training or outdated or poorly maintained systems limits their effectiveness. Alternatively, the airspace control system will never reach its potential if all airspace users are not required to use and "feed the system" with information. At the user level, all participants should have access to the same information and should adhere to the same equipment requirements before entering a given section of airspace. Operationally, disconnects between internal elements of the theater airspace control system and external component systems can impose unexpected barriers to airspace control system performance. Equipment compatibility between Service components and host nation systems can present multiple issues.

Politics can also play a role in limiting the airspace control system. Policies as simple as those limiting the number of personnel granted access to a location may deny a needed element of the airspace control system. Even if that element is able to establish itself elsewhere, the optimum placement has already been affected. On a different note, political decisions to upgrade or purchase equipment can affect an

[105] AF/A9 L2, *Integration of Airpower in Operational Level Planning Report*

airspace control system's effectiveness by impacting an element's maintenance rate, stability, or compatibility with newer systems.

The benefits and risk mitigation provided by airspace control rely upon the active participation of airspace users and controlling agencies. The technologies allowing forces to identify, spatially locate, and then communicate with airspace users require resources and ultimately all rely on human beings to operate. To properly execute an ACP, trained personnel and resources should first be made available. In addition, the airspace control systems' placement, design, and setup impact an airspace control system's efficiency and effectiveness. Planners should establish airspace control systems that account for each of the limitations listed above and still operate effectively.

CONCLUSION

This publication outlined the Air Force's role in integrating controlling agencies and joint airspace users into the theater-wide mission of the joint force commander. More than just combat, the publication addresses operations across the range of military operations. Accordingly, it establishes the foundations for developing Air Force education on airspace control and the subsequent development of sound tactics, techniques, and procedures in subordinate documents.

AT THE VERY HEART OF WARFARE LIES DOCTRINE…

APPENDIX A
SAMPLE AIRSPACE CONTROL PLAN

The following is a **notional** example of an airspace control plan (ACP). Details may vary according to the situation.

Headquarters, JFACC

(a) JAOC Name and Office Symbol

Headquarters, Base, or Location
DD MMM YYYY

APPENDIX X TO ANNEX C TO [Operation Name] JAOP XX-XX, AIRSPACE CONTROL PLAN

[Operation name] AIRSPACE CONTROL PLAN [Number] (ACP XX-XX).

EFFECTIVE UPON ORDER BY THE JOINT FORCE COMMANDER (JFC) AND FOR THE DURATION OF [Operation Name]. RETAIN THIS DOCUMENT THROUGHOUT THE OPERATION. THE DAILY AIRSPACE CONTROL ORDER (ACO) IS IN EFFECT Time Zulu (Z)-Time Z (Time Local [L] Time-L) EACH DAY, COINCIDING WITH THE AIR TASKING ORDER (ATO) EFFECTIVE TIMES. DOCUMENT LENGTH: X PAGES.

THIS DOCUMENT IS UNCLASSIFIED.

REFERENCES:
JP 3-52, *Joint Airspace Control*.
JP 1, *Doctrine For The Armed Forces Of The United States*.
Air Force Tactics, Techniques, and Procedures 3-3.AOC, *Operational Employment, Air and Space Operations Center*.

[Operation name] AIRSPACE MASTER DATA BASE, DAILY ACO, ACMREQ FORM, ACP AND AIRSPACE POWERPOINT SLIDES DEPICTING ESTABLISHED AIRSPACE AND COORDINATE INFORMATION CAN BE FOUND ON THE [Operation or Command Name] WEB PAGE ON SIPRNET LOCATED AT: (https://XXX.XXX)

INDEX OF THE ACP SECTIONS:

ALPHA:	Basic Plan
	A1. Scope
	A2. Definition Of Airspace Control
	A3. Primary Airspace Control Responsibilities
BRAVO:	Special Procedures
CHARLIE:	Points Of Contact
DELTA:	Functional Responsibilities

ECHO: ACM Request/ACO Promulgation Procedures
FOXTROT: ATC Equipment Defined
GOLF: Abbreviations And Definitions
HOTEL: Airspace Coordinating Measures (ACM)

SECTION ALPHA: BASIC PLAN

A1. SCOPE: Information in this plan does not replace airfield or airspace local operating procedures, the flight information publication (FLIP), or service and/or national flight operations regulations.

A2. DEFINITION OF AIRSPACE CONTROL:

A2.2.1. OBJECTIVE: To enhance air, land, maritime, and special operations force effectiveness in accomplishing the joint task force's (JTF's) objectives. This is accomplished with the maximum allowable freedom to airspace users consistent with the JTF's determination of acceptable risk. Airspace control includes coordinating, integrating, and regulating airspace to increase operational effectiveness; however, the airspace control authority (ACA) does not have the authority to approve, disapprove, or deny combat operations. Such authority is vested in operational commanders.

A2.2. TYPES OF AIRSPACE CONTROL: control of airspace will be accomplished by two primary means: procedural control and positive control.//

A2.2.1. Procedural control is that method of airspace control which relies on previously agreed to airspace control measures or procedures which are promulgated in the ACP, ACO or air traffic control (ATC) guidance (i.e., ROZ, track, orbit).

A2.2.2. Positive control is that method of airspace control that relies on real-time surveillance and guidance of an airspace user by an authorized airspace control agency (e.g., ATC, control and reporting center [CRC], airborne warning and control system [AWACS]).

A3. PRIMARY AIRSPACE CONTROL RESPONSIBILITIES

A3.1. Joint force air component commander (JFACC): Designated by the JFC to accomplish missions and tasks assigned by the JFC to meet JFC objectives. [Rank, Name, Office] IS DESIGNATED AS THE [Operation Name] JFACC.//

A3.2. ACA: The ACA is responsible for the operation of the ACS in the airspace control area and develops the ACP for JFC approval and promulgation. [Rank, Name], [Operation Name] JFACC, is designated as the ACA with headquarters in the joint air operations center (JAOC). The airspace control cell of the JAOC will

act as the focal point for JTF airspace issues. Modifications to the ACP or the airspace structure will be published in the ACO or special instructions (SPINS).

A3.3. Battlefield coordination detachment (BCD): The BCD is the primary interface between the US Army component commander and the JFACC. The BCD coordinates ARFOR airspace management needs with the JAOC when the JFACC is also designated the ACA. These airspace requirements are generated through the AAGS. The BCD coordinates the use of airspace by ground-based fire support systems, especially rockets and missiles, and with other airspace users such as aviation, UA, and supporting aircraft. The commander, ARFOR is responsible for identifying any required ACMs and FSCMs to both facilitate fires and protect other airspace users. The Army identifies airspace requirements and submits ACMREQs to the BCD. The BCD coordinates the ACMs and designated FSCMs with the ACA's Airspace Management Team to ensure they are included in the ACO per the ACP guidance. The BCD will notify the JAOC ACA representative about immediate airspace requirements during combat operations if required. The NRT airspace integration is conducted by Army AC2 elements with the ACA's ACS per the ACP.

A3.4. Airspace users: Any user of airspace, to include operators of aircraft, UASs, artillery, missiles, or other flying objects. Airspace users will adhere to airspace guidance promulgated in the ACP, ACO or spins while operating within the [Operation Name] operational area. Airspace users will adhere to host nation ATC procedures while operating outside of the [Operation Name] operational area.

SECTION BRAVO: SPECIAL PROCEDURES

B1. AIR TRAFFIC CONTROL PROCEDURES.

B1.1. GENERAL.

B.2. COORDINATING ALTITUDE. A vertical boundary that delineates airspace for the purpose of facilitating, coordinating and deconflicting operations between airspace control agencies. The coordinating altitude is normally specified in the airspace control plan and may include a buffer zone for small altitude deviations.

B.3. IDENTIFICATION PROCEDURE:

B.3.1. Aircraft penetrating friendly airspace must be classified (friendly, unknown, or hostile) within X minutes of initial detection.

B.4. HELICOPTER PROCEDURES. All rotary-wing aircraft will use see and avoid deconfliction procedures at all times.

B.5. TRANSITION ALTITUDE.

B.6. SPECIAL USE AIRSPACE.

B.7. DEGRADED OPERATIONS.

B.8. IDENTIFICATION FRIEND OR FOE/SELECTIVE IDENTIFICATION FEATURE (IFF/SIF) MODE III PROCEDURES.

B.8.1. IDENTIFICATION OF HELICOPTERS:

B.9. EMERGENCY PROCEDURES.

B.10. WEATHER AVOIDANCE.

B.11. DIVERT/FUEL DUMPING PROCEDURES.

B.12. CORRIDORS AND ROUTES:

B.12.1. CORRIDORS.

B.12.2. SAFE PASSAGE.

B.12.3. LAME DUCK PROCEDURES. (A lame duck aircraft is defined as an aircraft that is unable to talk, squawk and navigate along promulgated minimum risk routes [MRRs]).

B.13. UNMANNED AIRCRAFT

B.13.1. ESTABLISHING AIRSPACE PARAMETERS.

B.13.2. UA DECONFLICTION. Deconfliction will be accomplished using ACMs to segregate UA from other airspace users.

B.13.3. REAL-TIME DECONFLICTION PROCEDURES.

B.13.3.1. UA WITH IFF.

B.13.3.2. UA WITHOUT IFF.

B.13.4 – X. GUIDANCE FOR SPECIFIC TYPES OF UASs

.

B.14. C2 AND ISR PLATFORMS AND RPA.

B.14.1. IN-FLIGHT DECONFLICTION PRIORITY.

B.14.2. RESPONSIBLE AGENCIES FOR DEPARTURE, ARRIVAL, ENROUTE/

OPS AREA DECONFLICTION.
B.14.3. EN-ROUTE DECONFLICTION PROCEDURES TO OPERATIONS AREA.

B.15. MONITORING AGENCIES.

SECTION CHARLIE: POINTS OF CONTACT.

C.1. Specific points of contact, as required by the operation. Include email and internet contact points.

C.2. CHANGES TO THE ACP should be disseminated by separate message as required. Proposed changes must be submitted to JFACC airspace management team (AMT) in the JAOC at [Location].

C.2.1. METHODS TO REQUEST UNCLASSIFIED CHANGES.

C.2.2. METHODS TO REQUEST CLASSIFIED CHANGES.

SECTION DELTA: AIRSPACE CONTROL ORDER.

D.1. JOINT FORCE AIR COMPONENT COMMANDER. Airspace-specific duties and responsibilities of the JFACC, as well as required information on who has been appointed as the JFACC and what command arrangements have been made to support him or her.

D.2. AIRSPACE CONTROL AUTHORITY. Location and required details on the ACA.

D.3. AIRSPACE MANAGEMENT TEAM (AMT). Location and required details about the AMT within the JAOC.

D.4. COORDINATION AND DECONFLICTION PROCEDURES WITH OTHER JOINT FORCE COMPONENTS.

SECTION ECHO: ACM REQUEST / ACO PROMULGATION PROCEDURES.

E.1. INTRODUCTION.

E.1.1. THE JOINT OPERATIONS AREA DEFINED.

E.1.2. OVERFLIGHT CONSIDERATIONS.

E.1.3. SPECIAL TARGET RESTRICTIONS.

E.2. SUBMISSION RESPONSIBILITIES AND PROCEDURES.

E.3. ACM REQUESTING PROCEDURES.

E.4. ACM COORDINATION PROCEDURES.

E.5. ACO PROMULGATION / DISSEMINATION PROCEDURES.

SECTION FOXTROT: ATC EQUIPMENT DEFINED

F.1. RADAR SERVICES.

F.2. NAVIGATIONAL AIDS (NAVAIDS).

F.3. COMMUNICATION REQUIREMENTS.

F.4. ATC SERVICES

F.5. AIRPORT INFORMATION.

SECTION GOLF: ABBREVIATIONS AND DEFINITIONS

SECTION HOTEL: AIRSPACE COORDINATING MEASURE

H.1. INTRODUCTION.

H.2. AIRSPACE CONTROL DEFINITIONS AND PROCEDURES

H.3. DECONFLICTION PROCEDURES.

H.4. ACM TYPES. (IAW US message text format, 2004 usage codes)

H.5. ACM USAGE CODES. (USMTF 2000 usage codes)

H.6. NO FLY AREA (NOFLY).

APPENDIX B
REGIONAL AIR MOVEMENT CONTROL CENTER

Used in Operations ALLIED FORCE, ENDURING FREEDOM, and IRAQI FREEDOM, the RAMCC is typically established when significant military forces operate in an area with an inadequate air traffic control infrastructure. Under these circumstances, the ACA deconflicts aircraft directed by the AOC with other aircraft participating in the contingency (e.g., United Nations, Red Cross, NGO, and commercial operators). This becomes even more critical when joint force air operations are conducted in an ICAO flight information region in a sovereign nation with limited airspace control capabilities. Additionally, the RAMCC may provide a useful aid in the transition of airspace back to civil authorities and may remain for a number of years after a conflict.

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

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

The ACA may elect to establish airfield and airspace scheduling, granting authority to the RAMCC to issue or deny slot times at airfields and control points in order to deconflict aircraft in the airspace control area/ICAO flight information region. Slot times are normally based on an assessment of an airfield's limitations (onload/offload rate, parking capacity, etc.) and, as applicable, air traffic control separation capability. With RAMCC scheduling in effect, all US military aircraft operating in the control area must participate and adhere to slot times to ensure adequate margins of safety. The RAMCC issues Mode 3 IFF codes to civilian aircraft desiring to transit the airspace control area, and includes them in the daily ATO/SPINS if necessary. The coalition coordination cell provides Mode 3 IFF codes for non-AOC military aircraft. Thus RAMCC is the centralized information source providing the AADC with the identity of civil and other military aircraft operating in the control area. Despite gaining a certain level of procedural control through these advanced scheduling schemes, most aircraft movements are still conducted under visual flight rules (i.e., "see and avoid"), unless air traffic control separation is instituted. By managing ramp capacity at theater airfields,

the RAMCC ensures the maximum capacity for parking aircraft at an airfield or that the maximum on ground capability for aircraft is not exceeded.

Organization

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

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

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

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ICAO Document 9689, *Manual on Airspace Planning Methodology for the Determination of Separation Minima*
ICAO Document 9750, *Global Air Navigation Plan*
ICAO Document 4444, *PANS/ATM Air Traffic Management*
Joint Fires Observer Memorandum of Agreement

GLOSSARY

ABBREVIATIONS AND ACRONYMS

AADC	area air defense commander
AADP	area air defense plan
AAGS	Army air-ground system
ACA	airspace control authority
ACM	airspace coordinating measures
ACO	airspace control order
ACP	airspace control plan
ACS	airspace control system
AADP	area air defense plan
AEW	air expeditionary wing
AFDD	Air Force doctrine document
AFFOR	Air Force forces
AFI	Air Force instruction
AFNORTH	Air Forces Northern
AFTTP	Air Force tactics, techniques, and procedures
AFTTP(I)	Air Force tactics, techniques, and procedures (interservice)
ALO	air liaison officer
AMLO	air mobility liaison officer
ANG	Air National Guard
ANGLICO	air and naval gunfire liaison company
AO	area of operations
AOC	air and space operations center
AOD	air operations directive
AOR	area of responsibility
ASOC	air support operations center
ATC	air traffic control
ATO	air tasking order
AWACS	airborne warning and control system
BCD	battlefield coordination detachment
C2	command and control
CA	coordinating altitude
CAOC	combined air operations center
CAP	crisis action planning
CAPG	combined airspace planning group
CAS	close air support
CCDR	combatant commander

CCG	combat communications group
CFACC	combined forces air component commander
CGRS	common geographic reference system
CJCSI	Chairman of the Joint Chiefs of Staff Instruction
CJCSM	Chairman of the Joint Chiefs of Staff Manual
COMAFFOR	commander, Air Force forces
COP	common operating picture
CRC	control and reporting center
CRG	contingency response group
DACA	deputy airspace control authority
DCA	defensive counterair
DCFACC	deputy combined forces air component commander
DASC	direct air support center
DATCALS	deployable air traffic control and landing system
DOD	Department of Defense
DODD	Department of Defense directive
DSCA	defense support of civil authorities
EOC	emergency operations center
FAA	Federal Aviation Administration
FAC(A)	forward air controller (airborne)
FSCM	fire support coordination measure
FSE	fire support element
GARS	global area reference system
GPS	global positioning system
HIDACZ	high-density airspace control zone
IAA	incident awareness and assessment
IAMD	integrated air and missile defense
ICAO	International Civil Aviation Organization
ICC	installation control center
IFF	identification, friend or foe
ISR	intelligence, surveillance, and reconnaissance
JACCE	joint air component coordination element
JAGIC	joint air/ground integration cell
JAOC	joint air operations center
JFACC	joint force air and space component commander
JFC	joint force commander
JFLCC	joint force land component commander
JFO	joint fires observer

JFSOCC	joint forces special operations component commander
JOA	joint operations area
JICO	joint interface control officer
JOPP	joint operation planning process
JP	joint publication
JSCP	joint strategic capabilities plan
JSTARS	joint surveillance target attack radar system
JTAC	joint terminal attack controller
JTF	joint task force
MACCS	Marine air command and control system
MAGTF	Marine air-ground task force
MARLE	Marine liaison element
MTTP	multiservice tactics, techniques, and procedures
NALE	naval and amphibious liaison element
NGO	nongovernmental organization
NORAD	North American Aerospace Defense
NOTAM	notice to airmen
NTACS	Navy tactical air control system
OCA	offensive counterair
OPLAN	operations plan
OPSEC	operations security
RAMCC	regional air movement control center
ROZ	restricted operations zone
RPA	remotely piloted aircraft
SIF	selective identification feature
SPINS	special instructions
SOAGS	special operations air ground system
SOF	special operations forces
SOLE	special operations liaison element
STT	special tactics team
TACC	tactical air command center
TACP	tactical air control party
TACS	theater air control system
TAG	the Adjutant General
TAOC	tactical air operations center
TAGS	theater air-ground system
TDL	tactical data link
TLAM	Tomahawk land attack missile
TTP	tactics, techniques, and procedures

UA	unmanned aircraft
UAS	unmanned aircraft systems
USNORTHCOM	United States Northern Command

DEFINITIONS

airspace control. A process used to increase combat effectiveness by promoting the safe, efficient, and flexible use of airspace. (JP 1-02) [*Airspace control operations may begin prior to (and continue after) combat operations and may transition through varying degrees of civil and military authority. Airspace control does not restrict the authority of commanders to conduct operations. However, the airspace control procedures within the JOA are approved by the JFC and are derived entirely from the JFC's authority*.] [AFDD 3-52] {Words in brackets apply only to the US Air Force and are offered for clarity.}

airspace control order. An order implementing the airspace control plan that provides the details of the approved requests for airspace coordinating measures. It is published either as part of the air tasking order or as a separate document Also called **ACO**. (JP 3-52)

airspace control plan. The document approved by the joint force commander that provides specific planning guidance and procedures for the airspace control system for the joint force operational area. Also called **ACP**. (JP 3-52)

airspace control system. An arrangement of those organizations, personnel, policies, procedures, and facilities required to perform airspace control functions. Also called **ACS**. (JP 3-52). [*A system of systems creating a synergy of the various component air-ground systems, orchestrating the planning and execution of air-ground operations*.] [AFTTP 3-2.17] {Words in brackets apply only to the US Air Force and are offered for clarity.}

airspace coordinating measures. Measures employed to facilitate the efficient use of airspace to accomplish missions and simultaneously provide safeguards for friendly forces. Also called **ACM**. (JP 3-52)

air tasking order. A method used to task and disseminate to components, subordinate units, and command and control agencies projected sorties, capabilities and/or forces to targets and specific missions. Normally provides specific instructions to include call signs, targets, controlling agencies, etc., as well as general instructions. Also called **ATO**. (JP 3-52)

denied-access combat airspace. A high risk exists for many but not all US and coalition aircraft from integrated air defense systems, radars, anti-aircraft systems, electronic warfare, and fighter aircraft. The airspace is characterized by pervasive enemy activity. Expect operations to result in high losses or denial of sustained operations until a measure of air superiority can be achieved. (AFDD 3-52)

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 3-52)

coordinating altitude. An airspace coordinating measure that uses altitude to separate users and as the transition between different airspace coordinating entities. Also called **CA**. (JP 3-52)

contested combat airspace. A medium risk exists to US and coalition aircraft within the airspace of interest. Expect the enemy to employ fighters, anti-aircraft systems, and electronic jamming. US and coalition aircraft can achieve localized air superiority for operations within portions of the airspace. Enemy air defense assets are neither fully integrated nor attrited. (AFDD 3-52)

fire support coordination measure. A measure employed by land or amphibious commanders to facilitate the rapid engagement of targets and simultaneously provide safeguards for friendly forces. Also called **FSCM**. (JP 3-0)

high density airspace control zone. Airspace designated in an airspace control plan or airspace control order, in which there is a concentrated employment of numerous and varied weapons and airspace users. A high-density airspace control zone has defined dimensions which usually coincide with geographical features or navigational aids. Access to a high-density airspace control zone is normally controlled by the maneuver commander. The maneuver commander can also direct a more restrictive weapons status within the high-density airspace control zone. Also called **HIDACZ**. (JP 3-52)

installation control center. The ICC provides the commander of a USAF home station or an Air Expeditionary Wing (AEW) or Air Expeditionary Group (AEG) deployed to an expeditionary base with a single, consolidated C2 center from which to monitor, assess, plan, and execute the full range of installation activities. A key function of the ICC is the C2 Controllers serving in the CP function. Also called **ICC**. (AFDD 3-52)

joint force air component commander. The commander within a unified command, subordinate unified command, or joint task force responsible to the establishing commander for making recommendations on the proper employment of assigned, attached, and/or made available for tasking air forces; planning and coordinating air operations; or accomplishing such operational missions as may be

assigned. The joint force air component commander is given the authority necessary to accomplish missions and tasks assigned by the establishing commander. Also called **JFACC**. (JP 1-02)

kill box. A three-dimensional area used to facilitate the integration of joint fires. (JP 3-09) [*A generic term for airspace coordinating measures used by the theater air control system for controlling air-to-ground operations. An active kill box signifies: 1) airspace potentially occupied by attack aircraft, 2) underlying surface zone that contains known or suspected enemy targets, 3) underlying surface zone known to be clear of friendly forces. Kill boxes are complementary to, and do not preclude or conflict with, other airspace coordinating measures.*] [AFDD 3-03] {Words in brackets apply only to the Air Force and are offered for clarity.}

permissive combat airspace. A low risk exists for US and coalition aircraft operations within the airspace of interest. Operations can expect little to no use of adversary electronic warfare, communications jamming, anti-aircraft systems, or aircraft. Air superiority or air supremacy has been achieved. (AFDD 3-52)

positive control. A method of airspace control that relies on positive identification, tracking, and direction of aircraft within an airspace, conducted with electronic means by an agency having the authority and responsibility therein. (JP 3-52)

procedural control. A method of airspace control which relies on a combination of previously agreed and promulgated orders and procedures. (JP 3-52)

restricted operations area. Airspace of defined dimensions, designated by the airspace control authority, in response to specific operational situations/requirements within which the operation of one or more airspace users is restricted. Also called **ROA**. (JP 3-52)

restricted operations zone. Airspace reserved for specific activities in which the operation of one or more airspace uses is restricted. Also called **ROZ**. (AFDD 3-52)

unmanned aircraft. An aircraft or balloon that does not carry a human operator and is capable of flight under remote control or autonomous programming. Also called **UA**. (JP 3-52)

unmanned aircraft system. That system whose components include the necessary equipment, network, and personnel to control an unmanned aircraft. Also called **UAS**. (JP 3-52). [*When referring to Air Force unmanned aircraft in categories 4 and 5 only, it is a remotely piloted aircraft (RPA).*] {Words in brackets apply only to the US Air Force and are offered for clarity.}