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AIRSPACE CONTROL

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FOREWORD

Today's airspace environment is increasingly complex. Technological advances in air defense systems, cruise missiles, unmanned aircraft systems (UAS), loitering munitions, and long-range fires shape that complexity. The air domain's vertical component, and the speed and freedom with which forces maneuver within it, create unique challenges for commanders seeking to exercise control in the air domain. In addition, wide-ranging variables such as aircraft capabilities, airspace characteristics, airspace use, and various control procedures create additional layers of complexity. As such, the objective of airspace control is to enable military operations with the most effective, efficient, and safe use of airspace to achieve joint force commanders (JFC) objectives and priorities.

Airspace control is extremely dynamic and situational. It needs to be flexible and responsive to accommodate users with varied technical capabilities and to mitigate technical failure or adversary action to optimize airspace use. Therefore, Airmen should bring air domain expertise coupled with a joint perspective to ensure airspace control systems and procedures promote the safe, efficient, and flexible use of airspace while increasing operational effectiveness and facilitating emerging joint force capabilities (e.g., small UAS, loitering munitions). Proven airspace control procedures have enduring utility, but new technologies and platforms will force continued adaptations to match the changing operational environment. Airmen must think innovatively to anticipate and solve future challenges. Further, it is essential that Airmen are trained to perform deliberate planning of all-domain effects in a distributed manner and execute the mission when isolated from decision-makers in distributed environments. Airmen must be comfortable making decisions and operating based on the commander's intent and the principles of mission command.

As we build a more capable future force, doctrine must evolve to accommodate new technologies. Existing command and control (C2) architecture, coupled with validated best practices, provides the foundation for innovative solutions to evolving air domain challenges. Throughout history, innovative Airmen adapted technologies and developed methods of employment to meet our nation's challenges. We must continue to do so.

CHAPTER 1: INTRODUCTION TO AIRSPACE CONTROL

Airspace control is defined as "the exercise of delegated authority over designated airspace and users through control procedures and coordination measures (CM) to maximize operational effectiveness."[1] Airspace control in joint operations is a term used to describe the activities performed and authorities executed by the Airspace Control Authority (ACA). The ACA is the commander delegated overall responsibility for airspace control. The ACA develops airspace control plans (ACP) and performs airspace control through an airspace control system (ACS). The ACS is an arrangement by the ACA of the component and host-nation airspace control elements (i.e., airspace control organizations, personnel, policies, procedures, and facilities).[2] To enable air tasking order (ATO) execution, airspace control elements perform roles including air battle management (e.g., C2 joint air operations), air defense (combat identification, early warning, weapons control status, target tracking, defensive counter-air [DCA]), or surveillance and reconnaissance.

In accordance with (IAW) JFC guidance, airspace control elements manage airspace requests, direct maneuvering aircraft, and integrate fires. Effective airspace control requires planning and constant evaluation. Planning begins before combat operations and often transitions through varying degrees of civil and military control across the competition continuum. The JFC approves airspace control procedures within a joint operations area (JOA). Airspace control aims to maximize combat operations effectiveness without unduly restricting any Service or functional component's capability.

Wide-ranging variables such as aircraft capabilities, airspace characteristics, airspace use, and various control procedures add layers of complexity and difficulty to airspace control operation. Such challenges are heightened during multinational air operations. Additional concerns arise from host nation (HN) relationships, system interoperability, and disparate planning processes across component and partner forces. Likewise, other governmental agencies, civilian users, nongovernmental organizations (NGOs), and relief agencies may require combat zone airspace. Altogether, these user demands require an integrated ACS to enable safe, efficient use of airspace and to mitigate the risk of friendly-fire incidents and unintended engagements against civil and neutral forces.

BASIC PRINCIPLES

Airspace is used by all components of the joint and multinational forces in the JOA. **The primary goal of airspace control is to enhance the effectiveness of joint and multinational operations.** A high concentration of friendly surface, sub-surface, and air-launched weapon systems must share airspace to apply combat power IAW the JFC's intent without exceeding acceptable operational risk. The chart below is derived from Joint Publication (JP) 3-52, *Joint Airspace Control*, and details basic airspace control principles applicable throughout all joint air operations and across the competition continuum.

[1] See JP 3-52, *Joint Airspace Control,* for additional information.
[2] See JP 3-52, *Joint Airspace Control,* for additional information.

Basic Principles of Airspace Control
(Derived from JP 3-52, *Joint Airspace Control)*

- Unity of effort requires the ACS and associated procedures to be fully coordinated, integrated, and centrally planned by the ACA.
- Reduce the risk of unintended engagements against friendly, civil, and neutral aircraft, and optimize the effectiveness of air defense.
- Centralized airspace planning facilitates meeting joint force commander priorities.
- Decentralized execution gives subordinate commanders the flexibility to execute their missions effectively.
- Maintain close liaison and coordination with all airspace users.
- Require common airspace control procedures, which include procedural and/or positive control measures.
- Require reliable, jam-resistant, beyond line-of-sight, and secure communications networks.
- Require integrated, interoperable, survivable, and redundant airspace control systems.
- Respond to developing threat conditions and to the unfolding operation.
- Airspace control relies upon airspace management capabilities provided by airspace control elements and US civil and host nation air traffic control.
- Emphasize flexibility and simplicity.
- Support 24-hour operations in all weather and environmental conditions.
- Require operational training for effective and safe airspace control operations.

AIRMAN'S PERSPECTIVE

The Airman's Perspective on airpower, as stated by Air Force Doctrine Publication (AFDP) 1-1, is that **control of the air is a necessary precondition for control of the surface.** Airmen require theater-wide visibility of the air domain. They must maintain the requisite expertise and capabilities to control and operate across theaters, transitioning seamlessly from operational levels to the lowest tactical level, anywhere around the globe.

Given airpower's range and speed, Airmen operate and control aircraft across international boundaries, in controlled and uncontrolled airspace, and from en route airspace structures and tactically controlled operational areas during a single mission. Such capabilities may be provided from within or outside a combatant commander's (CCDR) area of responsibility

(AOR) or the JFC's JOA. Airspace control activities often cross theater and regional boundaries. As such, ACPs require integration across adjacent regions to support simultaneous operations. Effective integration is most important in large-scale combat operations, where manned and unmanned aircraft, missiles, artillery, space, and civilian airspace users operate in the same airspace. Effective joint force capabilities integration is crucial to generating effects and achieving objectives. This is a key reason the functions of joint force air component commander (JFACC), area air defense commander (AADC), and ACA are normally vested in a single commander.

CONTROL OF THE AIR

Control of the air is distinct from airspace control but closely related to it. Some level of airspace control is necessary for air operations regardless of the degree of control the joint force exercises over the air domain. The degree of control the joint force exercises in the air domain relative to that of an adversary at a given time and place can be described as air parity, superiority, or supremacy. Air parity describes a condition in a contested environment in which no force has control of the air. Air superiority describes a degree of control where one force can conduct its operations at a given time and place without prohibitive interference from air and missile threats. Air supremacy describes a degree of control where an opposing force is incapable of effective interference within the operational area (OA) using air and missile threats.[3]

While air supremacy is most desirable, it may not be operationally feasible. In such cases, air superiority, even local or temporary, may provide sufficient freedom of action to create desired effects. Airspace control procedures for localized air superiority operations should reflect the JFC's acceptable level of risk balanced against operational objectives. This ensures the appropriate level of airspace control resources are employed to enable operations.

The JFACC, in pursuit of achieving counterair objectives, integrates airspace control procedures and planning (an ACA function) with offensive counter-air (OCA), DCA (an AADC function), and other components operations. ACPs may exercise a greater degree of restriction on friendly and civil airspace users, particularly if certain platforms lack communications equipment and technology to facilitate identification. ACPs accommodate a greater variety of airspace users as joint force control over the air domain increases.

MISSION COMMAND

Vertically and horizontally integrated C2 enables airspace control inside the mission command framework of Centralized Command–Distributed Control–Decentralized Execution (CC-DC-DE).[4] This architecture fuses component liaisons, airspace control elements, and airspace users to enhance domain awareness and meet commander's intent. Increased airspace awareness fosters trust in the ACS and the ACA while mitigating airspace conflicts and enabling joint force operations. Airspace control elements and users operate according to commander's intent, enabling unity of effort in contested, degraded, and operationally limited (CDO-L) environments where communication with higher headquarters may be intermittent or impossible.

[3] See AFDP 3-01, *Counterair Operations*, for additional information.
[4] See AFDP 1-1, *Mission Command*, and AFDP 3-0.1, *Command and Control* for additional information.

The ACA (the centralized commander for airspace control) is delegated airspace control authority from the CCDR/JFC. The ACA should integrate JFC requirements, capabilities, and C2 structures to enable a coherent, resilient, and interoperable ACS. The ACS construct should accommodate distributed control and decentralized execution in the JOA. The ACA may further distribute airspace control authorities to commanders with the capability and capacity to plan, prepare, execute, and assess (i.e., conduct the C2 process) airspace control operations for a defined volume of airspace within the broader theater or JOA. ACA execution authorities are delegated to various airspace control elements (e.g., control and reporting center [CRC], air support operations center [ASOC], Navy tactical air control center [TACC], Airborne C2) to perform decentralized execution of airspace control and battle management functions IAW plans, directives, and orders. The chart below describes a notional ACS aligned with the mission command framework.

Notional Mission Command Framework for Airspace Control

Mission Command Aspect	Agent	Function	Description
Centralized Command (CC)	ACA (Airspace Control Authority)	Overall C2 of theater or JOA Airspace Control	Develops airspace control policies and procedures for all military-directed airspace users, airspace managers, and airspace control elements within the theater or JOA via ACP and establishes the ACS to meet JFC objectives
Distributed Control (DC)	Subordinate commanders (including other component commanders) delegated authority for C2 of an assigned volume of airspace within the theater or JOA	Manages and directs assigned airspace in coordination with ACA. Develops ACP for assigned airspace that is coordinated and synchronized with theater or JOA ACP. Provides capabilities (C2 elements or entities) to support the ACS.	Designs, plans, prepares, executes and assesses airspace control operations within assigned airspace
Decentralized Execution (DE)	Subordinate airspace control elements (e.g., control and reporting center [CRC], Airborne C2, air traffic control [ATC], air support operations center [ASOC], other component C2 nodes)	Executes battle management and control of airspace and airspace users IAW plans, orders and directives.	Exercises specified authority (delegated from the ACA) to coordinate, integrate, and regulate airspace users for an assigned volume of airspace via formal and informal ACMs, positive and procedural control, terminal and in-route ATC, etc.

JOINT ALL-DOMAIN OPERATIONS

Airspace control is inherently joint and affects every warfighting domain. All joint force components have airspace mission requirements that should be integrated, coordinated, prioritized, and deconflicted within the ACS. The ACS should be arranged and employed to:

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

Additionally, the ACS supports all-domain synergistic effects by leveraging 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 air domain's upper limit corresponds to the space domain's lower limit. The space domain is an area above the altitude where atmospheric effects on airborne objects become negligible.[5] **The ACA should coordinate any operations or planning above the air domain with US Space Command via the Joint Force Space Component Commander or Joint Integrated Space Team (if established).**

Cyberspace capabilities are crucial for coordination and airspace control functions within the ACS. Networked systems enable various airspace control elements to receive constant updates on accurate and timely ACS information. In addition to cyberspace, spectrum management is essential for effective ACS. The EMS undergirds many aspects of the ACS for all manner of transmissions between aircraft and control elements across a wide range of purposes.

[5] See JP 3-14, *Joint Space Operations*, for additional information.

CHAPTER 2: AIRSPACE CONTROL FUNDAMENTALS

Airspace control is essential to accomplishing the JFC's objectives. Effective airspace control allows all users to access airspace and aims to accommodate and deconflict competing users. As an operational environment (OE), the air domain encompasses a variety of conditions, circumstances, and influences that affect employment and the decisions of commanders. The air domain OE may be categorized as either hostile, uncertain, or permissive based on the following characteristics:[6]

- **Hostile:** A condition where freedom of movement is contested. Risk to air operations and air assets should be considered high in hostile air environments.
- **Uncertain:** A condition in which the joint force's freedom of movement **may** be contested. Risk to air operations and air assets may be considered moderate or significant in uncertain air environments.
- **Permissive:** Uncontested conditions in which joint forces have freedom of movement. Risk to air operations and air assets should be considered low in permissive air environments.

AIRSPACE CONTROL METHODS

An ACS should adapt to changing requirements and priorities as operations progress while accounting for dynamic OE conditions and changes in Joint Forces' degree of control over the air domain. The ACS should incorporate joint force and HN airspace control capabilities while remaining functional in situations where adversaries deny, degrade, or disrupt the ACS. The capabilities of the airspace control element executing control over a given volume of airspace and the categorization of airspace (hostile, uncertain, or permissive) normally determine the ACS's characteristics and methods of control within airspace. The control system's structure should encourage close coordination among joint force components, allowing a rapid concentration of combat power. Airspace control methods may vary across the JOA from positive control to procedural control, or any combination of the two.

Positive control relies on identification, tracking, and communicating with aircraft within the airspace, conducted with electronic means by an airspace control element. Positive control requires locating and identifying airspace users in real time while maintaining continuous communications to pass control instructions. It is normally conducted via electronic means by an airspace control element having the authority and responsibility for airspace management within an assigned airspace volume. Typically, airspace control elements should be equipped with radar, identification friend or foe interrogators and receivers, beacons, track processing computers, digital data links, and communications equipment to perform positive control. 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.

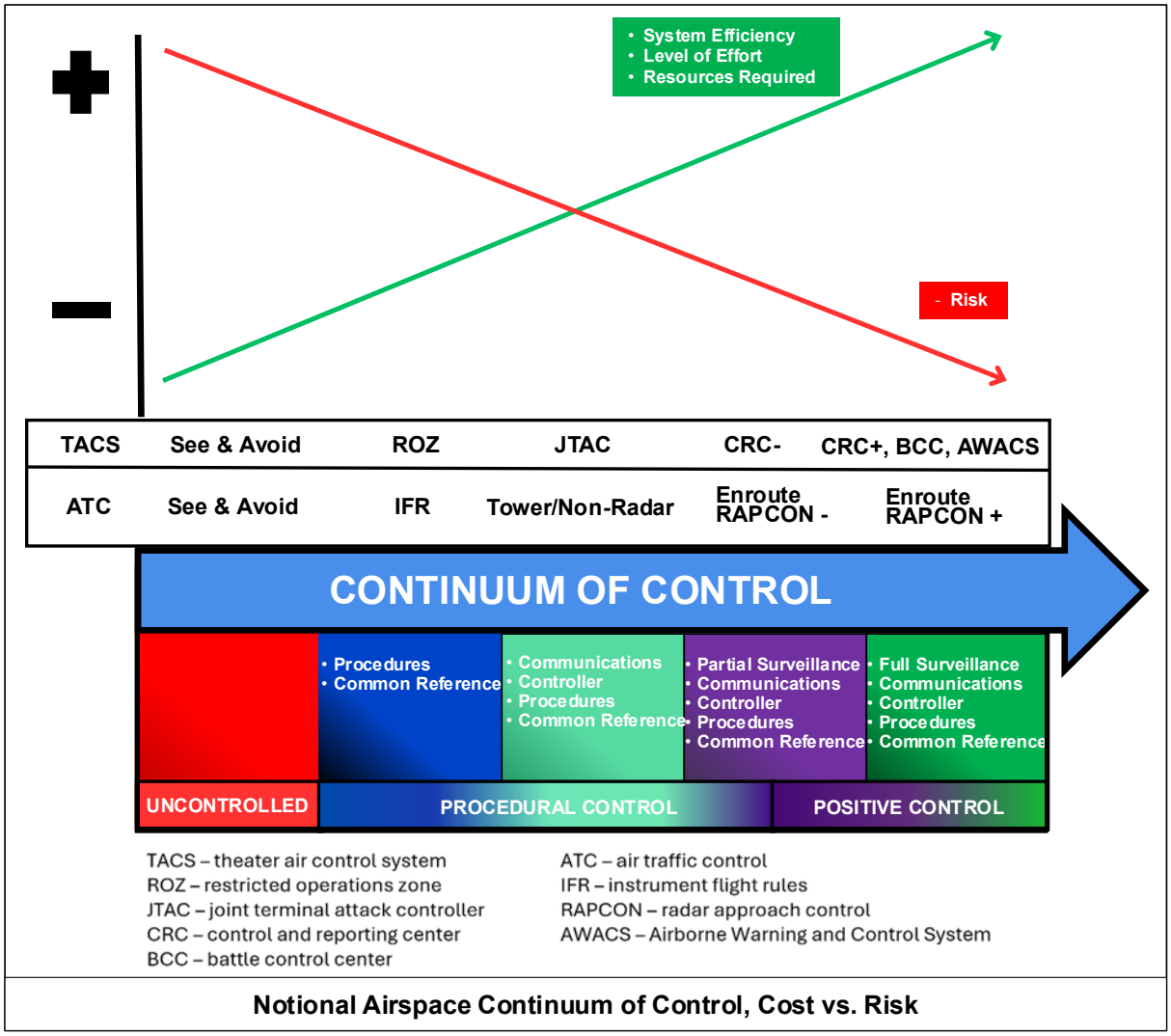
Procedural control relies on a combination of previously agreed-to and promulgated orders and procedures. It relies on common published procedures, designated airspace, and instructions by an authorized airspace control element to deconflict and activate CMs such

[6] See JP 3-0, *Joint Campaigns and Operations,* for additional information.

as airspace coordinating measures (ACM), fire support coordination measures (FSCM), air traffic control (ATC) measures, and air defense measures (ADM). Controlling agencies activate airspace with a defined time and volume through standard CMs or weapons control statuses. These procedures deconflict both aircraft and airspace use. When appropriate communication exists, an authorized airspace control element can provide procedural control instructions in real time. Though not as efficient as positive control, procedural control is considered effective for low-density airspace. Procedural control measures should be simple, readily accessible to all forces, and disseminated through the ACP, airspace control order (ACO), and special instructions (SPINS). The use of these single-source documents is essential for operations integrating airspace users such as rotary-wing, fixed-wing, fires, and UA.

COST VERSUS RISK

When considering procedural and positive control, level of effort, resources, and risk (i.e., risk to personnel and air assets, risk to force, and/or risk to mission) need to be addressed (see "Notional Airspace Control Continuum, Cost vs. Risk" figure). 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 varying levels and types of risk the JFC is willing to accept. Assuming a constant air traffic volume, uncontrolled airspace exerts a small drain on resources however, carries increased risk to personnel and air assets. On the other hand, this arrangement may decrease risk to mission by capitalizing on airpower's inherent flexibility. For that same airspace, standing airspace procedures incrementally increase control and resources required, reduce risk to personnel and air assets, but may increase risk to mission. Full military or civilian positive control provides the least risk to personnel and air assets, but significant airspace control resource requirements may increase risk to force (i.e., the ability to generate and sustain operations), and risk to mission. Commanders may desire that the entire airspace control area be under positive control, however, limited resources or other factors, such as terrain, may make this goal unrealistic. Airspace planners should establish positive control in areas where the JFC's risk tolerance regarding personnel and air assets is lowest and the need for efficiency is highest (e.g., enabling a large diversity of airspace users and uses). In areas where positive control is not feasible, procedural control is often the minimum standard for airspace control. Procedural control measures can also form a crucial backup in the event positive control capability is diminished.



Notional Airspace Continuum of Control, Cost vs. Risk

AIRSPACE CONTROL MECHANISMS

To execute airspace control effectively, the ACA translates Air Operations Directive (AOD) guidance into airspace use and deconfliction procedures through the ACP and ACO. The ACA also provides airspace use inputs to the ATO and SPINS.

Air Operations Directive (AOD). The AOD provides the JFACC's guidance for the planning and execution of each ATO period. It conveys JFC intent concerning acceptable levels of risk and priority of use for airspace, usually with mission-type orders.

Airspace Control Plan (ACP). The JFC-approved ACP provides specific planning guidance and procedures for the ACS in the JOA. The ACP implements AOD operational guidance and may be distributed as a separate document or as an annex to the joint air operations plan (JAOP). Refer to chapter 4 and appendix A for topics to consider when developing an ACP.

Airspace Control Order (ACO). The ACO implements the ACP and translates general guidance provided in the ACP into specific control procedures for defined periods. **The ACO provides details of approved CMs while defining and establishing airspace for military operations as coordinated by the ACA.** The ACO is normally disseminated as a separate document, published and effective for one twenty-four-hour period coinciding with the ATO

day. Like 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.

Air Tasking Order (ATO). The ATO assigns aircraft to perform missions under the control of the JFACC during a specified period IAW the AOD and the master air attack plan (MAAP). The ATO may also include theater air missions not under the control of the JFACC for visibility, coordination, deconfliction, and air defense amongst all airspace users. Airspace control planners develop instructions in sufficient detail to enable components to plan and execute all air missions listed in the ATO.

Special Instructions (SPINS). Along with the ACO, SPINS provide airspace users with directions to balance combat effectiveness with safe, orderly, and efficient use of airspace. SPINS provide operational and tactical direction at the appropriate levels of detail and are updated as frequently as required.

Aeronautical Information Publication (AIP). The AIP is a publication issued by, or with the authority of, a state (country) and contains aeronautical information that is essential to air navigation. It is intended to be a manual containing details of regulations, procedures, and other information pertinent to aircraft operations. AIPs relevant to the JOA should be referenced when developing the ACP.

Artificial Intelligence (AI) and Airspace Control

AI and human-machine teaming (HMT) have the potential to increase the speed, efficiency and effectiveness of airspace control elements. Airspace control applications may include:

- Predicting airspace conflicts and provide automated collision avoidance instructions to airspace users.
- Analyzing flight data to predict traffic patterns and reduce congestion.
- Processing joint force, coalition, and civil requests for airspace and develop airspace structure COAs for ACA and JFC approval.
- Anticipating weather patterns to help controllers route airspace users more effectively.
- Increased resilience of ACS C2 networks by managing multiple communication pathways to maintain connectivity in contested, denied, or operationally limited environments.
- Integrating campaign priorities for airspace allocation aligned with guidance documents such as the AOD and JAOP.
- Increasing the density of air assets that can be effectively controlled by a given control element.

The ACP, JAOP, and area air defense plan (AADP) are approved by the JFC and should complement each other. The ACP, JAOP, and AADP should support an orderly transition from peacetime operations to combat operations and back to peacetime.

AIRSPACE DECONFLICTION

The air operations center (AOC) plans airspace deconfliction at the operational level. The AOC's combat plans division usually resolves airspace conflicts during ATO or ACO production and dissemination, while the combat operations division handles ATO execution. Tactical level deconfliction is executed by ACS elements and is achieved by directing time, position, altitude, and airspace CMs. Tactical ACS elements performing this function include CRC, airborne C2, ASOC, joint air-ground integration center (JAGIC), Marine direct air support center (DASC), Navy TACC, tactical air control parties (TACP), ATC, and other component C2 nodes. These ACS elements represent "decentralized execution" of airspace control operations.

Tactical ACS elements will likely require enhanced air domain awareness to support planning and integration of emerging joint force capabilities (e.g., UAS, loitering munitions). Effective control and deconfliction of these systems at scale and concurrent with traditional air operations will challenge existing TTPs and have the potential to overwhelm current ACS capabilities. Detailed planning and the correct balance of airspace control resources and weight of effort is crucial to the integration of these capabilities in support of JFC objectives.

COORDINATION MEASURES

CMs are employed to facilitate planning and efficient execution of military operations and fires while simultaneously providing safeguards for friendly forces. The JFC uses CMs to integrate and deconflict users and uses of airspace to allow aircraft and fires to operate within, or transit through the air domain. Centralized airspace planning and coordination are essential to facilitate joint force operations.

The ACA, in conjunction with component and multinational partners, develops airspace control procedures and associated CMs for JFC approval and publication in the ACP and ACO. Once approved, CMs are promulgated to joint and multinational forces via the ACO and SPINS. Their implementation should include consideration of risks associated with fires and air operations. CMs in the ACO provide a physical description of the operational area. Commanders use CMs to assign responsibilities, synchronize forces, impose restrictions, or establish guidelines to regulate airspace use among various users. 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.
- **Air defense measures (ADM).** Restrictive measures employed to facilitate identification, detection, and tracking to engage enemy air and missile threats as directed by the AADC.
- **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 traffic control measures (ATCM).** A measure established by civil (including HN) or military ATC for expeditious and safe movements of aircraft. ATCMs are directive and restrictive and are established in conjunction with civil and military ACA and International Civil Aviation Organization (ICAO), as appropriate.

- **Fire support coordination measures (FSCM).** Measures employed by commanders to facilitate rapid engagement of targets and simultaneously provide safeguards for friendly forces.
- **Maneuver control measures (MCM).** Measures established by the supported/supporting commander on the surface to define lines of responsibility in support of movement and maneuver of friendly forces.
- **Maritime defense measures (MDM).** A measure planned, coordinated, and employed by the maritime commander to facilitate maritime offensive and defensive actions. MDMs may be restrictive or permissive.

All joint and multinational airspace users, including indirect fires platforms, should be aware and understand details regarding theater-wide CMs including:

- Activation procedures for FSCM include fire support coordination line (FSCL), coordinated fire line (CFL), and kill box.
- Establishment of a coordinating altitude and coordination level (if used).
- Promulgation of CMs required for special missions (e.g., air assaults or airborne operations).
- Establishment of areas that may 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 change) promulgation to airspace users.[7]

[7] For additional information on planning and employment, see JP 3-52, *Joint Airspace Control*, Air Force tactics, techniques, and procedures (AFTTP) 3-2.78, and *Multi-service Tactics, Techniques, and Procedures (MTTP) for Airspace Control.*

Airmen, in conjunction with joint and multinational partners, are responsible for planning and integrating the ACS IAW JFC guidance. The ACS should maximize the combat effectiveness of all forces while reducing the risk of friendly fire incidents and collateral damage.

JOINT FORCE COMMANDER

The JFC is responsible for military-directed airspace control within the JOA. Executed by the ACA through the ACS, airspace control procedures and authorities within the JOA are codified in the ACP and ACO. These documents express how airspace is to be used to support mission accomplishment and establish airspace priorities among users (including non-military airspace users) and missions.

COMMANDER, AIR FORCE FORCES

The Commander, Air Force Forces (COMAFFOR) provides the USAF theater air control system (TACS) and airspace control expertise and resources to the JFC. Normally, the COMAFFOR has the preponderance of airspace control resources and the capacity to C2 joint air operations via the Joint AOC (JAOC) or other distributed C2 entities. When the COMAFFOR is designated as the JFACC, ACA, and AADC, the TACS typically forms the nucleus of the ACS for the JOA. If JFACC, ACA, and/or AADC are designated from another component, the COMAFFOR may still be expected to provide the TACS.[8]

JOINT FORCE AIR COMPONENT COMMANDER

The JFC normally designates a JFACC to establish unity of command for joint air operations. The JFACC is typically also designated as the ACA and AADC due to the close coordination required by these three functions. JFCs normally designate the commander with the preponderance of taskable forces and the ability to C2 joint air operations as the JFACC. Vesting JFACC, ACA, and AADC roles in one commander ensures unity of effort for air operations within the theater of operations.

AIRSPACE CONTROL AUTHORITY

The ACA is typically the commander with the preponderance of airspace control and management capabilities in the JOA and who has been delegated overall responsibility for airspace control.[9] The ACA provides and operates an effective and adaptive ACS. In addition, the ACA plans, coordinates, and develops airspace control procedures for all military airspace users and airspace control elements operating in the JOA. The ACA does not have the authority to approve or disapprove combat operations, but plays a key role in synchronizing, deconflicting, and coordinating air operations in pursuit of JFC objectives. Airspace control procedures within the JOA are approved by the JFC, derived from JFC authority, and promulgated to the joint force through the ACA's authoritative guidance (ACP, ACO, SPINS). If the ACA and an affected component commander are unable to agree on an airspace issue, the issue should be referred to the JFC for resolution.

[8] See the "Theater Air Control System" section of this chapter for additional information on TACS.
[9] See JP 3-52, *Joint Airspace Control*, for additional information.

AREA AIR DEFENSE COMMANDER

The AADC is the component commander with the preponderance of AMD capabilities and the required command, control, and communications capabilities assigned by the JFC to plan and execute integrated air defense operations.[10] Because ACA and AADC authorities are so integral to air operations, and due to the USAF's ability to C2 these activities, the JFACC is normally assigned both ACA and AADC responsibilities.

The AADC is responsible for DCA operations. The AADC develops the AADP with JFC approval and ensures it is promulgated. The AADC should identify specific volumes of airspace and CMs 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 facilitate C2 of airspace based on the size and scope of the operation. The successful conduct of AMD operations requires the integrated operation of all available air, land, and maritime-based AMD systems. Chapter 5 of this publication provides additional information on the integration of AMD with airspace control functions.

In joint operations where ACA and AADC authorities are assigned to different commanders, 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.

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 CMs to the ACA for inclusion in the ACO IAW the ACP.
- Develop component-specific airspace control instructions, plans, and procedures IAW 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 area of operation (AO) 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.

COORDINATION WITH THE HN, REGIONAL AUTHORITIES, AND ICAO

As a guiding principle for all operations, a HN retains sovereign control of its national airspace unless otherwise agreed upon by treaty or international agreement. In such circumstances, joint forces primarily use existing international, HN, or Department of Defense (DoD) AIPs for airspace procedures or guidelines. Airspace, navigation services, and radio frequencies are the sovereign property and responsibility of the HN. Joint forces operating within the airspace of any HN use these airspace services with the sovereign consent of that nation under the provisions of respective national AIPs or other appropriate agreements. A HN may retain

[10] See JP 3-01, *Countering Air and Missile Threats*, for additional information.

overall airspace control, allowing the JFC and ACA less influence over day-to-day airspace management, particularly when joint air operations are employed in scenarios below the threshold of armed conflict. ACA tasks and responsibilities, as they relate to theater security cooperation, are crucial to gaining access, basing, and overflight support while enabling strategic and operational partnerships. In some cases, the HN military may be the ACA as opposed to a civilian organization. In these cases, planners should address airspace relationships, roles, and responsibilities through the military.

National Airspace

International law recognizes two types of airspace—**national** and **international.** National airspace is any airspace subject to the sovereignty of a State. This includes airspace above the territorial seas, internal waters, archipelagic waters (for archipelagic States), and land territory of a State. Consistent with international law, the US Government recognizes territorial sea claims up to a maximum distance of 12 nautical miles from a coastal State's baseline drawn IAW international law. International airspace is not subject to the sovereignty of a State. This includes all airspace seaward of coastal States' national airspace, including airspace over contiguous zones, exclusive economic zones, and the high seas. International airspace is governed by international law and treaty (e.g., Chicago Convention) and may further be governed by international agreements. See Department of Defense Instruction (DoDI) 4540.01, *Use of International Airspace by U.S. Military Aircraft and for Missile and Projectile Firings*, and *DoD Law of War Manual*, for additional information.

AIRSPACE CONTROL LEAD AGENT

In the 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 JOA. The commander, Navy forces (COMNAVFOR) is normally assigned responsibility for airspace procedures applicable to fleet air operations over international waters within the JOA and only advises the JFC's lead agent as appropriate. As a lead agent, the JFACC 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 HN authorities as appropriate.[11]

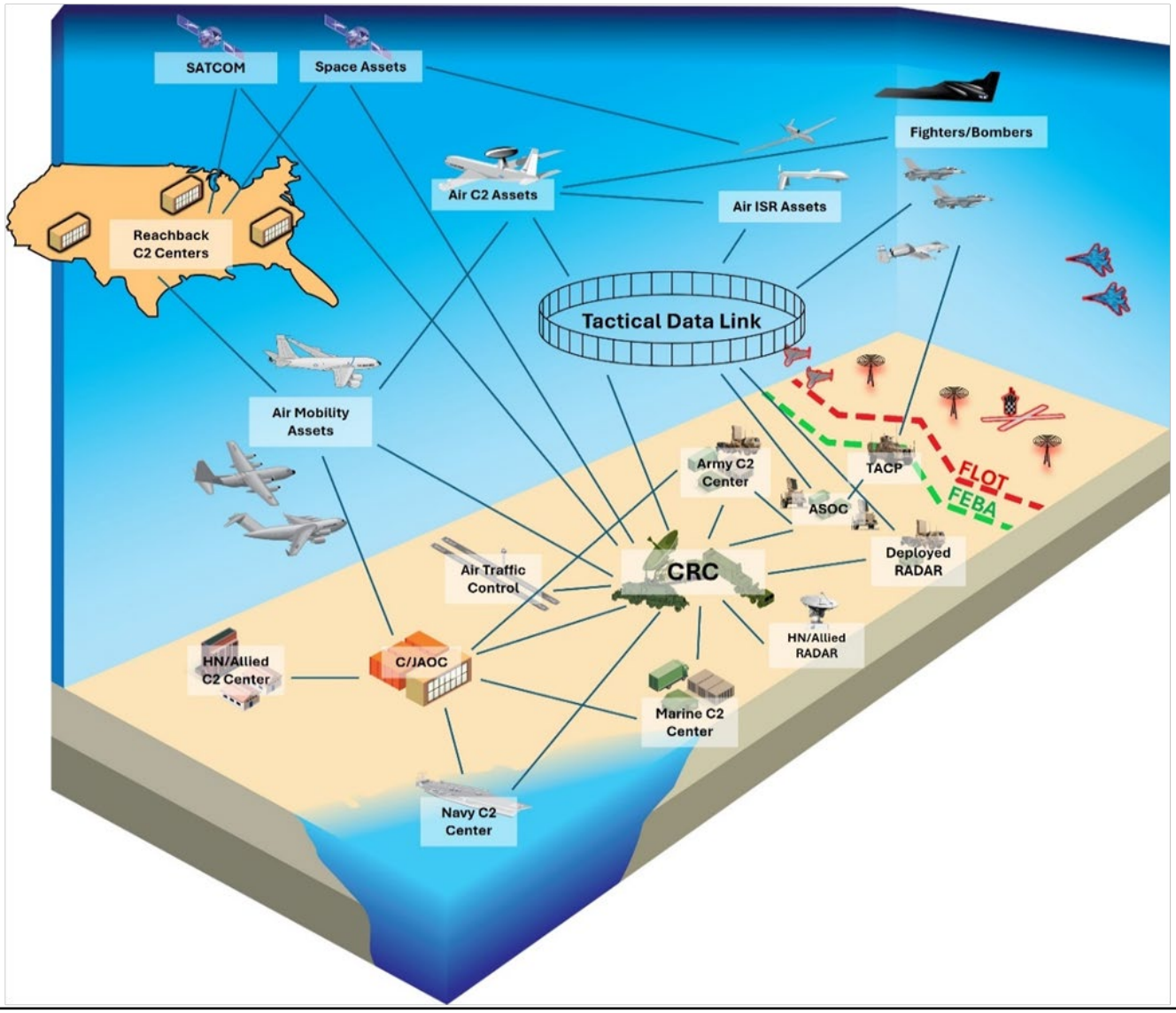
AIRSPACE CONTROL SYSTEM (ACS)

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. The use of multiple acronyms to describe an increasingly complex ACS encompassing airspace control elements from across

[11] For additional information on airspace control lead agent duties and responsibilities, see JP 3-52, *Joint Airspace Control.*

the joint force 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.

A system of systems, the ACS enables multiple component air and ground systems to support the JFC's planning and execution of air-ground operations. The ACS combines each Service component's C2 and airspace control capabilities supporting the JFC's mission (See "Notional Military Airspace Control System" figure). The Army Air-Ground System (AAGS), the Naval Tactical Air Control System (NTACS), the Marine Air Command and Control System (MACCS), and the Special Operations Air Ground System (SOAGS) combine with the USAF 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.



Notional Military Airspace Control System

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, and indirect fires). Flexibility and simplicity should be emphasized 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. 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, including emerging systems such as small UAS and loitering munitions. 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 requirements among friendly forces.[12] Common equipment, understanding of Service and joint doctrine, and familiarity with procedures through joint exercises and training can enhance airspace control within an AOR or JOA. Standardized airspace procedures rely on a mix of identification and control measures. Airspace control identification requirements should be integrated with those for AMD. Airspace control, AMD, ATC, supporting C2 procedures, equipment, and terminology should be compatible, mutually supporting, and integrated to enable common procedures for airspace users and control agencies. Airspace control agencies should establish agreements and communication links to facilitate coordination.

The ACA normally executes airspace control via distributed elements of the ACS. The ACA distributes an ACP designating joint force component airspace control elements to be part of the ACS. These elements may be required to provide ICAO-approved traffic and separation standards. In this regard, ACS elements may be governed by HN rules and regulations pertaining to airspace control during military operations.

However, as operations transition between peacetime and combat operations, peacetime airspace rules and organizations change. These changes vary with some ACS elements executing dual roles for air battle management and airspace control of assets. For example, a CRC, tasked with airspace control duties, may also be a RADC/SADC responsible for a portion of theater AMD.

The ACS requires the timely exchange of information through reliable, secure, and interoperable communications networks. ACS systems include, but are not limited to, sensors, communications, data processing, and common operating databases. It is critical that these systems are protected by cybersecurity programs such as communications security, physical security, emissions security, and defensive cyberspace operations. Implementing operations security practices is imperative when developing communication policies and procedures.

The ACS's supporting systems (e.g., satellite ground stations, air navigation, surveillance and weather radars, and voice radio communications) rely 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,

[12] See AFTTP 3-2.17, *MTTP for the Theater Air-Ground System,* for additional information.

particularly in congested or contested OEs. EMI can cause safety of flight hazards by degrading position, navigation, and timing (PNT) systems, radar separation, and interrupting voice communications between airspace control elements and users. The JFACC's communications staff and the theater frequency manager should work to identify all sources of potential EMI and allocate alternate frequencies as required by the Joint Frequency Management Office. Deliberate planning at the earliest stages helps avoid EMI and ensure ACS data and communications systems and associated airspace control procedures are compatible.[13]

THEATER AIR CONTROL SYSTEM

The TACS is the USAF C2 system by which the JFACC executes joint air operations, including the tasking of joint air forces made available by other components. It provides the JFACC with the means to distribute control and decentralize 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 JFACC/ACA/AADC executes the ATO, ACP, ACOs, and the AADP via the TACS. As an organic USAF system, the TACS remains under the operational control (OPCON) of the COMAFFOR.

When the COMAFFOR is designated as the JFACC, the TACS becomes the nucleus of the TAGS, which incorporates other components and HN airspace control elements. The JFACC exercises centralized command of joint air operations in pursuit of JFC objectives through the JAOC.

The TACS is composed of dedicated elements, dynamic elements, and supporting systems. Dedicated elements include both airborne and ground-based battle management units. Dynamic TACS elements are any other weapon system or entity that has a primary role other than C2 but may, with appropriate certification or delegated authority, augment, or become a substitute for dedicated TACS elements. Support systems include organic or opportunistic surveillance, communications, and decision-making capabilities that improve and extend TACS capabilities. To fully understand the relationship of the TACS to the ACS, planners should know each component's system, composition, and structure.[14]

COMMON TACS CONTROL AUTHORITIES, ROLES, AND ORGANIZATIONAL ALIGNMENT

The control authorities, roles, and organizational alignment for the entities below are consolidated here for brevity and commonality. This information supplements further discussion on specific entities in the next section.

- **Common Control Authorities—CRC, airborne C2, and battle control center (BCC).** The COMAFFOR may delegate all or portions of identification, commitment, 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.

[13] For additional information on EMI, see 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.
[14] For additional information on TACS and other component's capabilities, see AFTTP 3-2.17*, MTTP for the Theater Air-Ground System* and AFTTP 3-3.TACS.

The CRC, airborne C2, and BCC are not certified to perform ATC services.

- **Common Roles and Alignment—CRC, airborne C2, and BCC.** The CRC, airborne C2, and BCC can accept delegated responsibility to execute missions and tasks for offensive and defensive air operations. The CRC, BCC, and airborne C2 are key C2 elements for DCA operations, they may be delegated RADC or SADC responsibilities. **The CRC, airborne C2, and BCC are under the OPCON of the COMAFFOR and vertically integrated with the AOC. They may be employed alone or horizontally integrated with other C2 elements of the TAGS.**

TACS GROUND ELEMENTS

Air Operations Center. The AOC is the senior C2 element of the TACS where centralized planning, direction, control, and coordination of assigned air 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 USAF forces). The AOC commander should be prepared to direct a joint or combined AOC when designated. The AOC has five divisions: strategy division, combat plans division, combat operations division, intelligence, surveillance and reconnaissance (ISR) division, and air mobility division, along with multiple support and specialty teams. Each division integrates numerous disciplines in a cross-functional team approach to planning, execution, and assessment.[15]

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 plans air operations within 48 hours of ATO execution. Airspace managers within the C2 plans team of the combat plans division develop and promulgate the 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 real time AOC airspace coordination issues per AOD prioritized objectives and tasks. In certain time sensitive situations, operational necessity may preclude generation of an ACO change to enact required CMs. In such cases, airspace control elements should be prepared to interface with the AOC and airspace users to deconflict CMs with short notice and in real time.

Airspace Management Specialty Team. Based on the complexity of the airspace environment, the ACA may designate an airspace management specialty team (AMT) within the AOC to assist with airspace deconfliction and provide a single point of contact to the JFACC for all airspace matters. The AMT includes staff representation in both the combat operations and combat plans divisions of the AOC. The AMT receives inputs from military and civilian and/or HN airspace users and coordinates ACA responsibilities such as production of the ACP and ACO. The team leader may coordinate airspace control matters directly with the HN and officials in neighboring countries. AMT duties include:

[15] For additional information on AOC, see Air Force Manual (AFMAN) 13-1, *Air Operations Center Volume 3*, and AFTTP 3-3.AOC, *Combat Fundamentals-AOC.*

- Coordinate, develop, manage, and disseminate the ACP and ACO.
- Identify airspace conflicts and facilitate integration and deconfliction.
- Provide airspace consideration inputs for ATO development and execution.
- Coordinate airspace matters with other AOC functions such as: AMD planners, ATO production team, master air attack planning team, combat operations division, and other liaisons and airspace users.
- Evaluate and input coordinating measure requests based on the ACP and JFACC priorities.
- Coordinate with the air traffic control cell, ICAO, joint/coalition/HN, and other airspace users as required.

Regional Air Movement Control/Coordination 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 coordinates operational requirements with ICAO and disseminates airspace and airfield information to civil operators. The RAMCC may include liaison officers from multinational forces or neutral nations and enables coordination with non-governmental organizations and civil airspace users.[16]

Component AOC Liaisons. Each Service or functional component commander involved in joint air operations normally provides a liaison element to the JAOC. 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 forces. Other Service liaisons include the Army's BCD and the Naval and Amphibious Liaison Element (NALE) to articulate Navy and Marine interests unless a separate Marine liaison element (MARLE) is designated.

Joint Air Component Coordination Element (JACCE). The JFACC may establish a JACCE within a JFC or other component headquarters. When established, the JACCE acts as the JFACC's primary representative to the other headquarters and facilitates staff coordination. The JACCE performs a liaison function and should communicate joint decisions and interests to the JFACC. Likewise, the JACCE communicates the JFACC's intent, capabilities, restraints, and perspective to the host commander. **The JACCE does not perform C2 functions or act as a C2 node unless specifically delegated authority to direct or execute operations by the JFACC.** The JACCE may include plans, operations, intelligence, airspace management, logistics, space, and air mobility expertise. In multi-national operations, the JACCE may function as the JFACC's representative to a HN. To do so, the JFC should authorize direct liaison authority (DIRLAUTH) for coordination of air operations between the JFACC and HN.[17]

[16] For additional information on RAMCC, see Appendix B.
[17] See Appendix G of JP 3-30, *Joint Air Operations, for additional information*.

Control and Reporting Center (CRC). The CRC is a ground-based, mobile TACS element with air surveillance radar and voice and data communications capabilities. The CRC is tailorable by mission requirements to support and facilitate airpower across the competition continuum, 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 can import and display non-organic radar data using direct communication feeds and provide persistent, wide-area surveillance, early warning, battle management, target detection and tracking, and weapons control functions. The CRC fuses C2 data with other systems and combat aircraft via tactical data links (TDL) to obtain information for expanded surveillance coverage.[18]

Battle Control Center (BCC). The BCC is a ground-based fixed element of the TACS, comprised of four major systems: a C2 processing and display system, primary and secondary radar capabilities (organic or HN), flight-plan processing and identification systems, communication (organic or HN) systems, and TDL connectivity. The USAF employs five BCCs in support of the commander, North American Aerospace Defense Command (NORAD), US Northern Command (USNORTHCOM), and US Indo-Pacific Command CCDR as the primary battle management command and control (BMC2) nodes for homeland defense and defense support of civil authorities (DSCA). BCCs manage the largest operational web of sensor tracking architecture in the DoD. BCCs operate continuously to provide wide-area surveillance, early warning, battle management, target detection and tracking, non-lethal warning, weapons control functions, fires coordination and deconfliction, and BMC2. In addition, BCCs can provide BMC2 for OCONUS AOs (e.g., the BCC at Shaw AFB supports USCENTCOM as the primary BMC2 node for AFCENT air operations).

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 facilitates airpower across the competition continuum, 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 status fighters in support of Operation NOBLE EAGLE) through TDL systems. BCCs can distribute the tactical air picture (including plot level data) directly to the AOC and combatant command operations centers. During lost connectivity, they can operate autonomously and provide immediate mutual support and redundancy if another becomes inoperative.[19]

Air Support Operations Center (ASOC). The ASOC is the primary TACS control agency for the execution of airpower in direct support of land operations. As a direct subordinate element of the JAOC, the ASOC directs and controls air operations in its assigned area. The ASOC is aligned at the Army echelon above brigade most capable of integrating fires and effects and procedural control. When co-located with the division, the ASOC can form the JAGIC by integrating with division fires (including loitering munitions), airspace (including UAS and small UAS requirements), AMD, and aviation elements. The JAGIC coordinates, integrates, and controls the airspace within the ACA delegated airspace in support of the division commander and coordinates requirements with external airspace elements for activities outside their assigned airspace. The ASOC typically works with TACP planners and Army

[18] For additional information on CRC, see AFMAN 13-1, *Control and Reporting Center, Volume 3*
[19] For additional information on BCC, see AFMAN 13-1, *Battle Control Center, Volume 3*

airspace elements to ensure necessary CMs are included in the unit airspace plan.

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 close air support (CAS). TACPs coordinate ACMs and deconflict aircraft from other supporting fires. TACPs may employ joint terminal attack controllers (JTAC) at any echelon but often place them in a forward position (e.g., the company or team level). TACPs may also employ agile coordination and integration teams (ACIT) and integrated sensing and effects teams (ISET) to extend the TACS into contested environments and provide procedural control to airspace users such as net-enabled weapons, aircraft, and long-range precision fires.[20]

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

- **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 IAW JFACC 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 capabilities.

TACS AIRBORNE ELEMENTS

Airborne Warning and Control System (AWACS). The AWACS is an airborne platform that provides long-range air and maritime surveillance radar, additional sensors, voice and data communications capabilities. AWACS was designed to overcome the inherent line-of-sight and mobility limitations of ground-based radar systems. 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 a C2 node with persistent 360-degree wide-area surveillance, early warning, battle management, target detection and tracking, and weapons control functions. AWACS is tailorable by mission requirements. It can exchange radar picture data with other C2 nodes 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 identify and locate airborne and ground-based emitters with an integrated radio frequency passive detection system.

Forward Air Controller (Airborne) (FAC[A]). The FAC(A) is a specially trained pilot, acting as an airborne extension of the TACP, who is qualified and authorized to provide coordination and terminal attack control of CAS aircraft and conduct other direct air support missions. The

[20] For additional information on ACIT and ISET, see AFDP 3-0.1, *Command and Control*, and AFDP 3-03, *Counterland Operations*.

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.

Tactical Air Coordinator (Airborne) (TAC[A]). The TAC(A) provides a 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. USAF 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).[21]

OTHER USAF ACS ELEMENTS

WING OPERATIONS CENTER (WOC)

An installation's WOC provides a standardized, functional organization to facilitate installation-level C2 across the 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, including tenant, joint, and combined missions. It interfaces with the AOC and Air Force forces 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 necessary 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, and incident response (including base defense and force protection). 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 HN representatives, tenant organizations, and joint and multinational 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, USAF component headquarters, AOC, and civil emergency operations centers.

With appropriately delegated authorities, coupled with the capability and capacity to execute the C2 process (i.e., plan, prepare, execute, and assess air operations), a wing commander exercising C2 via a WOC may be considered a "Distributed Control" node in CC-DC-DE Mission Command Framework.

CONTINGENCY RESPONSE FORCE (CRF)

The CRF is the USAF's standing initial airfield-opening force postured for rapid response. As such, CRFs are continually engaged with the respective JFACC and AFFOR staff's contingency planning process, helping to ease the transition of airbase opening from planning

[21] See AFTTP 3-3, *TACS,* for additional information.

to execution.[22]

AIR FORCE AIR TRAFFIC CONTROL (ATC) CAPABILITIES

The USAF organizes, trains, and equips 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 CCDR through various arrangements to meet contingency requirements. As conditions permit, HN or multinational ATC capabilities may be leveraged to provide ATC services and thus reduce the need for USAF ATC personnel and equipment.

DEPLOYABLE ATC AND LANDING SYSTEM (DATCALS)

The USAF and Air National Guard (ANG) maintain DATCALS at ATC squadrons across the country. These units can deploy as an entire airfield system and support package or as individual DATCALS packages (tower, navigation aids, radar). They are the USAF'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 JFACC 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.

THEATER AIR GROUND SYSTEM (TAGS)

The TAGS combines each joint component's ACS into a joint framework that operates as part of a unified effort in support of the JFC.

Traditionally, the TAGS incorporates the AAGS, MACCS, Navy composite warfare command (CWC) structure, NTACS, special operations air-ground system (SOAGS), and the Air Force TACS into one integrated and interoperable system.

The JFACC plans and tasks joint air operations with the TAGS. The JFACC is normally designated as the ACA and integrates and coordinates airspace requirements with the HN, components, and multinational forces on behalf of the JFC via the ACS. The ACA delegates airspace control authorities to TAGS elements that contribute to the ACS.[23]

ARMY AIR-GROUND SYSTEM (AAGS)

The AAGS is a vital part of the Army C2 system that connects to the TACS to enable air-ground operations. AAGS is the Army's control system for synchronizing, coordinating, and integrating air operations with the ground commanders' operational objectives. The AAGS provides the framework for initiating and processing component air support requests, collection requirements, airspace integration, joint fires, AMD, and liaison exchanges. The combined effort of the AAGS and TACS enhances air-ground operations for their components by increasing situational awareness and understanding of both air and land operations.

MARINE AIR COMMAND AND CONTROL SYSTEM (MACCS)

The Marine Corps uses centralized command and decentralized control to C2 aviation assets.

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[22] See AFDP 4-0, *Combat Support*, for additional information.
[23] For additional information on TAGS and its composite elements, see AFTTP 3-2.17, *MTTP TAGS*.

The MACCS provides the Marine Air/Ground Task Force (MAGTF) commander the means to exercise C2 over Marine aviation assets. The MACCS is capable of exercising C2 over joint and multinational aviation assets operating within MAGTF airspace.

COMPOSITE WARFARE COMMANDER/NAVY TACTICAL AIR CONTROL SYSTEM (CWC/NTACS)

Naval aviation doctrine is distinguished from USAF airpower doctrine in that the primary responsibility of naval airpower is to support the maritime commander. There are two distinct applications of naval airpower: one, an organic integral extension of naval sea power employed by the maritime commander, and two, the tactical, operational, and strategic capabilities under the unified command of a JFACC in support of a JFC. Maritime C2 of naval air forces is designed to support both applications of naval airpower, integrate allocated joint air support assets, and align with joint planning and execution systems (such as the joint air tasking cycle and the TAGS). For example, within the same maritime AOs there may be naval aircraft supporting an amphibious landing, naval aircraft supporting a war at sea strike against enemy ships, and other aircraft provided to the JFACC supporting the land component commander. Each of these separate employments of naval airpower have specific C2 processes that should be integrated. For instance, naval aircraft supporting a war at sea strike are integrated within the CWC C2 process while naval airpower supporting an amphibious landing integrate with the amphibious force NTACS.

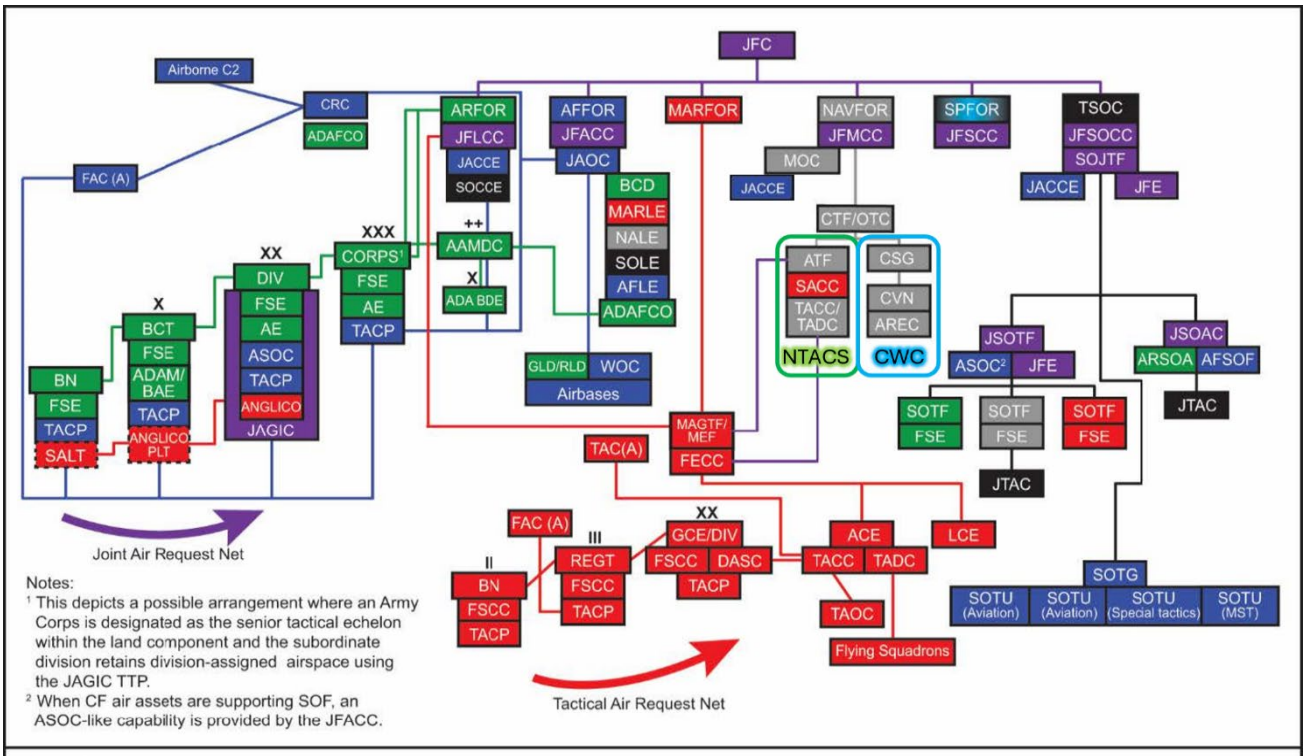
The NALE is the key point for integration of naval and joint force air operations within the JAOC. The NALE coordinates airspace requests from naval air control centers with the ACA for inclusion in the ACO. Once approved, naval control centers (e.g., Naval tactical air control center [NTACC], air resource element coordinator [AREC], supporting arms control center [SACC]) conduct battle management of allocated and assigned air assets in support of component and joint force objectives.

SPECIAL OPERATIONS AIR-GROUND SYSTEM (SOAGS)

Special operations (SO) air forces are typically organic to the joint special operations component commander's (JFSOCC) formation. SO air assets are inherently joint and can be employed in concert with, or independently from, conventional force (CF) operations. In any case, SO integration with the TAGS requires extensive planning and coordination. SO may provide their own air support, require CF air support, or make SO air assets available for use by CF. The SOAGS is scalable and tailorable depending on the mission and JFC requirements. The principal functions supporting SO air operations within the SOAGS may include a joint special operations air component commander (JSOACC), special operations task groups/units (SOTG/SOTU), SOLE, Special Tactics Teams (STT), SO Joint Fires Element (JFE), and JTACs.

The SOLE within the JAOC is the key point of integration for SO and CF air operations. The SOLE coordinates airspace requests from SOAGS elements with the ACA for inclusion in the ACO, such as special operations force areas. The SOLE may also coordinate CAS and time-sensitive target support (in support of SO forces or when SO aircraft support CF), facilitate airspace deconfliction actions, and coordinate ISR requirements for the SO component. In cases where CF air assets are required to support SO, the JFACC may be required to establish a capability similar to an ASOC at the SO task force level to facilitate C2 of CF air assets.

The Theater Air-Ground System figure depicts an example of the TAGS.[24] The example is not intended to show every possible TAGS configuration. Each JFC tailors the system based on the situation, mission, forces available, and C2 structure. NTACS and CWC C2 structures are highlighted to aid in understanding.



Notes:
[1] This depicts a possible arrangement where an Army Corps is designated as the senior tactical echelon within the land component and the subordinate division retains division-assigned airspace using the JAGIC TTP.
[2] When CF air assets are supporting SOF, an ASOC-like capability is provided by the JFACC.

Legend:

AAMDC—Army air and missile defense command
ACE—air combat element (USMC)
ADA—air defense artillery
ADAFCO—air defense artillery fire control officer
ADAM—air defense and airspace management
AE—airspace element
AFFOR—Air Force forces
AFLE—Air Force liaison element
AFSOF—Air Force special operations forces
ANGLICO—air-naval gunfire liaison company
AREC—air resource element cordinator
ARFOR—Army forces
ARSOA—Army forces special operations air
ASOC—air support operations center
ATF—amphibious task force
BAE—brigade aviation element
BCD—battlefield coordination detachment
BCT—brigade combat team
BDE—brigade
BN—battalion
C2—command and control
CF—conventional forces
CRC—control and reporting center
CSG—carrier strike group
CTF—commander, task force
CVN—multi-purpose aircraft carrier (nuclear-powered)
DASC—direct air support center
DIV—division
FAC(A)—forward air controller (airborne)
FECC—fires and effects coordination center (USMC)
FSCC—fire support coordination center
FSE—fire support element
GCE—ground combat element (USMC)
GLD—ground liaison detachment
JACCE—joint air component coordination element
JAGIC—joint air-ground integration center
JAOC—joint air operations center
JFACC—joint air force component commander
JFC—joint force commander
JFE—joint fires element
JFLCC—joint force land component commander
JFMCC—joint force maritime component commander
JFSCC—joint force space component commander
JFSOCC—joint force special operations component command
JSOAC—joint special operations air component
JSOTF—joint special operations task force
JTAC—joint terminal attack controller
LCE—logistics combat element (USMC)
MAGTF—Marine air-ground task force
MARFOR—Marine forces
Marine TACC— Marine tactical air command center
MARLE—Marine liaison element
MEF—Marine expeditionary force
MOC—maritime operations center
MST—mission sustainment team
NALE—naval and amphibious liaison element
NAVFOR—Navy forces
Navy TACC—Navy tactical air control center
OTC—officer in tactical command
PLT—platoon
REGT—regiment
RLD—reconnaisance liaison detachment
SACC—supporting arms coordination center
SALT—supporting arms liaison team
SOC—special operations command
SOCCE—special operations command and control element
SOF—special operations forces
SOLE—special operations liaison element
SOJTF—special operations joint task force
SOTF—special operations task force
SOTG—special operations task group (USAF)
SOTU—soecial operations task unit (USAF)
SPFOR—Space forces
TAC(A)—tactical air controller (airborne)
TACC—tactical air control center
TADC—tactical air direction center
TAOC—tactical air operations center (USMC)
TACP—tactical air control party
TSOC—theater special operations command
TTP—tactics, techniques, and procedures
USAF—United States Air Force
USMC—United States Marine Corps
WOC—wing operations center (USAF)

Joint
United States Army
United States Marine Corps
United States Air Force
United States Navy
United States Special Operations Forces
United States Space Force

Theater Air-Ground System (TAGS)

[24] Figure derived from AFTTP 3-2.17, *MTTP TAGS*, August 2024

CHAPTER 4: AIRSPACE CONTROL PLANNING

Commanders, planning staffs, and airspace control professionals 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.

GENERAL CONSIDERATIONS

Airspace control planning begins well before the onset of armed conflict. Airspace control professionals should develop understanding, partnerships, and integrated processes and procedures to facilitate cooperation and transitions between civil and military ACA in each JOA. Furthermore, such planning should be adaptable and scalable to account for various airspace control scenarios and requirements.

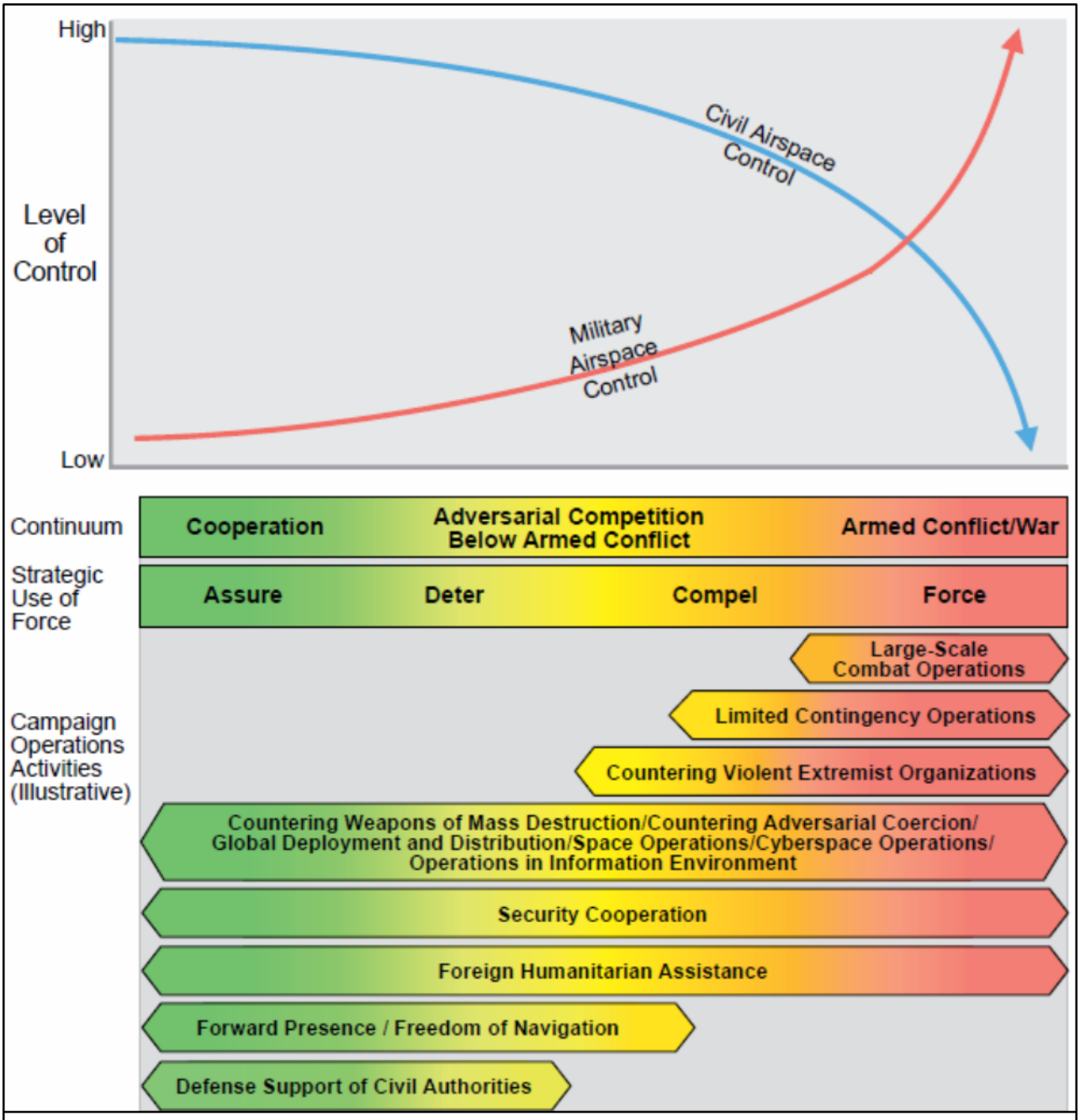
Establishing relationships with the host and key neighboring nations' ATC organizations is critical. Planners should consider establishing an ATC cell to liaise with HN ATC representatives. Establishing an aircraft diplomatic clearance process should be accomplished as early as possible during the planning process. Key items include:

- Identifying key personnel and their contact information.
- Identifying existing agreements (e.g., AIPs and site surveys).
- Identifying rules, regulations, and existing international, multilateral, or bilateral agreements or arrangements governing proposed operations (e.g., ICAO, *Federal Aviation Administration (FAA)*, regional organization, or HNs). For planning purposes, this information is in the DoD *Foreign Clearance Guide,* DoD Directive 4500.54E, *DoD Foreign Clearance Program*. Planners and operators should consult with their servicing legal advisors to ensure active international agreements are reflected in DoD guidance.
- Identifying special operating rules or waivers needed for certain aircraft or operations within HN airspace (e.g., rules for unmanned aircraft system [UAS]).
- Establishing requirements to integrate liaison officers, equipment, processes, and functions.

To preserve and maximize airpower's inherent speed, range, and flexibility, potential ACS modifications should be anticipated, considered, and planned for across the competition continuum and during all operational phases (i.e., shape, deter, seize the initiative, stabilize, and enable civil authority) to enable joint and combined force effectiveness. The ACP should be consistent with and support specific operation plans (OPLANs) and operation orders (OPORDs) 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 actions associated with a typical major operation or campaign. Typically, operational phasing delineates a shift in the operation's nature, focus, or objective. Associated shifts in airspace control requirements should be accounted for and planned.

Transferring airspace control from civil to military control, adapting it to JFC or HN needs throughout the transition from competition to armed conflict, and eventually returning it to civil authority are complex tasks requiring joint military, diplomatic, and interagency efforts. The

figure below depicts a notional civil/military airspace control relationship across the competition continuum. Civil or military authorities may exercise varying proportions of control depending on the nature of the campaign or operation. As such, thorough planning and close coordination is paramount for safe and effective airspace control operations.



Civil/Military Airspace Control Across the Competition Continuum

THE AIRSPACE CONTROL PLAN

The ACP establishes ACS procedures in the operational area and serves as airspace control guidance. The ACP and the AADP are both approved by the JFC and should be integrated with the JFC's operation plan (OPLAN) and orders. The ACP considers procedures and international or regional ATC systems necessary to effectively support air operations and meet JFC objectives. Consequently, the ACP should be planned and organized in a simplified, understandable format. Because the airspace control area normally coincides with AMD boundaries, coordination between airspace control and area AMD operations is essential. Key factors to consider are listed in the Airspace control plan considerations chart.

Airspace Control Plan Considerations

- Procedures that include rules of engagement and disposition of air and missile defense systems.
- Limitations or adverse conditions in the joint operations area that may adversely affect the airspace control plan.
- Anticipated restricted areas based on initial deployment of friendly air, land, maritime, and special operations forces and bases.
- Existing air traffic control areas, base defense zones, controlled or uncontrolled airspace, and overflight of neutral nations.
- Mission profiles; combat radii; and identification, friend or foe (IFF), or other identification capability of aircraft that will operate in the operational area.
- Enemy air and missile defense weapons capabilities and deployment.
- Electromagnetic, cyberspace, and deception capabilities.
- Emergency procedures for aircraft experiencing difficulties (including IFF problems).
- Procedures for day or night operations and for aircraft experiencing adverse weather.
- En route and terminal-area air traffic control procedures for aircraft transiting to and from the operational area.
- Procedures to support surge operations requiring high volumes of air traffic.
- Enemy offensive air capabilities. Additionally, the vulnerability of friendly aircraft to enemy surface-to-air missiles and the vulnerability of friendly surface-based air defenses to enemy long-range indirect fires are important planning and execution considerations.
- Procedures, routes, and restricted areas for air mobility assets performing direct combat support of forces, logistic resupply, aerial refueling, personnel recovery, or aeromedical evacuation.
- Civil air traffic corridors and procedures.
- Provisions for fire support coordination measures.

JOINT PLANNING PROCESS (JPP)

The JPP is an orderly, analytical process that consists of logical steps to analyze a mission, select the best course of action (COA), and produce a campaign or joint operation plan or order. To enable joint air operations, support JFC plans, and account for joint, HN, and civil airspace requirements, airspace control planners should be integrated throughout the JPP.

JOINT PLANNING PROCESS FOR AIR (JPPA)

The JPPA is an air-centric application of the JPP used by the JFACC to guide the employment of joint air capabilities. The JPPA drives the production of the JFACC's joint air operation plan (JAOP), COMAFFOR's operation order, and other plans and orders. Joint airspace control planning is normally conducted using the JPPA. The JPPA is ideally suited for Airmen at or in concert with the JAOC.[25]

AIR FORCE PLANNING PROCESS (AFPP)

The AFPP is a planning method developed for use by all USAF units. Airmen employ AFPP when the situation and mission do not necessitate planning for the joint force or joint air operations. Localized airspace control planning may be accomplished using the AFPP.[26]

CONSIDERATIONS FOR OPERATIONS DURING COOPERATION AND COMPETITION

In addition to ensuring the continuation of routine DoD flight operations, USAF airspace planners should establish effective relationships with key airspace authorities in the AOR, work with the ACA to develop specific ACPs in preparation for future operations and build airspace planning expertise. Regular DoD or joint force interaction with HN authorities and participation in regional airspace conferences establishes relationships with the HN. This can speed issue resolution, enable effective coordination of airspace requirements, and facilitate deliberate crisis planning in the event of armed conflict.

JOA-specific airspace control expertise, for ACS design and establishment of procedures, is as crucial for operations in cooperation and competition phases as in any other operation. Airspace managers should receive formal training before arriving at a USAF 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. Bilateral or regional exercises with host and partner nations provide opportunities to improve cooperation with, and understanding of, HN airspace control agencies and capabilities.

ACPs should integrate known international or HN ATC and AMD 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 civil airspace control from the HN to the joint force and the ACA. This includes rerouting of airways, ACA responsibilities for continuity of civil aviation operations, and HN notification of ACA areas of control through notices to Airmen or AIP entries.

[25] For additional information on JPPA, see JP 3-30, *Joint Air Operations*.
[26] For additional information on AFPP, see AFDP 5-0, *Planning*.

CONSIDERATIONS FOR TRANSITION TO ARMED CONFLICT

Prior to initiating large-scale combat operations, the JFC should ensure a fully operational TAGS is in place. TACS and other ACS elements should be able to move with surface elements, and since airspace control is a critical C2 function, elements of the TAGS 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 JFACC/COMAFFOR (in the ACA role) 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, including responsibilities and authorities (including special operations and multinational 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 AMD radars to provide coverage and sharing of coverage pictures, if required.
- Area AMD and short-range air defense integration behind the FSCL and forward line of own troops (FLOT).
- UAS (all categories), loitering munitions, and rotary wing deconfliction methods.
- Continued integration of the ASOC, TACPs, and DASC with the rest of the ACS.

OPERATIONS AND RISK

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—risk acceptance criteria should be delineated in the ACP, including a risk matrix that is agreed upon by components before commencing operations. At a minimum, this matrix should include the types of risk shown in Appendix B, Notional JFC Airspace Control Risk Guidance Matrix.

In general terms, *low*-risk acceptance by the JFC prioritizes resource preservation. *Moderate* risk acceptance by the JFC seeks to balance mission accomplishment with resource preservation. Lastly, *high*-risk acceptance prioritizes mission accomplishment above all other concerns. The assumption of risk is a command decision. Airspace control planners should assess risk throughout the planning process. Upon approval by the JFC, the ACP risk guidance matrix translates risk assessments into specific criteria that inform commanders where risk factors may exist, provide mitigation measures, and when to apply them. Risk guidance for civil aviation (if present in the JOA) should be added to the matrix.

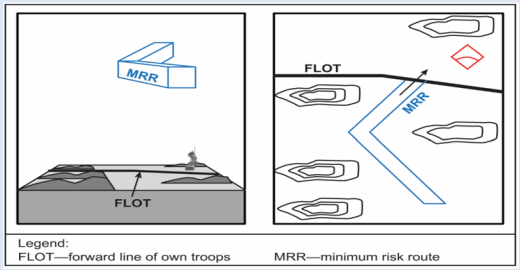
Control procedures should be modified to keep pace with increases in airspace users and keep operations within JFC acceptable risk levels. The ACP should specify areas where high numbers of airspace users are projected and plan for increased control capability.

REFERENCE SYSTEMS

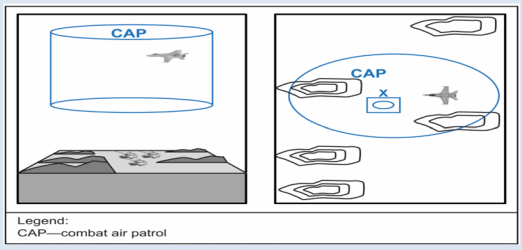
The Global Area Reference System (GARS) is the DoD's standard area reference system.[27] GARS is an operational-level administrative measure used to coordinate geographic areas for rapid deconfliction and synchronization, such as "Kill Box" activation/deactivation. GARS is not used to describe exact geographic locations or to express precise positions for guided weapon employment. It provides a two-dimensional construction that describes the surface of the earth in boxes, quadrants, and keypads from which control and CMs can be communicated and understood. GARS uses a grid system with a universal identifier recognizable by each component and their C2 and attack assets. Procedures and authority for activating GARS airspace vary based on the needs and intent of the JFC. At a minimum, GARS, or "Kill Boxes," should be coupled with appropriate ACMs or fire support CMs and in the ACO.[28]

Airspace Coordinating Measures (ACM) Examples:

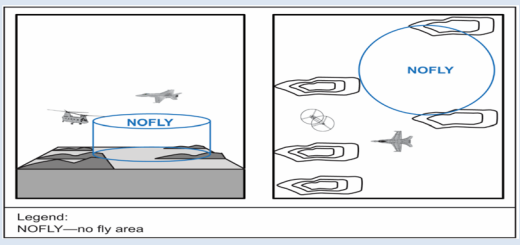
Air corridor/route include low-level transit routes, minimum-risk routes, transit corridors, air corridors, and standard-use Army aircraft flight routes.



ROZs include landing zones, pickup zones, drop zones, airborne early warning areas, combat air patrol, and air-to-air refueling areas.



Standalone ACMs include airspace control areas, high-density airspace control zones, no-fly areas, coordination level, and coordination altitude.



[27] See CJCSI 3900.01E, *Position (Point and Area) Reference Procedures,* for additional information.
[28] See AFTTP 3-2.59, *MTTP Kill Box,* for additional information.

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 multinational airspace control elements coincide with GARS boundaries.

In certain situations (such as amphibious objective areas), ground forces may request control of the airspace over its AO with airspace boundaries corresponding to terrain features (e.g., shoreline). In such circumstances, procedures for airspace control and handoffs between adjacent airspace control elements should be coordinated to prevent loss of situational awareness and potential conflicts. Equally important is to address the specifics of returning the airspace to the primary ACA agency (e.g., the AOC) after the specific mission is accomplished. Improper or poorly coordinated transfers of airspace control responsibility for a volume of airspace may negatively impact future operations.

COMMUNICATIONS AND INFORMATION

Though airspace C2 infrastructures have not changed significantly over time, most communications networks are significantly improved, enhancing the reliability, security, and timeliness of information. Tactical information that may have terminated with an airborne C2 element or CRC is now passed to the AOC, enhancing situational awareness. In addition, broad-bandwidth communications using spacecraft and internet protocol communications have substantially increased ACS C2 coverage and reach-back capabilities. Along with newer technologies, secure voice systems (ultra-high, very high, and high frequencies) offer reliable means of communication. Such technologies provide the JFACC with a variety of options to execute airspace control. Despite advances in communications technology, JFACCs should plan for degradation, intermittency, or complete loss of communication with other C2 elements, particularly in CDO-L environments.

DIGITALLY ENABLED OPERATIONS

TDLs are standardized communication links suitable for the 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 AMD nodes, leverage TDLs to enhance the situational awareness and effectiveness of the ACS.

Gateways. Gateways translate and forward tactical data to facilitate 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 combat airspace information to compatibly equipped aircraft.

Joint Interface Control Officer (JICO). The JICO works with the JAOC's plans division, C2 elements, and component liaisons to develop and publish the theater's integrated data link architecture and operations guidance. Circumstances may 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), and AFTTP 3-2.31, *MTTP for AMD*, provide further information on data links and the key role they play in enabling effective airspace control and AMD.

Providing an Air Picture for the Joint Force. To enable planning and decision-making for air operations, the JFACC is normally expected to incorporate data from various air, ground, and space sensors into a singular air picture. Feeds from data links are managed in the JAOC by the JICO and combined with other sources into a common operating picture (COP). 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 spacecraft-based 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.

A detailed analysis of joint network and joint infrastructure requirements is crucial to enabling systems integration across components 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 protect information from exploitation.

ELECTROMAGNETIC SPECTRUM (EMS)

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

Spectrum Management. CJCSI 3320.01E, 13 Jan 2023, *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 effects. All EMS planning and coordination should be accomplished IAW this guidance. The appropriate frequency management office or joint spectrum management element should be consulted for all spectrum management issues.[29]

CONTINGENCY PLANNING

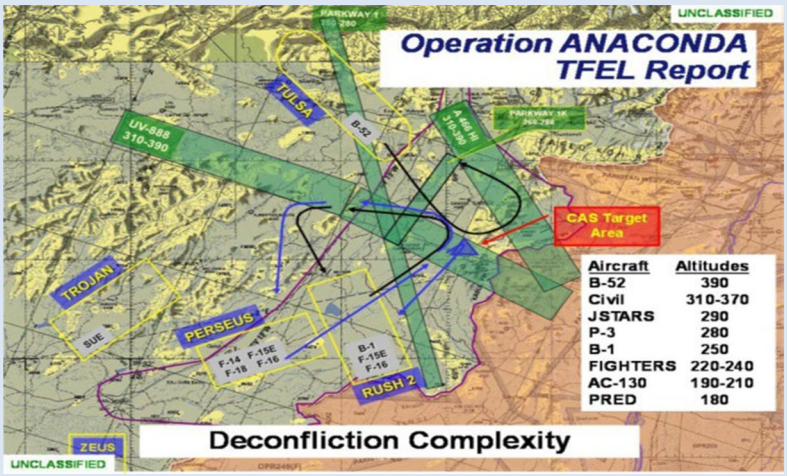
The operation plan serves as the foundational employment concept for an operation and its associated AO(s). The JFC's plan typically involves some form of phasing, moving from one to the next as an operation progresses and achieves necessary objectives towards an end state. The JFC may follow the traditional six phase model (i.e., shape, deter, seize the initiative, dominate, stabilize, transition to civil control), modify it, alter it entirely, or adapt it to the situation as required. In any case, airspace planners should account for unique airspace control requirements for each phase, anticipating operations may not transition smoothly between phases or phases may overlap.

Operations may start, stop, or transition unexpectedly along the competition continuum depending on the operation's nature, strategic objectives, and JFC intent. Transferring ACA from civilian to military control, adapting the ACS to the JFC's needs during each phase, and eventually returning an ACS 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 plan is required to ensure critical ACS capabilities are available at the appropriate time and phase of the operation.

[29] See JP 3-85, *Joint Electromagnetic Spectrum Operations*, for additional information.

OPERATION ANACONDA

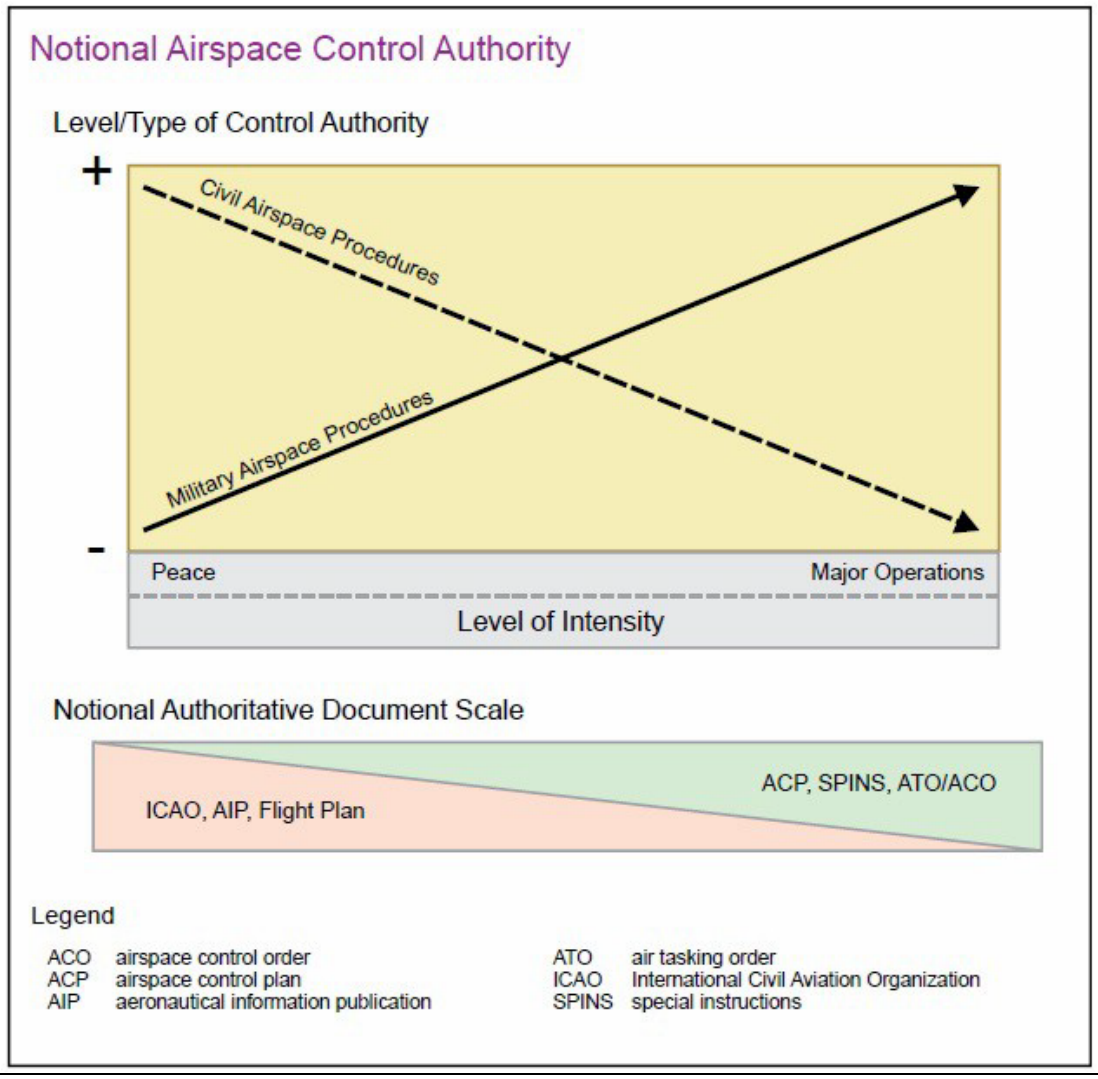
An example of failing to effectively plan and integrate airspace use occurred during Operation ANACONDA in 2002. Very little planning for the use of airpower was conducted prior to the start of the operation, hence ACMs were ad hoc and very rudimentary. The lack of airspace planning prior to Operation 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 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 of 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, deliberate airspace control directly contributed to the operation's success.



CRISIS PLANNING

Contingency planning supports crisis planning by anticipating potential crises and facilitating the development of branch and sequel plans to enable the rapid evolution 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., HN, 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 control elements to support operational objectives. In addition, planners should examine the role and contributions of airspace control functions throughout an operation.

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 HN, resulting in decreased JFC and ACA influence over airspace control. The Notional Airspace Control Authority figure below depicts the differing levels of intensity between civil and military operations and respective control authorities. As military operations intensify, 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 and confusion, negatively impacting operations and harming HN or partner relations.



CHAPTER 5: AIRSPACE CONTROL EXECUTION

Airspace control execution supports JFC operations, activities, and investments across the competition continuum. However, the composition of the ACS and locus of ACA may vary widely as military force is employed through cooperation, competition, and conflict. The ACP and the ACS should be flexible and adaptable to changing environments, objectives, and circumstances while facilitating transitions between operations within JFC notional operational phases (e.g., shape, deter, seize the initiative, dominate, stabilize, and enable civil authority).

COOPERATE

Shaping activities are designed to achieve objectives by creating perceptions and influencing the behavior of 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. **Airspace control shaping activities during cooperation are characterized by normal military airspace activities designed to deter adversaries and ensure or solidify relationships with allies and partners.** Shaping entails various joint, multinational, and interagency airspace activities that are executed to enhance international legitimacy and gain cooperation in support of defined military and national strategic objectives.

During the shaping phase, airspace control and aerial navigation services are likely to remain under the sovereign control of the HN. In such cases, the JFC may appoint a lead agent to coordinate airspace control issues with the joint force and HN instead of an ACA. The lead agent is typically the commander with the preponderance of air assets and the ability to C2 within the theater.[30]

Proper coordination with civil air operations is 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 joint force airspace control. Applicable information from the ACP should be distributed to joint and multinational forces as well as HNs, allies, and international organizations such as ICAO.

In addition to building JOA airspace expertise and establishing effective relationships with allies and partners, airspace planners should develop specific ACPs in preparation for future operations during the shaping phase. Planners should assess and integrate HN ATC, airspace control, and AMD capabilities into the ACP and identify airspace required for future joint operations, along with the procedures for obtaining access to that airspace. Airspace planning should also anticipate and establish procedures for the transition of ACA from the HN to the joint force.

COMPETE

While the shaping phase of a joint operation entails normal activities may have deterrent value, deterrence operations typically initiate upon the issuance of an OPLAN or OPORD and entail activities designed to demonstrate joint force capabilities and resolve to prevent

[30] For additional information on airspace control lead agent responsibilities and activities, see JP 3-52, *Joint Airspace Control.*

undesirable adversary action. The transition to deterrence operations 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.

Largely characterized by preparatory actions, operations designed to produce deterrent effects also 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 permissions, and assigning joint force airspace liaison personnel to DoS, US embassies, multinational, or HN organizations to coordinate airspace requirements for subsequent phases of the operation. Liaisons can facilitate the timely exchange of airspace control information, especially in a multinational environment where language barriers may impede communication necessary for safe and effective airspace control.

The JFACC (acting as ACA and AADC) may establish a dedicated AMT to finalize the ACP, develop ACOs for current and future operations, and provide inputs to the JAOP and AADP. The ACP and AADP should complement each other and enable an orderly transition from assurance and deterrence operations to combat operations. The JFACC may:

- Coordinate with the JFC, components, interagency, multinational, and HN 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, JAOC 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, AIPs, and ICAO Notices to Airmen system (NOTAMS) availability to support inter-theater dissemination of flight operating information and USAF and FAA flight check aircraft for air traffic facility inspection.
- Identify ACS components and structures desired for post-combat operations. Consider placing critical components of the enemy ACS on the restricted target list to preserve them for future use.

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 HN, in whose airspace the operations take place (when appropriate), and with civil air activities occurring 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 HN agreements that could impact air operations and should identify any new requirements to negotiate and formalize with the HN. HN agreements concerning airspace control may only be negotiated by authorized personnel IAW applicable law, policy, and instructions.

ARMED CONFLICT/WAR

The JFC's initiative or an enemy attack can trigger the transition from adversarial competition to armed conflict. Airspace rules and organizations are altered during combat operations, and the ACP should provide clear instructions for transitioning from peacetime to combat, including airspace control concepts and procedures for potentially degraded operations. Airspace planners should be involved in the development of the MAAP to enable adequate airspace to be allocated for combat operations and an effective transition from peacetime to combat airspace control.

At the start of combat operations, civil aviation operations should be excluded from the affected JOA. Notifying adversaries of impending changes to airspace control should be avoided, so the timing for airspace transition to potential combat should be carefully considered. Advanced or open notification of airspace changes should be integrated into information operations for operations security or military deception purposes.

During the initial stages of combat, effective airspace control requires an understanding of the OPLAN, JFC intent, airspace environment, and requirements for effective control. The JFACC is typically the supported commander for the theater-wide counterair effort, integrating OCA and DCA (as the AADC) to gain control of the air. More control of the air domain may be necessary for simultaneous operations against enemies with a credible AMD threat, and efforts to achieve control of the air may progress sequentially in the early stages.

Operating airborne systems with limited identification and communications equipment can increase the risk of enemy air and missile attacks and friendly fire incidents. The ACP may restrict friendly military and civil airspace users until air superiority is achieved. Specific airspace measures are required for mission-essential systems with limited identification or autonomous sense-and-avoid capability.

Once the desired degree of control of the air is achieved, the JFC may allow increased operations by airborne systems with limited identification and communications capabilities. A theater-wide common operational picture (COP) can contribute significantly to AMD and airspace control. The JFC's ACP may employ fewer restrictions on certain systems visible on the airspace COP. Other systems with less capable identification and communications equipment may require more restrictions and coordination.

THEATER AIR CONTROL SYSTEM (TACS)

During the initial stages of major operations, in place ACS assets may be predominantly airborne (e.g., AWACS and Navy E-2C/D Hawkeye). Elements such as ASOC and CRC may not be fully deployed due to cargo transport constraints. When this occurs, airborne elements of the TACS and NTACS should accomplish C2 functions until the full TAGS is established.

Planning for follow-on basing of the TACS/TAGS should occur before or during the early stages of combat and be coordinated with other components and multinational forces (including SOF). Failure to conduct this planning may prevent critical ACS elements from

deploying to the theater in a timely manner and can result in a less-than-optimum long-term airspace control capability. When land or maritime AOs are established, key C2 nodes may move forward to support the JFLCC, JFMCC, SOF, or task forces. Airspace control elements in direct support of the JFLCC, JFMCC, SOF, and task force 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.

INTEGRATION WITH AMD OPERATIONS

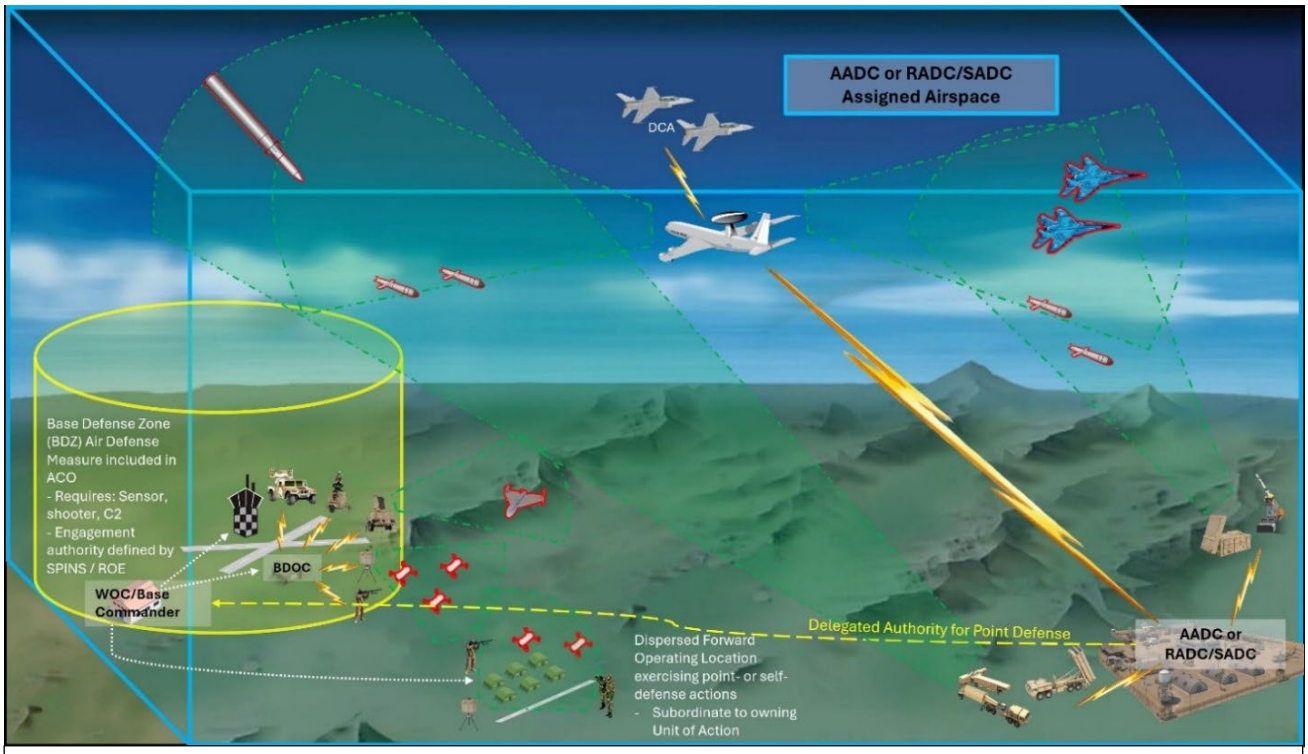
The JFACC, acting as the ACA and AADC, normally unifies airspace control and AMD functions within the JOA. This integration ensures deconfliction of these two functional areas and enables prioritization and integration of air assets. Integrating the airspace control function with AMD operations is critical during initial efforts to gain control of the air. Effective airspace control procedures assist with aircraft and missile identification, facilitate engagement of enemy aircraft and missiles, and provide safe passage of friendly aircraft.

The AADC 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 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.

Emerging threat systems such as small UAS and loitering munitions represent a rapidly evolving and broadly proliferated air defense challenge. Effective defense against these threats requires integration of airspace control and AMD functions. Component active air defense systems employed to protect personnel, facilities, and assets require detailed coordination with the ACA and AADC. With appropriately delegated authorities, air base commanders may execute AMD for their installations using organic capabilities and approved airspace structures (e.g., a base defense zone [BDZ] ADM published in the ACO with engagement authorities defined by ROE and SPINS). Point defense of air bases is integrated into the broader IAMD system under the JFC and AADC when in operational theaters.

In the notional IAMD example depicted in the figure below, the USAF base commander is delegated authority, via the ACO and AADP, to employ organic point defense capabilities inside a BDZ. In this example, the base commander plans, directs, integrates, coordinates, and controls point defense activities through the base defense operations center (BDOC) as the focal point for base defense and security.[31]

[31] For additional information on base defense operations centers, see JP 3-10, *Joint Force Protection.*



Air Base Point Defense within a Notional IAMD Construct

AMD AND AIRSPACE CONTROL IN THE AOC

Airspace control and AMD functions are integrated into the AOC's combat plans and combat operations divisions. In the combat plans division, C2 plans officers integrate AMD 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 AMD operations respectively.[32]

INTEGRATION WITH LAND AND MARITIME 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 to this effort. Each surface component's AO may be defined with specific boundaries. These boundaries are normally defined by FSCMs such as a CFL, MCMs such as FLOT or forward boundary, ACMs, or multiples of these during nonlinear operations.

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 JAOC, the Army's BCD monitors and interprets the land battle for the JFACC's staff. The Army Air and Missile Defense Command (AAMDC) also helps integrate Army AMD capabilities supporting DCA operations. Airspace planners in the SOLE also keep the

[32] See AFTTP 3-2.17, *MTTP for the Theater Air-Ground System,* for additional information.

JFACC's staff abreast of their ongoing surface operations.[33]

When one or more land and/or surface component commanders become supported commanders for their AOs, the ACS should be modified to meet this mission. The JFACC normally remains the supported commander for strategic attack, counterair, air interdiction (outside a land or maritime AO), personnel recovery, airborne ISR, and may be a supporting commander for other missions, such as CAS. Airspace management in support of maritime component operations may involve airspace sanitization, target prosecution, deconfliction of air-to-surface and surface-to-surface fires, and locating surface contacts. The ACP should acknowledge this transition and guide integration of airspace control elements from other component commanders. The JFACC (as the ACA) should consider the following when creating the operational transition portion of the ACP:

- The C2 plan for the initial employment of ground forces.
- Adequate level of theater communications required 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 AOC, Marine DASC, 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 FIRE SUPPORT

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

The JFACC, working with the JFC and other components, should identify the risk of combining fires and aircraft operations (manned and unmanned). Such concerns are heightened during the 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 guidelines 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 (such as small UAS and loitering

[33] See JP 3-09, *Joint Fire Support*, for additional information.

munitions), 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 JFACC normally serves as the supported commander for the JFC's overall air interdiction effort. Airspace control, including deconfliction with fires, is critical to the success of interdiction. The JFACC should ensure common reference systems and TTPs to support and enable interdiction are established. The JFACC should advise the JFC and clearly define these reference systems and TTPs in the ACP, ACO, and SPINS. These plans should 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 indirect fires in the JFLCC and JFMCC AOs. Indirect fire systems are considered 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 CMs (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. When possible, fires planning should be done early to enable air planners to build their routes around planned restricted airspace due to surface-to-surface missile systems (SSMS) and other FSCMs. Numerous deconfliction measures are available to address 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.[34]

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, ACP and SPINS should direct the deconfliction of service, joint, and multinational UA platforms operating at all altitudes. Unlike their manned counterparts, the vast majority of UA do not have onboard sense-and-avoid capabilities. Therefore, other means of aircraft separation should be employed to reduce the risk of mid-air collisions.

[34] See AFTTP 3-2.68, *MTTP For Airfield Opening,* for additional information.

INTEGRATION OF 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 OE. Part of this intelligence preparation includes information gained using ISR platforms. Airborne ISR platforms (including small UAS) 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 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 may add complexity to airspace control operations and may delay fire support to forces on the ground.[35]

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 ACMs 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.[36]

POST COMBAT OPERATIONS

Operations to enable civil authorities are predominantly characterized by joint force support to legitimate civil governance in theater. The joint force performs key airspace control functions as the delegated ACA or as a supporting airspace control service provider under the HN's aviation authority. The JFACC can expect frequent coordination and interaction on airspace issues with HN, multinational, interagency, and other airspace users. During enabling operations, the JFACC is typically 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 HN and other agencies, beyond the termination of the joint operation, may be required to achieve the desired end state.

Enabling operations could be characterized by a normal transition from stability operations or joint force support to a humanitarian relief effort, natural disaster, or other catastrophic event. During such operations, HN aviation regulations and guidance are the authoritative source for airspace control procedures. To the maximum extent possible, original HN aviation and airspace documents should be used by the joint force to comply with HN aviation authority

[35] See AFDP 2-0, Intelligence, and JP 2-0, Joint Intelligence, for additional information.
[36] See JP 3-18, *Joint Forcible Entry Operations,* for additional information.

intent. If derivative HN 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 referred to the source document. In situations where HN procedures are modified by the military for airspace access or use, HN authorities should be consulted and provide appropriate approval of the deviation. Formal agreement or understanding should be coordinated between joint forces and the HN authority to enable clarity on exact airspace control responsibilities. Frequent and extensive coordination among the joint force, HN, and other agency personnel on airspace control issues may require physical proximity of staff organizations or use of liaisons.

JFC AIRSPACE CONTROL ASSETS IN SUPPORT OF THE HOST NATION

Based on the level of required support, airspace control personnel may be required to deploy service-specific controllers, ACSs, liaisons, or trainers to support HN authorities. Senior air component staff personnel should ensure an agreement with the HN authorizing DoD personnel or equipment to provide air traffic services in sovereign HN airspaces. Joint force personnel may be required to use systems provided by the HN or other agencies. Joint force personnel may also be embedded with HN 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 HN authority.

Setting the conditions and milestones for the relief of joint forces and the re-establishment of effective HN airspace control is crucial for successful termination of joint operations. HNs with limited capabilities may attempt to rely on joint forces for long-term airspace control functions and divert state resources to other higher priority HN programs. In such situations, NGOs or contracted services may provide a bridging alternative to perform airspace control functions instead of joint forces until the HN is prepared to accept them.

INTERAGENCY CONSIDERATIONS

Interagency coordination and the development of airspace transition milestones are necessary to reduce friction among the JFC, US Government, and international and HN 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 HN ACS. However, the JFACC may have to assume this leadership role, especially in seriously degraded or failed state scenarios. The joint force may be required to provide training for HN personnel to enable a successful transition to HN airspace control. The JFACC's responsibilities as the acting HN ACA should be detailed in delegation documents from the HN and referenced in the HN AIP.

TRANSITION CRITERIA

To set conditions for ACA transfer to the HN government, threats to friendly air operations should be reduced and sufficient JOA security should be established. During this phase, the airspace environment is dynamic, and levels of stability may vary significantly. The JFACC should continually balance operational requirements against increased civil airspace access needs before transfer of ACA authority to a legitimate HN entity.

Reduced military control of airspace may result in decreased flexibility for operations with increased coordination and approval requirements from the HN. Primary transition planning criteria include:

- Sufficient effectiveness and efficiency of HN airspace control capabilities prior to transition.
- Transition to installation of commercial ACSs.
- Consolidation and reduction of JFC manpower and systems footprint.
- Use of contracted airspace control capabilities.
- Joint force ACS linkage to HN systems.
- Leveraging HN capabilities and systems.
- Transfer of contracts or excess systems to the HN.
- 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 HN 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 HN agencies or NGOs. As major operations end, and conflict transitions to a legitimate post-conflict government, military operations, including irregular warfare, may continue to reduce the military or political threats to a level the HN can manage. The full transition is unlikely to occur immediately and will typically unfold through an iterative and deliberate process. During the transition, the joint force may be required to operate and maintain the ACS until HN entities are capable. The JFACC 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 HN or contract personnel, or operation of airspace control infrastructure systems.

Unless destroyed or deemed ineffective, the pre-conflict HN airspace control structure (civilian or military) provides the baseline for end-state HN ACS capabilities. HN ACS simplicity and basic effectiveness should be the transition plan's primary goal. In most cases, to prevent excessive requirements or delays, the JFACC should prioritize ACS requirements ahead of other aviation related issues such as airfield construction or certification issues. The HN, or other supporting agencies, may desire to modify or upgrade the ACS, thereby increasing transition timelines. Ideally, HN airspace control infrastructure end-state capabilities should meet minimum ICAO certification requirements and ensure HN airspace sovereignty. Interim transfer of airspace control to HN military forces or contracted airspace control services should be considered to allow the redeployment of joint airspace control forces.

The ACP should address airspace access criteria for NGO, military, and civil airspace priorities, and identification and acceptance of associated civil airspace operating risks. When

the transition to HN governmental operations is anticipated, a thorough review of all written guidance should be conducted. Documents such as the JAOP, ACP, AADP, SPINS, ROE, AIPs, 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 AMD, joint fires, and civil aviation. Use of military liaison teams embedded in HN airspace control facilities may be required to ensure adequate coordination and representation of continuing joint force airspace requirements. Civil documents that govern the HN 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 HN and adjacent nations to enable effective AMD 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's 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 DoS, FAA, ICAO, or a contracted agency should be considered to assist with the establishment of HN capabilities. The RAMCC can play a critical role during transition as the volume of non-military traffic increases (see Appendix C).

CHAPTER 6: 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, § 106 of the U.S. Code (USC), *FAA*. 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). In the interest of national defense, the administrator establishes airspace areas by regulation or order and restricts or prohibits certain flights of civil aircraft in those areas. Title 5, USC., § 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 IAW 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 IAW Title 49 USC, § 40107, Presidential Transfers, and Executive Order 11161, as amended.

NORAD, USNORTHCOM, CONR, AND AFNORTH

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 AOR overlap within the homeland. The continental US NORAD region (CONR) and 1st Air Force (Air Forces Northern [AFNORTH]) combine to function as part of the US TACS.[37] Additionally, AFNORTH works with other service components and commands collaborating within a civilian interagency environment composed of government and civilian organizations (e.g., FAA, Federal Emergency Management Agency, US Secret Service), 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.[38]

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 the USNORTHCOM commander and the JFACC (usually the AFNORTH 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

[37] As a Component Numbered Air Force, First Air Force presents forces to USNORTHCOM as AFNORTH.
[38] See JP 1, Volume 2, *The Joint Force, Ch IV,* and Title 10 USC*, § 162*, *Combatant Commands,* for additional information.

prepare a plan to support the employment of DoD forces to provide DSCA IAW 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 is the first military organization engaged at the state level in an incident area. The AFNORTH commander, as the supporting air commander, provides AOC capabilities and liaison support to state headquarters and interagency partners and negotiates command arrangements to ensure unity of effort before Title 10 forces are introduced into a JOA.[39]

The ACA (AFNORTH Commander) 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 be designed to coexist with civilian operations. Airspace deconfliction and coordination are accomplished through the AOC and approved by the FAA.[40]

EMERGENCY SECURITY CONTROL OF AIR TRAFFIC (ESCAT)

ESCAT is an emergency preparedness plan of the US that prescribes the joint action to be taken by appropriate elements of the DoD, FAA, and Federal Communications Commission in the interest of national security to effectively control air traffic and air navigation aids under emergency conditions. The implementation of ESCAT is intended to meet threat situations.[41]

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 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. When employed, AFNORTH exercises tactical control (TACON) of assets supporting IAA missions. Additionally, if the DSCA mission requires, AFNORTH assists USNORTHCOM in assessing the need for dynamic terminal or TACON 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.

[39] See AFDP 3-27, *Homeland Operations*, for additional information.
[40] See JP 3-27, *Homeland Defense*, JP 3-28, *Defense Support of Civil Authorities*, and AFDP 3-27, for additional information.
[41] For additional information on ESCAT, see Title 32 Code of Federal Regulations part 245.

ELECTROMAGNETIC SPECTRUM (EMS) MANAGEMENT

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) IAW Title 47 USC, Telecommunications. As such, the NTIA's Interdepartmental Radio Advisory Committee through the military Services, regulates use IAW the NTIA's *Manual of Regulations and Procedures for Federal Radio Frequency Management*. This presents additional, sometimes more complex, EMS access and coordination requirements.

APPENDIX A: SAMPLE AIRSPACE CONTROL PLAN

The following is a notional format of an ACP. Details vary by operation and theater.

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 AIRSPACE CONTROL ORDER (ACO) IS IN EFFECT

Time Zulu (Z)-Time Z (Time Local [L] Time-L) EACH DAY, COINCIDING WITH THE AIR TASKING ORDER (ATO) EFFECTIVE TIMES. DOCUMENT LENGTH: X PAGES.

THIS DOCUMENT IS UNCLASSIFIED.

REFERENCES:

JP 3-0, Joint Campaigns and Operations, DD MMM YY.

JP 3-01, Joint Countering Air and Missile Threats, DD MMM YY.

JP 3-09, Joint Fire Support, DD MMM YY.

JP 3-30, Joint Air Operations, DD MMM YY.

JP 3-52, Joint Airspace Control, DD MMM YY.

JP 5-0, Joint Planning, DD MMM YY.

AFTTP 3-3.AOC, Combat Fundamentals - Air Operations Center, MMM YY.

AFTTP 3-2.17, Multi-Service Tactics, Techniques and Procedures for the Theater Air Ground System, MMM YY.

AFTTP 3-2.78, Multi-Service Tactics, Techniques, and Procedures for Airspace Control, MMM YY.

AFTTP 3-2.68, Multi-Service Tactics, Techniques, and Procedures for Airfield Opening, MMM YY.

[Operation name] AIRSPACE MASTER DATA BASE, DAILY AIRSPACE CONTROL ORDER (ACO), ACM REQUEST 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

BRAVO: Special Procedures

CHARLIE: Points of Contact

DELTA: Functional Responsibilities

ECHO: Coordination Measure Request/ACO Promulgation Procedures

FOXTROT: ATC Services and Equipment

GOLF: Abbreviations and Definitions

HOTEL: Coordination Measures

JULIET: Diagrams of Coordination Measures

SECTION ALPHA: BASIC PLAN

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

A2. DEFINITION OF AIRSPACE CONTROL

A2.1. OBJECTIVE: To enhance air, land, maritime, and special operations force effectiveness in accomplishing joint force commander (JFC) objectives. This is accomplished with the maximum allowable freedom to airspace users consistent with the JFC's airspace control risk guidance. Airspace control includes coordinating, integrating, and regulating airspace to increase operational effectiveness, however, the airspace control authority (ACA) does not have the authority to approve, disapprove, or deny combat operations.

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

A2.2.1. Procedural control is a method of airspace control which relies on a combination of previously agreed on and promulgated orders and procedures.

A2.2.2. Positive control is a method of airspace control that relies on positive identification, tracking and direction of aircraft within an airspace, conducted with electronic means by an agency having the authority and responsibility therein.

A3. PRIMARY AIRSPACE CONTROL RESPONSIBILITIES

A3.1. JFACC: Designated by JFC to accomplish missions and tasks assigned by the JFC to meet JFC objectives. [Rank, Name, Office] IS DESIGNATED AS THE [Operation Name] JFACC.

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

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

A3.3. Airspace users: Any user of airspace, including operators of aircraft, UA, artillery, missiles, or other flying objects. Airspace users will adhere to airspace guidance promulgated in the ACP, ACO or SPINS while operating within the [Operation Name] operational area. Airspace users will adhere to host nation ATC procedures while operating outside of the [Operation Name] operational area.

A.4. JFC AIRSPACE CONTROL RISK GUIDANCE

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

Notional Joint Force Commander Airspace Control Risk Guidance

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

SECTION BRAVO: SPECIAL PROCEDURES

B.1. TRANSITION FROM PEACETIME TO MILITARY AIRSPACE CONTROL.

B.2. COORDINATING ALTITUDE (CA) and COORDINATION LEVEL (CL).

B.3. HANDOVER PROCEDURES.

B.4. ROTARY WING/TILT ROTOR PROCEDURES.

B.5. TRANSITION ALTITUDE.

B.6. SPECIAL USE AIRSPACE.

B.7. DEGRADED OPERATIONS.

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

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.

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

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 MEASURE SUBMISSION RESPONSIBILITIES AND PROCEDURES.

E.3. ACO PROMULGATION/DISSEMINATION PROCEDURES.

SECTION FOXTROT: ATC SERVICES AND EQUIPMENT

F.1. CONTROL TOWER SERVICES.

F.2. RADAR SERVICES.

F.3. NAVIGATIONAL AIDS.

F.4. COMMUNICATION REQUIREMENTS.

F.5. ATC SERVICES.

F.1. F.6. AIRPORT INFORMATION.

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

SECTION HOTEL: COORDINATION MEASURES

H.1. INTRODUCTION.

H.2. AIRSPACE CONTROL DEFINITIONS AND PROCEDURES.

H.3. COORDINATION MEASURE DECONFLICTION PROCEDURES.

H.4. AIRSPACE NAMING CONVENTIONS.

H.5. CM TYPES. (IAW US message text format (USMTF)

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/COORDINATION 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 military airlift, special operations, and other Services, along with United Nations or other peacekeepers, humanitarian relief organizations, HN, or multinational 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 operational complexity that undermine the operation unless integrated air traffic management measures are implemented.

The RAMCC[42] 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) and, as applicable, ATC separation capability. With RAMCC scheduling in effect, all US military aircraft operating in the control area should 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 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. Despite gaining 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.

[42] Different DoD doctrine publications define the RAMCC as both a "control center" as well as a "coordination center." In the interest of multinational relations and to prevent concerns regarding ownership and sovereignty of foreign airspace, overseas RAMCCs typically use the "coordination center" nomenclature.

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 multinational 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 multinational 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.

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- AFDP 3-0.1, *Command and Control*
- AFDP 3-01, *Counterair Operations*
- AFDP 3-03, *Counterland Operations*
- AFDP 3-27, *Homeland Operations*
- AFDP 4-0, *Combat Support*
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JOINT DOCTRINE

- JP 1, Volume 2, *The Joint Force*
- JP 2-0, *Joint Intelligence*
- JP 3-0, *Joint Campaigns and Operations*
- JP 3-01, *Countering Air and Missile Threats*
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- JP 3-14, *Joint Space Operations*
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- JP 3-85, *Joint Electromagnetic Spectrum Operations*

TACTICAL DOCTRINE

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- AFTTP 3-2.31, *MTTP for Air and Missile Defense*
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- AFTTP 3-2.68, *MTTP for Airfield Opening*
- AFTTP 3-2.78, *MTTP for Airspace Control*

Air Force Weapon System TTPs (AFTTPs)

- AFTTP 3-3.AOC, *Combat Fundamentals, Air Operations Center (AOC)*
- AFTTP 3-3.TACS, *Combat Fundamentals, Theater Air Control System (TACS)*

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