AIR FORCE DOCTRINE PUBLICATION 3-52

AIRSPACE CONTROL

U.S. AIR FORCE

31 December 2021

Air Force Doctrine Publication 3-52, *Airspace Control*

Table of Contents

"The Air Force organizes, trains, and equips forces to be an air component to a joint force commander (JFC). As part of the joint force's air component, our forces must be prepared to accomplish JFC objectives**.** The air component commander's administrative authorities are derived from Title 10, U.S. Code, and exercised as the commander, Air Force forces (COMAFFOR). The air component commander's operational authorities are delegated from the JFC and exercised as both the COMAFFOR, over Air Force Forces, and as the functional joint force air component commander (JFACC), over joint air forces made available for tasking. Thus, the air component commander leads Air Force forces as the COMAFFOR and the JFC's joint air operations as the JFACC. This duality of authorities is expressed in the axiom: Airmen work for Airmen and the senior Airman works for the JFC."

-- Air Force Doctrine Publication (AFDP) 1, *The Air Force*

Since the COMAFFOR and JFACC are nearly always the same individual, this AFDP will use the term "air component commander" when referring to duties or functions that could be carried out by either or both, unless explicit use of the term "COMAFFOR" or "JFACC" is necessary for clarity.

FOREWORD

Doctrine embodies the fundamental principles by which military forces guide their actions in support of national objectives. It is a body of carefully developed, authoritative ideas that have been officially approved or ratified corporately, establishing a common frame of reference for solving military problems. However, to be an effective guide, the challenge for doctrine is to be simultaneously focused on the past, applicable in the present, and facing toward the future; all in equal measure.

The US Air Force must anticipate a new reality; one in which decision advantage, freedom of maneuver, and freedom of action are increasingly challenged. To deter, compete, and win across the competition continuum, Airmen must advance solutions that enable operations in highly contested environments. Broadly, the joint force's approach to meet this challenge is encapsulated in joint all-domain operations (JADO). Together with joint all-domain command and control (JADC2), JADO provides joint force commanders (JFC) the means to integrate, synchronize, and deconflict the convergence of effects across all domains to achieve operational advantage.

AFDP-1, *The Air Force,* supports this effort by establishing mission command as the Airman's philosophy for the command and control (C2) of airpower. Despite our advances, adversaries will likely retain an ability to deny or degrade our communications. Decision makers at all echelons must have the ability to develop understanding, make decisions, and converge effects when disconnected from higher echelons. Mission command embraces centralized command, distributed control, and decentralized execution as the foundation for the responsiveness, flexibility, and initiative necessary at the tactical edge, and ensures capabilities continue to function, even when information is degraded or denied.

AFDP 3-52, *Airspace Control*, though firmly rooted in the past, must also look to the future; adapting where needed to ensure continued utility and efficacy for the challenges to come. Airspace control provides capabilities and procedures to increase operational effectiveness by promoting the safe, efficient, and flexible use of airspace. What worked in the past, WILL work in the future; but NOT in the same way! Airmen must be trained to perform deliberate planning of all-domain effects in a distributed or decentralized manner, and execute the mission when isolated from decision makers in distributed environments. Airmen at all levels must be comfortable making decisions and operating based on the commander's intent and the principles of mission command.

Though not fully adapted to the challenges identified above, this doctrine represents what we believe to be true based on the evidence to date. As we continue to press toward a more capable future force, it is critical that we continue to evolve our doctrine, ensuring a grounded foundation perpetually set to meet our nation's security challenges. Throughout our history, innovative Airmen have adapted technologies and developed methods of employment to meet the challenges our nation has faced. We will continue to do so.

CHAPTER 1: INTRODUCTION TO AIRSPACE CONTROL

Airspace control is defined as “capabilities and procedures used to increase operational effectiveness by promoting the safe, efficient, and flexible use of airspace” (Joint Publication [JP] 3-52, *Joint Airspace Control*). Airspace control is a broad term used to describe the activities performed and authorities executed by a wide range of entities, both civil and military. Together, executed through a notional airspace control system (ACS), the goal of airspace control operations is to ensure the most effective, efficient, and safe use of airspace to enable achievement of JFC objectives and priorities. Never static, airspace control commonly begins prior to combat operations and often transitions through varying degrees of civil and military control as operation phases progress from pre, through post combat. Airspace control procedures within a joint operations area (JOA) are approved by the JFC and are derived from the JFC’s authority. Properly employed, airspace control aims to maximize the effectiveness of combat operations without unduly restricting the capabilities of any Service or functional component.

Today’s airspace environment is increasingly complex; a trend furthered by technological advances in air defense systems, cruise missiles, unmanned aircraft, and long-range fires. Unlike other physical domains, the air domain’s vertical component, and the speed and freedom with which forces move horizontally within it, creates unique challenges for control in the air. Further, wide-ranging variables such as aircraft capabilities, airspace characteristics, airspace use, and various control procedures add additional layers of complexity. Such challenges are heightened further during coalition and multinational airspace control operations. Additional concerns arise from host nation relationships, systems interoperability, and disparate planning processes across component and partner forces. Likewise, other governmental agencies, civilian users, nongovernmental organizations (NGO), and relief agencies may require the use of combat zone airspace. Altogether, these user demands require an integrated ACS to enable safe, efficient use of airspace and to mitigate the risk for friendly-fire incidents and unintended engagements against civil and neutral forces.

AIRMAN’S PERSPECTIVE

Airmen approach airspace control from a global perspective. Airmen share a JFC’s theater-wide focus and maintain the requisite expertise and capabilities to control and operate in airspace across theaters, transitioning seamlessly down to the lowest tactical level, anywhere around the globe. In a single mission, Airmen may be tasked to operate or control aircraft across international boundaries, in controlled and uncontrolled airspace, and from en-route airspace structures down to airfields and tactically controlled operating areas. Such capabilities may be provided from within or outside an area of responsibility (AOR). Airspace control activities may have impacts across theater and regional boundaries. As such, airspace control plans (ACPs) may require integration across adjacent regions to support several operations simultaneously. The need for effective integration is greatest in large-scale combat operations, where manned and unmanned fixed-, tilt-, and rotary-winged combat aircraft, military airlift, missiles, artillery, space, and commercial airspace users all vie for the same airspace.

This is a key reason airspace control authority (ACA) is normally vested in a single commander.

AIR SUPERIORITY

Few missions can be accomplished without at least localized air superiority. Air superiority is required to establish even the most limited forms of airspace control. If enemy aircraft can attack friendly aircraft or troops, deconfliction measures between friendly air operations such as close air support (CAS), air interdiction, and other supporting efforts are likewise compromised.

JOINT ALL-DOMAIN OPERATIONS

Airspace control is inherently joint and intrinsically all domain. All joint force components have mission requirements for airspace that should be integrated, coordinated, and deconflicted within the ACS. Airspace control is required to:

- Prevent friendly fire incidents, avoid collateral damage, and prevent unintended engagements against friendly, neutral, and civil aircraft.
- Enhance air and missile defense.
- Facilitate joint fires.
- Enhance and support movement, maneuver, and employment of land component forces.
- Conduct fleet defense and project power from naval surface forces.
- Maximize the effectiveness of operations conducted in, from, and through the air.
- Integrate and synchronize all-domain operations to create synergistic effects and achieve JFC objectives.

Though focused on control and deconfliction in the air, airspace control integrates and synchronizes air, land, and maritime operations to achieve synergistic effects. To do so, the Air Force leverages air, space, cyberspace, and electromagnetic spectrum (EMS) capabilities. Space-based systems provide positioning, navigation, and timing for airspace users. As users traverse or operate in remote areas, terrestrial-based positioning capabilities diminish. In these cases, the importance of space systems is increased.

The upper limit of the air domain corresponds to the lower limit of the space domain. JP 3-14, *Space Operations*, defines the space domain as the altitude where atmospheric effects on airborne objects becomes negligible. **The ACA should coordinate any operations or planning above the air domain with US Space Command**.

Cyberspace capabilities are crucial for coordination and control within the ACS. Networked systems ensure various control nodes are connected and constantly updated with accurate and timely information on display.

In addition to cyberspace, the EMS undergirds many aspects of airspace control. Encompassing all manner of EMS transmissions between aircraft and control entities for a wide range of purposes, spectrum management is a crucial component of effective airspace control.

JOINT ALL-DOMAIN COMMAND AND CONTROL (JADC2)

JADC2 is the art and science of decision-making to rapidly translate decisions into action and leverage capabilities across all domains, with mission partners, to achieve operational and informational advantage in both competition and conflict. It is the **natural extension of C2 across domains and functional components and is essential for JADO**. Though airspace control forms just one portion of the JFC's overall C2 architecture, entities that plan and conduct airspace control also perform or have direct ties with those executing C2 of operations. The Department of the Air Force's (DAF) vision for JADC2 connects distributed sensors, combat aircraft, and data across all domains, to all forces, to enable mission command for the scaled, coordinated exercise of authority, integrating planning and ensuring the convergence of effects across a dynamic battlespace.

AIRSPACE CONTROL FUNDAMENTALS

International law recognizes two types of airspace—**international** and **territorial**. Territorial airspace is that airspace above a nation's land areas, internal waters, archipelagic waters (for archipelagic states), and territorial waters (out to a distance of no more than 12 nautical miles) subject to its sovereignty. All other airspace is categorized as international airspace. International airspace exists outside the boundaries of, and is not subject to, state sovereignty, but may be governed by international law, treaties, and agreements.

Operations involving Remotely Piloted Aircraft (RPA) and small unmanned aircraft systems (sUAS), typically reliant on global positioning system (GPS) satellites as their sole source of navigation information, highlight the importance of space-based navigation capabilities.

Typically requiring less airspace to move and operate than their manned counterparts, precise GPS enabled navigation allows the use of kill boxes and their more refined keypads to procedurally deconflict RPA and sUAS from other airspace users. This enables accommodation of significantly more users within confined airspace and became increasingly important to air operations during Operation INHERENT RESOLVE in Iraq and Syria.

Airspace control is essential to accomplishing the JFC's objectives. It allows all users to access needed airspace and aims to accommodate and deconflict overlapping needs among competing users. To aid understanding and discussion, operational airspace can

be categorized as either Denied, Contested, or Permissive, based on the following characteristics:

- **Denied**: Risk to friendly aircraft from air defense systems, electromagnetic warfare, and enemy aircraft is high. Operations may result in significant loss. Sustained operations are denied until a measure of air superiority is achieved.
- **Contested**: Risk to friendly aircraft from adversary aircraft, anti-aircraft systems, and electromagnetic warfare is medium. Enemy air defenses are functional but not fully integrated. Localized air superiority to support operations within portions of the airspace can be achieved.
- **Permissive**: Risk to friendly aircraft is low. Operations can expect little to no use of adversary electromagnetic warfare, communications jamming, anti-aircraft systems, or aircraft. Air superiority or air supremacy has been achieved.

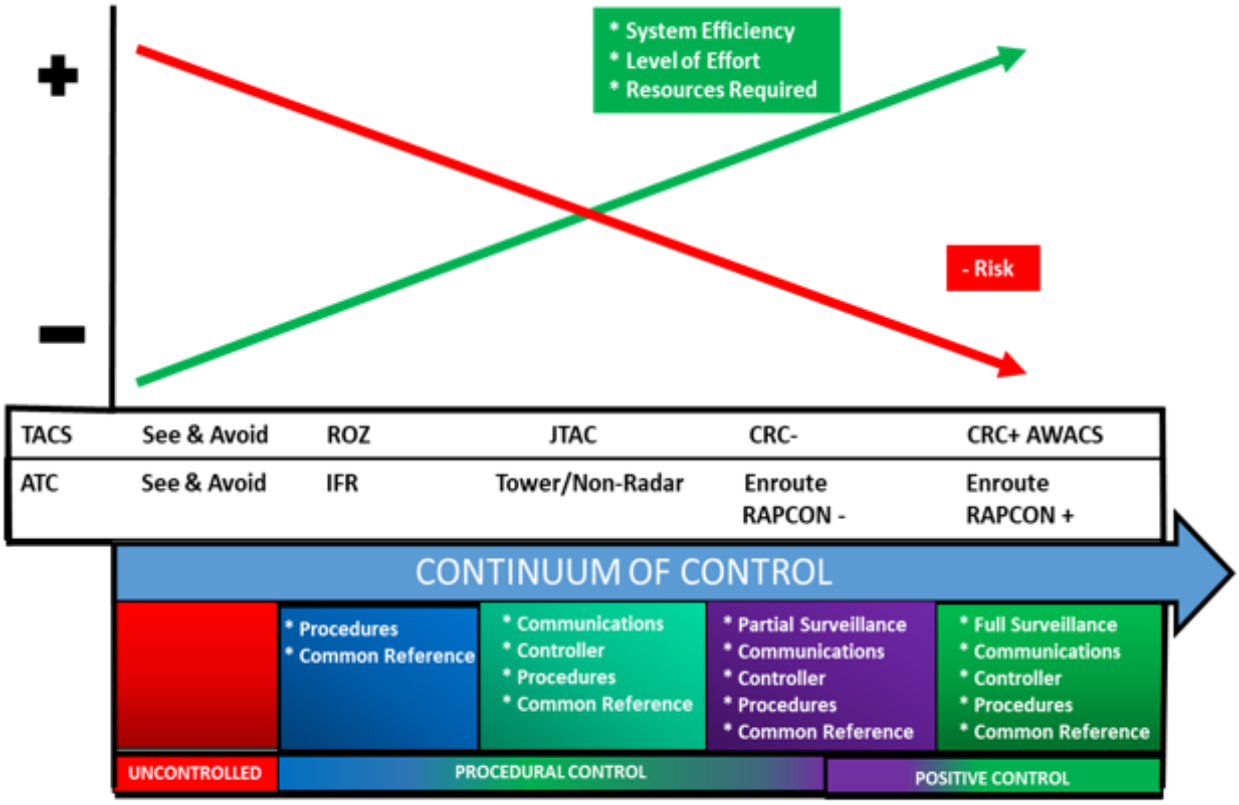
AIRSPACE CONTROL PROCEDURES

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

Procedural control is a method of airspace control relying on a combination of previously agreed to and published orders and procedures (JP 3-52). This form of control relies on common published procedures, designated airspace, and instructions by an authorized airspace control element to deconflict and activate airspace coordinating measures (ACM), fire support coordination measures (FSCM), air traffic control (ATC) measures, and air defense measures. Controlling agencies activate airspace with a defined time and volume through standard 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 element can provide procedural control instructions in real time to increase operational flexibility for airspace users. Though not as efficient as positive control, this method is considered effective for low density airspace. Procedural control measures should be uncomplicated, readily accessible to all forces, and disseminated through the airspace control order (ACO) and special instructions (SPINS). Use of these single-source documents is essential for integrating rotary-wing, fixed wing, fires, and unmanned aircraft (UA) operations.

Positive control is a method of airspace control relying on positive identification, tracking, and communication to direct aircraft. Positive 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. It is normally conducted by electronic means by an airspace control element having the authority and responsibility for airspace management within an assigned airspace volume (JP-52). Airspace control elements are typically equipped with radar, identification friend or foe

interrogators and receivers, beacons, track processing computers, digital data links, and communications equipment. In the event positive control systems become degraded or unavailable, predetermined procedures to transition to procedural control should be established. Such procedures should account for the differences between civil and military communications and surveillance systems.



TACS – theater air control system
ROZ – restricted operations zone
JTAC – joint terminal attack controller
CRC – control and reporting center
ATC – air traffic control
IFR – instrument flight rules
RAPCON – radar approach control
AWACS – airborne warning and control system

Notional Airspace Continuum of Control, Cost vs. Risk (derived from JP 3-52)

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 titled “Notional Airspace Continuum of Control Cost vs. Risk”). 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, incrementally increase control and resources required, and also reduce risk.

Full military or civilian positive control provides the least risk 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 coordination 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.

AIRSPACE CONTROL MECHANISMS

To execute airspace control effectively, the ACA provides guidance on airspace use through the ACP and ACO. The ACA also provides airspace usage inputs to the air tasking order (ATO), air operations directive (AOD), and SPINS.

Air Operations Directive (AOD). The AOD provides the air component commander's guidance for each ATO and subsequent planning steps. Among other purposes, AOD guidance conveys JFC and air component commander guidance concerning acceptable levels of risk with respect to airspace control. The AOD, like the ACP, is directive in nature.

Airspace Control Plan (ACP). The ACP implements AOD operational guidance providing specific planning guidance and establishing airspace procedures and control nodes for the ACS throughout the JOA. It may be distributed as a separate document or as an annex to the operations plan. Refer to JP 3-52, and Appendix A of this publication for topics to consider when developing an ACP.

- **The ACP and area air defense plan (AADP) should complement each other to provide effective airspace control.** Normally, the ACP should be developed ahead of expected operations to provide advance information to other component and coalition planners. The ACP should support an orderly transition from peacetime operations to combat operations and back to peacetime. Such transitions could occur during a period of increasing tensions or suddenly without warning.

Airspace Control Order (ACO). The ACO executes the ACP and may contain airspace priorities discussed in the AOD. The ACO translates general guidance provided in the ACP and establishes specific procedures for defined time periods. The ACO is normally disseminated as a separate document, published and effective for one twenty-four hour period coinciding with the ATO day. Along with other airspace information, the ACO includes ACMs, ATC measures, air defense measures, and FSCM. Similar to the ATO, changes to the ACO are published during execution, on an as-needed basis, or at set intervals, to meet the needs of dynamic, high-tempo operations.

AIRSPACE DECONFLICTION

Airspace deconfliction at the operational level normally occurs within the air operations center (AOC). The AOC's combat plans division usually resolves airspace conflicts during ATO or ACO production and dissemination while the combat operations division handles post-ATO or ACO dissemination and real-time ACO changes. Deconfliction at the tactical level is executed by elements of the ACS and achieved by directing time, position, altitude, and other deconfliction methods to airspace users. Tactical ACS entities performing this function include: control and reporting center (CRC), Airborne Warning and Control System (AWACS), Joint Surveillance Target Attack Radar System (JSTARS), Air Support Operations Center (ASOC), joint air-ground integration center (JAGIC), tactical air control parties (TACP), and ATC.

COORDINATION MEASURES

Coordination measures are employed to facilitate planning and efficient execution of air operations and fires, simultaneously providing safeguards for friendly forces. They deconflict users and uses of airspace and are designed to allow aircraft and fires to operate within, or transit through, airspace provided necessary coordination or pre-planning with the owning airspace control element occurs.

As the ACA, the air component commander, in conjunction with component and coalition partners, develops airspace control procedures and associated coordination measures for JFC approval and publication in the ACP. Once approved, coordination measures are promulgated to joint and coalition forces via the ACO and SPINS. Their implementation should include an awareness of risks associated with fires and offensive air operations. Coordination measures may be restrictive or permissive. Categories include:

- **Airspace coordinating measures (ACM).** Measures employed to facilitate the efficient use of airspace to accomplish missions and simultaneously provide safeguards for friendly forces.
- **Fire support coordination measures (FSCM).** Measures employed to facilitate rapid engagement of targets while safeguarding friendly forces.
- **Maneuver control measures (MCM).** Measures established to define lines of responsibility in support of friendly maneuver; normally established by the ground force commander.
- **Air reference measures (ARM).** Measures, to aid C2 coordination, used to define a point over the ground or a volume of airspace for reference. (Does not require coordination to pass over or through.)
- **Air defense measures (ADM).** Restrictive measures employed to facilitate identification, detection, and tracking to engage enemy air and missile threats.
- **Maritime defense measures (MDM).** Measures employed to facilitate maritime actions.

- **Air traffic control measures (ATCM).** Measures employed to expedite the safe movement of aircraft established in conjunction with civil and military ACA and International Civil Aviation Organization (ICAO), as appropriate.

For effective airspace control, all joint and coalition airspace users, including indirect fires platforms, should be aware and understand details regarding theater-wide control measures including:

- Activation procedures for FSCM including fire support coordination line (FSCL), coordinated fire line, kill box, etc.
- Establishment of a coordinating altitude (if used).
- Promulgation of ACMs required for special missions (e.g., air assaults or airborne operations).
- Establishment of areas that will become high density airspace and the type of control procedures used to mitigate risk.
- Use of automated tools and systems to aid ACO (and ACO changes) promulgation to airspace users.

For coordination measures planning and employment details, see JP 3-52 and Air Force Tactics, Techniques, and Procedures (AFTTP) 3-2.78, *Multi-Service TTP (MTTP) for Airspace Control*.

CHAPTER 2: COMMAND AND CONTROL

Airmen, in conjunction with joint and coalition partners, are responsible for planning and integrating the ACS in accordance with JFC guidance. The ACS should maximize the combat effectiveness of all forces, while reducing the risk of friendly fire incidents and collateral damage, to include unintended engagements against friendly, civil, and neutral aircraft.

JOINT FORCE COMMANDER

The JFC is responsible for airspace control within the JOA. Executed by the ACA, airspace control procedures and authorities within the JOA are codified in the ACP and ACO. Together with the AOD, these documents express how airspace will be used to support mission accomplishment and establishes airspace priorities among users and missions.

AIR COMPONENT COMMANDER

The air component commander provides Air Force theater air control system (TACS) and airspace control expertise and resources to the JFC. Through air force forces (AFFOR) assigned or attached, the air component commander is provided the resources necessary to assume the ACA and area air defense commander (AADC) roles. “Dual hatting” ACA and AADC roles ensures unity of effort in all aspects of airspace control. Though rare, in the event the joint force air component commander (JFACC) is designated from another component, the air component commander may still be expected to perform ACA and AADC roles.

AIRSPACE CONTROL AUTHORITY

The ACA is “the commander designated to assume overall responsibility for the operation of the ACS in the airspace control area” (JP 3-52). The ACA should be the commander with the preponderance of airspace control and management capabilities in the JOA. The ACA is responsible to provide and operate an effective and adaptive ACS and to plan, coordinate, and develop airspace control procedures. The ACA does not have the authority to approve or disapprove combat operations. Airspace control procedures within the JOA are approved by the JFC and are derived 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. Key ACA responsibilities can be found in JP 3-52.

COORDINATION WITH THE HOST NATION, REGIONAL AUTHORITIES, AND ICAO

As a guiding principle for all operations, a host nation retains ACA. When the host nation retains ACA, joint forces primarily use existing international, host nation, or Department of Defense (DOD) aeronautical information publications for airspace procedures or guidelines. Airspace, navigation services, and radio frequencies are the sovereign property and responsibility of the host nation. 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. A host nation may retain overall airspace control, allowing the JFC and ACA less influence over the conduct of day-to-day airspace control. ACA tasks and responsibilities, as they relate to theater security cooperation, are crucial to gain required access and enable strategic and operational partnerships.

LEAD AGENT

In early phases of an operation, the JFC may not designate an ACA. In these cases, the JFC should consider appointing a lead agent, normally the commander with the preponderance of air assets and the ability to C2 them, for airspace control, ATC, instrument procedures, and navigation aids within the operations area (OA). The commander, Navy forces (COMNAVFOR) is normally assigned responsibility for airspace procedures applicable to fleet air operations over international waters within the OA and only advises the JFC's lead agent as appropriate. As lead agent, the air component commander 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. Additionally, the lead agent normally serves as the focal point to:

- Assist the JFC, components, Services, and supporting commands on airspace, air traffic, and navigation aid matters.
- Develop appropriate coordination measures in support of JFC contingency planning to include airspace requirements for UAS.
- Coordinate host nation navigation aids inspections with Headquarters Air Force Flight Standards Agency, the Federal Aviation Administration (FAA) or ICAO aviation system standards, and the DOD program management office for flight inspection.
- 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 OA.
- Develop friendly host nation airspace capabilities through the joint force theater engagement plan, training, and exercises.
- Submit changes to DOD aeronautical and flight information publications to the National Geospatial-Intelligence Agency on a timely basis.

AREA AIR DEFENSE COMMANDER

The AADC is the commander with the preponderance of air and missile defense capabilities and the ability to command, control, plan, and execute integrated air defense operations, assigned overall responsibility for theater air and missile defense (JP 3-01, *Countering Air and Missile Threats*). Because ACA and AADC authorities are so integral to air operations, and due to the Air Force's ability to C2 these activities, the air component commander is normally assigned both ACA and AADC responsibilities.

The AADC is responsible for defensive counterair (DCA) operations. The AADC develops the AADP with JFC approval and ensures it is promulgated. The AADC should identify those volumes of airspace and coordination 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 ACS. The AADC may also designate regional or sector air defense commanders (RADCs/SADCs) to ease C2 of airspace based on the size and scope of the operation. The successful conduct of air and missile defense operations requires the integrated operation of all available air, land, and maritime-based air and missile defense systems.

In joint operations where separate commanders are designated, close coordination is essential for unity of effort, prevention of friendly fire and unintended engagements against civil and neutral aircraft, and joint air operations deconfliction (JP 3-52). **Because such separate arrangements are rare, the remainder of this publication assumes the air component commander has been designated as the ACA and AADC. This is the preferred Air Force construct for which Airmen are trained.**

OTHER COMPONENT COMMANDERS

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

- Provide airspace control in areas designated in the ACP.
- Forward requests for 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; and 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 OAs and identify those facilities and personnel to the ACA for inclusion in the ACP.
- Provide component airspace liaison personnel to the air component commander, ACA, and airspace control facilities as required.

AIRSPACE CONTROL SYSTEM

Consistent with the provisions of JP 1, *Doctrine for the Armed Forces of the United States*, a JFC has the authority to organize forces to accomplish the assigned mission based on their concept of operations. The organization of forces depends on the mission assigned, the way the mission is to be fulfilled, and the capabilities of assigned component elements. Consequently, the organizational form of the ACS may vary (JP 3-52). Generally speaking, command arrangements for airspace control do not vary across the competition continuum. The use of multiple acronyms to describe an increasingly complex ACS has led to confusion even among airspace professionals. To alleviate this confusion, the generic term ACS is used throughout this publication and in JP 3-52.

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.[1] The ACS combines each Service component's C2 and airspace control capabilities supporting the JFC's mission. The Army Air-Ground System (AAGS), the Naval Tactical Air Control System, the Marine Air Command and Control System, and the Special Operations Air Ground System combine with the Air Force TACS and other airspace control agencies (e.g., civil ATC) to create the theater air ground system (TAGS). In many operations, other governmental agencies and NGOs may be involved, challenging unity of command. Because any action taken by one airspace user may impact other users, a coordinated and integrated ACS is essential to the conduct of successful operations. An ACA-established ACS supports JFC objectives and facilitates unity of effort.

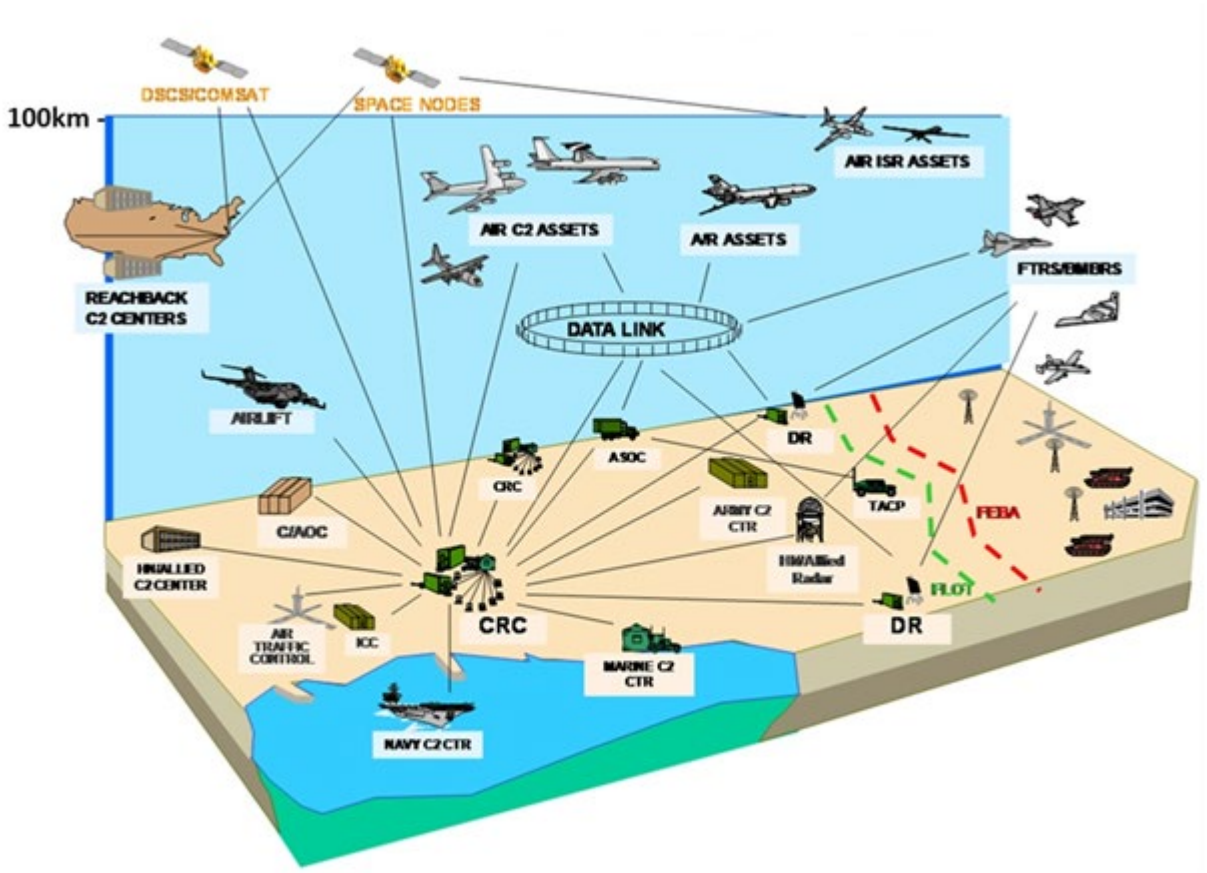
The ACS is designed to meet the needs of a wide variety of airspace users (e.g., civil and military ATC, military aircraft, indirect fires). Flexibility and simplicity should be emphasized throughout to maximize the effectiveness of forces operating within the system. Airspace control should be capable of supporting 24-hour operations in all weather and environmental conditions. (See figure titled "Notional Military Airspace Control System"*)*. As it is likely to be a prime target of attack, it should be integrated, survivable, sustainable, and redundant. 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 ACS should be responsive to emerging threats and the evolution of ongoing operations. Emphasis should be placed on simple, flexible airspace management procedures. Provisions should allow for control capability degradation. In this manner, flexibility and battlespace responsiveness are preserved.

ACS FUNDAMENTALS

A common ACS facilitates accurate and timely coordination of airspace operations among friendly forces. Common equipment, a common understanding of Service and

[1] AFTTP 3-2.17, *MTTP for the Theater Air-Ground System* (restricted distribution, common access card required).

joint doctrine, and familiarity with procedures through joint exercises and training can enhance airspace control operations within the JOA. Standardized airspace procedures rely on an effective mix of identification and control measures. Airspace control identification requirements should be integrated with those for air and missile defense. Airspace control, air and missile defense, ATC, supporting C2 procedures, equipment, and terminology should be compatible, mutually supporting, and integrated to ensure commonality of procedures for airspace users and control agencies. Airspace control agencies should work out procedural agreements and establish required communication links to ensure effective interagency coordination.



NOTIONAL MILITARY AIRSPACE CONTROL SYSTEM

The ACA normally delegates airspace control to elements of the ACS. Their associated ATC functions provide ICAO-approved traffic and separation standards as required. In this regard, ACS elements may be governed by host nation rules and regulations. However, as operations transition between peacetime and combat operations, peacetime airspace rules and organizations change. The nature of those changes will vary from theater to theater. Additionally, elements of the ACS may have dual roles as DCA and airspace control assets. For example, a CRC, tasked with airspace control duties, may also be a RADC/SADC responsible for a portion of theater air and missile defense.

The ACS requires timely exchange of information through reliable, secure, and interoperable communications networks. The systems comprising the ACS include, but are not limited to, sensors, communications, data processing, and common operating databases. Cybersecurity programs such as communications security, physical security, emissions security, along with defensive cyberspace operations, protect the ACS. Due to the US military's dependence on, and the general vulnerability of supporting information systems, cybersecurity is essential to airspace control. Implementing operations security practices is imperative when developing communication policies and procedures.

Systems supporting the ACS (e.g., satellite ground stations, air navigation, surveillance and weather radars, and voice radio communications) rely heavily on the EMS. These systems are susceptible to electromagnetic interference (EMI) from intentional (e.g., frequency jammers) and unintentional (e.g., friendly transmissions on adjacent frequencies) emissions, particularly in congested or contested operational environments. EMI can result in degraded positioning, navigation, and timing; radar separation; and interrupted voice communications between airspace control elements and users, and cause safety of flight hazards. The air component commander's communications staff and the theater frequency manager should determine potential sources of unintentional EMI and coordinate to allocate alternate frequencies as required by the Joint Frequency Management Office. Deliberate, coordinated and detailed planning at the earliest stages will help avoid friendly EMI and ensure ACS data and communications systems, and their associated procedures, are compatible. All sources of EMI should be resolved in accordance with Chairman of the Joint Chiefs of Staff Instruction (CJCSI) 3320.02F, *Joint Spectrum Interference Resolution*, Chairman of the Joint Chiefs of Staff Manual 3320.02D, *Joint Spectrum Interference Resolution (JSIR) Procedures*, and local policies.

THEATER AIR CONTROL SYSTEM (TACS)

The TACS is the C2 mechanism providing the air component commander with the means to achieve decentralized execution of air operations. TACS elements may be employed in garrison, deployed for contingencies, or deployed to augment theater-specific systems. Though they may be configured differently across various theaters, basic functions performed by the TACS are the same. The air component commander executes the ATO, ACP, ACOs, and the AADP, via the TACS. The TACS, in combination with other Service airspace control elements, constitute the TAGS which executes operations for the JFC through an AOC.

To fully understand the relationship of the TACS to the ACS, planners should know each component's system, its composition, and its structure. For more information on the TACS and other component's capabilities see AFTTP 3-2.17, *MTTP for the Theater Air-Ground System*[2] and AFTTP 3-3.TACS, *Combat Fundamentals–TACS*.[3]

[2] Common access card required.
[3] Common access card required.

COMMON TACS CONTROL AUTHORITIES, ROLES, AND ORGANIZATIONAL ALIGNMENT

- **Common Control Authorities—CRC, AWACS, JSTARS, and Battlefield Control Center (BCC)** According to the nature of the operation and specific asset or organizational capabilities, the air component commander may delegate all or portions of identification, commit, engagement, and airspace control authorities to these entities to dynamically execute commander's guidance and intent. Additionally, the BCC may be delegated data-link control authority. The CRC, AWACS, JSTARS, and BCC are not certified to perform ATC services.

- **Common Roles and Alignment—CRC, AWACS, JSTARS, and BCC.** The CRC, AWACS, and JSTARS can accept delegated responsibility to execute missions and tasks for offensive and defensive air operations. The CRC and AWACS may be delegated RADC or SADC responsibilities and are a key C2 element for DCA operations. **The CRC, AWACS, JSTARS, and BCC are under the operational control of the air component commander and vertically integrated with the AOC. They may be employed alone or horizontally integrated with other C2 and surveillance and reconnaissance elements of the TAGS**.

Note: The control authorities, roles, and organizational alignment for the entities above are consolidated here for the purposes of brevity and commonality. This information supplements further discussion on specific entities below.

TACS GROUND ELEMENTS

Air Operations Center (AOC). The AOC is the senior C2 element of the TACS where centralized planning, direction, control, and coordination of assigned air and cyberspace forces occur. An AOC is organized under a commander, whereas a combined or joint AOC (C/JAOC) is organized under a director (for joint forces) and a commander (for Air Force forces). The AOC commander should be prepared to direct a joint or combined AOC when designated. The AOC has five divisions: strategy, combat plans, combat operations, intelligence, surveillance and reconnaissance (ISR), and air mobility, along with multiple support and 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 AFTTP 3-3.AOC, *Combat Fundamentals - AOC*.[4]

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 and specialty teams, and other Service or functional component liaisons (e.g., battlefield coordination detachment [BCD], naval and amphibious liaison element [NALE], and special operations liaison element [SOLE]).

The combat plans division is responsible for near-term air operations planning within 48 hours of ATO execution. Combat plans airspace managers develop and promulgate the

[4] Common access card required.

ACP and ACO. The combat operations division is responsible for ATO execution. Combat operations airspace managers execute and make necessary changes to the ACO, and manage other real-time AOC airspace coordination issues. In certain time sensitive operations, operational necessity may preclude generation of an ACO change to enact required coordination measures. To support operations, C2 agencies should be prepared to deconflict coordination measures with short notice and in real-time.

Airspace Management Specialty Team. 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 OA. The airspace management specialty team leader acts as the senior airspace manager and is supported by a small staff that coordinates ACA responsibilities. Responsible for coordinating civil and military airspace control matters directly with the host nation and officials in neighboring countries, airspace management specialty team duties include:

- Establishing and formalizing agreements with the host nation and international agencies (e.g., memoranda of understanding).
- Coordinating host nation and international aeronautical information publications.
- Coordinating host nation notices to Airmen.
- Coordinating procedures to reintroduce civil aviation in the OA.
- Developing strategy for airspace control transition from the ACA back to host nation authorities.

Use of coalition airspace management specialists can provide a wealth of expertise on international airspace issues. The airspace management specialty team may work through the Joint Air Component Coordination Element (JACCE) to coordinate with host nation authorities, and as a minimum should keep the JACCE informed.

Regional Air Movement Control Center (RAMCC). The RAMCC is a separate specialty team that reports directly to the AOC commander, but may not be co-located with the AOC. The RAMCC manages interactions with aircraft not assigned or attached to the joint force, including civil aircraft accessing or transiting the JOA, providing the AADC with visibility of non-military air traffic not appearing on the ATO. The RAMCC is responsible for coordinating operational requirements with ICAO and disseminating airspace and airfield information to civil operators. The RAMCC may include liaison officers from coalition or neutral nations and enables coordination with non-governmental organizations and civil airspace users. For more information on RAMCC, see Appendix B.

Component AOC 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 to develop and execute the AADP, ACP, and ACO. The joint force special operations commander is represented by the SOLE to coordinate, deconflict,

and synchronize air and surface special operations with conventional air. Other Service liaisons include the Army's BCD and the Navy's NALE to articulate Navy and Marine interests unless a separate Marine liaison element (MARLE) is designated.

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

Following the close of major operations in Afghanistan and Iraq, the combined forces air component commander (CFACC), in his role as ACA, assumed responsibility for all host nation airspace control functions. Because of the scope and complexity of those responsibilities, and from civil pressure to open and expand airfields and overflight routes, the CFACC established a CAPG consisting of an ATC officer from the US Air Force, the Royal Air Force, and the Royal Australian Air Force. The CAPG developed interagency working group charters and coordinated quarterly meetings between the deputy CFACC (DCFACC) / deputy ACA (DACA), ACCE, RAMCC, Department of State, and multiple other coalition and civil stakeholders to resolve key airspace issues. Additional responsibilities included:

- International operating memoranda
- Host nation aeronautical information publications
- Civil aviation safety report responses
- Host nation notices to Airmen
- Combined force commander waivers for civil airspace use
- Representing the CFACC in regional aviation forums

The CAPG was aligned under air, space and information operations staff directorate (AFFOR/A-3) outside of the AOC. This arrangement achieved mixed results due to 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 by collocating the CAPG with the AOC's combat plans division airspace managers, improving access to the DCFACC / DACA and providing close 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

Control and Reporting Center (CRC). The CRC is a ground-based, mobile TACS element with long-range air surveillance radar and voice and data communications capabilities. The CRC is tailorable by mission requirements to support and facilitate the

full spectrum of airpower, including ATO execution, airspace management, surveillance and combat identification, and data link management. Its radars and communications systems may be co-located with the CRC or deployed forward.

The CRC has the capability to import and display non-organic radar data via direct communication feeds, and can provide persistent, wide-area surveillance, early warning, battle management, target detection and tracking, and weapons control functions. The CRC fuses C2 data with other C2 systems and combat aircraft via various tactical data link (TDL) systems to obtain information for expanded surveillance coverage.

Reference paragraphs three and four of this section for discussion of CRC control authorities, roles, and organizational alignment.

Battle Control Center (BCC). The Air Force employs four BCCs in support of the commander, North American Aerospace Defense Command (NORAD) and the US Northern Command (USNORTHCOM) and US Indo-Pacific Command combatant commanders (CCDR) as the primary tactical C2 nodes for homeland defense and defense support of civil authorities (DSCA). The BCC is a ground-based fixed element of the TACS, comprised of four major systems: a C2 processing and display system—Battle Control System-Fixed; primary and secondary radar capabilities; flight-plan processing and identification systems; and communication and data link connectivity. BCCs manage the largest, operational netted-sensor tracking architecture in the DOD. It operates continuously to provide wide-area surveillance, early warning, battle management, target detection and tracking, and non-lethal warning and weapons control functions.

The BCC fuses all-source sensor and intelligence data into a common tactical picture and disseminates tactical warning and attack assessment information to the appropriate users and decision-makers. It can perform all tasks that facilitate the full spectrum of airpower including ATO execution, airspace management and integration, surveillance and combat identification, and data link management. The BCC can find, fix, track, and target airborne threats and exchange air picture data with other C2 systems and combat aircraft (to include aerospace control alert fighters on the ground in scramble status) through TDL systems. BCCs can distribute the tactical air picture (to include plot level data) directly to the AOC and CCMD operations centers. In the event of lost connectivity, they can operate autonomously and provide immediate mutual support and redundancy if another becomes inoperative.

Reference paragraphs three and four of this section for discussion of BCC control authorities, roles, and organizational alignment.

Air Support Operations Center (ASOC). The ASOC is responsible for the direction and control of air operations directly supporting the ground combat element. It coordinates air missions requiring deconfliction and integration with other supporting arms and ground forces. It normally collocates at the division level with the Army tactical headquarters senior fire center and becomes part of the JAGIC. The JAGIC provides a modular, scalable, and tailorable cell designed to fully integrate and coordinate fires and

air operations within a division commander's area of operations (AO). The ASOC normally requests 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.

Tactical Air Control Party (TACP). The TACP is the principal air liaison unit collocated with ground maneuver units. TACPs are organized into expeditionary air support operations groups or squadrons aligned with an Army corps, division, or brigade. The TACP has two primary missions: 1) advise ground commanders on the capabilities and limitations of air operations, and 2) provide primary terminal attack control of CAS. TACPs coordinate ACMs and deconflict aircraft from other supporting fires. TACPs may employ joint terminal attack controllers (JTAC) at any echelon but will most often place them in a forward position (e.g., the company or team level).

Joint Terminal Attack Controller (JTAC). A JTACs is a qualified (certified) Service member who, most often from a forward position, performs the detailed integration required for air operations in close proximity to friendly forces by providing terminal attack control of aircraft CAS aircraft. JTACs provide ground commanders with recommendations on the use of CAS and integrating air operations with ground maneuver.

Air Liaison Officer (ALO). An ALO is an officer TACP member and air operations expert who functions as the primary air operations advisor to a ground force commander. The ALO plans and supports execution of air operations to meet ground commander objectives in accordance with air component commander guidance and intent.

Air Mobility Liaison Officer (AMLO). AMLOs are rated air mobility officers supporting the Army at regiment through corps levels. AMLOs advise ground commanders, staffs, and the ALO on capabilities, limitations, and use of air mobility resources and assist with planning, requesting, and employing airlift.

TACS AIRBORNE ELEMENTS

Airborne Warning and Control System (AWACS). The E-3 AWACS is a highly modified Boeing 707 aircraft with a long-range air and maritime surveillance radar, additional sensors, and voice and data communications capabilities. It is normally one of the first air battle management elements of the TACS to arrive in a theater during a crisis or heightened tensions. It is an integrated C2 platform providing persistent 360 degree wide-area surveillance, early warning, battle management, target detection and tracking, and weapons control functions. AWACS is tailorable by mission requirement to provide support that facilitates the full spectrum of airpower including ATO execution, airspace management, surveillance and combat identification, and data link management.

The AWACS elevated radar system has the ability to find, fix, track, and target maritime and airborne threats at lower altitudes and extended range compared to ground-based

radars. It can exchange radar picture data with other C2 systems and combat aircraft via various TDL systems, and can obtain TDL information from other surface and airborne participants to expand or augment its surveillance coverage. It also has the capability to identify and locate airborne and ground-based emitters with an integrated radio frequency passive detection system.

Reference paragraphs three and four of this section for discussion of AWACS control authorities, roles, and organizational alignment.

Joint Surveillance Target Attack Radar System (JSTARS). The E-8C JSTARS is a highly modified Boeing 707 aircraft with voice and data communications and a long-range, wide-area, ground and maritime, moving target synthetic aperture radar capabilities. It is normally one of the first air battle management elements of the TACS to arrive in a theater during a crisis or heightened tensions. It is an integrated Air Force C2 platform providing persistent surveillance, early warning, battle management, target detection and tracking, and weapons control functions. It can also provide surveillance and reconnaissance support to joint intelligence. JSTARS is tailorable by mission requirements to provide support that facilitates the full spectrum of airpower including ATO execution, airspace management, wide area and focused surveillance, target characterization and execution, and data link management.

JSTARS exchanges radar picture data with other C2 systems and combat aircraft via various TDL systems, and can obtain TDL information from other surface and airborne participants to expand or augment its surveillance coverage. It can also provide radar data directly to other joint C2 and intelligence nodes using its unique surveillance and control data link to visualize the ground and maritime battlespace in near-real time. JSTARS can execute decentralized planned, dynamic, functional, and geographic missions and tasks for offensive and defensive air operations. JSTARS direct target attack mission capabilities that assist ground, air, and naval commanders in detecting, delaying, disrupting, and destroying enemy forces.

Reference paragraphs three and four of this section for discussion of JSTARS control authorities, roles, and organizational alignment.

Forward Air Controller (Airborne) (FAC[A]). The FAC(A) is a specially trained pilot, who acts as an airborne extension of the TACP, qualified and authorized to provide coordination and terminal attack control of CAS aircraft and conduct other direct air support missions. The FAC(A) provides additional flexibility by enabling rapid coordination and execution of air operations, and enhances the TACS' situational awareness by disseminating information on the flow of aircraft in the target area.

Air Force Tactical Air Coordinator (Airborne) (TAC[A]). The TAC(A) provides communications relay between the TACP and attack aircraft, as well as other agencies of the TACS. The TAC(A) can expedite CAS aircraft-to-JTAC handoff during "heavy traffic" CAS operations. Air Force two-ship FAC(A) flights, especially in higher threat environments, may divide responsibilities so one aircraft fills the normal FAC(A) role while the second acts as the TAC(A). Additionally, when coordinated with an ASOC, E-8

JSTARS may act as TAC(A) to aid the ASOC and JTAC/FAC(A) by fulfilling a host of "bring order" functions. For details reference AFTTP 3-3.TACS.

OTHER COMMAND AND CONTROL ELEMENTS

JOINT AIR COMPONENT COORDINATION ELEMENT (JACCE)

To better integrate operations, the air component commander may establish a JACCE within a JFC or other functional component headquarters. When established, these elements act as the air component commander's primary representative to the JFC or respective component commander, and facilitate coordination with their staff. The JACCE performs a liaison function and should communicate JFC or component commander decisions and interests to the air component commander. **The JACCE does not perform C2 functions or act as a C2 node.** Unless specifically delegated by the air component commander, the JACCE has no authority to direct or execute operations. The JACCE may include plans, operations, intelligence, airspace management, logistics, space, and air mobility expertise, as needed. The JACCE may function as the air component commander's representative to a host nation following large-scale combat operations. To do so, the JFC should authorize direct liaison authority (DIRLAUTH) for coordination of air operations issues between the air component commander and host nation (see JP 3-30, Joint Air Operations).

WING OPERATIONS CENTER (WOC)

An Air Force installation's WOC provides a standardized, functional organization, to facilitate installation-level C2 across the full spectrum of operations for all wing-assigned units and organizations. The WOC provides a single, consolidated C2 center to monitor mission execution of installation commander assigned or supported missions; to include tenant, joint, and combined missions. It interfaces with the AOC and AFFOR staff, and is the key C2 center that connects operational planning with tactical execution.

The WOC is scalable and tailorable at the installation commander's discretion to provide the exact C2 capability required for the unique location, mission, and operational situation. As a baseline, it consists of the following functional areas: operations control maintenance coordination, aerial port coordination, reports, battle management, and incident response. It provides experts to receive, schedule, plan, and direct execution of the ATO. When required, the WOC can connect with TACS elements, and is capable of coordinating with host nation representatives, tenant organizations, and joint and coalition forces as required.

In addition to the command post function, the WOC may include provisions for a battle staff, mission planning, operations planning and execution monitoring, maintenance operations, a logistics readiness center, and an emergency operations center. It is linked to group and squadron unit control centers; on-base support facilities; and off-base C2 nodes including major command C2 centers, Air Force component headquarters, AOC, and civil emergency operations centers.

SPECIAL TACTICS TEAMS (STT)

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

CONTINGENCY RESPONSE FORCE (CRF)

The CRF is the Air Force's standing initial airfield-opening force postured for rapid response. As such, CRFs are continually engaged with the respective air component commander and A-staff's contingency planning process, helping to ease the transition of airbase opening from planning to execution. For additional information, see AFDP 4-0, *Combat Support*.

AIR FORCE AIR TRAFFIC CONTROL (ATC) CAPABILITIES

The US Air Force organizes, trains, and equips specially trained Airmen capable of conducting ATC operations and services, from fixed or deployable facilities, including procedural, radar, tower, approach, and en-route control. These forces may be assigned through normal processes or deployed and presented to a combatant commander through various arrangements to meet contingency requirements. As conditions permit, host nation or coalition ATC capabilities may be leveraged to provide ATC services and thus reduce the need for US Air Force ATC personnel and equipment.

DEPLOYABLE ATC AND LANDING SYSTEM (DATCALS)

The US Air Force and Air National Guard (ANG) maintain DATCALS at ATC squadrons across the country. These units can deploy as an entire airfield systems and support package or as individual DATCALS packages (tower, navigation aids, radar, etc.). They are the Air Force's interim airfield-opening response force, designed to provide an initial cadre of associated maintenance personnel. As such, they are continually engaged with the respective air component commander and A-staff's contingency planning process, helping to ease the transition of airbase opening planning and execution to airbase sustainment. These squadrons provide a full range of ATC services including procedural and positive control capabilities.

For details of other Service component ATC capabilities, see AFTTP 3-2.68, *MTTP for Airfield Opening*.[5]

[5] Common access card required.

CHAPTER 3: AIRSPACE CONTROL PLANNING

GENERAL CONSIDERATIONS

- C2, ATC, and airspace planners should be involved from the outset in planning and executing C2, ATC, and airspace management. This ensures airspace requirements are coordinated and approved by the proper agencies.
- Establishing relationships with host and key neighboring nations' ATC is critical. Planners should consider establishing an ATC cell to liaise with host nation ATC representatives. Establishing an aircraft diplomatic clearance process should be accomplished as early as possible during the planning process. Key issues to resolve include:
  - Identifying key personnel and their 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 DOD *Foreign Clearance Guide,* DOD Directive 4500.54E, *DOD Foreign Clearance Program*.
  - Identifying special operating rules or waivers needed for certain types of aircraft or operations within host nation airspace (e.g., rules for UAS).
  - Establishing requirements to integrate liaison officers, equipment, processes, and functions.[6]

To preserve and maximize airpower's inherent speed, range and flexibility, potential ACS modifications should be considered during all planning phases. Airspace control considerations should be integrated into planning to ensure joint and combined force effectiveness. The ACP should be consistent with specific operation plans (OPLANs) and operation orders developed by the JFC and component commanders. Planning for airspace control should ensure control responsibilities, activities, systems, documents, and liaison requirements are aligned across the range of action associated with a typical major operation or campaign. Typically this will entail some level of operational phasing to delineate a shift in the operation's nature, focus, or objective. Associated shifts in airspace control requirements should be accounted and planned for in advance.

The joint planning process (JPP) is an orderly analytical set of logical steps to frame a problem; examine a mission; develop, analyze, and compare alternative course of action (COA); select the best COA; and produce a plan or order. To ensure joint air

[6] AFTTP 3-2.78, *MTTP for Airspace Control*. Common access card required.

operations support JFC plans, airspace control should be integrated throughout the JPP.

CONSIDERATIONS FOR ROUTINE OPERATIONS

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

Airspace control expertise, for ACS design and establishment of procedures, is as crucial for normal, steady-state operations as it is in any other operation. 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, exercises may provide key opportunities for airspace control planners to practice joint C2 procedures and familiarize themselves with the basic operations plan. Aimed at improved planning accuracy and interoperability, conducting bilateral or regional exercises with host and partner nations provides opportunities to improve cooperation with, and understanding of, host nation capabilities.

The ACP should integrate known international or host nation air traffic airspace and air and missile defense capabilities. Primary planning considerations include identification of airspace required for joint force operations and the proposed coordination process for obtaining that airspace. Joint planning should consider procedures to transfer coordinating authority from the host nation to the ACA. This includes rerouting of airways, ACA responsibilities for continuity of civil aviation operations, and host nation notification of ACA areas of control through notices to Airmen or aeronautical information publication entries.

CONSIDERATIONS FOR TRANSITION TO COMBAT OPERATIONS

Prior to initiating large-scale combat operations, the air component commander 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 TACS and other 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. Once combat operations commence, a reliable and jam-resistant communications system should be available to cover the entire JOA. While the air component commander is normally responsible for most of this system, other Service component contributions can significantly increase its capability. The ACP, ACO, ATO, and SPINS should be updated to include responsibilities and authorities (including special operations and coalition forces) for the following:

- Unassigned areas within the joint force land component commander's (JFLCC) AO.
- Procedures for forward operating bases and airfields.

- DATCALS, ATC, and air traffic service at forward operating bases.
- ATC or air traffic service at captured airfields.
- Placement of the CRC, Marine tactical AOC, and air and missile defense radars to provide coverage and sharing of coverage pictures, if required.
- Area air and missile defense and short-range air defense integration behind the FSCL and forward line of own troops (FLOT).
- UAS and rotary wing deconfliction methods.
- Continued integration of the ASOC, TACPs, and direct air support center (DASC) with the rest of the ACS.

OPERATIONS AND RISK

Risk is a fundamental consideration of airspace control. Joint doctrine recognizes each Service and functional component's need to maximize the availability and use of airspace within JFC established acceptable levels of risk. For all airspace users (including fires), these should be clearly delineated in the ACP, to include a risk matrix that is agreed upon by components before commencing combat operations. At a minimum, this matrix should include the types of risk shown in Appendix B, Notional Risk Assessment Matrix.

In general terms, *low* risk prioritizes preservation of resources over mission accomplishment. Aircraft damage or loss is acceptable for both *moderate* and *significant* risk. However, *moderate* risk prioritizes aircraft survival, whereas *significant* risk places greater emphasis on mission accomplishment. Lastly, *high* risk prioritizes mission accomplishment above all other concerns. During all operational phases, the assumption of risk is a command decision. Definitions of risk, as well as the specified levels, vary from theater to theater based on commander's guidance.

During large-scale combat operations the risk matrix assumes the JFC has the authority to deny access to civil aviation in the JOA. If that is not the case, civil aviation should be added to the matrix. As the number of airspace users increases, control should be enhanced to keep operations within JFC acceptable risk levels. The ACP should specify areas where high numbers of airspace users are projected and plan for increased control capability (i.e., positive versus procedural control). If control capabilities required to reduce risk are not available, commanders should understand they are accepting a higher risk of mid-air collisions and friendly fire incidents.

REFERENCE SYSTEMS

Global Area Reference System (GARS). GARS is the DOD standard area reference system established by CJCSI 3900.01D, *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. It simply provides a two-dimensional construct from which control and coordination measures can be communicated and understood. GARS uses a grid system with a simple, universal identifier recognizable by each component and their associated C2 and attack assets. 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 than ensuring all components use the same reference system and procedures. A detailed discussion of GARS is located in JP 2-03, *Geospatial Intelligence Support to Joint Operations*.[7]

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 during the Vietnam War, 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.

Common Geographic Reference System (CGRS). An additional standardized geographic reference system, CGRS predates GARS and may still be in use. The system divides airspace into cells which are then further divided into nine keypads, similar to a telephone keypad, which can be further subdivided into quadrants.[8] Additionally, CGRS uses a theater-determined origin or starting point rather than a global point referenced by GARS. Because both CGRS and GARS reference common terms with different meanings, there is a risk of confusion if both systems are employed. To reduce this risk, it is recommended that only one system be used within an OA. For further details, see AFTTP 3-2.59, *MTTP for Kill Box Planning and Employment*.[9]

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 to define airspace dimensions and activate it for use. Normally airspace boundaries between component or coalition airspace control elements coincide with GARS boundaries. However, in certain situations (such as amphibious objective areas), ground forces may request to control the airspace over its AO with airspace boundaries corresponding to terrain features (e.g., shoreline). In such circumstances, procedures for airspace control

[7] Common access card required.
[8] AFTTP 3-2.78, *Airspace Control*. Common access card required.
[9] Common access card required.

and handoffs between adjacent airspace control elements should be clearly coordinated to prevent loss of situational awareness and potential conflicts.

COMMUNICATIONS AND INFORMATION

Though airspace C2 infrastructures have not changed much over time, communications networks have improved significantly; enhancing the reliability, security, and timeliness of information. Tactical information that may have terminated with an AWACS or CRC is now sent further to the AOC, enhancing situational awareness. In addition, broad-bandwidth communications using satellite and internet protocol communications have substantially increased ACS C2 coverage and reachback capabilities.[10] Along with newer technologies, secure voice systems (ultra-high, very high, and high frequencies) offer highly reliable means of communication. Such technologies provide the air component commander a variety of options to execute airspace control.

DIGITALLY ENABLED OPERATIONS

TDLs are standardized communication links suitable for transmission of digital information between C2 nodes and link equipped aircraft. Each Service uses these links for situational awareness to support battle management, C2, and combat airspace management. Link equipped TACS airspace control elements, including air and missile defense nodes, leverage TDLs to enhance the situational awareness and effectiveness of link-equipped aircraft.

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

- **Joint Interface Control Officer (JICO).** The JICO works with the AOC's plans division, C2 elements, 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 lower echelons. CJCSI 6610.01F, *Tactical Data Link Standardization and Interoperability,* provides a detailed description of data links. AFTTP 3-2.17, MTTP for the Theater Air-Ground System (TAGS),[11] and AFTTP 3-2.31, *MTTP for Air and Missile Defense*,[12] provide further information on data links and the key role they play enabling effective airspace control and air and missile defense.

- **Providing an Air Picture for the Joint Force.** To enable planning and decision making for air operations, the air component commander is normally expected to incorporate data from various air, ground, and space sensors into a recognized air picture. Feeds from data links are managed in the AOC by the Joint Interface

[10] AFTTP 3-3, AOC, *Combat Fundamentals - AOC* (common access card required).
[11] Common access card required.
[12] Common access card required.

Control Officer **(**JICO), and combined with other sources into a common operating picture. This fused picture is shared for mission planning and execution at appropriate levels of command.

COMMUNICATIONS PLANNING

Comprehensive communications enable airspace control throughout a theater. Its availability cannot be taken for granted or treated as a foregone conclusion. Detailed, deliberate planning, including radar and radio signal analysis, ensures surveillance and communications systems provide appropriate coverage within the airspace by employing a combination of fixed and mobile systems. TACS communication capabilities include line of sight, beyond line of sight, and satellite systems. Principal transmissions should be through secure and jam-resistant radio equipment. Planners should ensure radio relays are considered to enhance over-the-horizon radio communications.

Networking technologies may also increase the capabilities of C2 nets and net enabled communication to disseminate information. However, planners should consider the unique requirements, specific configurations, protocols, and tactics, techniques, and procedures (TTPs) to ensure the availability, reliability, resiliency, and effectiveness of these capabilities. Specific procedures for the use of internet relay chat or other non-voice communication systems should be included in the ACP. If communications cannot be secured through technical means, procedures to meet operations security requirements should be applied to unsecure communications.

Detailed analysis of joint network and joint infrastructure requirements is crucial to enable systems 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 mission requirements, maximize use of military capabilities, increase capacity and reliability, and generate greater freedom of action. Communications planners should perform an operations security vulnerability analysis to determine procedures that will protect information from exploitation.

ELECTROMAGNETIC SPECTRUM (EMS)

Airspace control relies heavily on equipment using the EMS—GPS, radio navigation, ATC radars, weather radars, voice, etc. Use of spectrum-dependent technologies is constrained by frequency availability and EMS congestion. The rapid growth of sophisticated weapons systems, as well as intelligence, operations, and communications systems, greatly increases demand for EMS access. Lack of proper, pre-planned EMS coordination and consideration of environmental electromagnetic effects will have an adverse effect on safe, efficient, and flexible use of airspace. An additional constraint, international law, protects a nation’s sovereign right to utilize and regulate the EMS within borders. Generally, host nation approval (and potentially frequency clearances and landing rights) is required prior to conducting EMS operations in foreign locations.

Spectrum Management. CJCSI 3320.01D, *Joint Electromagnetic Spectrum Operations (JEMSO)*, issues policy and guidance for efficient management, control, and use of the EMS to ensure operations are conducted with minimal unintentional EMI or adverse electromagnetic environmental effects. All EMS planning and coordination should be accomplished in accordance with this guidance. The appropriate frequency management office or joint spectrum management element should be consulted for all spectrum management issues. See JP 3-85, *Joint Electromagnetic Spectrum Operations*, for further details.

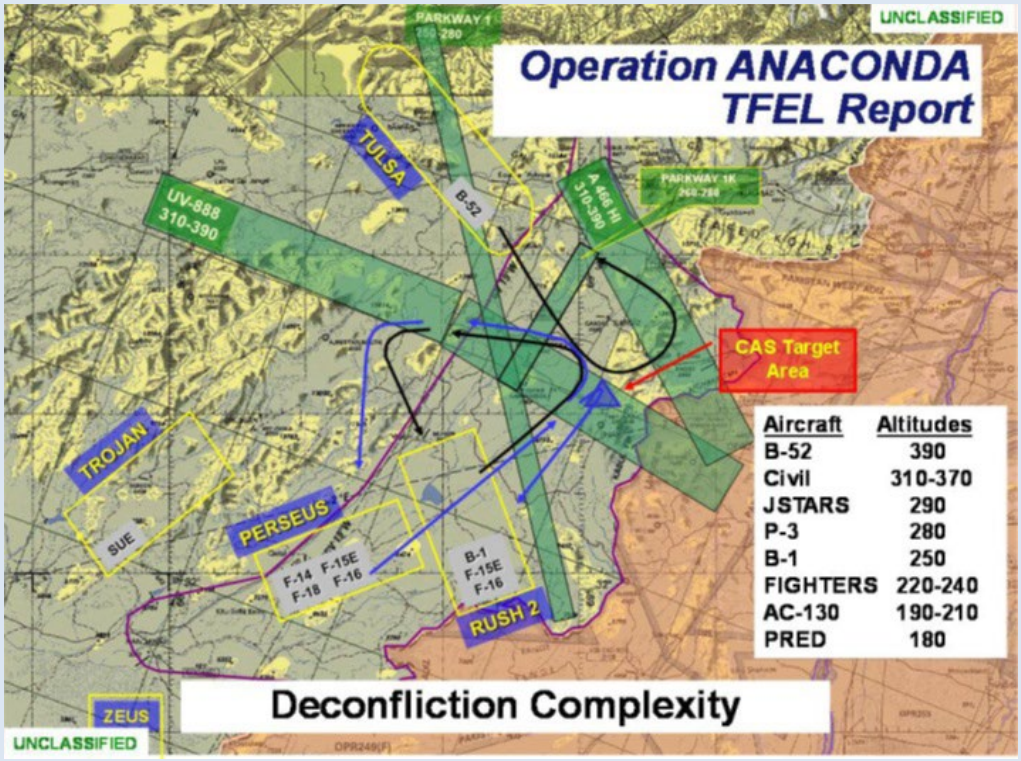
CONTINGENCY PLANNING

The operation plan serves as the foundational employment concept for an operation and its associated OA(s). The JFC's plan will likely involve some form of phasing, moving from one to the next as an operation progresses through and achieves necessary objectives towards an end state. Airspace control planners should expect, as an operation's focus and nature shifts from one phase to the next, each phase will levy unique airspace control requirements. The JFC may choose to follow the traditional five phase model, modify it, or alter it entirely; adapting it to the situation as required. In any case, airspace planners should account for unique airspace control requirements for each phase, anticipating that operations may not transition smoothly between phases.

Depending on the operation's nature, strategic objectives, and JFC intent, operations may start, stop, or transition unexpectedly before engagement, cooperation, or deterrence activities commence. Transferring ACA from civilian to military control, adapting the ACS 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 planning from the beginning. For instance, moving ACS equipment (e.g., CRCs or ATC facilities) is a time-phased force and deployment data consideration. Since much of this equipment is subject to airlift (or other mobility) constraints, a comprehensive, coherent plan is required to ensure critical ACS capabilities are available at the appropriate time and phase of the operation.

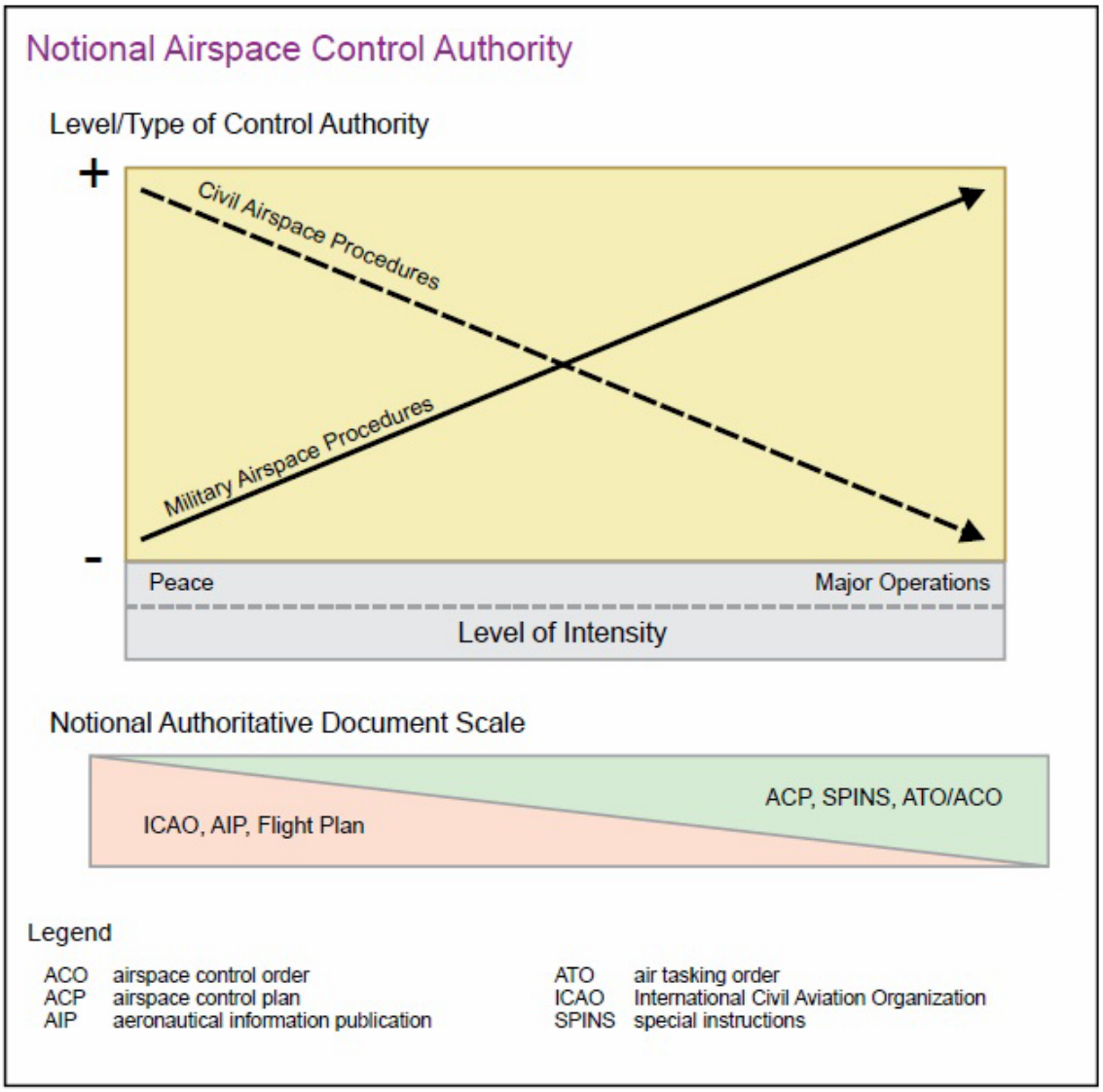
Operation ANACONDA

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 coordinating 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. Once air component airspace planners were integrated with the joint force, airspace control enhanced the operation and its success.



CRISIS PLANNING

Contingency planning supports crisis planning by anticipating potential crises and facilitating development of joint plans to enable the rapid development and selection of a COA. This is especially crucial for certain airspace control operations that may need substantial coordination in advance with various (e.g. host nation, regional, or international) airspace or aviation agencies. During COA development, planners should integrate required airspace control actions into each COA and identify tasks for airspace access and airspace control elements to support operational objectives. In addition, planners should examine the role and contributions of airspace control functions throughout an operation.



Notional Airspace Control Authority (source: JP 3-52)

Following large-scale combat operations, as conditions allow the return of civil airspace use, the likely mix of combat, stability operations, and commercial activity may result in an airspace environment more complex than the most demanding combat airspace. Compounding this, the ACA may transfer airspace control responsibility to the host nation, resulting in decreased JFC and ACA influence over airspace control. The figure titled “Notional Airspace Control Authority” depicts the differing levels of intensity between civil and military operations and respective control authority. As military operations ramp up, the prominence of military airspace procedures should increase. However, the opposite is true as military operations wind down, returning to pre-conflict activities. Without proper planning, such transition periods could result in unnecessary friction, negatively impacting operations and harming host-nation or partner relations.

CHAPTER 4: AIRSPACE CONTROL EXECUTION

COOPERATION AND COMPETITION

Airspace control supports combatant command steady state operations, activities, and investments in cooperation and competition to discourage potential adversaries and develop relationships with friends and allies. 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 and coalition operations, improving information exchange and intelligence sharing, and providing US forces with peacetime and contingency airspace access.

DETERRENCE OPERATIONS

The transition to operations designed to create deterrent effects begins with the identification and determination of a contingency or crisis requiring joint force action and 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.

Normally a demonstration of joint force capabilities and resolve, deterrence seeks to avert undesirable adversary action. Largely characterized by preparatory actions, operations designed to produce deterrence specifically facilitate the execution of succeeding operations or theater campaigns. Airspace control contributes to these operations by supporting the JFC's 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 air component commander (acting as ACA and AADC) establishes a dedicated airspace planning team to finalize the ACP and area air defense plan and develops ACOs for current and future operations. The ACP and area air defense plan should complement each other and ensure the orderly transition from steady-state peacetime operations to combat operations. The air component commander 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.
- Identify ACS requirements and personnel needed to support airspace control and deploy those assets as required.
- Coordinate DOD, FAA, and ICAO Notices to Airmen system availability to support inter-theater dissemination of flight operating information and Air Force and FAA flight check aircraft for air traffic facility inspection.
- Identify ACS components and structure desired for post-combat operations. Consider placing critical components of the enemy ACS on the restricted target list to preserve them for future use.

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 ACS 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.

The ACP should contain procedures to fully integrate the resources of military and civil ATC facilities responsible for terminal-area airspace management or en route ATC. Airspace management personnel should coordinate the ACP with representatives of the host nation, in whose airspace the operations will take place (when appropriate), and with civil air activities that may occur in, or near, the airspace. Broad areas of concern for developing the ACP include familiarity with theater strategy, knowledge of host and multinational capabilities, procedures for military and civil airspace control and ATC systems, and general locations for anticipated combat operations.

Additionally, planners should be familiar with any host nation agreements that could impact air operations and should 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 applicable law, policy, and Air Force instructions.

MAJOR OPERATIONS AND CONFLICT

Transitioning to combat operations from a position of deterrence may be accomplished with 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. Airspace planners should be integrated into development of the master air attack plan to ensure required airspace is provided for combat operations and an effective transition from peacetime to combat airspace control.

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 operations security or military deception considerations.

INITIAL STAGES

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 large-scale combat operations, the air component commander is typically the supported commander for the theater-wide counterair effort, integrating offensive counterair (OCA) and DCA to gain control of the air. Because air superiority is normally a precondition to enable simultaneous operations, against enemies with a credible air and missile defense threat, efforts to "seize initiative" may progress sequentially in early stages. 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.

Operating airborne systems with limited identification and communications equipment places those aircraft at risk and complicates counterair operations by increasing the risk of enemy air and missile attacks and friendly fire incidents. Until air superiority is achieved, the initial ACP may restrict friendly military and civil airspace users. Certain friendly airborne systems (e.g., cruise missiles; UA) 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.

Once air superiority is achieved, the JFC may allow increased operations by airborne systems with limited identification and communications capabilities. In such cases, a theater-wide common operational picture (COP) can contribute significantly to air and missile defense and airspace control. The JFC's ACP may employ fewer restrictions on certain systems which are visible on the airspace COP. Oppositely, systems lacking or with less capable identification and communications equipment may require more restrictions and coordination.

The actions below are not exclusory, but consideration and implementation of each may be crucial in an operations opening stages.

- ✪ Systems that cannot be positively identified as friendly may be restricted during the opening stages of combat operations.

- When combat operations commence, the air component commander should immediately execute plans and procedures to reduce civil aviation to levels compatible with combat operations. Some level of civil aviation, especially commercial airlift delivering support to coalition operations, will probably continue throughout the entire operation (where they operate, and under what restrictions, will be fluid). The air component commander may assign the responsibility to monitor these operations to the director of mobility forces.
- The ACP should be continuously assessed and updated during the entire operation.
- The air component commander should ensure the ACP and ACOs are fully coordinated with supporting components, coalition partners, and host nation air and missile defense forces, even if the host nation is not participating in combat operations. This coordination should also include all SOF elements who participate in access operations. Because some of these plans are highly sensitive, the air component commander should ensure alternate communication means are available to pass information to friendly organizations that lack access to normal military communications.

THEATER AIR CONTROL SYSTEM (TACS)

During the initial stages of major operations, in place ACS assets may be predominantly airborne (e.g., AWACS and JSTARS). Elements such as ASOC and CRC may not be fully deployed due to cargo transport capabilities.[13] When this occurs, airborne elements of the TACS and Naval Tactical Air Control System should accomplish C2 functions until the full TAGS is established.

Planning for follow-on basing of the TACS should occur either before or during the early stages of combat and be coordinated with other components and coalition forces (including SOF). Failure to conduct this planning may prevent critical TACS elements from deploying to the theater at the appropriate time and can result in a less-than-optimum long-term airspace control capability. When AOs are established, key C2 nodes may move forward to support the JFLCC or SOF. Airspace control elements in direct support of the JFLCC, SOF, or other component commanders play a key role in airspace control. These elements control CAS, ISR, and interdiction in the affected AO, and are the primary control nodes for deconfliction of fires. 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.

INTEGRATION WITH COUNTERAIR

JP 3-01 discusses counterair within a framework that addresses requirements for gaining control of the air. Through the counterair framework, the air component commander ensures items on the JFC's critical asset list and defended asset list are protected from attack while simultaneously minimizing friendly fire incident risk between

[13] AFTTP 3-2.17, MTTP for the Theater Air-Ground System. Common access card required.

friendly forces. The air component integrates joint air and missile defense sensor and shooter platforms through effective C2, to include positive and procedural airspace control procedures. Dual-hatted as AADC and ACA[14], the air component commander and staff establish and publish specific supporting relationships for DCA through the AADP to synchronize Army, Navy, and Marine Corps counterair capabilities in support of JFC objectives.

Airspace control and area air defense operations should be capable of functioning in a degraded C2 environment. Detailed engagement procedures and clear delegation of authority to subordinate commanders are keys to success in a degraded environment.

For further information on integration with counterair, refer to JP 3-01 and AFTTP 3-2.31.

INTEGRATION WITH AIR AND MISSILE DEFENSE OPERATIONS

During combat operations the air component commander, acting as the ACA and AADC, normally unifies the functions of airspace control and air and missile defense within the JOA. 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 and missile defense operations is especially critical during the initial efforts to gain control of the air. Effective airspace control procedures assist aircraft and missile identification, facilitate engagement of enemy aircraft and missiles, and provide safe passage of friendly aircraft.

AIR AND MISSILE DEFENSE AND AIRSPACE CONTROL IN THE AOC

Airspace control and air and missile defense functions are integrated in the AOC's combat plans and combat operations divisions. In the combat plans division, C2 plans officers integrate air and missile defense considerations such as minimum-risk route; identification friend or foe and other selective identification procedures; and missile, fighter, and joint engagement zones. In the combat operations division, duties are split between the airspace manager and the senior air defense officer to execute airspace control and to oversee air and missile defense operations respectively.

INTEGRATION WITH LAND COMPONENT 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 friendly fire incidents, integration of joint operations is necessary. Liaison elements are vital towards this effort. Each surface component's AO may be defined with specific boundaries. These boundaries are normally defined by FSCMs such as a FSCL, maneuver control measures such as FLOT, ACMs, or multiples of these during nonlinear operations.

---

[14] Though this command arrangement is not universal, it the preferred Air Force construct for which Airmen are trained.

Deconfliction of airspace and joint fires normally occurs during mission planning once FSCMs and ACMs are disseminated through command and fire support channels. Combat dynamics make real-time coordination, deconfliction, and integration of airspace and joint fires C2 nodes essential. Fires profiles and parameters should be integrated with other airspace users. Within the AOC, the Army's BCD monitors and interprets the land battle for the air component commander's staff. The BCD also helps integrate Army air and missile defense capabilities supporting DCA operations. Airspace planners in the SOLE also keep the air component commander's staff abreast of their ongoing surface operations. See JP 3-09, *Joint Fire Support*, for further details.

When one or more land component commanders become supported commanders for their AOs, the ACS should be modified to meet this mission. The air component commander normally remains the supported commander for strategic attack, counterair, air interdiction, personnel recovery, and airborne ISR and may be a supporting commander for other operations, such as CAS (JP 3-0, *Joint 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 air component commander should consider the following when creating the operational transition portion of the ACP:

- The C2 plan for the initial employment of ground forces.
- Adequate theater communications to execute the plan.
- TACS elements required to support other component schemes of maneuver.
- Delegation of airspace control authorities to components (e.g., joint special operations area, amphibious objective area, high-density airspace control zone, or sectors) and integration of component airspace control elements.
- Location and required phased movements of the ASOC, CRC, Marine tactical air operations center, Marine direct air support center, and DATCALS.
- Authorities and procedures for real-time airspace control execution in the JFLCC's AO including integration of JFLCC fires and ISR planning.

INTEGRATION WITH JOINT FIRES SUPPORT

Planning airspace control for combat operations should fully integrate fires from all friendly and coalition forces (JP 3-52). Failure to integrate fires in initial planning significantly increases the potential for friendly fire incidents and may delay execution or decrease effectiveness of combat operations. Early integration of airspace and fires prevents costly decisions that result when two components plan to use the same airspace, at the same time, for different missions. Air component airspace managers and airspace control elements should coordinate with the JFLCC's senior fires element, air naval gunfire liaison company, SOF, and cruise missile planners to identify conflicting airspace requirements and quantify risk.

The air component commander, working with the JFC and other components, should clearly identify the risk of combining fires and aircraft operations (manned and unmanned). Such concerns are heightened during initial stages when airspace is typically congested by a 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. The ACP should establish procedures for procedural control and coordination of fires. These procedures should also include real-time deconfliction measures for missions in the ATO, ACO, and SPINS.

- Some component fires systems, such as Joint Air-to-Surface Standoff Missile (JASSM), Army Tactical Missile System, and other future systems, have small radar cross sections and are difficult to track with surveillance and ATC radar systems. As a result, these systems do not lend themselves to positive control and should be deconflicted with procedural control measures.

The air component commander normally serves as the supported commander for the JFC's overall air interdiction effort. Airspace control, to include deconfliction with fires, is critical to the success of interdiction. The air component commander should ensure common reference systems and TTPs to support and enable interdiction are established. The air component commander should advise the JFC and clearly define these reference systems and TTPs in the ACP, ACO, and SPINS. These plans should also include real-time airspace control procedures for time-sensitive interdiction events and fires.

INTEGRATION WITH INDIRECT FIRES

During large-scale combat 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 and should be integrated with other airspace users to meet air and ground component commander objectives and avoid friendly fire incidents. Airspace planners should minimize the number of coordination measures (especially FSCM) 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 aircraft. Numerous deconfliction measures are available to solve these issues and generally involve some sort of spatial or temporal separation of fires and aircraft, allowing both to operate simultaneously without undue risk.

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.

INTEGRATION OF UNMANNED AIRCRAFT (UA)

UA deconfliction is critical in all phases and requires detailed planning and coordination. UA compete for airspace with manned aircraft, particularly in the vicinity of high value targets. To minimize risk and maximize the effectiveness of UA, the ACP and SPINS should direct the deconfliction of joint, Service, and coalition UA platforms operating at all altitudes. Unlike their manned counterparts, the vast majority of UA 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.

INTEGRATION OF THEATER INTELLIGENCE, SURVEILLANCE, AND RECONNAISSANCE (ISR) PLATFORMS

Prior to, and during, a joint force's operation, the JFC and components conduct thorough joint intelligence preparation of the operational environment. Part of this intelligence preparation includes information gained through the use of ISR platforms. Airborne ISR platforms may require use of the same airspace and require prioritization. The JFC's ISR priorities should be widely disseminated to facilitate airspace planning and deconfliction of ISR mission execution. Prior to 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., identification, friend or foe) are required to operate within them. If the JFC elects not to restrict operations by these systems, the ACA should clearly outline the increased risk to the JFC for approval.

ISR asset congestion in airspace over high interest areas can be mitigated by integrating the airborne ISR collection plan into airspace planning and control documents. Employing multiple ISR assets to view the same objective area add complexity to airspace control operations and may delay fire support to forces on the ground. For more information, see AFDP 2-0, *Global Integrated Intelligence, Surveillance, and Reconnaissance Operations*; and JP 2-0, *Joint Intelligence*.

AIRSPACE CONTROL FOR SPECIAL MISSIONS

Missions such as air assaults, airborne assaults, and forcible entry into enemy territory require specific airspace control coordination. These events may require coordination measures such as a high-density airspace control zone, restricted operations zones, minimum risk routes, or low-level transit routes. Additionally, these missions may require specific C2 relationships, organizations, and authorities that should be planned for and included in the ACP, ACO, ATO, and SPINS.

POST COMBAT OPERATIONS

ENABLING CIVIL AUTHORITIES

Enabling operations are predominantly characterized by joint force support to legitimate civil governance in theater. The joint force performs key airspace control functions either

as the delegated ACA or as supporting airspace control service provider under the host nation's aviation authority. The air component commander can expect frequent coordination and interaction on airspace issues with host nation, multinational, interagency, and other airspace users. The air component commander is in a supporting role to the legitimate civil aviation authority in the region. 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.

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), such derivative 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 proximity of staffs or use of liaisons.

JFC AIRSPACE CONTROL ASSETS IN SUPPORT OF THE HOST NATION

It should be expected that all Service ACSs will be required. Based on the level of required support, airspace control personnel may be required to deploy Service-specific controllers, ACSs, liaisons, or trainers to support host nation authorities. Senior air component staff personnel should ensure 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.

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 state resources to other higher priority host nation programs. In such situations, NGOs or contracted services may provide a bridging alternative to perform airspace control functions instead of joint forces until the host nation is prepared to accept them.

INTERAGENCY CONSIDERATIONS

Interagency coordination and development of airspace transition milestones are necessary to reduce friction among the JFC, US Government, and international and host nation agencies involved in the airspace transition process. Identification of an agreement toward establishing transition milestone criteria, as well as establishing the airspace control infrastructure end-state by the various stakeholders, are key to a successful transition plan. Normally, a national, regional, or international civil governmental organization should handle planning and determine requirements for reconstituting the host nation ACS. However, the air component commander may have to assume this leadership role, especially in seriously degraded or failed state scenarios. The air component commander may be required to provide training for host nation personnel before enabling a successful transition to host nation airspace control. The air component commander's responsibilities as the acting host nation ACA should be detailed in appropriate delegation documents from the host nation and referenced in the host nation aeronautical information publication.

TRANSITION CRITERIA

To set conditions for ACA transfer to the host nation government, threats to air operations must be reduced and security established. During this phase, the airspace environment is dynamic and levels of stability may vary significantly. The air component commander should continually balance operational requirements against increased civil airspace access before transfer of ACA authority to a legitimate host nation entity. Reduced military control of airspace may result in decreased flexibility for operations with increased coordination and approval requirements from the host nation. Primary transition planning criteria include:

- Sufficient effectiveness and efficiency of host nation airspace control capabilities prior to transition.
- Transition to or installation of commercial airspace control systems.
- Consolidation and reduction of JFC manpower and systems footprint.
- Use of contracted airspace control capabilities.
- Joint force ACS 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.
- Developing a clear agreement and timelines for airspace control transfer.
- Ensuring continued joint force airspace mission needs are supported.

ACA TRANSITION

Transitioning ACA to the host nation should be considered carefully while military operations are ongoing. This transfer is typically characterized by a change from sustained combat operations to stability operations with increased requests for airspace and airfield access by host nation agencies or non-governmental organizations. As major operations end, and conflict transitions to a legitimate post-conflict government, military operations, including irregular warfare, may continue to reduce the threat (military or political) to a level the host nation can manage. Full transition is unlikely to occur immediately and will typically unfold through an iterative and deliberate process. During transition, the joint force may be required to perform local governance until legitimate local entities are operational. The air component commander could be required to perform roles traditionally associated with civil aviation authority and may include the development of aeronautical information (e.g., instrument procedures, publications, notices to Airmen), civil flight planning procedures, certification of procedures, aviation safety investigation, training of host nation or contract personnel, or operation of airspace control infrastructure systems.

Unless destroyed or deemed ineffective, the pre-conflict host nation airspace control structure (civilian or military) provides the baseline for end-state host nation ACS capabilities. Host nation ACS simplicity and basic effectiveness should be the transition plan's primary goal. In most cases, to prevent excessive requirements or delays, the air component commander should prioritize ACS requirements ahead of other aviation related issues such as airfield construction or certification issues. The host nation, or other supporting agencies, may desire to modify or upgrade the ACS, thereby increasing transition timelines. Ideally, host nation airspace control infrastructure end-state capabilities should meet minimum ICAO certification requirements and assure host nation airspace sovereignty. 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.

The ACP should address airspace access criteria for non-governmental organizations, military and civil airspace priorities, and identification and acceptance of associated civil airspace operating risks. When the transition to host nation governmental operations is anticipated, a thorough review of all written guidance should be conducted. Documents such as the joint air operations plan, ACP, AADP, SPINS, ROE, aeronautical information publications, letters of agreement, and international agreements may significantly change during this phase.

Interoperability between military and civil airspace users and control agencies is crucial for safe and effective integration of airspace control including air and missile defense, joint fires, and civil aviation. Use of military liaison teams embedded in host nation airspace control facilities may be required to ensure adequate coordination and representation of continuing joint force airspace requirements. Civil documents that govern the host nation ACS may become more authoritative for all airspace users, and by the end of conflict, should be the primary source of guidance and regulation. The joint force should ensure proper agreements exist between the host nation and adjacent nations to enable effective air and missile defense and safe, efficient flow of air traffic

across borders. Transition planning should also account for management and guidance for cybersecurity and spectrum management. During this period, spectrum congestion is likely as devices that exploit, interrupt, or use the frequency spectrum proliferate due to increased civil communications activities.

Priorities for airspace control should be redefined to address increasing civil authority. A catastrophic event involving civil aircraft could impact JFC strategic and operational objectives. To mitigate such risk, a clear determination of accepted levels of risk should be inextricably linked to a review of priorities. Assistance from the Department of State, FAA, ICAO, or a contracted agency should be considered to assist with establishment of host nation capabilities. The RAMCC can play the critical lead role during transition as the volume of non-military traffic increases (see Appendix C).

Chapter 5: HOMELAND OPERATIONS

HOMELAND OPERATIONS AND THE LAW

The US homeland represents a complex political-military environment different from any other CCDR's AOR. Within the US, the FAA is granted statutory authority over managing airspace by Title 49 of the U.S. Code (USC), *Transportation*. 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 (SecDef). The administrator establishes areas in the airspace as necessary in the interest of national defense by regulation or order and restricts or prohibits certain flights of civil aircraft in those areas. Title 5, USC., sections 551–559, *Administrative Procedure*, requires public notice before the FAA can carry out certain airspace management actions, including military actions. However, the DOD may direct and implement emergency security control of air traffic in certain specified circumstances in accordance with Title 32, Code of Federal Regulations, Part 245, *Plan for the Emergency Security Control of Air Traffic (ESCAT)*. Additionally, during wartime, the President may transfer FAA responsibilities to the DOD in accordance with Title 49 USC, Section 40107, Presidential Transfers, and Executive Order 11161, as amended.

USNORTHCOM, AFNORTH, AND NORAD

Complicating the FAA's control of US airspace, two separate military commands share the responsibility of defending the US. The operational missions of NORAD and USNORTHCOM and its assigned OA intersect within the homeland. The continental US NORAD region and First Air Force (Air Forces Northern) (1 AF [AFNORTH])[15] combine to function as part of the US TACS. AFNORTH works within a civilian interagency environment composed of government and civilian organizations (FAA, Federal Emergency Management Agency, US Secret Service, etc.) to execute air missions prior to and after crises or disasters. 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 and the National Guard.[16]

NATIONAL GUARD

The National Guard normally operates under the command authority of a state's governor and the Adjutant General in full-time National Guard duty status (Title 32 USC, National Guard). AFNORTH uses an approved legal model based on memoranda of understanding with governors to receive ANG volunteers for short notice federal missions. 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 USNORTHCOM and the air component commander (usually the AFNORTH

[15] As a component numbered air force, First Air Force presents forces to USNORTHCOM as AFNORTH.
[16] JP 1, *Doctrine for the Armed Forces of the United States, Ch IV; Title 10 USC,* Armed Forces, *Section 162(a),* Combatant Commands.

commander) situational awareness of the affected air, space, and cyberspace domains even before National Guard units are federalized under authority of Title 10, USC, Armed Forces.

DEFENSE SUPPORT OF CIVIL AUTHORITIES (DSCA)

The DOD has a long history of supporting civil authorities in the wake of catastrophic events. The Joint Strategic Campaign Plan (JSCP) directs the commander, USNORTHCOM, to prepare a plan to support the employment of DOD forces to provide DSCA in accordance with the National Response Framework, applicable federal law, DOD directives, and other policy guidance. The plan should include those hazards defined by the national planning scenarios not addressed by other JSCP tasked plans.

When directed by the President or the SecDef, USNORTHCOM and Service components respond to the requests of civil authorities to save lives, prevent human suffering, and mitigate great property damage. Federal military commanders should anticipate the National Guard will be the first military organization engaged at the state level at an incident area. The AFNORTH commander, as the supporting air commander, will provide AOC capabilities to state headquarters and interagency partners, and negotiate command arrangements to ensure unity of effort before Title 10 forces are introduced into a JOA. For additional information, see AFDP 3-27, *Homeland Operations*.

When designated, 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 should normally be designed to coexist with civilian operations. Airspace deconfliction and coordination are accomplished through the AOC and approved by the FAA. For additional information, see JP 3-27, *Homeland Defense*; JP 3-28, *Defense Support of Civil Authorities*; and AFDP 3-27.

EMERGENCY SECURITY CONTROL OF AIR TRAFFIC (ESCAT)

ESCAT is an emergency preparedness plan of the US which prescribes the joint action to be taken by appropriate elements of the DOD, FAA, and the Federal Communications Commission in the interest of national security to effectively control air traffic and air navigation aids under emergency conditions. Implementation of ESCAT is intended to meet threat situations. For specific information on the ESCAT see Title 32 Code of Federal Regulations part 245, referenced previously.

INCIDENT AWARENESS AND ASSESSMENT (IAA)

IAA is the SecDef-approved use of DOD ISR and other intelligence capabilities for domestic non-intelligence support for DSCA. IAA operations focus on providing timely and usable information to all levels of command and to local, state, civil, and federal leaders. The three mission sets of IAA are broad area coverage, damage assessment, and situational awareness. AFNORTH tasks in support of IAA include:

- Assisting USNORTHCOM in identifying, sourcing, sustaining, and employing airborne IAA assets. Additionally, if the DSCA mission requires, AFNORTH assists USNORTHCOM in assessing the need for dynamic terminal or tactical control of airborne assets.
- 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.

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 and civil support operations. Specific information for homeland airspace coordination considerations is included in JP 3-27, *Homeland Defense*; JP 3-28, *Defense Support of Civil Authorities*; and AFDP 3-27, *Homeland Operations*.

ELECTROMAGNETIC SPECTRUM (EMS)

Military use of radio frequencies within the US and its territories are managed and controlled by the Department of Commerce, National Telecommunications and Information Administration (NTIA) in accordance with Title 47 USC, Telecommunications. As such, the NTIA's Interdepartmental Radio Advisory Committee through the military Services, regulates use in accordance with the NTIA's *Manual of Regulations and Procedures for Federal Radio Frequency Management*. This presents additional, and sometimes more complex, EMS access and coordination requirements.

APPENDIX A: SAMPLE AIRSPACE CONTROL PLAN

The following is a sample example of an ACP. Details may vary according to the operation.

Headquarters, JFACC

Joint air operations center (JAOC) Name and Office Symbol

Headquarters, Base, or Location

DD MMM YYYY

APPENDIX X TO ANNEX C TO [Operation Name] joint air operations plan (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 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 1, *Doctrine for the Armed Forces of the United States*

JP 3-52, *Joint Airspace Control*

Air Force Doctrine Publication 3-52, *Airspace Control*

Air Force Tactics, Techniques, and Procedures 3-3.AOC, *Combat Fundamentals - AOC*

[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

A.1. Scope

A.2. Definition of Airspace Control

A.3. Primary Airspace Control Responsibilities

BRAVO: Special Procedures

CHARLIE: Points of Contact

DELTA: Functional Responsibilities

ECHO: Coordination Measures Request/ACO Promulgation Procedures

FOXTROT: ATC Services and Equipment Defined

GOLF: Abbreviations and Definitions

HOTEL: Coordination Measures

SECTION ALPHA: BASIC PLAN

A.1. 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.

A.2. DEFINITION OF AIRSPACE CONTROL:

A.2.1. OBJECTIVE: To enhance air, land, maritime, space, and SOF 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 airspace control risk guidance. Airspace control includes coordinating, integrating, and regulating airspace to increase operational effectiveness; however, the ACA does not have the authority to approve, disapprove, or deny combat operations. Such authority is vested in operational commanders.

A.2.2. TYPES OF AIRSPACE CONTROL: control of airspace will be accomplished by two primary means: procedural control and positive control.

A.2.2.1. 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 ATC guidance (e.g., restricted operations zone, track, and orbit).

A.2.2.2. Positive control is that method of airspace control that relies on positive identification, tracking, and guidance of airspace user with the airspace. Guidance of an airspace user by an authorized airspace control element (e.g., ATC, CRC, AWACS).

A.3. PRIMARY AIRSPACE CONTROL RESPONSIBILITIES:

A.3.1. 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.

A.3.2. 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 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 SPINS.

A.3.3. Airspace users: Any user of airspace, to include operators of aircraft, UAS, 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] OA. Airspace users will adhere to host nation ATC procedures while operating outside of the [Operation Name] OA.

A.3.4. Battlefield coordination detachment (BCD): The BCD is the primary interface between the US Army component commander and the JFACC. The BCD coordinates Army forces (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 airspace control measures, FSCM, and other coordination measures to both facilitate fires and protect other airspace users. The Army identifies airspace requirements and submits coordination measures requests to the BCD. The BCD coordinates the coordination measures 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 near-real-time airspace integration is conducted by Army airspace C2 elements with the ACA's ACS per the ACP.

A.4. JFC AIRSPACE CONTROL RISK GUIDANCE

A.4.1. Provide a summary of JFC airspace control risk guidance for all airspace users. The figure below is an example.

Risk To	Risk From	Acceptable Risk	When to Accept Risk
Civil Aviation	Any Military System	None	On approval from JFC
Manned Aircraft	Indirect Fires	A trajectory no closer than 1,000 feet of rotary-wing and one nautical mile of fixed-wing aircraft. (This may be rounded up to two kilometers when using military grid reference system maps.)	1. Immediate fires in support of troops in contact. And 2. Ground commander approval.
Manned Aircraft	Unmanned Aircraft	One nautical mile lateral and 1,000 feet vertical separation. (This may be rounded up to two kilometers when using military grid reference system maps.)	1. Immediate air support to troops in contact. And 2. Manned aircraft pilot accepts responsibility for separation. And 3. Ground commander approval.
Unmanned aircraft	Indirect Fires	Trajectory no closer than 1/2 nautical mile to unmanned aircraft. (this may be rounded to one kilometer when using military grid reference system maps.)	1. Owning surface commander, or above, for component assets. Or 2. Division or Marine air-ground task force commander, or above, for joint assets.

JFC Airspace Control Risk Guidance

SECTION BRAVO: SPECIAL PROCEDURES

B.1. AIR TRAFFIC CONTROL PROCEDURES

B.2. COORDINATING ALTITUDE

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. GLOBAL AREA REFERENCE SYSTEM

B.13. AIRWAYS, CORRIDORS AND ROUTES:

B.13.1. AIRWAYS

B.13.2. CORRIDORS/ROUTES

B.13.3. SAFE PASSAGE

B.13.4. 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).

B.14. AIR REFUELING OPERATIONS

B.15. ORBIT PROCEDURES.

B.16. TACTICAL MISSILE SYSTEMS.

B.17. UNMANNED AIRCRAFT PROCEDURES:

SECTION CHARLIE: POINTS OF CONTACT.

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

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: FUNCTIONAL RESPONSIBILITIES.

D.1. JOINT FORCE AIR COMPONENT COMMANDER. Airspace-specific duties and responsibilities of the JFACC; airspace-related command arrangements with other components and HN military/ATC.

D.2. AIRSPACE CONTROL AUTHORITY (ACA). 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 AND HN MILITARY/ATC.

D.5. TACTICAL AIRSPACE CONTROL ELEMENTS. Location and required details for each tactical airspace control element in the ACS.

SECTION ECHO: COORDINATION MEASURES REQUEST/ACO PROMULGATION PROCEDURES.

E.1. INTRODUCTION

E.1.1. THE JOINT OPERATIONS AREA (COORDINATES/GRAPHICS)

E.1.2. AIRSPACE CONTROL AREA(S) (COORDINATES/GRAPHICS)

E.1.3. DECONFLICTION CONCEPT

E.1.4. AIR DEFENSE IDENTIFICATION ZONE(S) (COORDINATES/GRAPHICS)

E.1.5. AIR DEFENSE REGION(S) (COORDINATES/GRAPHICS)

E.1.6. RESTRICTED AIRSPACE (COORDINATES/GRAPHICS).

E.2. COORDINATION MEASURES SUBMISSION RESPONSIBILITIES AND PROCEDURES

E.3. ACO PROMULGATION/DISSEMINATION PROCEDURES

SECTION FOXTROT: ATC SERVICES AND EQUIPMENT.

F.1. RADAR SERVICES

F.2. NAVIGATIONAL AIDS

F.3. COMMUNICATION REQUIREMENTS

F.4. ATC SERVICES

F.5. AIRPORT INFORMATION

SECTION GOLF: ABBREVIATIONS AND DEFINITIONS. Lists acronyms and defines key terms used in the ACP.

SECTION HOTEL: COORDINATION MEASURES.

H.1 INTRODUCTION

APPENDIX B: NOTIONAL RISK ASSESSMENT MATRIX

Operational Acceptable Risk Levels	
LOW	Potential for aircraft damage or loss must be negligible. Aircraft survival is the dominant concern
MODERATE	Potential for aircraft damage or loss is acceptable, but aircraft survival should be prioritized over mission accomplishment.
SIGNIFICANT	Potential for aircraft damage or loss is acceptable. Mission accomplishment should be prioritized over aircraft survival.
HIGH	Any aircraft loss is acceptable. Mission accomplishment outweighs any other concern.

Example Operational Risk Level	
Mission	**Acceptable Risk**
Civil Aviation	NONE
High-value Airborne Assets	LOW
OCA/DCA	SIGNIFICANT
XCAS, CAS, AI	MODERATE
Tanker, Airlift	MODERATE
RPA, Unmanned Aircraft	MODERATE
Personnel Recovery	LOW

Notional Baseline Airspace Acceptable Risk			
Risk To	**Risk From**	**Acceptable Risk**	**When to Accept**
Civil Aviation	Any Military System	None	On approval from JFC
Manned Aircraft	Indirect Fires	RW – A trajectory no closer than 1000 ft. FW – A trajectory no closer than 1 nm.	1. Immediate fires in support of troops in contact. AND 2. Ground commander approval.
Manned Aircraft	Unmanned Aircraft	1 nm. Lateral and 1000 ft. vertical separation. (May be rounded to 2 km. when using MGRS)	Immediate air support to troops in contact.
Unmanned Aircraft	Indirect Fires	Trajectory no closer than .5 nm.	Immediate air support to troops in contact.

Notional Risk Assessment Matrix

Note: Values and approval authorities are notional and are provided for illustration purposes

APPENDIX C: REGIONAL AIR MOVEMENT CONTROL CENTER

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 ATO, ACO, 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 users frequently transit airfields in the airspace control area.

After initial military strikes, combat, combat sustainment, and non-AOC directed airlift missions may increase dramatically. Civil entities conducting humanitarian or commercial air operations may further congest airspace and airfields. This can lead to increased hazardous air traffic reports and increased airfield problems that undermine the operation unless integrated air traffic management measures are implemented.

The RAMCC is typically established to help prevent congestion and airspace conflicts when significant military forces operate in an area with an inadequate ATC infrastructure. Under these circumstances, the ACA deconflicts aircraft directed by the joint or combined AOC with other aircraft participating in the contingency or during disaster relief operations (e.g., United Nations, Red Cross, NGOs, and commercial operators). This becomes even more critical when joint force air operations are conducted in an ICAO flight information region within a sovereign nation. Additionally, the RAMCC may prove useful in the transition of airspace back to civil authorities and may remain for several years after a conflict.

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 AOC divisions, but its members are not spread across them.

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 to deconflict aircraft in the airspace control area or 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, ATC 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. Slot times also aid in managing ramp capacity at theater airfields by ensuring the maximum capacity for parking aircraft at an airfield or that the maximum on ground capability for aircraft is not exceeded.

RAMCC is the centralized information source providing the AADC with the identity of civil and other military aircraft operating in the control area. It issues Mode 3 identification friend or foe (IFF) codes to civilian aircraft desiring to transit the airspace control area and includes them in the daily ATO or SPINS if necessary. The coalition coordination cell provides Mode 3 IFF codes for non-AOC military aircraft. 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 ATC separation is instituted.

ORGANIZATION

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 ACA-controlled airspace. The RAMCC director is normally a senior officer (O-6) because of the scope of responsibility and seasoned leadership expertise required.

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, C2 specialists, communication and 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.

A RAMCC was used in Operations ALLIED FORCE, ENDURING FREEDOM, IRAQI FREEDOM, and Operation UNIFIED RESPONSE.