

# **FM 3-52**

## **AIRSPACE CONTROL**

**FEBRUARY 2013**

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# Airspace Control

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## Preface

Field manual (FM) 3-52, *Airspace Control*, provides commanders, staff officers, and airspace element personnel with tactics essential for the exercise of airspace control. Using the backdrop of the Army air-ground system (AAGS), the Army component of the theater air-ground system (TAGS), and the operations process, the manual addresses roles and responsibilities, by echelon, between Army and air support agencies of other Services in the planning, preparation, execution, and assessment of airspace use.

The principal audience for FM 3-52 is commanders, leaders, and staffs across all Army echelons with responsibilities for airspace control, airspace element personnel, controllers, and airspace users from tactical to operational levels. Trainers and educators throughout the Army will also use this manual.

Commanders, staffs, and subordinates ensure their decisions and actions comply with applicable U.S., international, and, in some cases, host-nation laws and regulations. Commanders at all levels ensure their Soldiers operate in accordance with the law of war and the rules of engagement. (See FM 27-10.)

FM 3-52 implements the standardization agreement entitled Allied Joint Publication-3.3.5.

FM 3-52 uses joint terms where applicable. Selected joint and Army terms and definitions appear in both the glossary and text. Definitions shown in the text have the term italicized and the number of the proponent publication following the definition.

This manual uses the terms *command and control* and *command and control system* as defined in Joint Publication (JP) 1 and JP 6-0, respectively, when referring to joint or other Service processes. This manual uses the term *mission command* when referring to U.S. Army processes.

FM 3-52 applies to the Active Army, Army National Guard (ARNG)/Army National Guard of the United States (ARNGUS), and the United States Reserve (USAR) unless otherwise stated.

The proponent for FM 3-52 is the United States Army Combined Arms Center. The preparing agency is the Combined Arms Doctrine Directorate, United States Army Combined Arms Center. Send comments and recommendations on DA Form 2028 (Recommended Changes to Publications and Blank Forms) to Commander, U.S. Army Combined Arms Center and Fort Leavenworth, ATTN: ATZL-MCK-D (FM 3-52), 300 McPherson Avenue, Fort Leavenworth, KS 66027-2337; by e-mail to: [usarmy.leavenworth.mccoe.mbx.cadd-org-mailbox@mail.mil](mailto:usarmy.leavenworth.mccoe.mbx.cadd-org-mailbox@mail.mil); or submit an electronic DA Form 2028.

# Introduction

FM 3-52, *Airspace Control*, updates the previous 2002 version of FM 3-52 to reflect lessons learned through recent operational experience and to adapt to the Army's new operational concept of unified land operations covered in Army Doctrine Publication (ADP) 3-0 and Army Doctrine Reference Publication (ADRP) 3-0. Two significant changes occur from the previous manual. First, this version shifts the emphasis from Army airspace command and control as a centralized coordination activity to an airspace control process designed to maximize operational effectiveness and increase the flexible use of airspace. The central idea of this publication reflects the Army's role within a larger framework (unified action) and its focus on maximum flexibility through a philosophy of mission command and an operations process approach. The other significant change from the previous FM 3-52 is that the organization of this manual reflects the operations process as the overarching framework for exercising airspace control.

To fully comprehend the doctrine contained in FM 3-52, readers must first understand how the Army conducts operations as described in the 3-0 doctrinal series; the 6-0 doctrinal series; the 5-0 doctrinal series; and doctrine for joint airspace control as described in JP 3-52.

Army forces operate as part of a larger national effort characterized as unified action. Army commanders understand that they do not operate independently but as part of a larger force. They integrate and synchronize their actions and operations within this larger framework, collaborating with entities outside their direct control. Just as commanders manage terrain throughout their area of operations, they continuously collaborate with unified action partners to integrate the use of airspace.

The joint term *airspace control* has replaced the term *Army airspace command and control*. Army commanders exercising airspace control for Army forces aim to integrate all airspace users while minimizing adverse impacts.

The Army refers to its system for coordinating and integrating all airspace use as the Army air-ground system. The Army air-ground system, a component of the theater air-ground system, provides for interface between Army and tactical air support agencies of other Services in the planning, preparation, execution, and assessment of airspace use. Army forces use the principles of airspace control, which complement joint airspace control principles, to integrate all airspace users.

Airspace planning focuses on setting conditions for near-real-time airspace control during mission execution thereby providing commanders flexibility while reducing risk. Airspace elements provide airspace control subject matter expertise in the planning process.

As in planning, airspace element personnel play an integral role in preparation activities that a unit performs as it transitions from planning to execution. This is particularly relevant as it relates to improving situational understanding and developing a common understanding of the plan.

During execution, near-real-time airspace control requires airspace elements and users to continually monitor and assess the operations of all airspace users in support of their mission as well as those transiting through the air over their ground area of operations. This continuous assessment provides situational understanding in the command post and enables units to react to situations requiring immediate use of airspace.

Airspace elements assist commanders in assessing airspace operations. Airspace elements continuous assessment of operations enables identifying shortcomings in key airspace planning documents. Based on these shortcomings, airspace elements recommend needed adjustments to establish the conditions for future operations.

The four chapters and their associated seven appendixes constitute the doctrinal framework for the Army's use of airspace within the joint force commander's theater air-ground system. This framework leverages all the qualities of detailed airspace planning. It also focuses on the dynamic integration of all airspace users during execution. The framework ensures users follow the joint force commander's and the combined arms commander's (battalion through theater army) intent, priorities, and risk guidance. Lastly, the framework describes how Army capabilities—resident down to brigade level—expand airspace control options for the airspace control authority and for the joint force commander.

## Chapter 1

# Airspace Control Operational Context

This chapter refreshes the leader's understanding of the relationships. It discusses the nature of unified land operations and unified action. Then it discusses airspace in operational environments with joint airspace control. Next, it discusses theater air-ground system and methods of control. Lastly, it discusses airspace control through mission command and the operations process.

### UNIFIED LAND OPERATIONS AND UNIFIED ACTION

1-1. For Army forces, airspace control primarily aims to integrate airspace users during planning and in near-real-time execution. Integration is one of the principles of unified land operations. Army commanders must integrate their actions and operations in the airspace over an area of operations within the larger framework of unified action. This integration occurs in accordance with the commander's intent, priorities, and acceptable levels of risk. Successful integration maximizes all airspace users' capabilities while minimizing adverse impacts.

1-2. Army forces conduct unified land operations as part of a larger national effort called unified action. *Unified action* is the synchronization, coordination, and/or integration of the activities of governmental and nongovernmental entities with military operations to achieve unity of effort (JP 1). (See JP 3-0 for more information on unified action.) Unified land operations are how the Army seizes, retains, and exploits the initiative to gain and maintain a position of relative advantage in sustained land operations to set the conditions for favorable conflict resolution. This is accomplished through the simultaneous combination of offensive, defensive, and stability operations that set conditions for favorable conflict resolution. The Army's two core competencies—combined arms maneuver and wide area security—provide the means for balancing the application of Army warfighting functions within the tactical actions and tasks inherent in offensive, defensive, and stability operations. (See ADP 3-0 and ADRP 3-0 for more information on unified land operations.)

1-3. Unified land operations acknowledges that strategic success requires fully integrating U.S. military operations with the efforts of interagency and multinational partners. As such, Army leaders integrate their actions and operations within this larger framework, collaborating with entities outside their direct control. This requirement to integrate actions is present at all echelons.

### AIRSPACE IN OPERATIONAL ENVIRONMENTS

1-4. Army forces conduct unified land operations in operational environments that are complex, ever changing, and uncertain. An *operational environment* is a composite of conditions, circumstances, and influences that affect the employment of capabilities and bear on the decisions of the commander (JP 3-0). An operational environment includes physical areas (air, land, maritime, space, and cyberspace domains) and the information environment. (See ADRP 3-0 for more information on an operational environment.)

1-5. Army forces are assigned an area of operations by the joint force commander. An *area of operations* is an operational area defined by the joint force commander for land and maritime forces that should be large enough to accomplish their missions and protect their forces (JP 3-0). For land operations, an area of operations includes subordinate areas of operations as well. The Army or land force commander is the supported commander within an area of operations designated by the joint force commander. Within their areas of operations, commanders integrate and synchronize the elements of combat power. To facilitate this integration and synchronization, commanders have the authority to designate targeting priorities, effects, and timing.

1-6. Airspace is a component of an operational environment critical to successful Army or land operations. Army forces use airspace over an area of operations to—

- Collect information.
- Conduct air operations.
- Deliver direct and indirect fires.
- Conduct air and missile defense.
- Conduct sustainment.

1-7. Airspace is not owned by individual subordinate organizations in the sense an assigned area of operations confers ownership of the ground. Airspace over an Army area of operations remains under the purview of the joint force commander (JFC). Other military and civilian organizations operating in the joint operations area have airspace requirements over an Army area of operations. These organizations may require airspace to—

- Conduct joint air operations.
- Conduct area air defense.
- Deliver joint fires.
- Conduct civil air operations (see appendix G).

1-8. Other commanders with a mission encompassing the joint operations area have the latitude to plan and execute these operations in the airspace over an Army area of operations. Commanders with such a mission must coordinate the operation to avoid adverse effects and fratricide. If those operations would have an adverse impact within an Army or land area of operations, the commander assigned to execute functions that extend across the joint operations area must readjust the plan, solve the problem, or consult with the JFC for resolution.

## JOINT AIR OPERATIONS

1-9. Normally, the JFC designates a joint force air component commander (JFACC) to synchronize the joint air effort. Components retain organic capabilities (sorties) to accomplish missions assigned by the JFC. Components also make capabilities (sorties), either JFC directed or excess, available to the JFC for tasking by the JFACC. Generally, Army capabilities (sorties) are never made available to nor directed by the JFC for tasking by the JFACC. The JFACC plans for and tasks only those joint capabilities (sorties) made available to the JFC for tasking by the JFACC. The JFACC has the authority to direct and employ these joint capabilities (sorties) for a common purpose based on the JFC's concept of operations and air apportionment decisions. (See JP 3-30 for more information on joint air operations.)

1-10. The responsibilities of the JFACC, the area air defense commander (AADC), and airspace control authority (ACA) are interrelated and the JFC normally assigns them to one individual for unity of effort. These responsibilities are normally assigned to the JFACC. Designating one Service component commander as the JFACC, AADC, and ACA often simplifies the coordination required to develop and execute fully integrated air operations.

## AREA AIR DEFENSE

1-11. The AADC oversees defensive counterair (DCA) operations, which include both air and missile threats. The AADC identifies airspace coordinating measures (ACMs) that support and enhance DCA operations, identifies required airspace management systems, establishes procedures for systems to operate within the airspace, and incorporates them into the airspace control system. (See JP 3-01 for more information on the AADC.)

## JOINT FIRES

1-12. *Joint fires* are fires delivered during the employment of forces from two or more components in coordinated action to produce desired effects in support of a common objective (JP 3-0). Often each Service component commander has airspace requirements that require close coordination and integration with another area of operations commander. (See JP 3-09 for more information on joint fires.)

## CIVIL AIR TRAFFIC CONTROL

1-13. Typically, civilians use airspace alongside ongoing military operations. Civilian airliners, nongovernmental organizations, and relief agencies require airspace to continue their operations. They must have the ability to coordinate their activities with military airspace users. (See aeronautical information publications—known as AIPs—published by the host nation.)

## JOINT AIRSPACE CONTROL

1-14. Competing airspace users balance the demands for and integrate their requirements for airspace. *Airspace control* is a process used to increase operational effectiveness by promoting the safe, efficient, and flexible use of airspace (JP 3-52). Airspace control increases combat effectiveness while placing minimum restraint upon airspace users.

1-15. The JFC is responsible for airspace control in the joint operations area. JFCs establish command relationships and direct and guide subordinate commanders. They organize forces to accomplish the mission based on their visions and a concept of operations. They develop this concept of operations with their Service component commanders and supporting organizations. Their direction and guidance enable effective spans of control, responsiveness, tactical flexibility, and protection.

1-16. To help balance the various airspace user demands, the JFC usually designates an ACA responsible for establishing an airspace control system. An *airspace control system* is an arrangement of those organizations, personnel, policies, procedures, and facilities required to perform airspace control functions (JP 3-52). The JFC tasks the ACA to assume overall responsibility for operating the airspace control system in the airspace control area. The ACA, working with the other components, develops policies and procedures for all airspace users. In addition, the ACA establishes an airspace control system that coordinates and integrates airspace use under JFC authority.

1-17. The ACA approves, amends, or disapproves airspace requests according to the JFC's guidance and objectives. The ACA does not have the authority to approve, disapprove, or deny combat operations. That authority is only vested in operational commanders. If the ACA and an affected Service component commander cannot agree on an airspace issue, they refer the issue to the JFC for resolution. (See JP 3-52 for more discussion on the ACA.)

## THEATER AIR-GROUND SYSTEM

1-18. The theater air-ground system (TAGS) is the sum of the component systems that support the airspace control system. The TAGS links decisionmakers and command posts from all components. The ACA may delegate authority to control an assigned volume of airspace to elements of the TAGS. (For more information on the TAGS, see FM 3-52.2.)

1-19. The Army component of the TAGS is the Army air-ground system (AAGS). The AAGS provides for interface between Army and air support agencies of other Services in the planning, preparation, execution, and assessment of airspace use.

1-20. The AAGS is the Army's system for coordinating and integrating all airspace use. The AAGS enables Army commanders and staffs to coordinate and integrate the actions of Army airspace users over the area of operations regardless of whether they have been assigned airspace control responsibility for a volume of airspace. AAGS also provides Army commanders the ability to control volumes of airspace when delegated control authority by the ACA. There are two methods of control, positive and procedural.

## METHODS OF CONTROL

1-21. Army commanders and staffs utilize positive control methods, procedural control methods, or a combination of both methods. When delegated control authority by the ACA, the Army procedurally controls assigned airspace—for example, the airspace up to the coordinating altitude—and may use positive control for small volumes of airspace.

1-22. While the Army's airspace control methodology emphasizes procedural control of airspace use, it includes the flexibility to utilize positive control or a combination of the two throughout a commander's area of operations. For example, within a commander's area of operations, small areas of positive control as well as large areas under procedural control exist. In areas requiring positive control, air traffic services units provide positive airspace control. For all other areas, airspace users use procedural control. Current technology enables procedural control to be flexible and responsive allowing rapid airspace adjustments. There may be portions of an area of operations where preplanned airspace coordinating measures and procedures are the sole means of procedural control. This can result from a lack of communications (voice or digital) or electronically aided situational awareness due to terrain, mission profile, distance, or adversary actions to degrade the network.

### POSITIVE CONTROL

1-23. *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 (JP 3-52). Army air traffic service units train, man, and equip to perform positive control and establish and operate airfields and tactical landing sites.

### PROCEDURAL CONTROL

1-24. *Procedural control* is a method of airspace control which relies on a combination of previously agreed and promulgated orders and procedures (JP 3-52). Procedural control should be uncomplicated and understood by all aircrew members, air traffic control personnel, air defense and fires weapon system operators, and airspace element personnel. In addition to air traffic service personnel, the airspace elements in the AAGS are organized, trained, and equipped to ensure Army forces can provide near-real-time procedural control and balance airspace control system requirements with mission command.

## AIRSPACE CONTROL AND MISSION COMMAND

1-25. Mission command is essential to the effective conduct of operations. Through mission command, commanders initiate and integrate all military functions and actions toward a common goal—mission accomplishment. Mission command is both a philosophy of command and a warfighting function. (See ADP 6-0 and ADRP 6-0 for more discussion of mission command.) *Mission command* as a philosophy is the exercise of authority and direction by the commander using mission orders to enable disciplined initiative within the commander's intent to empower agile and adaptive leaders in the conduct of unified land operations (ADP 6-0). Commanders use mission command to initiate all military actions and military functions to accomplish missions. Through mission command, commanders blend the art and science of control to integrate the warfighting functions to accomplish objectives and missions. (See ADP 6-0 for a discussion of mission command.) Through the mission command warfighting function, commanders (supported by their mission command system) integrate the other warfighting functions (movement and maneuver, intelligence, fires, sustainment, and protection) into a coherent whole to mass the effects of combat power at the decisive place and time.

1-26. Army airspace users are ground forces operating in an inherently joint environment. Commanders are responsible for integrating Army airspace users, regardless of who controls the airspace, within the larger unified action framework. Commanders continuously integrate airspace users throughout their areas of operations while conducting operations. This affords commanders the flexibility and responsiveness to capitalize on opportunities and operate in a manner consistent with mission command.

1-27. Commanders need support to exercise mission command effectively. At every echelon of command, each commander establishes a *mission command system*—the arrangement of personnel, networks, information systems, processes and procedures, and facilities and equipment that enable commanders to conduct operations (ADP 6-0). The AAGS is a supporting component of the mission command system.

## AIRSPACE CONTROL AND THE OPERATIONS PROCESS

1-28. Airspace control is an additional task of the mission command warfighting function and a continuing activity of the operations process. As a supporting task of mission command, airspace elements belong to the mission command functional cell and cross functionally organize into the integrating cells as required. As a continuing activity, commanders and staffs continuously plan for and coordinate airspace use with other components of the TAGS and AAGS.

1-29. The Army's overarching framework for exercising airspace control is the operations process. It consists of the major mission command activities performed during operations: planning, preparing, executing, and continually assessing the operation. The commander drives the operations process through leadership.

1-30. Airspace elements play an integral role in planning by providing airspace control subject matter expertise into the planning process. Airspace planning focuses on setting conditions for near-real-time airspace control during mission execution so providing commanders flexibility while reducing risk. (See chapter 3 for more details.)

1-31. Airspace elements participate in certain preparation activities performed by units to improve their ability to execute an operation. Planning revision and refinement as well as rehearsals are the particular preparation activities that airspace element personnel support. (See chapter 3 for more details.)

1-32. By exercising mission command, commanders empower leaders to develop the situation, adapt, and act decisively to changes during mission execution. Using near-real-time procedural control, airspace element personnel can direct Army airspace users to shift airspace use to a different route, altitude, or volume of airspace. (See chapter 4 for more details.)

1-33. Airspace elements continually monitor and assess operations, airspace use, and future airspace use as part of their running estimate. These running estimates provide the analytical basis for airspace use recommendations. These recommendations focus on near-real-time airspace control or on posturing for future use airspace. (See chapter 4 for more details.)

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## Chapter 2

# Airspace Control in Operations

This chapter describes the Army's approach to airspace control. The chapter addresses exercising airspace control, the principles of effective airspace control, and delineates the key roles and responsibilities, by echelon, of the Army air-ground system.

### AIRSPACE CONTROL INTEGRATION

2-1. Commanders exercise airspace control to integrate Army forces with all airspace users. Integration aligns the commander's intent, priorities, and risk guidance; maximizes all airspace users' capabilities; and minimizes adverse impacts. Commanders understand that they do not operate independently, but as part of a larger force. They integrate and synchronize their actions and operations within this larger framework, collaborating with entities outside of their direct control. Just as commanders manage terrain throughout their areas of operations (AOs), they continuously collaborate with unified action partners to integrate the use of airspace. In essence, this affords commanders the same flexibility and responsiveness for airspace use as for ground operations. Army commanders are the supported commander within their designated AOs. As such, other commanders must coordinate their airspace use to avoid adverse effects and fratricide.

2-2. Army commanders exercise mission command to control Army airspace users—commander-to-commander—while airspace elements control airspace use. This is a subtle but important distinction. Army commanders direct the employment of Army assets while airspace element personnel direct the best use of the airspace. To exercise mission command, Army commanders have the authority to direct (control) the maneuver of all Army airspace users within their designated AOs, so that the best use of airspace is made. If the airspace control authority (ACA) assigns airspace control responsibility to the Army for a volume of airspace in the airspace control plan (ACP) or airspace control order (ACO), Army commanders exercise airspace control over all airspace users. This authority to exercise airspace control for an assigned volume of airspace does not include the authority to approve, disapprove, or deny joint combat operations.

2-3. Airspace elements do not routinely manage the flight path or trajectory of individual airspace users. Rather, airspace elements integrate airspace use for flight paths and trajectories in planning and execution to manage risk. Only when two or more airspace users conflict do airspace elements direct changes in flight path or, in the case of fires, coordinate with the fires cell to alter the trajectory or timing of fires. These changes are based on the commanders' mission priorities and risk guidance. Pilots, unmanned aircraft system operators, and weapon system controllers still maintain the responsibility to make the directed changes to their flight path or trajectory.

### AIRSPACE CONTROL PRINCIPLES

2-4. Effective airspace control enables commanders to respond effectively to changing operational environments with appropriate, flexible, and timely actions. Army forces use the principles of airspace control, which complement joint airspace control principles, to integrate all airspace users. The five principles of Army airspace control are:

- Airspace control is action executed through combined arms formations.
- Airspace control is a commander's responsibility based on the commander's intent, priorities, and risk guidance.
- Airspace control is a continuing activity of the operations process.
- Airspace control is an integral part of risk management.
- Near-real-time airspace control requires continuous assessment.

2-5. Airspace control is action executed through combined arms formations. Airspace is a crucial part of the operational area and is inherently joint. The Army has fielded airspace element personnel and capabilities down to brigade level. These capabilities enable effectively integrating airspace use into operations. These capabilities are fully integrated with joint airspace control processes thereby providing the Army and joint force commanders expanded airspace control options.

2-6. Airspace control is a commander's responsibility. Commanders drive the operations process and airspace control is an additional task of the mission command warfighting function. To successfully command, commanders at all echelons must be capable of integrating and synchronizing forces and warfighting functions, ground and air. The commander is the central figure in mission command, essential to integrating the capabilities of the warfighting functions to accomplish the mission.

2-7. Airspace control is a continuing activity of the operations process. Commanders use the operations process to help them decide when and where to make decisions, control operations, establish priorities, and provide command presence. Throughout the operations process, commanders, assisted by their staffs, integrate numerous processes and activities. Airspace control is an activity that commanders integrate and synchronize with other activities into operations. Airspace elements continually monitor and evaluate the situation, and make recommendations or take action to integrate airspace users.

2-8. Airspace control is an integral part of risk management. Commanders at every echelon continuously assess risk of conflicts among airspace users and consequences of these conflicts. Then they determine which consequences or conflicts they can accept based on an operational environment. Commanders determine what risks they can accept and include the risks in orders issued to subordinate units. When airspace conflicts arise between different airspace users or when users exceed a commander's risk guidance, the airspace element attempts to integrate the requirements by modifying planned airspace use without degrading the mission effectiveness of any airspace user. If airspace elements cannot resolve an airspace conflict without degrading the mission effectiveness of an airspace user or if the risk still exceeds risk guidance, airspace elements seek a decision from the S-3, G-3, or commander. When risk involves forces not under tactical control of that commander, time permitting, airspace elements share the risk assessment with affected component commanders. (Appendix A addresses risk considerations for airspace control.)

2-9. Near-real-time airspace control requires continuous assessment. Airspace elements continually monitor all airspace users to support their operations and those transiting through the airspace over their ground AOs. This continuous situational awareness ensures that commanders can react to any situation requiring immediate use of airspace, such as immediate fires or close air support (CAS) missions, unplanned unmanned aircraft system launch, or diversion of aviation assets in near real time.

## **ARMY AIR-GROUND SYSTEM**

2-10. The Army refers to its system for coordinating and integrating all airspace use as the Army air-ground system (AAGS). The AAGS, a component of theater air-ground system, provides for interface between Army and air support agencies of other Services in the planning, preparation, execution, and assessment of airspace use. The AAGS—comprised of elements organic at theater army level to brigade level—enhances situational awareness and understanding of all airspace users to reduce fratricide and assists in navigation and the location of airspace users.

2-11. Army components of the AAGS consist of airspace elements, fires cells, air and missile defense sections, and coordination and liaison elements embedded in Army command posts. Collectively they coordinate and integrate airspace use—joint, coalition, nonmilitary and Army manned and unmanned aircraft systems, directed energy, munitions—for the echelons they are assigned. Specifically, these participants (see figure 2-1) consist of airspace elements, fires cells, air defense airspace management/brigade aviation elements (ADAM/BAEs), an Army air and missile defense command (AAMDC), battlefield coordination detachments (BCDs), ground and reconnaissance liaison detachments, and air defense artillery fire control officers (ADAFCOs). Some participants of the theater air-ground system (TAGS)—such as the air mobility liaison officer, the tactical air control party, and the air support operations center—remain under operational control of different Services but provide direct support during the conduct of operations.

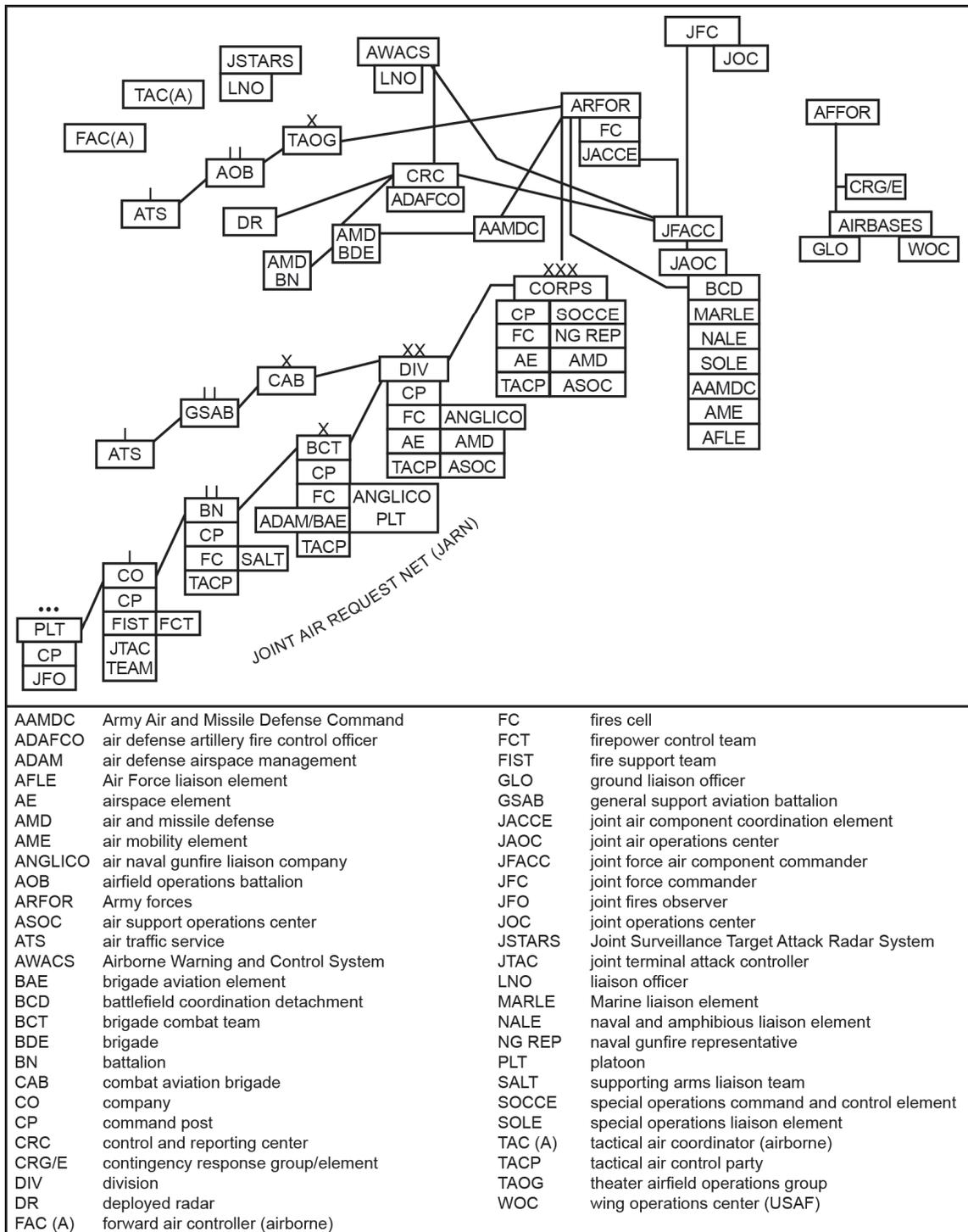


Figure 2-1. Army air-ground system with key theater air-ground system components

## AIRSPACE RESPONSIBILITIES BY ECHELON AND ROLE

2-12. Airspace elements are organic to Army brigades and higher. Corps and division airspace elements are the same and both contain an airspace element in their main and tactical command posts. Modular

brigade combat teams and support brigades (except sustainment) contain a version of an airspace element referred to as an ADAM/BAE. The ADAM/BAE integrates brigade airspace, including air and missile defense (AMD) and aviation functions. Each of these elements coordinates with higher, subordinate, and adjacent elements to maximize the effectiveness of airspace control.

2-13. The airspace element also manages the airspace control working group. A *working group* is a grouping of predetermined staff representatives who meet to provide analysis, coordinate, and provide recommendations for a particular purpose or function (ATTP 5-0.1). For airspace control, the airspace control working group facilitates and synchronizes contributions from all the elements that perform the airspace collective tasks. The airspace control working group typically consists of an air liaison officer and representatives from the airspace element, aviation element, AMD element, fires cell, tactical air control party, and unmanned aircraft systems element. Organizations without organic airspace elements accomplish airspace control through their airspace control working group.

## **THEATER ARMY**

2-14. The theater army retains responsibility for contingency planning and coordination, including developing and maintaining operation plans and contingency plans, updating regionally focused intelligence estimates, and supporting plans to a geographic combatant commander's theater campaign plan. In terms of airspace, the theater army primarily establishes airspace policy and standards and provides the Army's airspace requirements developed into operation plans and contingency plans. The theater army contingency command post has airspace, aviation, and air and missile defense elements roughly equivalent to a brigade combat team's (BCT's) ADAM/BAE. The contingency command post has the airspace control capability to support small, short-duration contingencies. As a joint operations area and subsequent Army operating forces are established, airspace control responsibilities transition to the operational Army force headquarters. As such, the operational Army force then provides the Army's input into the JFCs ACP and order as well as special instructions.

2-15. An operational Army force is the Army component headquarters for a joint task force (JTF) or a joint and multinational force. It consists of the senior Army headquarters and its commander (when not designated as the joint force commander) and all Army forces that the combatant commander subordinates to the JTF or places under the control of a multinational force commander. The senior Army headquarters identifies requirements and establishes priorities of support for Army forces within the operational area.

## **FIRE SUPPORT**

2-16. The theater army fires cell plans, coordinates, integrates, and synchronizes the employment and assessment of all strategic theater fires to support current and future theater operations.

## **Army Air and Missile Defense**

2-17. Army air and missile defense commands (AAMDCs) are placed under operational control (OPCON) to the joint force land component commander (JFLCC) or operational Army force and in direct support of the area air defense commander (AADC) for military operations. Other Army air defense artillery units in the area of responsibility (AOR) are normally assigned, attached, or OPCON to the AAMDC. The JFC establishes AMD priorities, allocates forces, and apportions air power. The JFC typically assigns overall responsibility for counterair and airspace control to the JFACC, and responsibility for defensive counterair (DCA) operations to the AADC. The AADC oversees coordination with joint and multinational partners to develop procedures for a combined theater air and missile defense (TAMD) plan. Typically, the AADC has the preponderance of AMD capabilities in theater and the ability to provide joint command and control.

2-18. The AAMDC has overall responsibility for planning Army AMD operations supporting the JFC. The AAMDC task organizes and assigns missions to the subordinate ADA brigades once planning is complete. The AAMDC has dedicated liaison teams that can deploy to liaise with major theater and Army forces elements (such as JFACC, JFLCC, joint special operations task force, and BCD) to facilitate and integrate Army forces AMD planning and operations. In some cases, the AAMDC conducts split-based operations that preclude them from being in theater. If the AAMDC is not located in theater, the responsibility for planning falls to the highest echelon ADA organization in the theater as well as for providing liaisons to the

JFLCC, BCD, and AADC. FM 3-01, FM 3-01.7, and FM 3-01.94 provide a more in-depth explanation of the command and support relationships for theater AMD.

### **Air Traffic Service**

2-19. Army air traffic service (ATS) units control airspace necessary to support airfield operations and can operate a fully instrumented airfield with airport surveillance radar approach and precision approach radar. ATS units can be organic to the combat aviation brigade (CAB) or the theater airfield operations group as part of the airfield operations battalion. The company and its elements often operate within an aviation battalion task force in a direct support or general support role. Airfield operations battalions and theater airfield operations group provide additional ATS forces that support theater-level requirements. One theater airfield operations group can support five theater airfields and operate from a single base, or conduct split-based operations in multiple locations within the theater AO. These units establish and operate airfields as needed in the theater AO. The theater airfield operations group consists of an ATS standardization element that develops special use airspace for restricted areas, transition areas, and control zones. Additionally, it provides oversight, technical expertise, standardization to Army airfields at theater level and quality assurance for training and certification of controllers and ATS maintenance personnel.

### **Coordination and Liaison Elements**

2-20. The JFACC establishes one or more joint air component coordination elements (JACCES). JACCES co-locate with the joint force commanders headquarters and other component commanders' headquarters. Such physical locations enable the JFACC to integrate air and space operations with component operations and the JTF headquarters to better integrate air and space operations within the overall joint force. When established, these elements act as the JFACC's primary representatives to the respective commanders and facilitate interaction among the respective staffs. The JACCE facilitates integration by exchanging current intelligence, operational data, and support requirements. It also aids integration by coordinating JFACC requirements for airspace coordinating measures (ACMs), joint fire support coordination measures, CAS, air mobility, and space requirements. As such, the JACCE is a liaison element, not a command and control node; thus, the JACCE normally has no authority to direct or employ forces. The makeup of the JACCE depends on the scope of the operation and the size of the staff with whom they will liaise. If the JACCE performs liaison duties for the commander, Air Force forces and JFACC staff, then it tailored the duties with the expertise necessary to perform effectively. Element expertise includes plans, operations, intelligence, airspace management, logistics, space, and air mobility, as needed. The JACCE also communicates the component commander's decisions and interests to the JFACC. However, the JACCE does not replace, replicate, or circumvent normal request mechanisms already in place in the component or JTF staffs, nor supplant normal planning performed by the Army operations center and Air Force forces staff. The JACCE director is the JFACC's personal and official representative.

2-21. As the Army liaison to the JFACC, the BCD is located in the joint air operations center (JAOC). The Army Service component commander provides the BCD as a liaison element to the Service component commander designated as the JFACC. The BCD facilitates the synchronization of air and Army ground operations within the AOR. BCD personnel work with their counterparts in the JAOC to facilitate planning, coordination, and execution of air-ground operations by ensuring that—

- The JFACC understands the operational Army commander's intent, priorities, objectives, and air support requirements.
- They forward all Army command operational data and operational support requirements to the JFACC and participating multinational forces, to include preplanned requests for CAS, air interdiction, manned and unmanned information collection, cyber electromagnetic activities, airlift, and joint suppression of enemy air defenses.
- They coordinate all Army requests for ACMs and air support with the appropriate JAOC elements.
- The air tasking order (ATO) and ACO accurately reflect air support and ACMs approved for the Army.
- They coordinate airspace requirements.

- They coordinate all changes to theater-wide air defense warnings, weapons control status, rules of engagement, and aircraft identification standards among the JAOC, Army force headquarters, and senior land-based air and missile defense headquarters.
- They coordinate planned and unplanned changes to the fire support coordination line.
- They publish all approved air missions and ACMs in the ATO and ACO.
- They coordinate Army airspace risk guidance and airspace use priorities with the appropriate JAOC elements.
- They forward priorities of JFC airspace risk guidance and airspace use to the senior Army headquarters.

2-22. The BCD expedites the exchange of information through face-to-face coordination and digital interfaces with JAOC elements and with—

- Army ground liaison officers at United States Air Force (USAF) operations centers.
- The operational Army main command post, the corps main command post (or if necessary the tactical command posts), and with subordinate unit command posts, if appropriate. At the corps main command post, the BCD exchanges information with the three integrating cells (current operations, future operations, and plans) and the six warfighting functional cells.
- The airspace elements at operational Army forces, corps, and corps subordinate formations.

2-23. Additionally, the BCD supervises the Army's reconnaissance liaison detachments and ground liaison detachments that provide coordination among Army forces and USAF reconnaissance, fighter, and airlift wings. The Army assigns ground liaison detachments to each USAF air wing operations center supporting ground operations. The Army ground liaison detachments provide Army expertise, interpreting and briefing pilots on the ground commander's concept of operations, tactics, equipment, and the ground situation. They also provide guidance on target designation, help identify friendly troops, and participate in the debriefing of pilots on their return from missions. These detachments are also the principal points of contact between the USAF contingency response groups and Army airfield control groups for controlling Army theater airlift movements. (See JP 3-17 for more information on air mobility operations.)

2-24. The air defense artillery fire control officer provides a single point of contact between Army AMD fire direction centers and the regional or sector air defense commander who typically locates with the control and reporting center (CRC). However, based on theater requirements these officers co-locate at the tactical air operations center, Air Electronic Guidance Information System, or Airborne Warning and Control System (AWACS). These officers advise and assist the controlling authority with integrating Army AMD capabilities into that part of the integrated air defense system. They identify and deconflict air tracks; provide early warning and cueing information to air and missile defense units, target weapons paring, and rapid engagement of targets; assist in airspace deconfliction between AMD fire and aircraft; and send engagement orders to AMD units.

## **CORPS AND DIVISION LEVELS**

2-25. The corps headquarters oversees airspace control policy and standardization of tactics, techniques, and procedures throughout the corps AO. The senior Army airspace element (either corps or division depending on the force structure deployed) contributes to the BCD's airspace section to ensure the joint airspace policies and documents incorporate the Army airspace priorities and requirements.

2-26. The corps and division airspace elements are designed to execute airspace responsibilities when a headquarters serves as an intermediate tactical headquarters, an operational Army force, a joint force land component headquarters, or a JTF headquarters. Airspace element personnel in the main and tactical command posts integrate airspace operations with the functional cells and with the integrating cells. The airspace element also coordinates with the tactical air control party (TACP) and the air support operations center (ASOC) co-located with the headquarters.

2-27. As the airspace functional lead for the corps and division staff, the airspace element develops standard operating procedures and airspace control annexes that help standardize airspace control operations among subordinate units. These procedures and annexes ensure consistency with joint airspace

procedures, the theater ACP, aeronautical information publications, and associated plans and orders. To support the corps and division mission, airspace elements in the main command post—

- Provide airspace control expertise for the commander.
- Monitor joint airspace operations.
- Plan and update input to the joint ACP.
- Integrate the airspace control architecture into the joint airspace control architecture.
- Develop the airspace control architecture to support plans.
- Draft all airspace control input for operation orders, operation plans, annexes, and estimates.
- Plan and request ACMs.
- Deconflict airspace through the appropriate authority.
- Coordinate with the movement and maneuver (for aviation), intelligence (for information collection), and fires and protection (for air and missile defense) cells.
- Provide ATS expertise to the headquarters.

2-28. The corps can function as a tactical headquarters subordinate to a theater army functioning as a joint force land component or JTF. In this case, the airspace element provides airspace requirements to the higher headquarters' airspace section for integration into the theater army unit airspace plan (see paragraph 3-33). This integration applies to the next ACO and the higher headquarters' airspace control annex.

2-29. Normally the corps headquarters decentralizes airspace control to subordinate divisions and BCTs within their respective AOs. It also authorizes direct liaison between them and other theater air-ground system airspace control nodes provided by other Services. These entities include USAF CRCs and AWACS, Marine Corps direct air support center and tactical air operations center, and other airspace control entities for rapid resolution of airspace issues. For corps assigned, attached, under OPCON, or under tactical control to BCTs or other brigades assigned their own AO, the corps delegates control over Army airspace users within the respective AOs. In these instances, the corps retains responsibility for integrating airspace users. The corps integrates all airspace requirements for corps BCTs and other brigades not assigned an AO. The corps airspace element retains responsibility for airspace control over portions of the AO not assigned to subordinate units. However, even when authorizing direct liaison to subordinate units, the corps retains responsibility for policies.

2-30. The corps may have OPCON of a Marine air-ground task force (MAGTF). A MAGTF integration with the corps airspace element depends on the size and capabilities of the MAGTF. The MAGTF's aviation combat element includes Marine air command and control system capabilities tailored for the size of the aviation combat element. Smaller regimental-based MAGTFs (with unmanned aircraft systems) may integrate in a similar manner with BCTs. Large MAGTFs bring the full joint capability to control airspace over the MAGTF AO. Large MAGTFs often include a division-based Marine expeditionary force with Marine rotary- and fixed-wing aviation as well as a robust Marine air command and control system. In this case, the MAGTF requires authorized direct liaison to coordinate airspace and air operations directly with the JAOC.

2-31. The corps and division headquarters provides airspace control to support multinational forces under OPCON to the corps if needed. If these forces lack airspace control capabilities, they require assistance from the corps airspace element. They receive support similar to Army functional brigades working directly for the corps. See paragraph 2-41.

2-32. Division airspace element oversees airspace control for the entire division AO, regardless of whether the AO has been further assigned to the BCT. When a division allocates part of its AO to a BCT, it delegates some airspace control responsibilities to the BCT. However, the division airspace element still integrates airspace users over the entire division AO. If the division has an unusually large AO or if the division AO is noncontiguous, then it can delegate more airspace control responsibilities to the BCTs. Normally, delegation of airspace control for unified action partner airspace users requires augmentation of the BCT with ATS elements from the combat aviation brigade.

**Fires Cell**

2-33. The fires cell is responsible for targeting coordination and for synchronizing fires delivered on surface targets by fire support means under the control of or in support of the corps or division. This cell coordinates and deconflicts fire support coordination measures (FSCMs) with ACMs through close interface with ADAM/BAE and airspace elements, the ASOC, and the TACP. The airspace element works with the fires cell to integrate FSCMs with the unit airspace plan. Although the airspace element reviews and integrates the fire support overlay with other airspace requirements, FSCMs are normally sent to higher, lower, and adjacent headquarters through fire support channels. In some cases, both the fires cell and the airspace element send related control or coordination measures through their respective channels. The airspace element and the fires cell ensure the standard operating procedures and the airspace control annexes address the procedures for forwarding FSCMs and associated ACMs through appropriate coordination channels. Other complex control measures—such as kill boxes, counterfire restricted operations zones, and airspace coordination areas—also requires this parallel teamwork. The airspace element and the fires cell need to review the ACO to ensure that ACMs avoid unnecessarily interfering with fires and that the ACMs are in a format that the fires digital information systems can process. If a conflict exists between the fire support plan and the ACO, the airspace element coordinates with the higher airspace elements to correct or modify the appropriate ACM.

**Air and Missile Defense Element**

2-34. The AMD element is the lead staff element for integrating the joint tactical data informational link network for the employment of Sentinel air defense radars and for the production of the air picture. (See appendix C for more details.) The airspace element links with the AMD element for air track data. The airspace element depends on the AMD element for integrating the airspace element's joint data network systems. In turn, these airspace element systems provide backup support to the AMD element. The airspace element ensures that AMD airspace requirements integrate with the corps and division airspace plans.

**Coordination and Liaison Elements**

2-35. Some elements of the theater air-ground system are Air Force liaisons provided to the division, the corps, or operational Army forces. These liaisons include the ASOC, TACP, and air mobility liaison officer. Air Force liaisons function as a single entity in planning, coordinating, deconflicting, and integrating air support operations with ground elements. These liaisons work with Army airspace elements, fires cells, AMD elements, and aviation elements of the corps and division command posts. They also coordinate with liaison elements such as the BCD, AMD coordinator for the operational Army forces, and ground liaison officers.

2-36. Ground-based liaison elements of the theater air-ground system subordinate to the JAOC provide similar capabilities as airborne elements but with reduced range, flexibility, and mobility. However, ground-based liaison elements do not depend on high-value assets for continuous operations. Additionally, they offer an important interface between the theater air-ground system and ground-based air defense activities. Ground-based liaison elements of the theater air-ground system include CRCs, tactical air operations centers (TAOCs), ASOCs, DASCs, and TACPs, and air mobility liaison officers.

2-37. The ASOC is the element responsible for planning, coordination, control, and execution of air operations that directly support the Army's ground combat forces. Each ASOC reports to the JAOC. The senior air liaison officer (ALO)—normally the ASOC director during operational contingencies—maintains the on-scene OPCON of the ASOC. It is directly subordinate to the JAOC and coordinates air operations directly supporting Army. Air operations include CAS, air interdiction, intratheater airlift, joint intelligence, surveillance, and reconnaissance, suppression of enemy air defenses, and combat search and rescue. The ASOC processes immediate requests submitted through TACP channels, the joint air request net (JARN), and Army fires channels. While Army airspace elements normally control air assets organic to maneuver commanders, the ASOC normally controls all joint air allocated from the JFACC to support the Army component.

2-38. The USAF TACPs are subordinate to the ASOC and are the single points of direct USAF interaction with supported ground combat units. Each maneuver battalion, brigade, division, and corps headquarters

will have an aligned TACP. Staffed with ALOs and other terminal attack controllers, TACPs perform liaison and control functions appropriate to the level of combat maneuver force supported. Only joint terminal attack controllers (JTACs) or forward air controllers (airborne) (FAC[A]s) personnel have the authorization to perform terminal control of CAS aircraft during operations (combat and peacetime) within proximity of their supported ground combat units. For airspace use, TACPs integrate with fires cells and the Army airspace elements. TACPs assist ground maneuver units in the planning and coordinating of FSCMs and ACMs needed to integrate air and ground operations. TACPs assist the ASOC and JTACs for tactical control of CAS and FAC(A) aircraft transiting from the ASOC to the JTAC contact point.

2-39. The air mobility liaison officer is an USAF officer specially trained to implement the theater air control system and to control airlift assets engaging in combat tactics such as airdrop. Air mobility officers are highly qualified, rated air mobility officers with experience in combat tactics and assigned duties supporting Army and Marine Corps units.

## **BRIGADE LEVEL**

2-40. Brigades are responsible for airspace control of Army airspace users within their AO. The authority of the brigade over unified action partner airspace users varies and is specified in the higher headquarters airspace control annex. All Army airspace users transiting a brigade AO coordinate with the brigade responsible for the AO they are transiting. The division only integrates Army airspace use between brigades if adjudication between brigades is necessary. Brigades normally have the authority to coordinate directly with joint airspace elements controlling airspace over the brigade (CRC, AWACS, and TAOC) for coordinating fires or immediate use of airspace. In some situations, for example, very heavily used airspace or airspace with numerous airspace users, the division may withhold this authority. Sometimes, the brigade requests approval to control a volume of airspace such as high-density airspace control zone (known as HIDACZ). However, for a brigade to control airspace for an extended period, it needs to augment the ADAM/BAE with assets from the ATS company organic to the combat aviation brigade. (See paragraph 2-48 for more details on ATS assets available to the CAB and brigade.)

2-41. Functional brigades without an organic ADAM/BAE still retain brigade responsibilities for some airspace tasks (see appendix E) but rely on their higher headquarters for complete airspace control. If a functional brigade falls under the control of a support brigade (for example, a military police brigade under a maneuver enhancement brigade), the support brigade integrates the functional brigade airspace requirements. If the functional brigade falls directly under the control of a corps or division, then the corps or division airspace element integrates the brigade airspace requirements.

2-42. Several multifunctional support brigades such as the combat aviation brigade or fires brigade do not routinely control AOs but conduct operations throughout the corps AO. Normally these brigades coordinate their airspace use with the divisions and brigades whose AOs they will transit (or with corps airspace elements for portions of the corps AO unassigned to a division or brigade). Airspace control becomes more complex when a corps tasks these brigades to accomplish a mission (such as interdiction attack or strike) that affects airspace use by other divisions or brigades. The brigade conducting the operation is the lead airspace control planner with the higher headquarters airspace element providing planning and airspace control support to the brigade's ADAM element. The division or corps airspace element checks that it adjusts the airspace plan account for the brigade commander's priorities and concept of operations.

## **Air Defense Airspace Management/Brigade Aviation Element**

2-43. All brigade combat teams and multifunctional brigades (except sustainment) have an organic ADAM or ADAM/BAE. This staff element is composed of air defense artillery and aviation personnel and performs the airspace control, AMD, and aviation functions for the brigade. It also provides added capability into the theater air-ground system at the tactical level.

2-44. Compared to an ADAM, an ADAM/BAE has additional aviation personnel and a larger aviation planning capability. Members of the brigade staff consist of key members of the airspace control working group—fires cell, air liaison officer or TACP, and the ADAM/BAE. The brigade aviation officer is the airspace control officer for the brigade S-3.

2-45. The ADAM/BAE supports the brigade commander by providing situational understanding of the airspace and early warning via connectivity with airspace users as well as with unified action partner's sensors and command networks. This element also continuously plans and executes airspace control requirements and integrates Army AMD and aviation requirements consistent with the brigade commander's intent, priorities, and acceptable risk levels.

2-46. The ADAM and ADAM/BAE continuously plan for, control, and monitor the operations of all airspace users to support their operations and those transiting through the air over their ground AOs. This continuous situational understanding is critical to ensure that the brigade can react to any situation requiring immediate use of airspace, such as immediate fires (offensive and defensive), CAS missions, unplanned unmanned aircraft system launches, or a diversion of aviation assets in real time. Table 2-1 illustrates ADAM/BAE functions. Note that ADAM capabilities resident in a CAB, fires brigade, and maneuver enhancement brigade do not have an aviation operations component and therefore have a very limited capability to perform BAE functions.

**Table 2-1. Air defense airspace management and brigade aviation element functions**

<b>ADAM</b>	<b>SHARED</b>	<b>BAE</b>
<ul style="list-style-type: none"> <li>• Plans and synchronizes air and missile defense operations with the concept of operations</li> <li>• Produces the integrated air picture</li> <li>• Plans low-level sensor employment</li> <li>• Develops and maintains air defense artillery overlay to include unit locations, weapons control status, and weapon system coverage</li> </ul>	<ul style="list-style-type: none"> <li>• Plans for airspace use and executes near real time control during execution and monitors operations of airspace users</li> <li>• Analyzes airspace use to determine and resolve conflicts</li> <li>• Reviews immediate airspace control means requests for conflicts with current operations</li> <li>• Requests, maintains, and disseminates joint airspace coordinating measures</li> <li>• Develops and coordinates airspace control appendix</li> </ul>	<ul style="list-style-type: none"> <li>• Plans and synchronizes aviation with the concept of operations</li> <li>• Advises and plans the use of unmanned aircraft systems, reconnaissance, attack, assault, air movement, sustainment, and medical evacuation</li> <li>• Standardizes brigade combat team unmanned aircraft system employment</li> </ul>
ADAM	air defense airspace management	BAE brigade aviation element

**Fires Cell**

2-47. The fires cell at brigade level is responsible for coordinating activities and systems that provide the collective and coordinated use of Army indirect fires and joint fires through the targeting process. The fires cell makes every effort to ensure that FSCMs and ACMs are coordinated and deconflicted through close interface with ADAM/BAE and the TACP. If this is not possible, the fires cell formulates and prepares to execute acceptable alternatives.

**Air Traffic Service**

2-48. Each CAB has an organic ATS company as part of the general support aviation battalion. The ATS company establishes and operates airfields to support CAB operations. The ATS company contains a terminal control platoon and an airspace information services platoon. The terminal control platoon can operate a fully instrumented airfield with airport surveillance radar or precision approach radar; it also has communications resources available to facilitate the control of the local airspace necessary to support airfield operations. The airspace information services platoon, with two tactical aviation control teams each, can control up to two tactical landing sites (rotary-wing, fixed-wing, or both) while the airspace information center provides en-route flight management support.

**Coordination and Liaison Elements**

2-49. The TACP helps maneuver brigades integrate air-ground operations. The TACP coordinates ACMs and FSCMs with the ADAM/BAE, fires cells, and the ASOC during the accomplishment of CAS missions to support ground operations. This coordination includes assisting the ASOC and JTAC for tactical control of CAS and FAC(A).

**BATTALION LEVEL**

2-50. The operations section plans and coordinates airspace requirements for the battalion. The major actions include—

- Establishing staff responsibility for airspace control from personnel assigned to the S-3 section.
- Receiving and disseminating airspace control means requests for approvals, changes, and disapprovals for small, unmanned aircraft system.
- Reviewing and resolving planned and immediate airspace control means requests.
- Monitoring and analyzing aviation, small, unmanned aircraft system, field artillery, air defense, and maneuver operations to determine and resolve conflicts.
- Submitting to ADAM/BAE all planned and immediate airspace control means requests including small, unmanned aircraft systems (see appendix C).
- Immediately communicating any deviations from pre-planned missions to the ADAM/BAE or higher headquarters.
- Informing airspace users at each echelon of any communication loss during operations.
- Tracking and reporting aviation, field artillery, air defense, small, unmanned aircraft systems, and personnel status.
- Monitoring rotary- and fixed-wing aircraft in the battalion AO to aid in deconflicting small, unmanned aircraft systems and other air traffic.
- Managing separation and frequencies of battalion and below small, unmanned aircraft system operations.

**Fires Cell**

2-51. The fire support officer and the fires cell are responsible for planning, coordinating, and synchronizing fire support operations, to include joint fire support. The major actions of the fires cell include—

- Planning, controlling, and synchronizing all fire support.
- Establishing priorities and allocating available fire support resources to support the battalion.
- Participating in and supervising the routine activity and coordination of the targeting process within the main command post.
- Coordinating with the ADAM/BAE regarding airspace clearance, artillery, and mortar firing unit locations as well as changes to FSCMs, and ACMs and aviation support.
- Coordinating air support through the USAF TACP.
- Coordinating suppression of enemy air defenses.

**Coordination and Liaison Elements**

2-52. The TACP consists of the ALOs and two JTACs. The TACP has two primary missions: advise ground commanders on the capabilities and limitations of airpower and provide the primary terminal attack control of CAS to support ground forces. At the battalion level, the TACP provides the primary link for the commander's to joint CAS assets made available to support the battalion's mission. Depending on the tactical situation, terminal attack control teams, consisting of one JTAC, may co-locate with each maneuver company.

## COMPANY OR TROOP LEVEL

2-53. The company commander is responsible for ensuring that airspace users (organic or in support) coordinate and share information concerning company airspace use by aircraft and fires.

2-54. The battalion's fire support teams are located at the battalion headquarters and headquarters company for training and administration. However, these teams typically attach or fall under OPCON to maneuver companies or troops for tactical operations. Fire support teams provide fire support coordination, precision targeting, terminal control, and assessment capabilities. These teams have responsibility for planning and coordinating all supporting fires, including mortars, field artillery, naval surface fire support, and CAS integration through close coordination with co-located JTACs.

2-55. A *joint fires observer* is a trained Service member who can request, adjust, and control surface-to-surface fires, provide targeting information in support of Type 2 and 3 close air support terminal attack control, and perform autonomous terminal guidance operations (JP 3-09.3). In type 2 control, the observer can see either target or attacking aircraft. In type 3 control, the observer can see neither target nor attacking aircraft. The joint fires observer also performs autonomous terminal guidance operations. Joint fires observers are typically members of a fire support team. A joint fires observer adds a joint warfighting capability without circumventing the need for qualified JTACs. These observers provide the capability to exploit those opportunities that exist in the corps AO where a trained observer could be used to efficiently support air-to-surface fires, and facilitate targeting for the JTAC.

2-56. The JTAC, when employed by TACP at the company or troop level, directs the action of or control aircraft engaged in CAS and other offensive air operations. The JTAC also provides the ground commander recommendations on the use of CAS and its integration with ground maneuver. The JTAC and fire support team or joint fires observer may develop informal ACAs to coordinate attacking aircraft and surface fires.

## Chapter 3

# Airspace Control—Planning and Preparation

The operations process consists of the major mission command activities performed during operations: planning, preparing, executing, and continuously assessing the operation. This chapter discusses airspace control planning and the documents necessary for planning. It also discusses preparation activities. These activities, which are continuous, underpin successful unified land operations.

## PLANNING

3-1. *Planning* is the art and science of understanding a situation, envisioning a desired end state, and laying out effective ways of bringing that future about (ADP 5-0). To operate successfully, commanders at all echelons must be capable of integrating and synchronizing forces and warfighting capabilities on the ground and in the air. Planning not only underpins this capability but also helps commanders reduce uncertainty and risk, providing the flexibility commanders need to conduct operations. Planning is both conceptual and detailed. Conceptual planning includes developing and understanding an operational environment, framing the problem, defining a desired end state, and developing an operational approach to achieve the desired end state. Detailed planning translates the broad concept into a complete and practical plan. Detailed planning works out the scheduling, coordination, and technical issues involved with moving, sustaining, administering, and directing the activities of forces in time, space, and purpose.

3-2. Commanders drive the operations process through understanding, visualizing, describing, directing, leading, and assessing operations. During planning, staff sections perform essential functions and activities that enable commanders to understand, visualize, and describe tasks. This results in the commander's intent and planning guidance. (Refer to ADRP 5-0 for details on conceptual and detailed planning.)

## KEY DOCUMENTS

3-3. The joint force commander (JFC) provides essential airspace planning documents to components to facilitate component planning and joint force standardization. These documents include plans, orders, messages, and any international agreements and letters of instruction. Although this publication lists these key documents in the discussion of planning, commanders and staffs also use or refer to these documents while they prepare, execute, and assess operations.

## Joint Air Operations Plan

3-4. The joint air operations plan (JAOP) is the joint force air component commander's (JFACC's) plan for integrating and coordinating joint air operations. The JFACC, together with other components, develops this plan. It includes forces tasked with accomplishing precise missions, message formats, suspenses for planning and execution phases, and rules of engagement. The JAOP translates JFACC tasking from the JFC into an air strategy and establishes the JFACC's objectives. This plan—

- Integrates the efforts of joint air and space capabilities and forces.
- Identifies desired end state objectives and tasks to be achieved through air operations.
- Identifies measures or indicators of success used to determine if air operations meet assigned objectives.
- Accounts for current and potential adversary offensive and defensive courses of action.

- Synchronizes the phasing of air and space operations with the JFC's operation or campaign plan:
  - The first phase normally involves counterair operations to attain and maintain the required degree of air superiority to accomplish other joint actions.
  - Offensive air operations may begin with the initial counterair operations or be delayed until forces achieve the requisite air superiority to reduce losses and attain greater freedom of action.
- Specifies capabilities and forces required to accomplish joint air objectives.

### **Airspace Control Plan**

3-5. An airspace control plan (ACP) details the broad policies and procedures for airspace control within the JFC's operational area. The airspace control authority (ACA), working with other components, develops this plan. Effective ACPs include transitions between phases or are updated as phase transitions occur. When the JFC signs the ACP, this plan becomes the JFC's airspace policies and procedures. This plan—

- Describes the operational area within which airspace applies.
- Lists current existing capabilities within the operational area to provide airspace control.
- Describes and lists duties of the ACA, each airspace user (including requirements for liaisons to and coordination with the ACA), and elements used in airspace control system.
- Describes the interface among the ACA, the area air defense commander (AADC), and fires elements with procedures for deconflicting air defense and operational requirements.
- Describes interface with the Federal Aviation Administration, host-nation air traffic control system, and International Civil Aviation Organization.
- Describes the interface between U.S. and multinational forces to coordinate and deconflict airspace requirements.
- Provides for continuity of airspace control operations under degraded conditions.
- Describes the airspace control procedures for the joint force including requesting, approving, modifying, and promulgating procedures.
- Describes identification, friend, or foe selective identification feature procedures.

### **Area Air Defense Plan**

3-6. With the support of the component commanders, the AADC develops, integrates, and distributes a JFC-approved joint area air defense plan (AADP). This plan protects assets on the defended asset list, other critical assets, friendly forces, and civilian population centers according to JFC guidance. It details defensive counterair priorities, authorities, procedures, tasks, and actions throughout the joint operations area. This plan includes—

- A layered and overlapping defense to allow for multiple engagement opportunities.
- Information engagement strategies for counterair.
- Detailed weapons control and engagement procedures and authorities integral to a joint counterair operation.
- Specific airspace coordinating measures (ACMs) required to accomplish the mission.
- All surface-to-air capabilities assigned, attached, and supporting.
- Provisions for protecting high-value airborne assets.
- Guidance on electronic warfare to disrupt or destroy guidance systems.

3-7. Planners carefully integrate air defense in the AADP with the appropriate sections in the ACP. A viable ACP requires locations of specific types of air defense operations and exact procedures for the identification of aircraft. The AADC writes the AADP with detailed engagement procedures consistent with the ACP and operations in the joint operations area. Planners of the AADP understand the capabilities and limitations of fielded equipment used by the joint or multinational forces. When writing, planners anticipate using airspace control and area air defense operations in a degraded command network environment.

### Airspace Control Order

3-8. An airspace control order (ACO) directs the use of joint airspace and details the approved requests for ACMs. The combat plans division of the JFACCs air operations center, together with other components, develops this plan. Component commanders consolidate, deconflict, and forward their airspace requests to the ACA for further consolidation with other theater-wide inputs. While the air operation center's combat plans division develops and disseminates the ACO, the combat operations division executes the planned ACO and develops and executes changes to the ACO during the execution period. The ACO implements precise ACMs for specific times, adding or activating ACMs for the missions and times needed. All airspace users review their daily requests for ACMs, removing unnecessary ACMs that unduly restrict other airspace users. Staffs disseminate ACMs with expiration times. The ACO activates and deactivates procedural control measures and updates positive control procedures. Normally, the combat plans division publishes this order as a stand-alone document but sometimes as part of the air tasking order special instructions.

### Air Tasking Order

3-9. An air tasking order (ATO) is the daily operation order listing all aviation assets (component capabilities) directed by the JFC or made available to the JFC for JFACC tasking. It also includes other component's direct support missions. These direct support air missions that appear on the ATO are not under control of the JFACC, but their presence on the ATO provides visibility to assist in overall coordination, deconfliction, prevention of duplication of missions, and prevention of fratricide. This document shows all missions operating in theater.

### Special Instructions

3-10. The special instructions (known as SPINS) section of the ATO provides supplemental, corrective, or exact amplification to the general mission tasking of the specific ATO period. This information is not contained in other operational documents (such as JAOP, ACP, operation order, regulations, and precise directive U.S. message text format messages). These general instructions pertain to the theater as a whole. The staff ensures that the instructions are brought to the attention of readers up front and are of general interest to all executors of the ATO. Special instructions avoid specific units or topics that other operational documents more appropriately cover. Some theaters deviate from this general purpose, as staffs publish numerous airspace procedures and airspace usages in the special instructions.

3-11. Special instructions contain a section that lists the airspace procedures. Other special instructions sections—such as tanker procedures or cruise missile procedures—also address airspace procedures within those particular sections. Special instructions often include rules of engagement and combat identification criteria for air defense. These instructions also include additional guidance, directives, or information that weapons system operators or aircrews require such as host-nation restrictions, base defense zone procedures, and special weapons systems control procedures (such as unmanned aircraft or cruise missiles). The combat plans division publishes special instructions as baseline, weekly, and daily.

### Airspace Control Means Request

3-12. An airspace control means request (ACMREQ) is a request to block out the use of exact airspace. An originator requests to designate a defined block of airspace as having special significance for air operations within the designated airspace for which the controller manager is responsible. An ACMREQ can consist of single or multiple ACMs. Appendix B has more details.

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*Note:* JP 3-0 and USMTF refer to an ACMREQ as an ACM request.

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### Air Operations Directive

3-13. The air operations directive is an internal JFACC document that translates the JFACC's JAOP into guidance for the planning and execution of a precise ATO. Published by the JFACC, it describes the JFACC's implementation of JFC's intent and provides guidance for operations prioritization. This document is reviewed by components and their liaisons to ensure that units meet their requirements within

the context of the JFC guidance and priorities. The daily air operations directive gives planners the priority of effort, operational constraints, and any other specific guidance governing the planning and execution of air and space operations during a particular ATO period. Airspace personnel review the directive to gain an overall view of what airspace requirements the ATO development created and to understand daily priorities for airspace deconfliction. In addition, the air operations directive often has specific guidance references for the airspace (such as a plan for high-value airborne asset retrograde procedures due to threat).

3-14. The strategy guidance team within the air operations center's strategy division develops the air operations directive. The team distributes the directive via the theater battle management core system and the air component network, typically the SECRET Internet Protocol Router Network (known as SIPRNET). Though the air operations directive is not authoritative for Army forces, effective airspace element personnel read and understand the air operations directive to understand the JFACC's airspace priorities and guidance.

### **Tactical Operational Data**

3-15. The tactical operational data (known as TACOPDAT) is data required to establish an integrated air defense (such as defense sectors, combat air patrol stations, and missile engagement zones). A joint operational commander uses this data to establish air defense and anti-air warfare responsibilities in a tactical area and to permit an area commander to provide supplementary orders for an area of operations. The AADC disseminates the tactical operational data.

3-16. The tactical operational data establishes command and control alignments of Air Force and Army air- and ground-based air defense systems as well as the tasking for air defense assets to include locations. The joint interface control officer coordinates the development of the tactical operational data message and manages all tactical data link interfaces to create a consolidated air picture.

### **Operations Task Link**

3-17. The operations task link (known as OPTASK LINK) is a message used to report changes to tactical data link operations. These changes are considered permanent. The operations task link provides detailed instructions regarding the operations of tactical data links, including information required to establish data links. The AADC disseminates the operations task link.

### **AIRSPACE CONTROL PLANNING**

3-18. Airspace elements provide airspace control subject matter expertise into the planning efforts. Airspace planning focuses on setting conditions for near-real-time airspace control during mission accomplishment thereby providing commanders flexibility while reducing risk.

3-19. At the brigade level, the air defense airspace management/brigade aviation elements (ADAM/BAEs) officer in charge leads the airspace control planning effort. The BAE generally represents Army aviation (manned and unmanned), ADAM personnel represent Army ground based air defense fires, fires cell personnel represent fire support, and tactical air control party personnel represent the air component assets to include the unmanned aircraft system and defensive counterair. To increase flexibility and reduce risk, airspace element planners—

- Consider the echelon commander's priorities for airspace use.
- Keep the plan for integrating airspace users simple and flexible.
- Maximize the use of procedural means of control.
- Limit (in number, size, and duration) ACMs to the minimum required for mission accomplishment to maximize flexibility for airspace users.
- Structure ACMs to facilitate recognition by ground forces and aircrew members through alignment with major terrain features.

3-20. During course of action (COA) development and collaborative planning, airspace element planners—

- Ensure planned airspace use supports the commander's intent and concept of operations.
- Comply with the commander's airspace risk guidance.

- Address airspace conflict resolution procedures and war game to verify.
- Develop ACMs when ground units conduct close combat attack operations.

3-21. Airspace control planning is central to facilitating a shared understanding of air-ground integration. Planning contributes directly to the staff's ability to assist the commander to execute commander tasks: understand, visualize, and describe. As commanders visualize an operation during planning, they describe it to their staffs and subordinates. Commanders describe their visualization in their initial commander's intent, planning guidance, and operational approach that arranges warfighting function capabilities in time, space, and purpose.

3-22. Facilitating a shared understanding of air-ground integration and airspace use spans all aspects of planning. The staff facilitates translate all higher headquarters airspace guidance and risk guidance from the ACP, AADP, ACO, special instructions, higher headquarters airspace appendixes, and other needed documents into airspace constraints for incorporation into the planning effort. This shared understanding also involves participating in COA development and war-gaming of air-ground integration using higher headquarters airspace constraints, commander's airspace priorities, airspace risk guidance, and conflict resolution guidance. The staff facilitates a shared understanding to utilize COA development and war-gaming. Using COA development ensures commanders understand that they normally are the final decision authority for assigning the mission and taking responsibility for prudent risk during combat operations. Commanders assess any higher commander constraints on the authority to accept prudent risk during COA development and war-gaming. If these constraints adversely impact mission success, they address constraints with higher headquarters through airspace and if necessary operations channels. The staff facilitates a shared understanding by supporting the air and missile defense (AMD) and fires cells with their running estimates and appendix development. Lastly, the staff helps by shaping theater-level airspace planning to accommodate Army requirements. Establishing a shared understanding of air-ground integration and airspace use not only guides further planning, but enables informed, timely decisions during mission accomplishment.

### **AIRSPACE CONTROL COLLECTIVE TASKS DURING PLANNING**

3-23. Airspace elements perform a series of collective tasks during staff planning. These tasks result in the production and refinement of the daily unit airspace plan (UAP) and an Appendix 10 (Airspace Control) to Annex C (Operations) of the Army plans and orders. (See appendix F and ATTP 5-0.1 for Army plans and orders.)

3-24. Airspace control is an integral part of planning. Airspace elements at all echelons perform collective tasks during planning:

- Determine integrated airspace user requirements.
- Develop airspace usage priorities.
- Coordinate air traffic service (ATS), sensor emplacement, and data links.
- Determine combat identification authority and procedures for airspace users.
- Develop rules of engagement and early warning procedures for air defense operations.
- Determine reporting requirements and monitoring methods for manual reporting.
- Integrate airspace use within the area of operations.
- Develop ACMs to support planned operations.
- Develop airspace control appendix to the operation annex.

### **Determine Integrated Airspace User Requirements**

3-25. During COA development, airspace control elements at all echelons solicit airspace user requirements from each of the functional and integrating cells as they develop airspace plans that support each COA. During COA analysis, airspace elements modify and synchronize each airspace plan to support each COA. Once the commander has selected a COA, they perform the final integration of airspace user requirements. Commanders submit the necessary ACMs, proposed risk guidance, and airspace priorities to higher headquarters for approval and integration into the higher headquarters UAP. Early and timely airspace planning at all echelons is a necessity. Airspace element personnel in Army operating forces

remain actively and continually engaged with all higher echelons (such as joint force commander, joint force air component commander, AADC, and airspace control authority) while preparing key airspace planning documents. By staying engaged, these personnel ensure documents accommodate all Army airspace requirements and procedures and that airspace used by other components does not inadvertently constrain Army operations.

### **Develop Airspace Usage Priorities**

3-26. Army airspace elements at all echelons develop airspace usage priorities. First, the airspace elements determine and confirm the commander's intent and guidance, mission priorities, and risk guidance for airspace utilization. Then they examine pertinent airspace orders, directives, and the ground commander's concept of operations to develop recommended airspace usage priorities according to ground operations and ACA directives. Lastly, they synchronize plans, orders, and special instructions to facilitate current operations and future planning to promote situational understanding and to detail the future integration decision basis. The echelon commander's priority of airspace use, once approved by the echelon commander, prominently appears in Appendix 10 (Airspace Control) to Annex C (Operations) of the respective echelon operation plans and orders.

### **Coordinate Air Traffic Service, Sensor Emplacement, and Data Links**

3-27. The airspace elements at corps and division levels coordinate with the aviation element for ATS and ATS sensor emplacement, the AMD element for AMD sensor emplacement, and data links for AMD and aviation cells. While the airspace element is not the staff lead for ATS or AMD, this coordination recommends emplacement of organic sensors, organic radars, and joint sensors necessary to support airspace control. This coordination also integrates available air defense artillery, ATS, and data links necessary to create and distribute an air picture for the area of operations.

### **Determine Combat Identification Authority and Procedures for Airspace Users**

3-28. The AADP (see paragraph 3-6) contains the combat identification authority and associated procedures. The AMD element at the corps and division levels, supported by the airspace element, makes inputs into the AADP. Based on this plan, the AMD element uses combat identification criteria to process and assign tracks as friend, neutral, hostile, or unknown. The AADP details—

- The authorities delegated to AMD fire controllers in individual areas of operations.
- The authorities delegated to execute identification of tracks in the joint data network.
- The airspace element's capability to provide identification friend or foe, precise position location information, and visual identification.
- The locations, number, and type of AMD sensors employed in the area of operations.
- The completeness of the low-level air picture.

3-29. The AMD element analyzes information from these documents. It determines if higher echelons retain combat identification authority or are delegated to lower echelons. If delegated to lower echelons, the AMD element determines whether the information is suitable for determining the identification of tracks in a unit's area of operations. AMD personnel determine whether to further delegate the responsibility of combat identification to subordinate units or retain at the highest tactical level.

### **Develop Rules of Engagement and Early Warning Procedures for Air Defense Operations**

3-30. The AMD element at the corps and division levels, supported by the airspace elements, develops rules of engagement and early warning procedures for air defense operations in the area of operations. The element recommends rules of engagement for current and future operations within the unit controlled airspace or high-density airspace control zone. The AMD element forwards these recommendations to the AADC for inclusion in the JFC's rules of engagement. The airspace element and AMD element analyze all airspace documents and the JFC's rules of engagement to extract pertinent data for dissemination to all subordinate ADAM/BAEs. Based on the AADP, the AMD element identifies and establishes liaison with the appropriate air defense artillery fire control officers and establishes procedures to process engagements

through these controllers. In coordination with the airspace element, the AMD element establishes early warning procedures.

### **Determine Reporting Requirements and Monitoring Methods for Manual Reporting**

3-31. An airspace element, supported by the aviation and AMD elements, determines which agencies operating in the area of operations lack self-reporting capabilities and equipment for identification, friend or foe. An airspace element establishes procedures for those agencies to manually report their locations. This airspace element also ensures dissemination of this information to unified action partners operating air platforms in the area of operations. The airspace element ensures all manually reported tracks are integrated into the common operational picture. Integration maximizes the freedom of maneuver and all airspace users' capabilities as well as minimizes the potential for fratricide and adverse impacts on operations.

### **Integrate Airspace Use Within the Area of Operations**

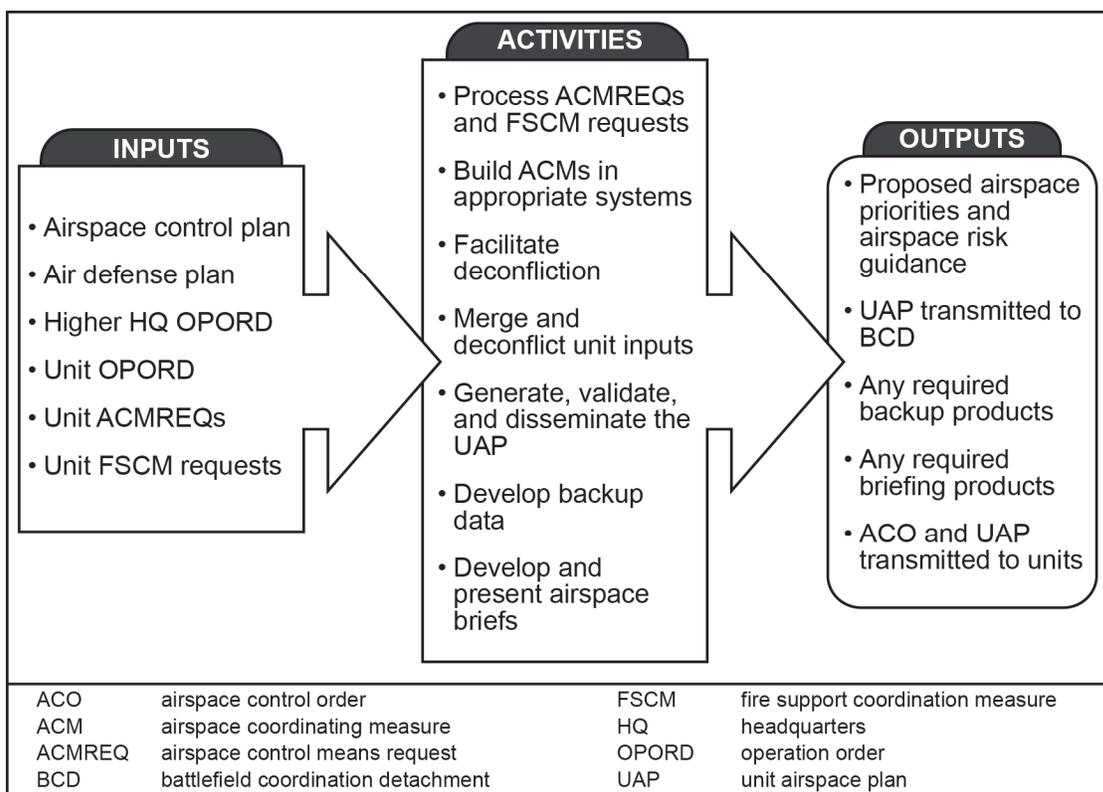
3-32. Airspace element personnel at all echelons integrate airspace use within the area of operations. They receive airspace control guidance (ACP, ACO, and special instructions) from the ACA and distribute the guidance through appropriate electronic systems to all subordinate airspace elements. The airspace element identifies all airspace users in the area of operations and then coordinates their airspace use. Coordination involves determining the length of time those users will require airspace, determining the altitude and type of airspace volume for each user, synchronizing all user requirements into a cohesive plan, and planning for airspace conflict resolution. The airspace element also identifies airspace control enablers (such as ATS, AMD units, and unified action partner airspace elements) in the area of operations.

### **Develop Airspace Coordinating Measures to Support Planned Operations**

3-33. During planning, airspace element personnel at all echelons develop ACMs to support planned operations. These personnel use an airspace control means request to integrate and nominate planned ACMs to higher headquarters as part of a future ACO. Consolidated at each echelon, airspace control means requests form the basis of a unit's UAP. Lower echelons initiate UAPs on a schedule dictated by the battle rhythm. As these UAPs migrate up the chain of command, each higher echelon coordinates, consolidates, and integrates the plans until a single Army UAP exists. Airspace element personnel send this last UAP to the battlefield coordination detachment for coordination with the ACA and inclusion in the appropriate ACO. See figure 3-1 on page 3-8. At each succeeding echelon, the staff coordinates the plan across the warfighting functions to ensure complete integration of fire support coordination measures and AMD planning. Timely feedback from each echelon throughout the process is essential for planning at lower echelons.

3-34. The corps and division airspace elements and ADAM/BAE develop ACMs to support the commander's concept of operations. The corps and division airspace elements and ADAM/BAE also ensure fire support coordination measures and AMD control measures are integrated with the UAP at each level. The staff disseminates these measures to higher, lower, and adjacent headquarters through fires and AMD channels.

3-35. To support planned operations, planners identify ACMs at each level and for the type of control required (positive, procedural, or a mix of both). Planners use tailored ACMs that minimize the necessary time and volume of airspace to accomplish each individual mission. Once they identify the required ACMs, airspace element personnel at each echelon develop and submit the UAP up the chain of command. Each echelon integrates fire support coordination measures and AMD control measures into the UAP. As these individual UAPs move through the higher echelons, planners deconflict, coordinate, integrate, and collate them with other UAPs until a single Army UAP evolves. Planners submit this final UAP to the ACA via the battlefield coordination detachment for inclusion in the appropriate ACO. (For detailed information on ACMs, see appendix B.)



**Figure 3-1. Development process for unit airspace plan**

**Develop Airspace Control Appendix to the Operation Annex**

3-36. The airspace element develops an airspace control appendix to the operation annex. The result of the unit performing the collective tasks in paragraphs 3-25 through 3-35 is Appendix 10 (Airspace Control) to Annex C (Operations) of the unit’s operation plan or operation order. (See ATTP 5-0.1.) The airspace control appendix articulates the airspace the commander is responsible for and states the commander’s airspace priorities and the ACA’s priorities and directives by phase. This appendix articulates the airspace element or ADAM/BAE mission. It lists the control authorities for each echelon as delegated or retained by the ACA and delineates the authority exercised at each echelon for each phase of the operation. It describes positive and procedural control requirements.

3-37. The airspace control appendix outlines the considerations of a radar versus a non-radar environment as well as airspace control in a degraded network environment. It includes the number and type of organic and joint sensors available in the area of operations to provide an air picture. Available sensors are addressed by phase as nonorganic assets flow in and out of the theater.

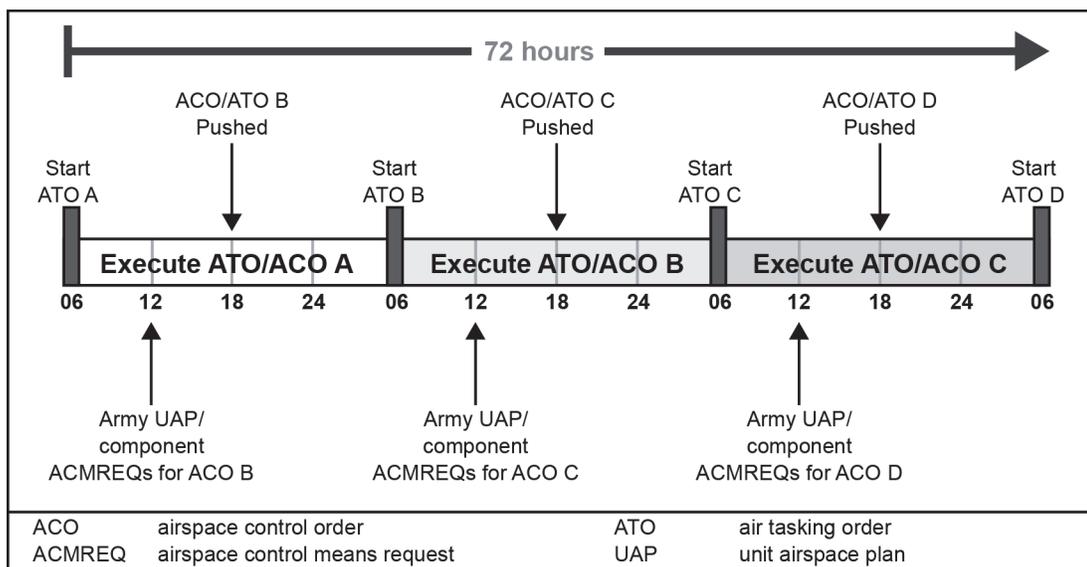
**BATTLE RHYTHM**

3-38. Commanders establish and utilize a battle rhythm to synchronize operations. A *battle rhythm* is a deliberate daily cycle of command, staff, and unit activities intended to synchronize current and future operations (JP 3-33). As a practical matter, a headquarters’ battle rhythm consists of a series of meetings, report requirements, and other activities synchronized by time and purpose. Planners logically sequence battle rhythm events so that one meeting’s outputs are available as another meeting’s inputs (to include higher headquarters meetings). The battle rhythm facilitates integration and collaboration between the commander and staff, synchronizing activities of the staff in time and purpose, and facilitates planning by

the staff and decisionmaking by the commander. In developing the unit’s battle rhythm, commanders and the chief of staff or executive officer consider—

- Higher headquarters battle rhythm and report requirements.
- The duration and intensity of the operation.
- Planning requirements of the integrating cells (current operations, future operations, and plans).

3-39. Airspace control planning is driven by not only higher headquarters battle rhythm but by external battle rhythm constraints. For example, the joint air tasking cycle (figure 3-2) drives when UAP inputs are due, which in turn influences the battle rhythm of airspace control working groups. Planners disseminate the joint air tasking cycle, ACO timelines, and other pertinent airspace coordination instructions (specified in the ACP and the JAOP) into Appendix 10 (Airspace Control) to Annex C (Operations) of the Army plans and orders.



**Figure 3-2. Notional 72-hour joint air tasking cycle**

3-40. Working groups are types of meetings. Their cross-functional design enables working groups to synchronize contributions from multiple command post cells and staff sections. For airspace planning, the airspace control working group facilitates and synchronizes airspace collective task contributions from all the airspace elements. The airspace control working group, at a minimum, consists of representatives from the airspace element, aviation cell, AMD element, fires cell, air liaison officer, tactical air control party, and unmanned aircraft systems cell. Airspace elements are integral participants in other working groups and provide expertise on how to maximize airspace use for information collection, targeting, and protection purposes:

- Operations and Intelligence working group (intelligence cell).
- Targeting working group (fires cell).
- Protection working group (protection cell).
- Assessment working group (plans or future operations functional cells).

Airspace elements also assist the S-3 and S-5 or G-3 and G-5 plans and future operations cells in assessing airspace integration of air-ground operations.

## PREPARATION

3-41. Airspace elements participate in certain preparation activities performed by units to improve their ability to execute an operation. Preparation helps the force transition from planning to execution and normally begins during planning and continues into execution by uncommitted units.

3-42. Preparation activities help commanders, staffs, and Soldiers to understand the situation and their roles in the upcoming operation. As in planning, airspace element personnel play an integral role in preparation activities that a unit performs as it transitions from planning to execution. This is particularly relevant as it relates to improving situational understanding and developing a shared understanding of the plan. Depending on the situation, airspace elements participate in all of the unit's preparation activities. Most notably, airspace elements actively participate during rehearsals, facilitating a shared understanding of air-ground integration, potential ground operations affect on airspace use, and potential airspace use affects on ground operations. Plan revision and refinement as well as rehearsals are particular preparation activities that airspace personnel support.

### **PLAN REVISION AND REFINEMENT**

3-43. Plan revision and refinement is a key activity of preparation. The airspace element supports this activity as planners validate planning assumptions or find them to be false, as enemy activities change in the area of operations, and as friendly capabilities expand or contract. The airspace element continually assesses the operation and makes recommendations for changes to unit plans and joint documents (such as ACP and JAOP).

### **REHEARSALS**

3-44. Rehearsals enable leaders to practice synchronizing operations and identify shortcomings (errors or omissions) while preparing to execute operations. A *rehearsal* is a session in which a staff or unit practices expected actions to improve performance during execution (ADRP 5-0). Leaders use rehearsals to practice synchronizing operations—including airspace control requirements—at times and places critical to mission accomplishment. Commanders use this tool to ensure staffs and subordinates understand the concept of operations and commander's intent. Effective rehearsals imprint a mental picture of the sequence of the operation's key actions and improve mutual understanding and coordination of subordinate and supporting leaders and units.

3-45. Rehearsals are conducted by units at the lowest possible level. They vary with the complexity of the mission, the type of rehearsal, and technique of rehearsal, and the level of participation. Four types of rehearsals exist: backbrief, combined arms rehearsal, support rehearsal, and battle drill rehearsals. Airspace elements participate in combined arms rehearsals enabling subordinate units to synchronize their plans with each other and support rehearsals that synchronize each warfighting function with the overall operation. ATTP 5-0.1 discusses rehearsals in detail.

3-46. Commanders integrate airspace use and key air-ground actions into larger combined arms and support rehearsals such that leaders and Soldiers build a lasting mental picture of the sequence of key air-ground actions and airspace use. During rehearsals, airspace elements ensure planned airspace use is consistent with the commander's intent and supports the concept of operations. Airspace elements ensure that all leaders and Soldiers understand the risk guidance. During rehearsals, staffs and units exercise key actions or procedures to effectuate near-real-time airspace control to resolve events that cause airspace conflicts. Rehearsing these events builds requisite skills to successfully integrate airspace users and to quickly resolve conflicts. Examples of when near-real-time airspace control is required include—

- Supporting troops in contact.
- Providing immediate fires or close air support.
- Engaging time sensitive targets.
- Engaging emerging or fleeting targets.
- Conducting casualty evacuation.
- Conducting personnel recovery.
- Supporting a mission change.
- Supporting mission delays (initiation or execution).
- Responding to enemy actions or reactions.

3-47. A rehearsal provides subordinates a final opportunity to identify and fix unresolved issues. Thorough preparation for rehearsals underpins successful outcomes that help commanders visualize conditions

associated with decisionmaking. This visualization before and during operations affords commanders an opportunity to make necessary changes essential to mission success and risk mitigation. Following the rehearsal, based on the commander's guidance, airspace elements make or recommend necessary adjustments to appropriate ACMs, UAPs, the airspace control appendix, fire support, and AMD annexes of operation plans at all echelons, as well as to the ACP, JAOP, and AADP.

3-48. Successful airspace elements participating in rehearsals—

- Complete the airspace control appendix and airspace overlays that underpin air-ground operations that units rehearse.
- Clearly describe the ACM that support air-ground operations.
- Clearly describe airspace constraints.
- Clearly describe near-real-time control and conflict resolution procedures.

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## Chapter 4

# Airspace Control—Execution and Assessment

This chapter provides an overview of airspace control activities performed during execution and assessment. These activities are interrelated. Near-real-time execution requires constant monitoring, evaluating, and assessing the situation and then taking action or making recommendations.

## EXECUTION

4-1. *Execution* is putting a plan into action by applying combat power to accomplish the mission (ADP 5-0). Execution uses situational understanding to assess progress and make execution and adjustment decisions. However, few plans are executed precisely as envisioned. Operations the commander envisioned in the plan may bear little resemblance to actual events in execution. Subordinate commanders need maximum latitude to take advantage of situations and meet the higher commander's intent when the original order no longer applies. Leaders must be trained in independent decisionmaking, aggressiveness, and risk taking for effective execution.

4-2. By exercising mission command, commanders empower their subordinate leaders to develop the situation, adapt, and act decisively to changes during execution. Army commanders have the authority to direct (control) the maneuver of all Army airspace users within their designated areas of operations (AOs), so they can make the best use of airspace. If assigned airspace control responsibility for a volume of airspace by the airspace control authority in the airspace control plan or airspace control order, Army commanders exercise airspace control over all airspace users. This authority to exercise airspace control for an assigned volume of airspace does not include the authority to approve, disapprove, or deny joint combat operations. Army commanders are the supported commander within their designated AO; as such, other commanders coordinate their airspace use with Army commanders to avoid adverse effects and fratricide.

4-3. Army commanders and staffs utilize positive control methods, procedural control methods, or a combination of both methods. When tasked by the joint force commander, the Army procedurally controls airspace up to a designated altitude—for example, the airspace up to the coordinating altitude—and at times may use positive control for small volumes of airspace (see paragraph 1-22 for further discussion).

4-4. Army airspace elements coordinate airspace use with airspace control agencies provided by unified action partners (tasked by the airspace control authority to control airspace). These elements can include elements of the Air Force theater air control system (for example, control and reporting centers or airborne warning and control systems), the Marine air command and control system (for example, direct air support center or tactical air operations center), the Navy tactical air control system, or similar coalition or civil air traffic control organizations. (See FM 3-52.2 for additional information.) Normally, brigades assigned an AO are authorized by division or corps to coordinate directly with unified action partner airspace control agencies for the execution of airspace control. Division can retain this authority.

4-5. In large portions of a unit's AO, airspace element personnel communicate with airspace users and have digital situational awareness of airspace user locations. This communication and awareness enable a form of near-real-time procedural control. By collaborating with cooperative airspace users, airspace element personnel can create focused (minimal time and area) airspace coordinating measures and exchange this data with all local airspace users. Using near-real-time procedural control, airspace element personnel can direct Army airspace users to shift airspace use to a different route, altitude, or volume of airspace. The airspace user still retains the responsibility for safely maneuvering to the new airspace. The collocation of functionally aligned theater air control system elements can expand this near-real-time control to joint airspace users.

4-6. During execution, near-real-time airspace procedural control requires airspace elements and users to continually monitor and assess the operations of all airspace users. The airspace elements monitor and assess in support of their operations as well as those transiting through the air over their ground AO. This continuous assessment contributes to the commander's situational understanding and enables units to react to situations requiring immediate use of airspace.

4-7. During execution, the airspace element's running estimate, along with other staff section's running estimates, supplements the common operational picture (COP) based on digital feeds from various information systems—Army, joint, coalition, interagency, and so on. The combined running estimates and COP depict key information from each functional area or warfighting function. This information directly supports the commander's ability to understand, visualize, describe, direct, lead, and assess operations and enables units to react to situations requiring immediate use of airspace. For example, information details airspace use for immediate fires, close air support missions, unplanned unmanned aircraft system launch, or diversion of aviation assets in near real time.

4-8. Situational understanding of airspace users within the unit's AO is a critical element in enabling the commander to make rapid decisions and capitalize on opportunities by taking prudent risk. Commanders rely on their understanding of an operational environment to make informed risk decisions. This understanding results from many factors, but heavily relies on situational understanding developed from the COP. The airspace elements perform the critical task of developing and interpreting the air COP for the commander and staff. The air COP enables the commander to visualize all airspace users' identification, location, flight paths, trajectories and other information critical to rapid decisionmaking and risk mitigation. By knowing who is in the airspace, where they are going, and what their mission is, commanders can integrate airspace use in near real time.

4-9. As in planning, the airspace elements maintain constant communications with the fires cell, air liaison officer, tactical air control party, intelligence sections, unmanned aircraft system operators, and all other staff elements that represent airspace users. Airspace elements track and establish communication links with all manned and unmanned airspace users. This communication enables the airspace elements to build complete situational understanding and to synchronize ongoing airspace operations. By establishing these communication links, airspace element personnel can solve airspace user conflicts in near real time by recommending adjustments to timing, trajectories, or flight paths to the staff elements and subordinate headquarters that control the conflicting users. This process is continuous and requires the airspace elements to monitor not only the current operations, but also to project airspace usage for planned operations.

## **ASSESSMENT**

4-10. Assessment, the continuous monitoring and evaluation of the current situation, precedes and guides every operations process activity and concludes each operation or phase of an operation. Staffs monitor the current situation for unanticipated successes, failures, or enemy actions. As commanders and staffs assess the operation, they look for opportunities, threats, and acceptable progress. They accept risks, seize opportunities, and mitigate threats.

4-11. Assessment activities help commanders visualize, describe, and direct changes to the operation. Airspace elements assist commanders in assessing airspace operations. Assessment consists of but is not limited to the following activities:

- Monitoring the current situation to collect relevant information.
- Evaluating progress toward establishing end state conditions, accomplishing objectives, and performing tasks.
- Recommending or directing action for improvement.

4-12. Staffs use several tools to assess progress. Running estimates and the COP are the two most prevalent. Running estimates provide information, conclusions, and recommendations from the perspective of each staff section. Running estimates help refine the COP and supplement it with information not readily displayed. The COP provides an integrated visualization of the operations (see paragraph D-14 through paragraph D-16).

4-13. Airspace elements continually monitor and assess operations, airspace use, and future airspace use as part of their running estimate. These running estimates provide the analytical basis for airspace use recommendations. These recommendations are focused on near-real-time airspace control or on posturing for future use of airspace. Examples of monitoring airspace use include—

- Verifying planned aviation missions conform to actual airspace use.
- Anticipating potential manned and unmanned aircraft missions generated to support adjustments to current operations (casualty evacuation, unmanned aircraft system retasking).
- Identifying airspace users entering the AO without prior coordination.
- Understanding airspace not in use (situational understanding of unused airspace provides flexibility since it is essentially pre-cleared for immediate use if needed).
- Maintaining situational understanding during current operations and anticipating potential fire missions (surface-to-surface, surface-to-air, and air-to-surface) that may result in an airspace conflict.

4-14. Continuous assessment enables learning and adaptability. Airspace elements continuously assess operations enabling the staffs to identify shortcomings in key airspace planning documents, most notably the joint air operations plan, the airspace control plan, the area air defense plan, and higher headquarters operation orders, and associated airspace appendices. Based on these shortcomings, airspace elements recommend needed adjustments to establish the conditions for future operations. In doing so, these key airspace planning documents remain relevant and help commanders reduce uncertainty and risk, and provide flexibility during mission accomplishment.

## **AIRSPACE CONTROL—EXECUTION AND ASSESSMENT COLLECTIVE TASKS**

4-15. Airspace elements perform a series of collective tasks to integrate airspace use in near real time. Executing collective tasks enables commanders to make informed decisions of when and where to shoot or fly, minimizing the risk. Airspace elements work alone to perform collective tasks.

### **PROCESS AIRSPACE ORDERS AND DIRECTIVES**

4-16. The airspace element processes airspace orders and directives. It uses information systems to receive and disseminate airspace orders and directives to or from the airspace control authority and subordinate airspace elements. The element builds and maintains the airspace control overlay consisting of the joint airspace control order, any local airspace coordinating measures the airspace control authority does not publish on the airspace control order, and near-real-time airspace coordinating measures too transient to be published in an airspace control order change. The airspace element establishes near-real-time, jam resistant, and long-range voice communications with higher, adjacent, and subordinate systems. The airspace element promulgates procedures for receiving and disseminating airspace information in Appendix 10 (Airspace Control) to Annex C (Operations). These procedures address communicating with units equipped with different information systems, operating in a degraded environment (for example, no communication lines and no radar feeds), as well as addressing reliability, speed, and risk issues associated with operating in degraded environments. See appendix C for a detailed discussion on information systems.

### **MANAGE AIRSPACE CONTROL INFORMATION DISPLAYS**

4-17. Airspace elements maintain accurate information displays. Information displays consist of overlays, maps, and databases in near real time. This information includes computer hardware and software and communications as well as policies and procedures. Once developed, the element updates information and disseminates it to subordinate airspace elements and users.

### **DETERMINE TRACK IDENTIFICATION FOR AIRSPACE USERS**

4-18. The air and missile defense (AMD) element, in coordination with the airspace element, uses combat identification criteria to determine track identification for airspace users. AMD elements, supported by airspace elements, continuously monitor the air picture. The AMD element tracks and identifies airspace

users as friend, neutral, hostile, or unknown. Once identified, the element assigns combat identification. The air and missile defense element confirms that all tracks are processed for identification. This element monitors and verifies that all subordinate airspace nodes process all organic tracks for identification. The AMD element coordinates with the area air defense commander for appropriate actions on hostile tracks within the AO. The airspace element maintains situational awareness and situational understanding of all unified action partners and neutral airspace users in the AO.

### **MONITOR ASSIGNED AIRSPACE AND AIRSPACE USERS WITHIN ASSIGNED AREA OF OPERATIONS**

4-19. Airspace elements continually monitor the operations of all airspace users to support their mission as well as those transiting through the air over their ground AO. By monitoring airspace users' identification, location, flight paths, trajectories, and other critical information, airspace elements can develop and maintain running estimates that provide the basis for the air COP. Further, by continuously monitoring and assessing airspace use and airspace coordinating measures for conflicts, airspace elements can provide direction to deconflict, coordinate, and integrate the use of airspace within the AO. Airspace elements monitor with a near-real-time, jam resistant, and secure communications network as well as digital connectivity. Airspace elements use several means to communicate with higher, adjacent, and subordinate airspace elements within the AO. First, elements determine the dimensions of the unit airspace. Next, they determine the level of authorization for airspace control delegated to the unit. Once the communication with the assigned AO is determined, airspace elements maintain and update all joint airspace control documents to ensure compliance with established monitoring procedures. Activities include—

- Airspace control utilizing the low-level air picture.
- Airspace control utilizing manual reporting.
- Monitoring air track actions.
- Maintaining an up-to-date airspace control order.
- Assigning combat identification (to support air and missile defense).
- Defensive counterair operations (to support air and missile defense).
- Airspace control liaison with higher controlling authorities (such as airborne warning and control system, control and reporting center, tactical air operations center, or direct air support center).

### **RESOLVE REAL-TIME CONFLICTS FOR AIRSPACE USERS WITHIN THE AREA OF OPERATIONS**

4-20. Regardless of the thoroughness of planning, during execution airspace elements need to resolve real-time conflicts for airspace users within the area of operations. These situations require immediate use of airspace. Continuously monitoring and assessing current and projected airspace use enables airspace elements to either coordinate or recommend airspace use for immediate fires, close air support, unplanned unmanned aircraft systems employment, aircraft redirection and numerous other missions. Airspace elements resolve airspace conflicts by changing the time, altitude, or location of one or more airspace users; by restricting operations of one or more airspace users; or by accepting prudent risk to accomplish both missions in the same airspace. Airspace elements do not routinely manage the flight path or trajectory of individual airspace users; rather they integrate airspace use both in planning and execution to manage risk. Only when two or more airspace users are in conflict do airspace elements direct changes in flight paths or, in the case of fires, coordinate with the fires cell to alter the trajectory. Airspace elements base these changes on the commanders' mission priorities and risk guidance. Pilots, unmanned aircraft system operators, and weapon system controllers still maintain the responsibility to make the directed changes to their flight path or trajectory. If the risk involves airspace coordination with other joint airspace controlling agencies, the unit makes every attempt to coordinate a satisfactory solution. However, the commander has the authority to accept prudent risk if necessary to accomplish an immediate combat mission unless specifically prohibited by higher headquarters constraints.

## **Appendix A**

### **Risk**

This appendix discusses risk and airspace control. First, it discusses risk collaboration in airspace. Then, it discusses the two types of risk. The appendix then discusses the effects risks have on airspace operations. Next, it addresses the condition of risk in airspace control. The appendix concludes with a discussion of the steps that airspace element personnel use to manage risk.

#### **COLLABORATION IN RISK**

A-1. Airspace use over an Army area of operations (AO) is always joint, and often coalition and interagency, so decisions require collaboration with many organizations. While the owner of an AO is the primary supported commander, other airspace users still require access to the area. For example, the joint force air component commander must have access to that airspace to accomplish missions supporting the ground commander and to accomplish theater-wide missions supporting the joint force commander. Further, other military and civil airspace elements at times control some or all the airspace over a unit AO. These organizations often have differing views of mission priorities and acceptable risk to their airspace users.

A-2. Joint airspace doctrine allows commanders to make risk decisions in combat situations; however, the commander making the decision accepts responsibility for the decision. Just as airspace use within and above an Army AO is joint, the risk accepted by the commander may also involve joint forces. Therefore, airspace control personnel should notify affected joint forces of the risk so the forces can properly mitigate it and remain within the joint force commander's acceptable level of risk for all airspace users (including fires) as delineated in the airspace control plan.

A-3. To set brigade commanders up for success, the operational Army force airspace element actively collaborates with the joint force commander while developing and refining acceptable airspace risk guidance and any associated decision support tools such as risk assessment matrixes. This collaboration necessitates early and continuous component participation in producing, and subsequently changing, the joint air operations plan, the area air defense plan, the airspace control plan, and airspace control orders. Once these higher echelon commanders have agreed to acceptable risk, the joint air force component commander publishes this guidance (including any constraints) in the joint air operations plan and the airspace control plan. Additionally, the joint force air component commander disseminates this guidance using the air operations directive. The Army disseminates the guidance in Appendix 10 (Airspace Control) to Annex C (Operations) of Army plans and orders. As military operations progress, participants readdress this risk guidance.

#### **TYPES OF RISK**

A-4. Airspace risk consists of real risks and perceived risks. Although effective airspace control facilitates a commander's ability to effectively and efficiently integrate and synchronize all airspace users within the assigned airspace, risks exist. Real risk is the actual probability of a collision between airspace users. The real risk of a collision between airspace users is small. Perceived risk is the risk of collision that airspace users and their commanders assess to incur by operating in the area. It may or may not be an accurate assessment, but airspace risk rules and constraints usually stem from perceived risk. A strategy that only addresses real risk can fail if external commanders and airspace agencies perceive the risk to be greater than it actually is. For example, from 2003 to 2010, small, unmanned aircraft systems flew approximately 250,000 hours with only one incident of a collision with another airspace user. However, the perception of the risk posed by small, unmanned aircraft systems was much greater. Airspace element personnel can reduce perceived risk by establishing a relationship of trust with adjacent joint and unified action partner

airspace agencies such as combat reporting centers, airborne warning and control systems, and direct air support centers. An effective airspace control plan targets both real risk and perceived risk.

## CONDITIONS OF RISK MITIGATION

A-5. Conditions of risk mitigation for airspace differ from conditions of risk mitigation for ground operations. Aircraft reporting based on planning or periodic voice reports have a greater degree of position uncertainty and greater risk due to the speed in which aircraft travel. Tactical jet aircraft move so quickly, they cause risk situations that require rapid decisions based on estimated locations. The current location of an aircraft is always an estimate. In 30 seconds, an aircraft traveling at 500 knots per hour has travelled 7 kilometers. Hence, electronic displays do not show where an aircraft *is*; they show where the aircraft *was* when it reported its position. Airspace element personnel facilitate risk reduction by maintaining a running estimate of the possible locations of an aircraft based on its last report. A rapidly updated position report (such as radar or aircraft automatic self reporting) facilitates risk reduction since the airspace the aircraft occupies likely consists of a small volume of airspace. Without near-real-time situational awareness, airspace element personnel facilitate risk reduction by requiring airspace users to use preplanned coordination measures and reserving large volumes of airspace for possible use.

A-6. To preclude an airspace mishap, commanders establish control measures to mitigate risk. However, these control measures, if excessive, can degrade unit operations. Understanding the nature of airspace risk, tools to mitigate risk, and the effects (both positive and negative) of risk mitigation strategies is a key responsibility of airspace element personnel.

## EFFECTS OF RISK

A-7. Usually mitigating risk has one of two influencing effects. The first effect is the risk of a collision between airspace users. The second effect is the risk to mission success if a mission is cancelled or delayed to reduce the collision risk. Ideally, if a risk of collision exists, airspace element personnel adjust airspace use, reducing risk and allowing both missions to proceed without degrading either mission. However, in some cases, one or both of the airspace users have their mission degraded to reduce risk to acceptable levels. In this case only, commanders or designated representatives direct an airspace adjustment that degrades a mission or exceeds risk guidance. For example, a troops-in-contact fire mission must shoot through an airspace coordinating measure currently occupied by an aircraft. The commander decides to reduce platform risk by moving the aircraft and accepting degradation of the platform's mission; to reduce platform risk by cancelling the fire mission and accepting risk to Soldiers who need the fires; or to accept risk to the platform and shoot while the aircraft remains on station.

A-8. Risk management associated with airspace control increases combat effectiveness by promoting the safe, efficient, and flexible use of airspace with minimum restraint on airspace users. A successful airspace risk mitigation plan and timely actions are force multipliers that assist in accomplishing the mission, protecting friendly forces and noncombatants, and preserving aircraft while adhering to commander's intent, guidance, and risk acceptance criteria.

## RISK MANAGEMENT PROCESS

A-9. The Army utilizes a risk management process (see FM 5-19). The five risk management steps (identify hazards, assess hazards to determine risk, develop control measures and make risk decisions, implement control measures, and supervise and evaluate) of this process also facilitates airspace risk management. The five steps align with the activities of the operations process (plan, prepare, and execute supported by continuous assessment). The aviation safety officer at each echelon assists the staff, ensuring each section or planner uses the risk management process. (See figure A-1.)

<b>Risk Management Steps</b>	<b>Operations Process</b>
<b>Step 1 - Identify Hazards</b> <b>Step 2 - Assess Hazards</b>	<b>Plan</b>
<b>Step 3 - Develop Controls/            Make Risk Decisions</b>	<b>Prepare</b>
<b>Step 4 - Implement Controls</b>	<b>Execute</b>
<b>Step 5 - Supervise and Evaluate</b>	<b>Assess</b>

**Figure A-1. Risk management aligned with the operations process**

## PLAN

A-10. In the planning phase, steps one and two of the risk management process provide the structure and situational awareness necessary to develop a sound course of action and plans. Only then can a stated mission or purpose be accomplished within a predetermined level of risk. When planning operations, commanders' efforts involve risk management tools and processes to assess and mitigate risk. If no airspace users risked interfering with each other airspace users, no requirement for airspace control would exist.

A-11. In step one, airspace control working group personnel identify potential hazards by using the standard mission, enemy, terrain and weather, troops and support available, time available and civil considerations (known as METT-TC) format. Personnel identify the potential hazards in the airspace above the AO that they can encounter while accomplishing a mission, event, or operation. For example, hazards they identify include physical hazards (such as wires or structures), firing unit locations and procedures, air defense unit locations and procedures, or misapplication of appropriate airspace coordinating measures. Poor choices and decisions on using the available airspace preclude its efficient utilization by airspace users and jeopardize mission accomplishment.

A-12. In step two, airspace control working group personnel assess potential hazards and assign risk in terms of probability and severity of adverse impact on an event or occurrence. This step considers the risk or likelihood of an event or incident adversely influencing a mission, capabilities, people, equipment, or property. Commanders ask what the odds (probability) are of something going wrong and what effects (severity) follow the incident if it does occur.

A-13. In these first two steps, airspace element personnel identify and assess hazards. They also analyze the plan's complexity using the density, diversity, duration, and promptness categories. Density refers to the number of airspace users a unit will control or will integrate in the airspace over the AO. Diversity accounts for the different types of airspace users (manned, unmanned aircraft systems, artillery, and air and missile defense) and organizations (joint forces, coalition forces, or civil airspace users) that use the airspace. Duration accounts for how long users will require the level of airspace control (for example, will it require airspace element personnel augmentation for a long duration high-density airspace control zone). Promptness is the amount of time needed to integrate a new airspace user safely into the airspace.

A-14. Density, diversity, duration, and promptness provide a tool for looking at a unit's mission and determining the complexity of the airspace control. Commanders and staffs assess information derived

from the density, diversity, duration, and promptness (along with hazards and associated risks) during mission analysis, course of action development, and course of action analysis. Commanders and staffs consider mission- and nonmission-related aspects that may have an impact. This assessment results in an initial estimate of risk for each identified hazard expressed in four terms. Airspace uses rate the risk with extremely high, high, moderate, or low as determined from the standardized application of the risk assessment matrix. (See figure A-2.)

Severity		Probability				
		Frequent A	Likely B	Occasional C	Seldom D	Unlikely E
Catastrophic	I	E	E	H	H	H
Critical	II	E	H	H	H	L
Marginal	III	H	H	M	L	L
Negligible	IV	M	L	L	L	L
		E - extremely high	H - high	M - moderate	L - low	

**Figure A-2. Sample risk assessment matrix**

**PREPARE**

A-15. In the preparation phase, leaders develop control measures and make decisions to eliminate unnecessary risks. Based on the identification and assessment of potential hazards by airspace personnel, leaders balance the risks (readiness, political, economic, and environmental) against the costs of each course of action as they develop control measures.

A-16. In step three, after airspace control working group personnel have assessed related hazards and made appropriate recommendations, leaders develop one or more control measures. These control measures either eliminate the hazard or reduce the risk (probability or severity) of a hazardous incident occurring. In developing control measures, leaders consider the reason for the hazard, not just the hazard itself.

A-17. To be effective, each control developed must meet the following criteria:

- Suitability. It removes the hazard or mitigate (reduce) the residual risk to an acceptable level.
- Feasibility. The unit has the capability to implement the control.
- Acceptability. The benefit gained by implementing the control justifies the cost in resources and time. The assessment of acceptability is largely subjective.

A-18. Commanders and staff develop and rehearse procedures for making risk decisions. Commanders ensure that the level of authority accepting the consequences of a given hazard is determined by the level of residual risk associated with that hazard. The greater the residual risk, the higher the authority that evaluates and decides to take the risk.

**EXECUTE**

A-19. In the execution phase, risk management involves the implementation of the identified control measures. In step four, leaders and airspace element personnel ensure that control measures are integrated into Appendix 10 (Airspace Control) to Annex C (Operations) of the Army plans and orders, standard operating procedures, written and verbal orders, mission briefings, and running estimates. The critical check for this step is to ensure that staffs convert control measures into clear and simple execution orders.

**ASSESS**

A-20. Leaders continuously assess effectiveness of control measures, adjusting as necessary for changing or unexpected situations or events, and evaluate their effectiveness to maintain an acceptable level of risk for the operation. In step five, leaders and airspace element personnel ensure that risk control measures are

enforced to standard. This step also encompasses airspace element personnel validating the adequacy of the selected control measures in supporting the unit's mission. Timeliness or promptness is a key aspect of determining adequacy due to the dynamic nature of events during mission accomplishment. A unit's reputation of compliance to standards helps reduce other airspace user's perception of risk when operating in the units AO.

A-21. Supervision is an integral part of the process. Supervision ensures subordinates understand how, when, and where to implement control measures. It also ensures that control measures are implemented, monitored, and remain in place. Situational awareness is a critical component of the risk management process when identifying hazards. Situational awareness is equally important in supervision. It ensures that complacency, deviation from standards or violations of policies and risk control measures do not threaten success. Airspace element personnel monitor factors, such as fatigue, equipment serviceability or availability, and the weather and environment. The personnel can then mitigate the hazards such factors present. Supervision and oversight provides commanders and leaders with the situational awareness necessary to anticipate, identify, and assess any new hazards and to develop or modify control measures as necessary.

A-22. Evaluation occurs during all phases of an operation and is included as part of every after action review. During evaluation, airspace element personnel identify and assess hazards and well as endure compliance. Airspace element personnel identify any hazards not identified as part of the initial assessment or identify new hazards that evolved during the operation or activity. For example, any time that personnel, equipment, environment, or mission changes the initial risk management analysis, airspace element personnel reevaluate the control measures. Airspace element personnel assess effectiveness in supporting operational goals and objectives. They check if the control measures positively or negatively impact training or mission accomplishment. They check if the control measures support existing doctrine, techniques, tactics, and procedures. Airspace element personnel assess the implementation, execution, and communication of the control measures. Airspace element personnel assess accuracy of residual risk and effectiveness of control measures in eliminating hazards and controlling risks. Airspace element personnel ensure compliance with the guiding principles of risk management. They check that they integrated the process throughout all phases of the operation. They check the accuracy and decision levels of risk decisions. They check the necessity of risks, verifying that the benefits outweigh the cost in terms of dollars, training benefit, and time. They checked that the process was cyclic and continuous throughout the operation. Airspace element personnel track risk management in a standardized manner according to FM 5-19.

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## Appendix B

# Airspace Coordinating Measures

This appendix discusses airspace coordinating measures. First, it discusses the overview. Then, it discusses the types and usages of airspace coordinating measures. Lastly, this appendix discusses common reference systems for airspace coordinating measures.

### OVERVIEW

B-1. Army commanders use airspace coordinating measures (ACMs) to facilitate the efficient use of airspace and simultaneously provide safeguards for friendly forces. The Army's airspace control methodology emphasizes procedural control of airspace. ACMs are organized into a set of eight broad categories called types. Each type includes a subset of control measures called usages.

B-2. Doctrinal ACMs are implemented by digital messages—United States message text format (USMTF) 2000 or 2004 standard. (See appendix D for USMTF details.) Table B-1 contains the eight ACM types (with USMTF abbreviations).

**Table B-1. Eight types of airspace coordinating measures**

<b>ACM Type</b>	<b>USMTF abbreviation</b>	<b>Description</b>
air corridor/route	CORRTE	A bi-directional or restricted air route of travel specified for use by aircraft.
air defense area	ADAREA	An area and the airspace above it within procedures are established to minimize mutual interference between air and ground-based Army air defense and other operations.
air defense operations area	ADOA	An area and airspace above it within which procedures are established to minimize mutual interference between maritime and amphibious air defense operations.
air traffic control	ATC	Airspace of defined dimension within which air traffic control service is provided to instrument flight rules and visual flight rules flights in accordance with civil air traffic control regulations.
procedural control	PROC	An airspace coordinating measure that delineates an airspace boundary or defines airspace dimensions for enabling other systems (such as fire support systems) to discriminate: friendly coordination joint engagement measures from enemy, employ fires across boundaries, coordinate joint engagement of targets for a particular operation.
reference point	REFPT	A point or set of coordinates generally used for control purposes or to indicate a reference position.
restricted operations zone	ROZ	Airspace reserved for specific activities in which the operation of one or more airspace uses is restricted.
special use airspace	SUA	Airspace defined for a specific purpose or to designate airspace in which no flight activity is organized.

B-3. Ideally, airspace staff plan and request ACMs prior to the publication of the current airspace control order (ACO). Once a commander approves ACMs, they are then promulgated through the daily ACO. This does not preclude a component from immediately establishing and executing an ACM after considering risk (see appendix A for discussion on risk). Once approved, the staff adds ACMs to the ACO. However, near-real-time airspace coordination requirements dictate that some ACMs be requested outside the

planning phase. Near-real-time ACMs are expedited and—once approved—appear in ACO changes as historical data.

B-4. Airspace elements request ACMs using airspace control means requests (ACMREQs). Airspace elements use ACMREQs for planning, requesting a change, and coordinating. Airspace elements use planned ACMREQs to develop the unit airspace plan (UAP) and nominate planned ACMs to higher headquarters as part of a future ACO. Airspace elements use ACMREQs submitted within the current ACO cycle to integrate and disseminate the change into the current ACO. Lastly, airspace elements use near-real-time ACMREQs for near-real-time coordination with external airspace agencies. These agencies include an Air Force control and reporting center (CRC) or Marines Corps direct air support center (DASC).

## **TYPES AND USAGES**

B-5. The types and usages of ACMs are identified in table B-2 on pages B-3 and B-4. Table B-2 lists the types of coordinating measures and their corresponding USMTF 2004 ACMs. The bolded ACMs reflect the most frequently used ACMs or ACMs of particularly importance to the Army. Tables B-3 through B-10 (beginning on page B-5) provide additional details for the most frequently used ACMs.

Table B-2. Types of airspace coordinating measures and their corresponding usage

Airspace coordinating measure types								
ADAREA (12)		ADOA (17)		ATC (24)		CORRTE (9)		
Airspace coordinating measures	ADIZ	JOA	ADAA	ISR	ADVRTE	CONTZN	AIRCOR	SL
	BDZ	LFEZ	ADZ	MFEZ	ARWY	CTA	AIRRTE	TC
	BZ	LMEZ	AOA	MISARC	ATSRTE	DA	MRR	TMMR
	HIDACZ	LOMEZ	APPCOR	MMEZ	CBA	FIR	SAAFR	TR
	HIMEZ	SHORAD	CADA	PIRAZ	CDR	NAVRTE	SC	
	JEZ	WFZ	CCZONE	RTF	CLSA	PROHIB		
			COZ	SAFES	CLSB	RA		
			FIRUB	SCZ	CLSC	RCA		
			FRAD		CLSD	TCA		
					CLSE	TRSA		
					CLSF	TSA		
					CLSG	WARN		
ADAA	air defense action area			FIRUB	fire-powered umbrella			
ADAREA	air defense area			FRAD	falcon radials			
ADOA	air defense operations area			HIDACZ	high-density airspace control zone			
ADVRTE	advisory route			HIMEZ	high-altitude missile engagement zone			
ADZ	amphibious defense zone			ISR	identification safety range			
AIRCOR	air corridor			JOA	joint operations area			
AOA	amphibious objective area			LFEZ	land fighter engagement zone			
APPCOR	approach corridor			LMEZ	land missile engagement zone			
ARWY	airway			LOMEZ	low-altitude missile engagement zone			
ATC	air traffic control			MFEZ	maritime fighter engagement zone			
ATSRTE	air traffic service route			MRR	minimum-risk route			
BDZ	base defense zone			NAVRTE	area navigation route			
BZ	buffer zone			PIRAZ	positive identification radar advisory zone			
CADA	coordinated air defense area			PROHIB	prohibited area			
CBA	cross border area			RA	restricted area			
CCZONE	carrier control zone			RCA	reduced coordination area (NATO)			
CDR	conditional route			RTF	return to force			
CLSA	class-A airspace			SAAFR	standard use Army aircraft flight route			
CLSB	class-B airspace			SAFES	safety sector (USMTF)			
CLSC	class-C airspace			SC	special corridor			
CLSD	class-D airspace			SCZ	ship control zone			
CLSE	class-E airspace			SHORAD	short-range air defense engagement zone			
CLSF	class-F airspace			SL	safe lane			
CLSG	class-G airspace			TCA	terminal control area			
CONTZN	control zone			TMMR	temporary minimum risk route			
CORRTE	air corridor/route			TR	transit route			
COZ	crossover zone			TRSA	terminal radar service area			
CTA	control area			TSA	temporary segregated area			
DA	danger area			WARN	warning area			
FIR	flight information area			WFZ	weapons free zone			

Table B-2. Types of airspace coordinating measures and their corresponding usage (cont.)

		<i>Airspace coordinating measure types</i>							
		<i>PROC (16)</i>		<i>REFPT (8)</i>		<i>ROZ (15)</i>		<i>SUA (11)</i>	
<b>Airspace coordinating measures</b>	<b>ACA</b>	<b>FLOT</b>	<b>ACP</b>	<b>HG</b>	<b>AAR</b>	<b>PZ</b>	<b>ACSS</b>	<b>KILLBX</b>	
	<b>ALTRV</b>	<b>FSCL</b>	<b>BULL</b>	<b>ISP</b>	<b>ABC</b>	<b>RECCE</b>	<b>ALERTA</b>	<b>MOA</b>	
	<b>BNDRY</b>	<b>IFFOFF</b>	<b>CP</b>	<b>MG</b>	<b>AEW</b>	<b>ROA</b>	<b>ASCA</b>	<b>NFA</b>	
	<b>CFL</b>	<b>IFFON</b>	<b>EG</b>	<b>SARDOT</b>	<b>CAP</b>	<b>SEMA</b>	<b>FACA</b>	<b>NOFLY</b>	
	<b>CL</b>	<b>RFA</b>			<b>CAS</b>	<b>SOF</b>	<b>FARP</b>	<b>SSMS</b>	
	<b>DBSL</b>	<b>RFL</b>			<b>DZ</b>	<b>TRNG</b>	<b>FOL</b>		
	<b>FEBA</b>	<b>SAFE</b>			<b>EC</b>	<b>UAV</b>			
	<b>FFA</b>	<b>TL</b>			<b>LZ</b>				
AAR	air-to-air refueling area			HG	hand-over gate				
ABC	airborne command and control area			IFFOFF	identification, friend, or foe (IFF) switch off line				
ACA	airspace coordination area			IFFON	identification, friend, or foe (IFF) switch on line				
ACP	air control point			ISP	identification safety point				
ACSS	airspace control subarea/sector			KILLBX	kill box				
AEW	airborne early warning area			LZ	landing zone				
ALERTA	alert area			MG	marshalling gate				
ALTRV	altitude reservation			MOA	military operations area				
ASCA	airspace control area			NFA	no fire area				
BNDRY	boundary			NOFLY	no fly area				
BULL	bulls-eye			PROC	procedural control				
CAP	combat air patrol			PZ	pickup zone				
CAS	close air support holding area			RECCE	reconnaissance area				
CFL	coordinated fire line			REPT	reference point				
CL	coordination level			RFA	restrictive fire area				
CP	contact point			RFL	restrictive fire line				
DBSL	deep battle synchronization line			ROA	restricted operations area				
DZ	drop zone			ROZ	restricted operations zone				
EC	electronic combat			SAFE	safe area for evasion				
EG	entry/exit gate			SARDOT	search and rescue point				
FACA	force air coordination area			SEMA	special electronic mission area				
FARP	forward arming and refueling point			SOF	special operations forces				
FEBA	forward edge of the battle area			SSMS	surface-to-surface missile system				
FFA	free fire area			SUA	special use area				
FLOT	forward line of own troops			TL	traverse level				
FOL	forward operating location			TRNG	training area				
FSCL	fire support coordination line			UAV	unmanned aircraft (USMTF uses UAV [unmanned aerial vehicle])				

Table B-3. Air defense area (ADAREA)

Usage Name/USMTF Abbreviation	Joint Definition	Joint/Army Planning Considerations	Remarks
Base defense zone (BDZ)	An air defense zone established around an air base and limited to the engagement envelope of short-range air defense weapons systems defending that base. Base defense zones have specific entry, exit, and identification, friend or foe procedures established. (JP 3-52)	A BDZ provides airspace users with location of the engagement zone for the air defense systems defending a base for planning purposes. (FM 3-52.1) Primarily used for forward operating bases protected by counterfire systems.	ACM initiated by the AMD element. Established by air ACA.
Buffer zone (BZ)	Airspace designed specifically to provide a buffer between various airspace coordinating measures. (JP 3-07.3)	Coordinating altitudes may include a buffer zone for small altitude deviations.	Established by the ACA.
High-density airspace control zone (HIDACZ)	Airspace designated in an airspace control plan or airspace control order, in which there is a concentrated employment of numerous and varied weapons and airspace users. A high density airspace control zone has defined dimensions, which usually coincide with geographical features of navigational aids. Access to a high density airspace control zone is normally controlled by the maneuver commander. The maneuver commander can also direct a more restrictive weapons status within the high density airspace control zone. Airspace of defined dimensions, designated by the airspace control authority, in which there is a concentrated employment of numerous and varied weapons/airspace users. (JP 3-52)	A HIDACZ allows Army and Marine air-ground task force commanders to restrict a volume of airspace from users not involved with ongoing operations. It restricts use of the airspace due to the large volume and density of fires supporting the ground operations. The volume of air traffic demands careful coordination to limit the potential conflict among aircraft needed for mission-essential operations within the HIDACZ and other airspace users. A HIDACZ is requested by ground components to support exact, usually short duration, unified land operations. Army division and corps headquarters have, resident in the command post, the capability to control a HIDACZ. Brigades and brigade combat teams with an ADAM/BAE or ADAM can control a HIDACZ for a limited time; however, they require additional ATS augmentation (tactical aviation control team or air intercept controller) to control a HIDACZ for extended periods. When establishing a HIDACZ, consider the following: (1) Minimum-risk routes into and out of the HIDACZ and to the target area. (2) Air traffic advisory as required. Procedures and systems also must be considered for air traffic control service during instrument meteorological conditions. (3) Procedures for expeditious movement of aircraft into and out of the HIDACZ. (4) Coordination of fire support, as well as air defense weapons control orders or status within and in the vicinity of the HIDACZ. (5) Location of enemy forces inside of and within close proximity to the HIDACZ. HIDACZ is nominated by the ground commander and approved by the ACA. (JP 3-52)	ACM initiated by ADAM/BAE or airspace element. Established by the ACA.

Table B-3. Air defense area (ADAREA) (cont.)

Usage Name/USMTF Abbreviation	Joint Definition	Joint/Army Planning Considerations	Remarks
High-altitude missile engagement zone (HIMEZ)	In air defense, that airspace of defined dimensions within which the responsibility for engagement of air threats normally rests with high-altitude surface-to-air missiles. (JP 3-52)	HIMEZ normally is used when a high-altitude missile system has a clear operational advantage over using aircraft. These advantages could include range, command and control, rules of engagement, or response time. It provides airspace users with location of the engagement zone of a high-altitude missile system for planning purposes. Design of the HIMEZ is contingent on exact weapon system capabilities. (FM 3-52.1) A HIMEZ is a type of weapon engagement zone utilized in AMD operations.	ACM initiated by AMD element. Established by the AADC.
Joint engagement zone (JEZ)	In air defense, that airspace of defined dimensions within which multiple air defense systems (surface-to-air missiles and aircraft) are simultaneously employed to engage air threats. (JP 3-52)	A JEZ provides airspace users with a location for planning purposes. JEZs are highly dependent on correct differentiation between friendly, neutral, and enemy aircraft. (FM 3-52.1) A JEZ is a type of weapon engagement zone utilized in AMD operations.	ACM initiated by AMD element. Established by the AADC.
Joint operations area (JOA)	Area of land, sea, and airspace, defined by a geographic combatant commander or subordinate unified commander, in which a joint force commander (normally a joint task force commander) conducts military operations to accomplish a specific mission. (JP 3-0)		Established by the JFC. Promulgated by the ACA.
Land missile engagement zone (LMEZ)	Airspace of defined dimensions within which responsibility for engagement of air threats normally rests with surface based air defense system. (JP 3-52)	A LMEZ is a type of weapon engagement zone utilized in AMD operations.	ACM initiated by AMD element. Established by the AADC.
Low-altitude missile engagement zone (LOMEZ)	In air defense, that airspace of defined dimensions within which the responsibility for engagement of air threats normally rests with low-to-medium altitude surface-to-air missiles. (JP 3-52)	A LOMEZ is a type of weapon engagement zone utilized in AMD operations. LOMEZs provide airspace users with the location of the engagement zone of low altitude missile systems for planning purposes. The design of the LOMEZ is contingent on specific weapon system capabilities. (JP 3-52)	ACM initiated by AMD element. Established by the AADC.

Table B-3. Air defense area (ADAREA) (cont.)

Usage Name/USMTF Abbreviation	Joint Definition	Joint/Army Planning Considerations	Remarks
Short-range air defense engagement zone (SHORADEZ)	In air defense, that airspace of defined dimensions within which the responsibility for engagement of air threats normally rests with short-range air defense weapons. It may be established within a low- or high-altitude missile engagement zone. (JP 3-52)	A SHORADEZ is normally established for the local air defense of high-value assets. It provides airspace users with the location of the engagement zone of short-range air defense systems for planning purposes. Centralized control of a SHORADEZ may not be possible. (JP 3-52)	ACM initiated by AMD element. Established by the AADC.
Weapons free zone (WFZ)	An air defense zone established for the protection of key assets or facilities, other than air bases, where weapons systems may be fired at any target not positively recognized as friendly. (JP 3-52)	A WFZ is a permissive temporary airspace restriction. A WFZ is normally used for high-value assets defense and in areas with limited command and control authority. This zone provides airspace users with the location of a weapons free area for planning purposes. The AADC declares the weapons engagement status.	ACM initiated by AMD element. Established by the ACA.
AADC ACA ACM ADAM/BAE AMD	area air defense commander airspace control authority airspace coordinating measure air defense airspace management/brigade aviation element air and missile defense	ATS air traffic service FM field manual JFC joint force commander JP joint publication	

Table B-4. Air defense operations area (ADOA)

Usage Name/USMTF Abbreviation	Joint Definition	Joint/Army Planning Considerations	Remarks
Approach corridor (APPCOR)	Airspace established for the safe passage of land-based aircraft joining or departing a maritime force. (JP 3-52)	All Army aviation units should become and remain intimately aware of APPCORs and their associated procedures when operating with maritime forces. Used in Army helicopter operations that may include transporting patients to and from naval medical facilities, Army amphibious operations, special operations, personnel recovery operations, or logistic and administrative flights to naval assets.	ACM initiated by the Maritime Commander. Established by the ACA.
Coordinated air defense area (CADA)	A mutually defined block of airspace between land-based air commander and a naval commander when their forces are operating in close proximity to one another. (JP 3-52)		Established by the AADC. Refer to AJP-3.3.5
AADC ACA ACM	area air defense commander airspace control authority airspace coordinating measure	AJP JP allied joint publication joint publication	

Table B-5. Air traffic control (ATC)

<b>Usage Name/USMTF Abbreviation</b>	<b>Joint Definition</b>	<b>Joint/Army Planning Considerations</b>	<b>Remarks</b>
Airway (ARWY)	A control area or portion thereof established in the form of a corridor equipped with radio navigational aids. (JP 3-52)		Established by the ACA.
Air traffic service route (ATS RTE)	A specified route designed for channeling the flow of traffic as necessary for the provision of air traffic services. (JP 3-52)	ATS RTE is a specified route designated for channeling the flow of traffic as necessary for the provision of air traffic services. ATS RTE refers to a variety of airways, including jet routes, area navigation routes, and arrival and departure routes. An ATS RTE is a visual flight rules corridor used by Army ATC and ATS to channel aircraft into or out of the vicinity of the airport traffic. An ATS RTE is defined by route specifications, which may include (1) An ATS RTE designator, (2) The path to or from significant points, (3) Distance between significant points, (4) Reporting requirements, and (5) The lowest safe altitude determined by the appropriate authority.	ACM initiated by ATS units. Established by ACA.
Cross border area (CBA) (AJP-3.3.5)	A temporary segregated area established over international boundaries for specific operational requirements. (AJP-3.3.5)		Refer to AJP-3.3.5 for details.
Conditional route (CDR)	A non-permanent air traffic service route or portion thereof that can be planned and used only under certain conditions. (JP 3-52)	Similar to ATS RTE, but only used for specific purposes. For example, very important person movements, medical evacuation, low-altitude navigation and targeting infrared for night.	ACM initiated by ATS elements. Established by ACA.
Class-A airspace (CLSA)	Generally, airspace from 18,000 feet mean sea level (MSL) up to and including flight level 600, including airspace overlying the waters within 12 nautical miles of the contiguous states and Alaska. VFR operations are not permitted in Class A airspace. (JP 3-52)	This definition is based on classification of airspace within the United States. Airspace classification may vary by specific location. Airmen and airspace planners should refer to the appropriate FLIP and NOTAMs, for detailed information and international airspace requirements.	ACM initiated by ATS units. Established by ACA.
Class-B airspace (CLSB)	Generally, airspace from the surface to 10,000 feet MSL surrounding the nation's busiest airports in terms of airport operations or passenger enplanements. ATC provides separation between all aircraft inside Class B airspace. (JP 3-52)	This definition is based on classification of airspace within the United States. Airspace classification may vary by exact location. Airmen and airspace planners should refer to the appropriate FLIP and NOTAMs, for detailed information and international airspace requirements.	ACM initiated by ATS units. Established by ACA.

Table B-5. Air traffic control (ATC) (cont.)

Usage Name/USMTF Abbreviation	Joint Definition	Joint/Army Planning Considerations	Remarks
Class-C airspace (CLSC)	Generally, airspace from the surface to 4,000 feet above the airport elevation (charted in MSL) surrounding those airports that have an operational control tower, are serviced by radar approach control, and have a certain number of IFR operations or passenger enplanements. ATC provides separation between VFR and IFR inside Class C airspace. (JP 3-52)	This definition is based on classification of airspace within the United States. Airspace classification may vary by exact location. Airmen and airspace planners should refer to the appropriate FLIP and NOTAMs, for detailed information and international airspace requirements.	ACM initiated by ATS units. Established by ACA.
Class-D airspace (CLSD)	Generally, airspace from the surface to 2,500 feet above the airport elevation (charted in MSL) surrounding those airports that have an operational control tower. The configuration of Class D airspace is individually tailored and when instrument procedures are published, the airspace will normally be designated to contain the procedures. Prior to entering Class D airspace, two-way radio communication must be established and maintained with the ATC facility providing air traffic service. (JP 3-52)	This definition is based on classification of airspace within the United States. Airspace classification may vary by exact location. Airmen and airspace planners should refer to the appropriate FLIP and NOTAMs, for detailed information and international airspace requirements.	ACM initiated by ATS units. Established by ACA.
Class-E airspace (CLSE)	Generally, if the airspace is not Classes A, B, C, or D, and it is controlled airspace, it is Class E airspace. Also includes federal airways. (JP 3-52)	This definition is based on classification of airspace within the United States. Airspace classification may vary by exact location. Airmen and airspace planners should refer to the appropriate FLIP and NOTAMs for detailed information and international airspace requirements.	Established by ACA.
Class-F airspace (CLSF)	Airspace in which IFR and visual flight rules flights are permitted; all participating IFR flights receive an air traffic advisory service, and all flights receive flight information service if requested. (JP 3-52)	This classification of airspace is not used within the United States (FAAO JO 7400.9T). Airspace classification may vary by exact location. Airmen and airspace planners should refer to the appropriate FLIP and NOTAMs for detailed information and international airspace requirements.	Established by ACA.
Class-G airspace (CLSG)	Airspace not assigned as A, B, C, D, or E is uncontrolled airspace and is designated as Class G airspace. (JP 3-52)	This definition is based on classification of airspace within the United States. Airspace classification may vary by exact location. Airmen and airspace planners should refer to the appropriate FLIP and NOTAMs for detailed information and international airspace requirements.	Established by ACA.

Table B-5. Air traffic control (ATC) (cont.)

Usage Name/USMTF Abbreviation	Joint Definition	Joint/Army Planning Considerations	Remarks
Area navigation route (NAVRTE)	An air traffic services route established for the use of aircraft capable of employing area navigation. (JP 3-52)		Established by ACA.
Prohibited area (PROHIB)	A specified area within the land areas of a state or its internal waters, archipelagic waters, or territorial sea adjacent thereto over which the flight of aircraft is prohibited. May also refer to land or sea areas to which access is prohibited. (JP 3-52)		
Restricted area (RA)	Restricted area (air) —Designated areas established by appropriate authority over which flight of aircraft is restricted. They are shown on aeronautical charts, published in notices to airmen, and provided in publications of aids to air navigation. An airspace of defined dimensions, above the land areas or territorial waters of a state, within which the flight of aircraft is restricted in accordance with certain specified conditions. (JP 3-52)		
ACA ACM AJP ATC ATS FAAO	airspace control authority airspace coordinating measure allied joint publication air traffic control air traffic service Federal Aviation Administration order	FLIP IFR JP MSL NOTAM VFR  flight information publication instrument flight rules joint publication mean sea level notice to airmen visual flight rules	

Table B-6. Air corridor/route (CORRTE)

Usage Name/USMTF Abbreviation	Joint Definition	Joint/Army Planning Considerations	Remarks
Air corridor (AIRCOR)	A restricted air route of travel specified for use by friendly aircraft and established for the purpose of preventing friendly aircraft from being fired on by friendly forces. (JP 3-52)	AIRCOR procedures are used to route aviation combat elements between such areas as forward arming and refueling points, holding areas, and battle positions. Altitudes of an AIRCOR do not exceed the coordinating altitude, if established. If a coordinating altitude has been established, an AIRCOR is implemented by the using authority. If a coordinating altitude has not been established, an air corridor is established by the ACA at the request of the appropriate ground commander. (JP 3-52) Airspace elements should assess for possible constraints on operations.	ACM initiated by ADAM/BAE and/or airspace elements. Established by the ACA.
Air route (AIRRTE)	The navigable airspace between two points, identified to the extent necessary for the application of flight rules. (JP 3-52)	Established to route nonoperational and operational support traffic through air defenses. (JP 3-52) Airspace elements should assess for possible constraints on operations.	ACM initiated by ADAM/BAE and or airspace elements. Established by the ACA.
Minimum-risk route (MRR)	A temporary corridor of defined dimensions recommended for use by high-speed, fixed-wing aircraft that presents the minimum known hazards to low-flying aircraft transiting the combat zone. (JP 3-52)	MRRs are used primarily for cross-forward line of own troops operations. Close air support aircraft do not usually use MRRs in the vicinity of the target area. MRRs are established based on known threats. (JP 3-52) Airspace elements should assess for possible constraints on operations.	ACM initiated by ADAM/BAE and or airspace elements. Established by the ACA.
Standard use Army aircraft flight route (SAAFR)	Route established below the coordinating altitude to facilitate the movement of Army aviation assets. Routes are normally located in the corps through brigade rear areas of operation and do not require approval by the airspace control authority. (JP 3-52)	SAAFR is an airspace coordinating measure used by Army assets for administrative and logistic purposes. If altitudes are at or below the coordinating altitude, SAAFRs are implemented by the using authority. If a coordinating altitude has not been established, an air corridor is established by the ACA at the request of the appropriate ground commander information. (JP 3-52)	ACM initiated by ADAM/BAE and or airspace elements. Established by the ACA if above the CA; does not require ACA approval if established below an existing CA.

Table B-6. Air corridor/route (CORRTE) (cont.)

Usage Name/USMTF Abbreviation	Joint Definition	Joint/Army Planning Considerations	Remarks
Special corridor (SC)	An area established to accommodate the special routing requirements of special missions. (JP 3-52)	Procedural ACMs for UAS, ATACMS, GMLRS, TLAMs, and other cruise missile systems include SCs, surface-to-surface missile system measures, restricted operations areas, and altitude reservations. Airspace elements should assess for possible constraints on operations.	ACM initiated by ADAM/BAE, airspace elements or AMD cell. Established by the ACA.
Transit corridor (TC)	A bi-directional corridor. ATS not normally provided. (JP 3-52)	Established to route aircraft through air defenses with minimum risk. Pre-planned TCs will be published in ACPs, as will their horizontal and vertical dimensions. (JP 3-52) Airspace elements should assess for possible constraints on operations.	ACM initiated by ADAM/BAE and or airspace elements. Established by the ACA.
Temporary minimum risk route (TMRR)	A temporary route established to route air traffic between transit routes or the rear boundary of the forward area and their operations area in direct support of ground operations. (JP 3-52)	Coordination is necessary between airspace elements and CRC/AWACS or ASOC/TACP.	ACM initiated by ADAM/BAE and or airspace elements. Established by the ACA.
Transit route (TR)	In air operations, a temporary air corridor of defined dimensions established in the forward area to minimize the risks to friendly aircraft from friendly air defenses or surface forces. (JP 3-52)	Coordination is necessary between airspace elements and CRC/AWACS or ASOC/TACP.	ACM initiated by ADAM/BAE and or airspace elements. Established by the ACA.
ACA ACM ACP ADAM/BAE ASOC ATACMS ATS AWACS	airspace control authority airspace coordinating measure airspace control plan air defense airspace management/brigade aviation element air support operations center Army Tactical Missile System air traffic service Airborne Warning and Control System	CA CRC GMLRS JP TACP TLAM UAS  coordinating altitude control and reporting center Global Positioning System Multiple Launch Rocket System joint publication tactical air control party Tomahawk land attack missile unmanned aircraft system	

Table B-7. Procedural control (PROC)

Usage Name/USMTF Abbreviation	Joint Definition	Joint/Army Planning Considerations	Remarks
Airspace coordination area (ACA)	A three-dimensional block of airspace in a target area, established by the appropriate ground commander, in which friendly aircraft are reasonably safe from friendly surface fires. The airspace coordination area may be formal or informal. (JP 3-09.3)	An ACA is used primarily in close air support situations for high volume fire. Friendly aircraft are reasonably free from friendly surface fires, with artillery, helicopters, and fixed-winged aircraft given specific lateral or vertical airspace within which to operate. Timely implementation of the area depends on the ground situation. Burden of deconfliction rests with the ground commander. It is established by the appropriate ground commander. (JP 3-52)	ACM initiated by ADAM/BAE and or airspace element after coordination with the fires cell. Established by the ground commander.
Boundary (BNDRY) [Note: In JP 3-52 this coordinating measure is listed as an ACM. In JP 3-09, this coordinating measure is identified as a maneuver control measure.]	A line that delineates surface areas for the purpose of facilitating coordination and deconfliction of operations between adjacent units, formations, or areas. (JP 3-0) In land warfare, a line by which areas of responsibility between adjacent units and/or formations are defined. (AAP-6)	Requires coordination between airspace elements and the fires cell. Informal ACAs can be established (digitally or none digitally) at unit level for near-real-time protection of aircraft.	Established by the JFC or land component commander.

Table B-7. Procedural control (PROC) (cont.)

<b>Usage Name/USMTF Abbreviation</b>	<b>Joint Definition</b>	<b>Joint/Army Planning Considerations</b>	<b>Remarks</b>
Coordinating altitude (CA)	An airspace coordinating measure that uses altitude to separate users as the transition between different airspace coordinating entities. (JP 3-52)	The airspace coordinating entities should be included in the ACP and promulgated in the ACO. Army echelons incorporate ACP guidance and integrate the ACO, AADP, SPIINS, and ATO via operation orders. All airspace users should coordinate with the appropriate airspace coordinating entities when transitioning through or firing through the CA. (JP 3-52) [Note: this is a new definition. Currently this ACM cannot be implemented in digital systems. The definition of CA does not contain boundaries; those must be provided either by text or by the use of unit boundaries.]	ACM initiated by ADAM/BAE and or airspace element. Established by the airspace control authority. The CA provides a transition between airspace coordinating agencies, it should not be viewed a boundary between components. A CA does not designate "Army" airspace or "JFACC" airspace, all airspace is the JFC's. If an Army organization is tasked by the airspace control authority to control airspace below the CA, the Army organization has the responsibility to control airspace according to JFC airspace priorities, just as a JFACC agency tasked to control airspace above the CA must control airspace according to JFC priorities.
Coordination level (CL)	A procedural method to separate fixed- and rotary-wing aircraft by determining an altitude below which fixed-wing aircraft normally will not fly. (JP 3-52)	CL retains the old CA meaning. Can be used with or without a CA for procedural separation of fixed-wing and rotary-wing aircraft.	ACM initiated by ADAM/BAE and or airspace element. Established by the airspace control authority.

Table B-7. Procedural control (PROC) (cont.)

Usage Name/USMTF Abbreviation	Joint Definition	Joint/Army Planning Considerations	Remarks
<p>Coordinated fire line (CFL)                      [Note: JP 3-09 establishes this fire support coordination measure. In JP 3-52, the measure is listed as an airspace coordinating measure.]</p>	<p>A line beyond which conventional and indirect surface fire support means may fire at any time within the boundaries of the establishing headquarters without additional coordination. The purpose of the coordinated fire line is to expedite the surface-to-surface attack of targets beyond the coordinated fire line without coordination with the ground commander in whose area the targets are located. (JP 3-09)</p> <p>A line beyond which conventional or improved indirect fire means, such as mortars, field artillery, and naval surface fire may fire without additional coordination. (AJP-3.3.5)</p>		<p>Refer to JP 3-09 for additional details.</p>
<p>Free fire area (FFA)                      [Note: JP 3-09 establishes this fire support coordination measure. In JP 3-52, the measure is listed as an airspace coordinating measure.]</p>	<p>A specific area into which any weapon system may fire without additional coordination with the establishing headquarters. (JP 3-09)</p>	<p>A FFA is used to expedite joint fires and to facilitate jettison of aircraft munitions. A FFA may be established only by the military commander with jurisdiction over the area. Preferably, the FFA should be located on identifiable terrain; however, it may be designated by grid coordinates or Global Area Reference System.</p>	<p>FSCM/ACM initiated by the fires cell.                      Established by division of higher commander with responsibility for the area of operations the FFA is in.</p>

Table B-7. Procedural control (PROC) (cont.)

Usage Name/USMTF Abbreviation	Joint Definition	Joint/Army Planning Considerations	Remarks
<p>Fire support coordination line (FSCCL)                      [Note: JP 3-09 establishes this fire support coordination measure. In JP 3-52, the measure is listed as an airspace coordinating measure.]</p>	<p>A FSCM that is established and adjusted by appropriate land or amphibious force commanders within their boundaries in consultation with superior, subordinate, supporting, and affected commanders. FSCCLs facilitate the expeditious attack of surface targets of opportunity beyond the coordinating measure. A FSCCL does not divide an area of operations by defining a boundary between close and deep operations or a zone for close air support. The FSCCL applies to all fires of air-, land-, and sea-based weapon systems using any type of ammunition. Forces attacking targets beyond a FSCCL must inform all affected commanders in sufficient time to allow necessary reaction to avoid fratricide. Supporting elements attacking targets beyond the FSCCL must ensure that the attack will not produce adverse effects on, or to the rear of, the line.                      Short of a FSCCL, all air-to-ground and surface-to-surface attack operations are controlled by the appropriate land or amphibious force commander. The FSCCL should follow well-defined terrain features. Coordination of attacks beyond the FSCCL is especially critical to commanders of air, land, and special operations forces. In exceptional circumstances, the inability to conduct this coordination will not preclude the attack of targets beyond the FSCCL. However, failure to do so may increase the risk of fratricide and could waste limited resources. (JP 3-09)</p>	<p>Use to ensure unity of effort, conservation of force, and fratricide prevention, attacks within a designated surface area of operations requires coordination with that supported component commander, as designated by the joint force commander. Unless in exceptional circumstances commanders of forces attacking targets beyond the fire support coordination line must coordinate with all affected commanders to avoid fratricide and to synchronize joint objectives.</p>	<p>FSCM/ACM initiated by the fires cell.                      Established by land component commander.                      [Note: In the context of this definition the term "surface targets" applies to those in littoral or inland waters within the designated area of operations. (AAP-6) Boundary used to coordinate fires of air, ground, or sea weapon systems against surface targets. (AJP-3.3.5)]</p>

Table B-7. Procedural control (PROC) (cont.)

Usage Name/USMTF Abbreviation	Joint Definition	Joint/Army Planning Considerations	Remarks
Restrictive fire area (RFA) [Note: JP 3-09 establishes this fire support coordination measure. In JP 3-52, the measure is listed as an airspace coordinating measure.]	An area in which specific restrictions are imposed and into which fires that exceed those restrictions will not be delivered without coordination with the establishing headquarters. (JP 3-09)	Use to regulate joint fires into an area according to the stated restrictions. Usually, the RFA is located on identifiable terrain, by grid, or by a radius from a center point. To facilitate rapidly changing operations, on-call RFA's may be used. The dimensions, locations, and restrictions of the on-call RFA are prearranged.	FSCM/ACM initiated by fires cell. Established by the land commander who is responsible for the area of operations in which the RFA will be located.
Restrictive fire line (RFL) [Note: JP 3-09 establishes this fire support coordination measure. In JP 3-52, the measure is listed as an airspace coordinating measure.]	A line established between converging friendly surface forces that prohibits fires or their effects across that line. (JP 3-09)	Use to prevent fratricide and duplication of engagements by converging friendly forces. It is located on identifiable terrain when possible. In linkup operations, it is usually closer to the stationary force to allow maximum freedom of action for the maneuver and joint fire support of the linkup force.	FSCM/ACM initiated by fires cell. Established by the land commander common to the converging forces.
No fire area (NFA) [Note: JP 3-09 establishes this fire support coordination measure. In JP 3-52, the measure is listed as an airspace coordinating measure.]	An area designated by the appropriate commander into which fires or their effects are prohibited. (JP 3-09.3)	Use to prohibit joint fires or their effects into an area. There are two exceptions: (a) When the establishing headquarters approves joint fires within the NFA on a mission-by-mission basis. (b) When an enemy force within the NFA engages a friendly force and the engaged commander determines there is a requirement for immediate protection and responds with the minimal force needed to defend the force. Any size unit may establish NFAs. If possible, the NFA is established on identifiable terrain. It may also be located by a series of grids or by a radius from a center point.	FSCM/ACM initiated by fires cell. Established by the airspace control authority.
AADP AAP ACM ACC ACP ADAM/BAE AJP	area air defense plan allied administrative publication airspace coordinating measure airspace control order airspace control plan air defense airspace management/brigade aviation element allied joint publication	ATO BCT FSCM JFACC JFC JP SPINS air tasking order brigade combat team fire support coordination measure joint force air component commander joint force commander joint publication special instructions	

Table B-8. Reference point (REPT)

Usage Name/USMTF Abbreviation	Joint Definition	Joint/Army Planning Considerations	Remarks
Air control point (ACP)	A point that is defined and used for navigation, command and control, and communication. (JP 3-52)	Most common Army reference point. May be used to dynamically build routes for participating aircraft. Unmanned aircraft system routing is normally accomplished through existing air control points. (JP 3-52)	ACM initiated by ADAM/BAE and or airspace element. Established by the ACA.
Bulls-eye (BULL)	An established reference point from which the position of an object can be referenced. (JP 3-52)	The BULL reference system is normally used during counterair engagements for situational awareness on targeted and untargeted airborne threats and for other coordination. Normally, theaters will only establish a few BULL reference points to ensure effectiveness. BULLs are not meant to provide detailed target guidance, but general reference information. Standard JFACC reference. Airspace elements should note location as JFACC controllers and aircraft will commonly use BULL as a reference point.	Established by the AADC.
Contact point (CP)	In air operations, the position at which a mission leader makes radio contact with an air control agency. (JP 3-09.3)		Established by the ACA.
Search and rescue point (SARDOT)	A reference point used in search and rescue operations. (JP 3-50)	SARDOTs, like bulls-eyes, are very few in number and provide general area reference for search and rescue operations. Established by the joint personnel recovery center.	ACM initiated by ADAM/BAE and or airspace element. Established by the joint personnel recovery center.
ACA AADC ACM	airspace control authority area air defense commander airspace coordinating measure	ADAM/BAE air defense airspace management/brigade aviation element JFACC joint force air component commander JP joint publication	

Table B-9. Restricted operations zone (ROZ)

Usage Name/USMTF Abbreviation	Joint Definition	Joint/Army Planning Considerations	Remarks
Air-to-air refueling area (AAR)	Airspace of defined dimensions set aside for air-to-air refueling operations, excluding special operations forces; AAR missions. (JP 3-52)	AAR tracks are typically set up in a racetrack configuration.	Established by the ACA.
Airborne command and control area (ABC)	Airspace of defined dimensions established specifically for aircraft conducting battlefield command and control. (JP 3-52)		Established by the ACA.
Airborne early warning area (AEW)	Airspace of defined dimensions established specifically for aircraft conducting early warning. (JP 3-52)		Established by the ACA.
Combat air patrol (CAP)	An aircraft patrol provided over an objective area, the force protected, the critical area of a combat zone, or in an air defense area, for the purpose of intercepting and destroying hostile aircraft before they reach their targets. (JP 3-01)	An anti-air warfare activity performed to support air operations.	Established by the ACA.
Close air support holding area (CAS)	Airspace designated for holding orbits and used by rotary- and fixed-wing aircraft that are in close proximity to friendly forces. (JP 3-52)	CASs may be established throughout the battlefield to be used by helicopters awaiting targets or missions. These holding areas serve as informal airspace coordination areas while they are in use. CASs provide the attack helicopter aircrews an area in which to loiter. CASs may be established during planning, referred to by name or number, and activated/established during operations. CASs are established using separation plans. When occupied, should be protected from fires.	ACM initiated by ADAM/BAE and or airspace element. Established by the ACA.
Drop zone (DZ)	A specific area upon which airborne troops, equipment, or supplies are airdropped. (JP 3-17)	Preferred ROZ usage for airborne operations. When active, fires should be under the control of the HQs controlling the DZ.	ACM initiated by ADAM/BAE and or airspace element. Established by the ACA.
Electronic combat (EC)	Airspace established specifically for aircraft engaging in electronic combat. (JP 3-52)		Established by the ACA.

Table B-9. Restricted operations zone (ROZ) (cont.)

<b>Usage Name/USMTF Abbreviation</b>	<b>Joint Definition</b>	<b>Joint/Army Planning Considerations</b>	<b>Remarks</b>
Landing zone (LZ)	Any specified zone used for the landing of aircraft. (JP 3-17)	Preferred ROZ usage for air assault operations. When active, fires should be under the control of the HQs controlling the LZ.	ACM initiated by ADAM/BAE and or airspace element. Established by the ACA.
Pickup zone (PZ)	Aerial retrieval area. (JP 3-17)	Preferred ROZ usage for air assault operations. When active, fires should be under the control of the HQs controlling the PZ.	ACM initiated by ADAM/BAE and or airspace element. Established by the ACA.
Reconnaissance area (RECCE)	Airspace established specifically for aircraft conducting reconnaissance. (JP 3-52)		Established by the ACA.
Restricted operations area (ROA)	Airspace of defined dimensions, designated by the airspace control authority, in response to specific operational situations or requirements within which the operation of one or more airspace users is restricted. (JP 3-52)	Generic ROZ usage. Whether the ROA should be protected or not from fires should be contained in the usage amplifying instructions A ROA is used to separate and identify areas. For example, artillery, mortar, naval surface fire support, UAS operating areas, aerial refueling, concentrated interdiction areas, areas of CSAR, SOF operating areas, and areas which the AADC has declared "weapons free." Commonly used for drop zones, landing zones, SAR areas, UAS launch and recovery sites, UAS mission areas, surface-to-surface missile launch sites, missile flight paths (if necessary), and predicted missile munitions impact locations, and special electronics mission aircraft. ROA can adversely affect air defense operations; therefore, air defense missions generally have priority over ROAs. (JP 3-52)	ACM initiated by ADAM/BAE and or airspace element. Established by the ACA.
Special electronic mission area (SEMA)	Airspace of defined dimensions established specifically for airborne platforms accomplishing missions. Generally, it is designed for aircraft such as Compass Call. (JP 3-52)		ACM initiated by ADAM/BAE and or airspace element. Established by the ACA.

Table B-9. Restricted operations zone (ROZ) (cont.)

Usage Name/USMTF Abbreviation	Joint Definition	Joint/Army Planning Considerations	Remarks
Special operations forces (SOF)	Airspace of defined dimensions created specifically for special operations forces missions by SOF airspace planners. (JP 3-52)	Preferred ROZ usage for SOF activities. Should be protected from fires.	ACM initiated by SOF units. Established by the ACA.
Training area (TRNG)	Airspace created during contingency for the purpose of conducting training. (JP 3-52)	Preferred ROZ usage for training activities.	ACM initiated by ADAM/BAE and or airspace element. Established by the ACA.
Unmanned aerial vehicle (UAV)	Airspace of defined dimensions created specifically for UA operations. Generally, this airspace will consist of the area in which UAV operations are conducted, not en route airspace. (JP 3-52)	Preferred usage for UAVs. Key consideration is whether this usage will be protected or transparent in respect for fires.	ACM initiated by ADAM/BAE and or airspace element. Established by the ACA.
AADC ACA ACM ADAM/BAE CSAR HQ	area air defense commander airspace control authority airspace coordinating measure air defense airspace management/brigade aviation element combat search and rescue headquarters	JP ROZ SAR SOF UAS joint publication restricted operations zone search and rescue special operations forces unmanned aircraft system	

Table B-10. Special use airspace (SUA)

Usage Name/USMTF Abbreviation	Joint Definition	Joint/Army Planning Considerations	Remarks
Alert area (ALERTA)	Airspace that may contain a high volume of pilot training activities or an unusual type of aerial activity, neither of which is hazardous to aircraft. (JP 3-52)		

Table B-10. Special use airspace (SUA)

Usage Name/USMTF Abbreviation	Joint Definition	Joint/Army Planning Considerations	Remarks
Forward arming and refueling point (FARP)	A temporary facility—organized, equipped, and deployed by an aviation commander, and normally located in the main battle area closer to the area where operations are being conducted than the aviation unit's combat service area—to provide fuel and ammunition necessary for the employment of aviation maneuver units in combat. The forward arming and refueling point permits combat aircraft to rapidly refuel and rearm simultaneously. (JP 3-09.3)	By itself, does not restrict flight operations. May require additional associated ACMs for airspace control.	ACM initiated by ADAM/BAE and or airspace element. Established by the ACA.
Forward operating location (FOL)	An advance position, usually of a temporary nature, from which air or ground units operate. (JP 3-09.3)	By itself, does not restrict flight operations. May require additional associated ACMs for airspace control.	ACM initiated by ADAM/BAE and or airspace element. Established by the ACA.
Kill box (KILLBX) [Note: JP 3-09 establishes this fire support coordination measure. In JP 3-52, the measure is listed as an airspace coordinating measure.]	A three-dimensional area used to facilitate the integration of joint fires. (JP 3-09)	Used to allow lethal attack against surface targets without further coordination with the establishing commander and without terminal attack control. When used to integrate air-to-surface and surface-to-surface indirect fires, the KILLBX will have appropriate restrictions. The goal is to reduce the coordination required to fulfill support requirements with maximum flexibility, while preventing fratricide. A KILLBX will not be established specifically for CAS missions. supported component commanders adjust a KILLBX in consultation with superior, subordinate, supporting, and affected commanders. A KILLBX is an extension of an existing support relationship established by the joint force commander.	FSCM/ACM initiated by fires cell. Established by the ACA.
Military operations area (MOA)	Airspace designated outside Class A airspace area to separate or segregate certain non-hazardous military from IFR traffic and to identify for VFR traffic where these activities are conducted. (JP 3-52)		Established by the ACA.

Table B-10. Special use airspace (SUA) (cont.)

Usage Name/USMTF Abbreviation	Joint Definition	Joint/Army Planning Considerations	Remarks
No fire area (NFA) [Note: JP 3-09 establishes this fire support coordination measure. In JP 3-52, the measure is listed as an airspace coordinating measure.]	An area designated by the appropriate commander into which fires or their effects are prohibited. (JP 3-09.3)	Use to prohibit joint fires or their effects into an area. There are two exceptions: (a) When the establishing HQ approves joint fires within the NFA on a mission-by-mission basis. (b) When an enemy force within the NFA engages a friendly force and the engaged commander determines a requirement for immediate protection and responds with the minimal force needed to defend the force. Any size unit may establish NFAs. If possible, the NFA is established on identifiable terrain. It may also be located by a series of grids or by a radius from a center point.	FSCM/ACM initiated by fires cell. Established by the ACA.
No fly area (NOFLY)	Airspace of specific dimensions set aside for a specific purpose in which no aircraft operations are permitted, except as authorized by the appropriate commander and controlling agency. (JP 3-52)		ACM initiated by ADAM/BAE and or airspace element. Established by the ACA.
Surface-to-surface missile system (SSMS)	Airspace defined specifically ATACMS and Tomahawk land-attack missile launch and impact points. (JP 3-52)	Used for sending ATACMS position area hazard and target area hazard data. (FM 3-52.1)	ACM initiated by ADAM/BAE and or airspace element. Established by the ACA.
ACM ACA ADAM/BAE CAS ATACMS	airspace coordinating measure airspace control authority air defense airspace management/brigade aviation element close air support Army Tactical Missile System	FSCM HQ IFR JP VFR fire support coordination measure headquarters instrument flight rules joint publication visual flight rules	

**Note:** North Atlantic Treaty Organization (NATO) ACMs per standardization agreement (STANAG) are slightly different. (See AJP-3.3.5 for details on NATO ACMs.)

## COMMON REFERENCE SYSTEMS

B-6. Airspace element personnel work with several reference systems such as military grid, latitude and longitude, area grid reference systems, and several altitude reference systems. For planning and immediate execution, these common reference systems require simple, widely distributed, and integrated platforms and weapons systems. Common reference systems are also a means to “digitize” operational environments and provide a two-dimensional construct from which three-dimensional control and coordination measures can be constructed at the operational level.

## POINT REFERENCE SYSTEMS

B-7. Airspace element personnel use the World Geodetic System 1984, Military Grid Reference System, and geographic coordinates as point reference systems.

### World Geodetic System 1984

B-8. The World Geodetic System 1984 (WGS 84) is the official Department of Defense positional reference system. The earth is an ellipsoid, not a sphere, flattened slightly at the poles and bulging somewhat at the equator. Datums are reference surfaces that consider the curvature of the earth for the mathematical creation of geodetic and cartographic data. Numerous datum exists. In unilateral and joint operations, U.S. military forces use the WGS 84 horizontal coordinates and height (height above ellipsoid) unless the commander determines that the use of other position reference systems (such as horizontal, vertical, or both datum) is mission critical. Universal use of the WGS 84 positional reference system (datum) eliminates confusion regarding which system to use in reporting positions.

### Military Grid Reference System

B-9. The Military Grid Reference System (MGRS) is an alpha-numeric system for expressing universal transverse mercator (UTM) universal polar stereographic coordinates. A single alpha-numeric value references an area unique for the entire earth. The number 15SWC8081751205 illustrates a MGRS coordinate. The first two characters represent the 6-degree wide UTM zone. The third character is a letter designating the band of latitude. The fourth and fifth characters are a pair of letters designating one of the 100,000-meter grid squares within the grid zone. The remaining characters consist of the numeric easting and northing values within the 100,000-meter grid square. Ten numeric characters equal a one meter refinement. Eight numeric characters equal a ten-meter refinement. Six numeric characters equal a one hundred meter refinement. Four numeric characters equal a one thousand meter refinement. The MGRS is the most commonly used point reference system by Soldiers.

### Geographic Coordinates

B-10. The use of geographic coordinates as a system of reference is accepted worldwide. It is based on the expression of position by latitude (parallels) and longitude (meridians) in relation to the equator (north and south) and a prime meridian (east and west). The map scale and the accuracy requirements for plotting and scaling influence the degree of accuracy of a geographic reference. The U.S. military uses two formats to show location that sometimes leads to confusion for airspace element personnel. The Army generally expresses position in degrees, minutes (sixty to a degree), and seconds (sixty to a minute). An example of a geographic reference referenced to degrees, minutes, and seconds of latitude and longitude found in an operation order is: 40°21'12" N 132°14'18" E. Joint and civil aviation express geographic reference position using the sexagesimal system using degrees, minutes, and decimal minutes (DDMM.mmmm). The same location given in the previous example is found in air tasking order or ACO expressed as 40°21.2000 N 132°14.3000 E. Army digital airspace systems translate between methods automatically. For manual data entry into a digital system, the operator just needs to select the correct format. If an airspace Soldier needs to convert locations manually from one format to another, the conversion is simple. There is no change to the degrees or whole minutes, only the seconds or decimal portion of the decimal minute are converted. To convert seconds to decimal minutes divide the seconds by 60 (for example, 12/60=.2). The product is the

decimal. To convert from decimal minutes to seconds multiply the decimal portion by sixty. The product is the seconds (for example, .2 X 60= 12).

## **AREA REFERENCE SYSTEMS**

B-11. Airspace element personnel use the Global Area Reference System and common geographic reference system as area reference systems.

### **Global Area Reference System**

B-12. The Global Area Reference System (GARS) is the standardized area reference system across the Department of Defense. It is based on lines of longitude (long) and latitude (lat) to provide an integrated common frame of reference for joint force situational awareness to facilitate air-to-ground coordination, deconfliction, integration, and synchronization. This area reference system provides a common language between the components and simplifies communications. The point of origin for this system is 90 degrees south and 180 degrees east/west. The areas GARS describes coincide with even numbered WGS-84 degree and minute lines. GARS airspace is divided into cells, further divided into quadrants, and subdivided into keypads.

### **Common Geographic Reference System**

B-13. The common geographic reference system (CGRS) is an early, theater specific system that may still be in use. CGRS uses a theater determined origin or starting point. CGRS airspace is divided into cells, further divided into nine keypads, and may be subdivided into quadrants.

B-14. Since GARS and CGRS use common terms (such as keypads and quadrants), a risk of confusion exists since these common terms have different meanings in the individual reference systems. For example, a GARS cell (~30nm x 30nm) is divided first into four quadrants (~15nm x 15nm) then into nine keypads (~5nm x 5nm), while a CGRS cell (~30nm x 30nm) is divided into nine keypads (~10nm x 10nm), which may be further subdivided into four quadrants (~5nm x 5nm). The risk in confusion is that a GARS keypad is ~5nm x 5nm while a CGRS keypad is ~10nm x 10nm.

## **ALTITUDE MEASURING SYSTEMS**

B-15. Airspace element personnel use the mean sea level, above mean sea level, above ground level, height above ellipsoid, and flight level as altitude measuring systems.

### **Mean Sea Level**

B-16. The mean sea level (MSL) is determined by continuously measuring the rise and fall of the ocean at “tide gauge stations” on seacoasts for a period of about 19 years. This averages out the highs and lows of the tides caused by the changing effects of the gravitational forces from the sun and moon which produce the tides. The MSL then is defined as the zero elevation for a local or regional area. The MSL is elevation used for military maps, digital terrain elevation data (DTED) and by artillery airspace users. Some aircraft systems using GPS data convert height above ellipsoid (see paragraph B-19) to MSL data before reporting.

### **Above Mean Sea Level**

B-17. The above mean sea level (AMSL) refers to the elevation (on the ground) or altitude (in the air) of any object, relative to the average sea level datum. It is also used in aviation, where all heights are recorded and reported with respect to AMSL. Manned aircraft determine AMSL with a barometric altimeter corrected for local air pressure.

### **Above Ground Level**

B-18. An altitude above ground level (AGL) is measured with respect to the underlying ground surface. AGL altitude varies constantly as the aircraft proceeds on course. Therefore, the only constant is the MSL. When working in and around controlled airspace or providing traffic separation clearance en route, airspace

element personnel must consider that the AGL varies while the MSL does not. Manned aircraft determine AGL with a radar altimeter.

### Height Above Ellipsoid

B-19. Sometimes referred to as Global Positioning System (GPS) altitude, height above ellipsoid (HAE) uses GPS for altitude data use. For global applications, the geodetic reference (datum) used for GPS is the WGS-84. When the HAE is used, the height above the ellipsoid differs from the MSL; direct elevation readings for most locations can differ up to hundreds of feet. This variation is caused, in part, because the GPS definition of altitude does not refer to MSL, but rather to a gravitational surface called the reference ellipsoid. Some aircraft self-reporting systems (see appendix C) report GPS altitude as an HAE altitude, but some systems convert the GPS altitude to an MSL altitude prior to reporting. Munitions maneuvering with GPS data generally use HAE.

B-20. Current digital systems use the USMTF standard for ACMs, and USMTF currently does not have an HAE option. Airspace personnel have to use MSL as a substitute. These personnel must know any significant differences between MSL, AMSL, AGL, and HAE for their AO and consider these differences when integrating airspace users.

### Flight Level

B-21. A flight level (FL) is a standard nominal altitude of an aircraft in hundreds of feet (such as FL 250 is 25,000 feet). This altitude is calculated from an international standard datum pressure of 29.92 inches of mercury (inHg), the average sea-level pressure, and therefore is not necessarily the same as the aircraft's true altitude either above MSL or above AGL. Airspace personnel normally use FL for flights above the transition altitude of 18,000 feet in the USA and Canada. The altitude that aircraft transition to FLs is called the transition altitude. Transition altitudes are local, regional, or national and vary considerably between about 3,000ft and 18,000ft. Regardless of altitude, Identification Friend Foe Mode C altitudes will be based on the standard datum pressure of 29.92 inHg.

## **Appendix C**

# **Airspace Control Connectivity**

This appendix discusses connectivity of airspace control systems. This appendix first discusses airspace control in a mission command system. Then it discusses equipment used for communications systems. The appendix then discusses networks and applications. It concludes with a discussion of airspace control in a degraded network environment.

### **AIRSPACE CONTROL IN A MISSION COMMAND SYSTEM**

C-1. As a component of the mission command system, airspace control systems enable commanders to have a near-real-time situational awareness of airspace users, communicate information between airspace elements and airspace users, and execute airspace control of airspace users in near real time. The airspace control set of mission command systems consists of networks, applications that process air track data for situational awareness, and airspace control-related applications supporting the operations process. They include joint, Army, and civil networks; systems and applications; and airspace control-related applications. Joint, Army, and civil networks enable the rapid, low-latent exchange of precise participant location and identification, communications with airspace users and control elements as well as communication of other mission command systems. These latter networks include the command post's mission command network (with external connectivity) and other networks (see paragraphs C-4 through C-23). Systems and applications receive aircraft location data from a variety of sources such as sensors (for example, radar) and self-reporting systems (for example, blue force tracking). These systems combine the air track data and pass data to mission command systems for display on visual displays and for use in airspace control running estimates. Airspace control-related applications use data for integrating airspace use, to include manned and unmanned aviation, as well as offensive and defensive fires.

### **COMMUNICATIONS SYSTEMS**

C-2. All echelons, brigade and higher, contain airspace elements equipped with a full suite of airspace information systems and line-of-sight, beyond-line-of-sight, and tactical satellite communications systems. These systems provide access to integrated terrestrial, aerial, and spaced-based networks. These communications systems enable horizontal and vertical connectivity with airspace users, airspace elements, the battlefield coordination detachment, and theater air-ground system airspace control nodes. These nodes include the theater air control system, control and reporting center, Airborne Warning and Control System, air support operations center, tactical air control parties, tactical air command center or tactical air direction center, tactical air operations center, and direct air support center. Collectively, communications systems enable airspace elements to perform the full range of their functions—identify, coordinate, integrate, and control Army airspace users as well as unified action partner airspace users, when appropriate, in the low to medium altitudes over their assigned area of operations.

C-3. Airspace users at different echelons use different communications systems. Divisions and corps have two communications systems that work together to support airspace control. The air and missile defense (AMD) element has a TSQ-253 air defense airspace management shelter. This shelter provides the integrated air picture for the unit and the airspace element while providing the airspace element its AMD applications. The airspace element uses the TSQ-221 tactical airspace integration system (TAIS) shelter. This shelter provides the airspace element personnel with TAIS workstations as well as a wide range of digital and voice communications with joint, Army, and civil airspace users. It also provides a backup air picture capability for the AMD TSQ-253 shelter. At the brigade level, the air defense airspace management/brigade aviation element (ADAM/BAE) primary system is the TSQ-253. This shelter provides a similar air picture and AMD capabilities resident at division level but has only one TAIS workstation and fewer ground-to-air radios.

## NETWORKS

C-4. The SECRET Internet Protocol Router Network (SIPRNET) resident in command posts (CPs) provides connectivity to other mission command systems to include the CP server. Through high bandwidth multichannel tactical satellite, the CP has connectivity to other airspace elements. Through these networks, the airspace control applications connect to the CP server, publish airspace data, and subscribe to data from other mission command systems.

### DATA DISSEMINATION SERVICES AND PUBLISH AND SUBSCRIBE SERVICES

C-5. Both the AMD workstation and TAIS publish and subscribe data from the CP server. Data dissemination services (known as DDS) is the next generation capability that goes beyond the current publish and subscribe services capabilities (known as PASS). Publish and subscribe services is a local service application for data exchange within and around the CP. As a federated service, data dissemination services are designed for global data dissemination. It replaces publish and subscribe services at all echelons, from battalion and above. It permits Department of Defense and joint interoperability beyond the current point-to-point interface. Data dissemination services affords discovery across the network, enables “many-to-many” exchanges, and supplies a means to share information that is useful for any community of interest. With data dissemination services, the network exchange potential dramatically improves, enabling exchanges typical in a net-centric data environment. Data dissemination services thus permits interoperable data exchanges to evolve from an intra-CP to an inter-CP, echelon, Service, and nation a reality, ensuring data is visible, available, and usable when and where needed to accelerate the decisionmaking process.

### MULTI-TACTICAL DATA LINK NETWORKS

C-6. ADAM/BAE operators configure and integrate numerous data link networks. Key networks include tactical digital information link J (Link 16), tactical digital information link B (Link 11B), Intra-forward area air defense (FAAD) Network (IFN), situational awareness data link, exploitation support data, cursor on target, and radar element subsystem.

#### Link 16

C-7. Link 16 is a secure, jam-resistant, high-capacity, nodeless tactical digital information link (TADIL), formerly known as TADIL-J. This link utilizes the joint tactical information distribution system, multifunctional information distribution system terminal, and its multiple access architecture for multi-netted communications. ADAM/BAE operators convey the information exchanged on this link in the J-series messages, which conform to the operational specifications contained in MIL-STD-6016 series.

#### Link 11B

C-8. Link 11B is a tactical digital data link protocol, formerly known as tactical data link B, specified by MIL-STD-6011, for point-to-point communication over landline between two units. The messages over Link 11B, known as M-series messages, adhere to the Link 11 message standard.

#### IntraFADD Network

C-9. The IFN is more commonly referred to as the FAAD. Paragraph C-23 discusses FAAD in detail.

#### Situational Awareness Data Link

C-10. ADAM personnel use an enhanced position location reporting system radio and air defense system integrator. Situational awareness data link (known as SADL) gives non-Link-16 aircraft the ability to pass their location to Link-16 aircraft via the Link-16 gateway. Link-16 gateways have a situational awareness data link radio located with them that allows aircraft with Link-16 and situational awareness data link to see one another digitally. The situational awareness data link is the only system that fully integrates with the Army’s enhanced position location reporting system network.

### **Exploitation Support Data**

C-11. ADAM/BAE personnel use exploitation support data within the air defense system integrator to communicate with the Shadow's ground control unit for flight following. ADAM/BAE personnel use this capability when radar coverage is minimal or nonexistent, to populate the Shadow's position, and pass the ground control unit's location to joint and coalition forces flying or monitoring Link-16.

### **Cursor on Target**

C-12. Cursor on target enables different communities across the Services to share vital information in near-real time. Cursor on target leverages the widespread extensible markup language and defines a common extensible message format for communicating key targeting information (what, when, and where). Small unmanned aircraft system operators connected to the SIPRNET can inject their what, when, and where into the common tactical picture. FAAD and air defense system integrator are the primary data systems within the ADAM/BAE to exploit this capability.

### **Radar Element Subsystem**

C-13. Radar element subsystem enables transmission control protocol/internet protocol capability for sensor connectivity to the ADAM's forward area air defense. Radar element subsystem allows counterfire (firefinder, lightweight countermortar, and sentinel) radar data to be shared on a network for an exploitation with a mission command system.

## **SELF-REPORTING TRACKING TECHNOLOGIES**

C-14. Self-reporting tracking technologies are increasingly being integrated into aerial systems (for example, manned, unmanned, cruise missiles, and precision munitions). These technologies when coupled with networked data systems (discussed in paragraphs C-5 through C-13) provide an accurate and complete low level air picture; rapid decisionmaking; and a significant improvement in an airspace elements' ability to integrate airspace users in near real time.

### **Blue Force Tracking–Air**

C-15. The blue force tracking (BFT) network (BFT-A/2) provides self-reporting aircraft position, velocity, and mission parameters in a joint variable message format transmitted to ground control centers via an L-Band satellite. Control centers accumulate these reports and redistribute them via satellite to all BFT transceivers coded for the operation. Control centers also distribute the reports via the SIPRNET to make this information available to support various missions. However, aircraft reporting and control center reporting rules can induce tens of seconds, and in some cases several minutes, delay in the aircraft reported position data being received at a transceiver and displayed to the user. Such a delay limits the BFT's use in increasing situational awareness.

### **Automatic Dependent Surveillance–Broadcast**

C-16. Automatic dependent surveillance-broadcast (ADS-B) is the basis for a revolution in worldwide civil air traffic control. ADS-B is one of a series of innovations that the federal aviation administration refers to as NextGen technologies in the national airspace. ADS-B establishes an air traffic surveillance structure that migrates from reliance on radars and interrogators to aircraft equipped with transceivers that transmit self-reported precise Global Positioning System (GPS) position, velocity, and identification information every second.

C-17. There are two ADS-B data links planned for the national airspace system: Mode S extended squitter and universal access transceiver. All aircraft that fly above 18000 feet worldwide use the Mode S extended squitter. Military aircraft use ADS-B Mode S extended squitter data link transmitted from military transponders. The universal access transceiver is used by general aviation within the national airspace system.

## **Mark XIIA Capabilities**

C-18. Mark XIIA, provides identification, friend or foe (IFF) encrypted waveform messaging. It extends the current triggered, transponder technology into the uplink and downlink encrypted messaging (Mode 5) technologies. It also provides an unencrypted Mode S capability to augment the encrypted messaging capabilities to permit operations within the evolving national and international air traffic control systems of the future. Mode 5 reliably populates the air picture with properly equipped friendly (blue) aircraft to altitudes as low as the surface of the earth. Aircraft using Mark XIIA Mode 5 Level 2, with embedded global positioning system or inertial navigation system, reply to interrogations from an airborne system (or squitter) with their identification and position data.

C-19. Mode 5 Level 1 and Level 2 not only reply to interrogations but also provide important multi-ship discrimination capabilities (Level 1) and identification information and position data (Level 2). Level 2 also provides the capability to report encrypted identification, position, altitude, and other information without prompting by interrogation. Level 2 has three settings:

- Triggered, a Level 2 report is sent when interrogated.
- Squitter, a Level 2 report is transmitted approximately every half second.
- Lethal, a Level 2 report is not broadcast or sent as a result of a normal interrogation; a report is only sent if the interrogator sends a lethal interrogation. Friendly air defense systems perform lethal interrogations as a last check before engaging.

## **AIR SITUATIONAL AWARENESS SYSTEMS**

C-20. ADAM/BAE operators configure and integrate numerous air situational awareness systems.

### **Air Defense System Integrator**

C-21. The air defense system integrator provides brigades with direct near-real-time access to tactical and strategic communications, tactical data information links, and intelligence networks such the joint planning network, joint data network, and the integrated broadcast service. The air defense system integrator receives line-of-sight and beyond-line-of-sight data from—

- Multifunctional information distribution system low volume terminal-2 for radio frequency Link 16.
- Transmission control protocol/internet protocol, serial, and landline for MIL-STD-3011 A, B, and C joint range extension applications protocols.
- Wideband tactical radio for satellite tactical data Link16.
- Enhanced position location reporting system for situational awareness data link to provide situation awareness for non-Link 16 capable platforms.

C-22. The air defense system integrator receives, processes, correlates, fuses, and displays up to 2000 precise participant location and identification tracks from multiple tactical data link and intelligence sources. These tracks include the Link 16 direct and indirect (forwarding) participant location and identification messages, the variable message format 5.01 position reports, and cursor on target position reports transmitted into the joint data network. Participant location and identification messages are combined with unmanned aircraft system vehicle GPS reports to ground control stations to provide a more complete air picture. Airspace personnel forward that single integrated picture to the AMD workstation to provide air situational awareness for dissemination into a mission command system.

### **Forward Area Air Defense**

C-23. The FAAD system (that includes the IFN), which is interoperable with joint, multinational, and unified action partner air defense artillery systems, provides real-time targeting and accurate and timely identification of air targets. It alerts indirect fire protection capability intercept and sense and warning systems, and it alerts and cues AMD units and weapon systems. FAAD systems receive air situational data from tactical digital information links via the joint data network and radar (sentinel, firefinder, lightweight countermortar radar, and Airborne Warning and Control System) data via radar elements subsystem. When augmented with AMD sensors and shooters, FAAD provides joint command and control for engagement

operations and displays a low-level correlated air picture with target cueing and tracking. In addition, FAAD integrates and disseminates airspace coordinating measures, rules of engagement, air defense warnings, and weapons control orders to augmented AMD units.

## APPLICATIONS

C-24. In airspace control systems, airspace elements employ two applications.

### TACTICAL AIRSPACE INTEGRATION SYSTEM AIRSPACE WORKSTATION

C-25. The TAIS airspace workstation (AWS) provides automated airspace control planning and enhanced airspace control execution. TAIS interfaces with Army and joint command and control systems and provides a direct link to the theater air-ground system through interface with the theater battle management core system; it also has an added civil and government interagency capability.

C-26. For commanders, the system provides a visual three-dimensional airspace picture near-real-time air tracks. TAIS combines multiple input sources into a single air picture for situational awareness, airspace control (to include clearing airspace for immediate fire missions), and fratricide avoidance. Combined with the electronic ground picture, TAIS provides the commander with visualization of the air and ground area of operations. TAIS enables ADAM/BAEs to digitally build, send, and receive airspace coordinating measures supporting the brigade unit airspace plan. TAIS publishes the airspace control order to the CP server (publish and subscribe services) enabling other mission command systems to subscribe from it. TAIS can disseminate the airspace control order directly via e-mail to other mission command systems as well as in U.S. message text format.

C-27. The latest version of TAIS software provides a Web-based, net-centric, thin client application called the dynamic airspace collaboration tool. This tool provides airspace control collaboration and a three-dimensional visualization capability for both TAIS and non-TAIS users. This capability extends key elements of TAIS functionality to other Army users, joint users, and unified action partners on shared mission command systems without the need for these other users to have a TAIS AWS. The dynamic airspace collaboration tool allows all airspace stakeholders to collaborate rapidly and accurately on airspace requests in near real time. For example, an Army brigade combat team uses its TAIS AWS to collaborate with a Marine Corps airspace agency using the dynamic airspace collaboration tool while an Air Force airspace agency uses the dynamic airspace collaboration tool to expedite dynamic retasking of assets across Service boundaries.

C-28. Generally, the air defense system integrator provides air tracks to the TAIS. This integrator is a native component of a TAIS shelter. However, air tracks can also be provided through direct connections with remote TAIS via a network connection. All TAIS can receive BFT data through a network multicast session.

C-29. Either TAIS AWS can pull air track data from another TAIS, or it can connect remotely to an air defense system integrator in the ADAM cell or even a TAIS shelter through the network, provided such arrangements are made prior to an attempt to connect. The TAIS can only pull air tracks from a single source at a time (not including BFT), and the track data is limited to what the air track source is receiving and processing.

### AIR AND MISSILE DEFENSE WORKSTATION

C-30. The AMD workstation provides a common AMD staff planning and execution tool. It enables collaborative AMD integration with intelligence preparation of the battlefield through development of threat analysis and sensor/shooter employment. The workstation also provides an AMD gateway to a mission command system and AMD interface to joint and multinational systems. For commanders, the AMD workstation provides a visual three-dimensional airspace picture with near-real-time air tracks. For ADAM/BAEs, the AMD workstation enables them to parse and graphically display the airspace control order, airspace coordinating measures, airspace control overlay, and unit airspace plan. The AMD workstation also enables ADAM/BAEs to leverage the integrated enemy target and friendly aircraft data

for airspace clearance. The workstation enables not only integrated Army AMD and aviation planning but near-real-time airspace control.

## **AIRSPACE CONTROL WITH A DEGRADED NETWORK**

C-31. While networks and applications greatly enhance airspace control, commanders can exercise airspace control in a degraded network environment. However, in a degraded network environment, controlling airspace is based on preplanned airspace coordinating measures with limited capability to assess airspace control effectiveness or make adjustments during execution. The nature of an operational environment, combined with the broad range of threats, makes it likely that Army forces will have to operate under degraded conditions and networks. While Army air-ground system and airspace information systems are not envisioned as a primary target, they will be degraded as a result of attacks against key enabling networks and nodes.

C-32. For airspace elements, degraded network operations potentially cause loss of air picture or air-ground communications, brigade CP connectivity, or digital systems in the CP. Loss of air picture or air-ground communications forces airspace elements to resort to 100% procedural control. Loss of brigade CP connectivity affects connectivity to higher headquarters CPs and joint airspace control nodes. In this case, airspace elements continue to digitally plan airspace use, download airspace control means requests (known as ACMREQs) to a disk, and physically transport it to an adjacent brigade that has connectivity or to a higher headquarters airspace element. Loss of digital systems in the CP occurs when the TAIS malfunctions. In this case, airspace elements can—with connectivity—client into another unit's TAIS. Loss of connectivity forces airspace elements to update maps and overlays manually. Airspace element personnel need to retain skills and expertise to control airspace manually.

## Appendix D

# Airspace Messages, Requests, and Information Displays

This appendix discusses airspace messages, requests, and information displays. First, it discusses the types of digital messages. The appendix then discusses airspace coordinating measure and system peculiarities. The appendix concludes with a discussion on information displays.

## DIGITAL MESSAGES

D-1. Digital messages consist of airspace messages, requests, and information displays. Airspace users transmit digital messages using two distinct formats compatible with multiple control systems within the data link architecture. The two primary formats used are United States message text format (USMTF) and joint variable message format. Digital airspace control systems—such as machine-to-machine exchange—determine appropriate formats to use for their particular systems. For example, tactical airspace integration system (TAIS) communicates point-to-point with theater battle management core system via USMTF. Airspace users utilize USMTF predominantly on the Army mission command system and joint command and control automation systems. Airspace users utilize joint variable message format messages on the tactical Internet and at the platform level to support Force XXI Battle Command Brigade and below.

## UNITED STATES MESSAGE TEXT FORMATTING

D-2. The USMTF establishes standards, rules, and conventions governing message text formats. USMTF is a set of character-oriented message text formats that provide common voice and automation templates to exchange information between joint command and control systems and enables interoperability for all military operations. The joint user handbook-message text formats (JUH-MTFs) and FM 6-99.2 provide additional information on USMTF.

D-3. The USMTF voice-message templates provide the means for units to communicate effectively during degraded network operations. Communicating expeditiously and succinctly via voice will remain a requirement due to the potential degraded network operations.

D-4. Common USMTF voice templates used by airspace elements include the following:

- Airspace control means request [ACMREQ]-REPORT NUMBER: A030 {USMTF # F658}.
- Airspace control order [ACO]-REPORT NUMBER: A035 {USMTF # F756}.
- Air defense command message [AIRDEFCOM]-REPORT NUMBER: A010 {USMTF # E710}.
- Airlift request [AIRLIFTREQ]-REPORT NUMBER: A015 {USMTF # D630}.
- Air Mission Request Status/Tasking [REQSTATASK]-REPORT NUMBER: A020 {USMTF # A661}.

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*Note:* These messages and reports may also be a record and are identified by “(Record)” at the end of the description.

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## JOINT VARIABLE MESSAGE FORMAT

D-5. Joint variable message format is a modem-based message protocol that provides the most extensive digital information exchange between similarly capable platforms and ground-based terminal attack controller kits. The variable message format provides an extremely flexible message standard that consists of only essential information, allowing shorter messages than USMTF for reduced transmission time and network clutter. It is bit-oriented, digital information with variable-length messages. The conveyed data requires varying amounts of volume and detail of information, and it can be transmitted over a broad range of tactical communications systems. Variable message format uses Link 16 data elements to create variable

length messages suitable for near-real-time data exchange in a bandwidth constrained combat environment. The variable message format is the Army solution to the battlefield digitization interoperability and bandwidth problems. Refer to MIL-STD-6017 for a complete listing of all variable message formats.

## **UNITED STATES MESSAGE TEXT FORMAT AND VARIABLE MESSAGE FORMAT RECORD TEMPLATES**

D-6. Airspace users utilize USMTF and variable message format record templates to record messages and reports. Airspace elements routinely use record messages and digitally transmit them via a mission command system.

## **AIRSPACE CONTROL PECULIARITIES TO BE AWARE OF**

D-7. Requesting airspace use requires an understanding of the different airspace coordinating measures, how those airspace coordinating measures are communicated (messages) between airspace control nodes, as well as the information displays used to integrate airspace use. All users requesting airspace must understand the methods used to transmit their airspace use requests. Sometimes transmit requests through a hand-held radio in degraded networks operations or through the most advanced systems on the battlefield. No matter the situation, effective individual users understand the systems used (such as advanced field artillery tactical data system, tactical airspace integration system, theater battle management core system) and how system interoperability impacts their airspace use requests.

## **AIRSPACE COORDINATING MEASURES PECULIARITIES**

D-8. *Airspace coordinating measures* are measures employed to facilitate the efficient use of airspace to accomplish missions and simultaneously provide safeguards for friendly forces (JP 3-52). While JP 3-52 and other doctrinal and joint standards documents define airspace coordinating measures (ACMs), the USMTF 2004 standard defines the implementation of these ACMs using current digital airspace control systems (such as machine-to-machine exchange).

D-9. The difference or peculiarities between the standards has caused confusion at times. In some cases, the name of the ACM differs between joint doctrine and USMTF. For example, joint doctrine refers to a “coordinating altitude” ACM and USMTF refers to the same ACM as a “coordination level.” In other cases, the nature of the coordinating measure changes. In USMTF 2004, a restricted operations zone is a category (type) with many associated coordinating measures (usages) one of which is a restricted operations area. The same situation exists for special use airspace, which in USMTF is a type, not a usage.

D-10. Since the language between the various Service command and control systems is USMTF, airspace element personnel need to understand how their automation systems use and exchange ACMs. Often airspace element personnel have to convert nondigital airspace requests using doctrinal definitions that may not be USMTF 2004 terms (such as coordinating altitude or restricted operations zone) into the appropriate digital USMTF format. In addition, since some digital systems do not process the entire USMTF set of coordinating measures, airspace element personnel must understand the peculiarities effects of ACM type, usage, and shape selection when translating text into a digital USMTF message to ensure that the ACM yields the desired outcome.

D-11. The shape tool used in the creation of an ACM is a critical aspect on whether the ACM can be processed among the systems used to integrate airspace use. For example, the tactical TAIS has eight different shape choices while the theater battle management core system has nine shape choices. See Table D-1.

**Table D-1. Airspace control system shapes**

<i>TAIS</i>	<i>TBMCS</i>	<i>Remarks</i>
Cylinder	Circle	A cylinder is a circle with three dimensions
Route	Corridor	Route is the same shape as a corridor
Orbit	Orbit	Cakes are complex Rad-Arcs
Cake/Rad-Arc	Rad-Arc	
Polyarc	PolyArc	
Polygon	Polygon	
Track	Track	
Line	Line	
	Point	TAIS does not have a point shape, rather TAIS uses its airspace control point tool for entering point data
TAIS – tactical airspace integration system TBMCS – theater battle management core system		

**AIRSPACE SYSTEM PECULIARITIES**

D-12. All effective airspace users know their system defaults, peculiarities, and how their system interchanges information between the available systems. Airspace users recognize that any software updates to their system may significantly change their “settings.”

D-13. Each system has peculiarities. TAIS—one of the airspace control system used by air defense airspace management/brigade aviation element (ADAM/BAE)—and airspace elements will parse, display, and run conflict checks against all USMTF 2004 compatible ACMs. However, the default setting for many ACMs is set to not check for conflicts. Operators of TAIS can change the default setting of “conflict check off” based on standard operating procedures or orders.

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*Note:* The critical importance of clarity in the discussion of ACMs and the manifestation of them in digital messages cannot be overstated.

*Note:* When sending data messages to the theater battle management core system or the NATO Integrated Command and Control (known as ICC) system, users must change the default USMTF 2004 format to USMTF 2000 format before transmitting; theater battle management core system and integrated command and control systems cannot parse USMTF 2004 messages.

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**INFORMATION DISPLAYS**

D-14. Information displays (also referred to as overlays) result from messages, either inputted or transmitted, into systems that portray a continuous common operational picture. This picture provides commanders with situational awareness and situational understanding of the operational area. Commanders use the common operational picture to support visualization of the mission. Staff components use it to support their running estimates that they continuously update.

D-15. Airspace elements are responsible for maintaining information displays based on accurate information and databases in near real time. This includes, but is not limited to—

- Ensuring airspace users disseminate up-to-date information to appropriate higher, lower, and adjacent command posts.
- Establishing a shared pasteboard for collecting, processing, displaying, and disseminating relevant information on the command post of the future system workstation.
- Preparing a shared plan using the two-dimensional application on the command post of the future system workstation.
- Preparing a shared plan using the three-dimensional application on the command post of the future system workstation.

D-16. Airspace elements typically publish the airspace control overlay (formerly airspace command and control overlay). Airspace control overlays can be digital (containing all data associated with ACMs), or graphic (drawn on plastic or paper for use during degraded network operations). Airspace elements typically subscribe to these overlays:

- Air defense artillery overlay.
- Fire support overlay.
- Intelligence overlay:
  - Information collection plan overlay.
  - Terrain overlay.
- Weather overlay.
- Operation overlay.

## Appendix E

# Airspace Element Collective Tasks

This appendix discusses Army collective tasks in general and then the specific airspace element collective tasks.

## ARMY COLLECTIVE TASKS

E-1. The Army Universal Task List (AUTL) is a comprehensive, but not all-inclusive listing of Army tasks, missions, and operations. The AUTL provides a common, doctrinal structure for collective tasks that support Army tactical missions and operations. The airspace control AUTL task is the Army tactical task (ART) 5.1.3.1.7, Control Tactical Airspace.

E-2. A collective task is a clearly defined, discrete, and measurable activity or action performed by an integrated and coordinated collection of Soldiers and contributes directly to mission accomplishment. In terms of airspace control, the Army has fourteen airspace control collective tasks.

## COLLECTIVE TASKS FOR AIRSPACE CONTROL

E-3. The airspace control collective tasks apply across echelons, brigade through theater army. At the brigade level, the air defense airspace management/brigade aviation element (ADAM/BAE) or ADAM elements execute all the collective tasks. Above the brigade level (division, corps, theater army), the airspace element and the air and missile defense (AMD) element collaborate to execute the tasks in contained in FM 7-15. Brigade and higher units without assigned airspace element personnel (ADAM/BAE or airspace elements) are required to execute the collective tasks marked with an asterisk (\*) in table E-1 on page E-2.

E-4. In FM 7-15, the AUTL task ART 5.1.3.1.7 (Control Tactical Airspace) consists of fourteen collective tasks that provide the basis for performance measures. These collective tasks are separated into two groups: tasks that focus on planning future airspace use and tasks that focus on the execution of airspace use. The first group of collective tasks integrate airspace requirements generated by all airspace user communities (movement and maneuver, intelligence, fires, sustainment, mission command, and protection), both joint and Army, while meeting commander's guidance for mission accomplishment and risk. The remaining collective tasks integrate airspace use during execution of current operations using both staff procedures and near-real-time procedural control. These latter tasks occur to resolve airspace use conflicts according to commander's guidance for mission accomplishment and risk.

**Table E-1. ART 5.1.3.1.7 Control tactical airspace**

	#	Scale	Measure	FM 3-52 Paragraph #
PLANNING	01	Yes/No	The unit determined integrated airspace user requirements*	3-26
	02	Yes/No	The unit developed airspace usage priorities	3-27
	03	Yes/No	The unit coordinated air traffic service, sensor emplacement, and data links	3-28
	04	Yes/No	The unit determined combat identification authority and procedures for airspace users	3-29
	05	Yes/No	The unit developed rules of engagement and early warning procedures for air defense operations in the area of operations	3-30
	06	Yes/No	The unit determined reporting requirements and monitoring methods for manual reporting	3-31
	07	Yes/No	The unit integrated airspace use within the area of operations	3-32
	08	Yes/No	The unit developed airspace coordinating measures to support planned operations*	3-33
	09	Yes/No	The unit developed the airspace appendix	3-36
EXECUTION	10	Yes/No	The unit processed airspace orders and directives*	4-16
	11	Yes/No	The unit managed airspace control information displays	4-17
	12	Yes/No	The unit determined track Identification for airspace users	4-18
	13	Yes/No	The unit monitored assigned airspace and airspace users within assigned area of operation	4-19
	14	Yes/No	The unit resolved real-time conflicts for airspace users within the area of operations*	4-20

E-5. For more detail, refer to the Digital Training Management System (known as DTMS) and the Training Development Capability (known as TDC) databases. These databases detail the task, condition, and standard of each collective task found by its training and evaluation outline task number. (See table E-2.)

**Table E-2. Airspace control collective tasks**

	Task	Task #
PLANNING	Determine integrated airspace user requirements.	71-8-5702*
	Develop airspace usage priorities.	71-8-5700
	Coordinate air traffic services, sensor emplacement, and data links.	71-8-5706
	Determine combat identification authority and procedures for airspace users.	71-8-5705
	Develop rules of engagement and early warning procedures for air defense operations in the area of operations.	71-8-5713
	Determine reporting requirements and monitoring methods for manual reporting.	71-8-5707
	Integrate airspace use within the area of operations.	71-8-5704
	Develop airspace coordinating measures to support planned operations.	71-8-5703*
	Develop the airspace annex.	71-8-5701
EXECUTION	Process airspace orders and directives.	71-8-5711*
	Manage airspace control information displays.	71-8-5710
	Determine track identification for airspace users.	71-8-5709
	Monitor assigned airspace and airspace users within assigned area of operations.	71-8-5712
	Resolve real-time conflicts for airspace users within the area of operations.	71-8-5708*

## Appendix F

# Airspace Control Appendix Format

An airspace control appendix is included in all maneuver brigade and functional brigade or higher units assigned an area of operations or that employ organic manned or unmanned aircraft. See Figure F-1. The airspace control appendix provides guidance on how to integrate airspace users in accordance with commander's intent, priorities, concept of operations, and risk guidance contained in Annex C (Operations) of the operation plan.

<p><b>[CLASSIFICATION]</b></p> <p><i>Include heading if attachment is distributed separately from the base order or higher-level attachment</i></p> <p><b>APPENDIX 10 (AIRSPACE CONTROL) TO ANNEX C (OPERATIONS) TO [OPERATION PLAN/ORDER [number] [(code name)]—[(classification of title)]</b></p> <p><b>(U) References:</b> <i>List documents essential to understanding the attachment.</i></p> <ul style="list-style-type: none"><li>a. <i>List maps and charts first. Map entries include series number, country, sheet names, or numbers, edition, and scale.</i></li><li>b. <i>List other references in subparagraphs labeled as shown.</i></li><li>c. <i>Doctrinal References for this appendix include the following: ADRP 5-0, ATTP 5-0.1, FM 3-52, FM 3-52.1, FM 3-52.2, JP 3-30, and JP 3-52.</i></li></ul> <p><b>(U) Time Zone Used Throughout the Plan or Order:</b> <i>Write the time zone established in the base plan or order.</i></p> <p><b>1. (U) Situation.</b> <i>Include information affecting the functional area that paragraph 1 of the operation plan (OPLAN) or operation order (OPORD) does not cover or that needs to be expanded.</i></p> <ul style="list-style-type: none"><li>a. (U) <u>Area of Interest.</u> <i>Refer to Annex B (Intelligence) as required.</i></li><li>b. (U) <u>Area of Operations.</u> <i>Refer to Appendix 2 (Operation Overlay) to Annex C (Operations).</i><ul style="list-style-type: none"><li>(1) (U) <u>Terrain.</u> <i>List all critical terrain aspects that impact airspace use. Refer to Tab A (Terrain) to Appendix 1 (Intelligence Estimate) to Annex B (Intelligence) as required.</i></li><li>(2) (U) <u>Weather.</u> <i>List all critical weather aspects that impact airspace use. Refer to Tab B (Weather) to Appendix 1 (Intelligence Estimate) to Annex B (Intelligence) as required.</i></li></ul></li><li>c. (U) <u>Enemy Forces.</u> <i>Describe anticipated enemy air defense, enemy use of manned and unmanned aircraft, fires, and other capabilities (such as electronic warfare and cyber warfare) that will impact friendly use of airspace.</i></li></ul> <p style="text-align: center;"><b>[page number]</b> <b>[CLASSIFICATION]</b></p>
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**Figure F-1. Sample airspace control appendix**

## [CLASSIFICATION]

## APPENDIX 10 (AIRSPACE CONTROL) TO ANNEX C (OPERATIONS) TO [OPERATION PLAN/ORDER [number] [(code name)]—[(classification of title)]

d. (U) Friendly Forces. *Outline the theater airspace structure to include higher headquarters airspace plans and airspace control appendixes as they pertain to airspace control. Outline the airspace control organization of unified action partners identifying airspace control entities and airspace users that will support or impact the issuing headquarters or require coordination and additional support. This will include joint force commander (JFC) designation of the airspace control authority (ACA), the area air defense commander (AADC), and the joint force air component commander (JFACC). Identify relevant theater air-ground system (TAGS) control agencies such as combat reporting centers, airborne warning and aircraft control systems, air support operations centers, direct air support centers, tactical air operations centers, air traffic control or services or their coalition equivalents involved with the operation of the airspace control system within the ground commander's area of operation. Describe probable airspace use by joint and coalition partners that will affect airspace control such as close air support, information collection, or special operations. Highlight aspects of higher headquarter airspace plans that impact operations. As a minimum, the joint force commander's airspace control plan and the airspace control appendix of the next higher headquarters will be addressed.*

e. (U) Interagency, Intergovernmental, and Nongovernmental Organizations. *Identify and describe other organizations in the area of operations that may impact the conduct of airspace control. Include both civil airspace control agencies as well as interagency, intergovernmental, and nongovernmental organizations that will be using airspace in the area of operation.*

f. (U) Civil Considerations. *Refer to Annex K (Civil Affairs Operations) as required.*

g. (U) Attachments and Detachments. *List units attached or detached only as necessary to clarify task organization and the airspace control architecture such as air traffic services, air and missile defense, supporting tactical air control party and artillery organizations. Identify units with manned and unmanned aircraft. Identify units with airspace elements to include air defense airspace management/brigade aviation elements (ADAM/BAEs) or ADAMs (or a joint or multinational equivalent). (Note: if the air traffic service information [Air traffic service facilities, airfields, or similar facilities] is lengthy or is not available from other sources, include Tab A, Air Traffic Services, to expand upon this sub-paragraph.)*

h. (U) Assumptions. *List any airspace control assumptions that support the appendix development.*

2. (U) Mission. *State the mission of the airspace element in support of the base plan or order.*

3. (U) Execution.

a. (U) Concept of Airspace Control. *Describe how airspace control supports the commander's intent, concept of operations, and concept of fires. Describe how the unit will manage airspace during the phases of the operation (radar, nonradar, procedural and positive control.) Specify the authority exercised at each echelon for each phase of the operation. Describe the roles and relationships between airspace elements in the organization and how the airspace elements will coordinate with joint and unified action partner airspace elements. Describe how air traffic service units and capabilities (airspace information center) are integrated into the unit airspace plan. Describe how air and missile defense units located in the area of operations are integrated with airspace control.*

b. (U) Assessment. *Describe the priorities for assessment and identify the measures of performance and effectiveness used to assess end state conditions and objectives. Refer to Annex M (Assessment) as required.*

[page number]

[CLASSIFICATION]

Figure F-1. Sample airspace control appendix (cont.)

**[CLASSIFICATION]**

**APPENDIX 10 (AIRSPACE CONTROL) TO ANNEX C (OPERATIONS) TO [OPERATION PLAN/ORDER [number] [(code name)]—[(classification of title)]**

c. (U) Tasks to Subordinate Units. *List airspace control tasks assigned to specific subordinate units not contained in the base order. This may include tasks to the combat aviation brigade for air traffic services, tasks to air and missile defense units for sensor coverage, tasks to airspace information center and air traffic service units, and tasks to brigade combat teams and other functional brigades.*

d. (U) Coordinating Instructions. *List only instructions applicable to two or more subordinate units not covered in the base order that affect airspace control procedures.*

*(Note 1: For operations within the United States and its territories, title this paragraph “Rules for the Use of Force.”)*

*(Note 2: Items listed below as examples do not need to be included if already in the unit standard operating procedure.)*

(1) (U) Unit Airspace Plan. *Planned airspace control means requests (ACMREQs) procedures to integrate and nominate planned airspace coordinating measures to higher headquarters as part of a future airspace control order.*

(2) (U) Airspace Control Order Change Request. *Procedures for submitting ACMREQs that are within the current airspace control order cycle and can be integrated into the current airspace control order and disseminated as a change to the current airspace control order.*

(3) (U) Near-Real-Time Airspace Coordination. *Immediate airspace request procedures for near-real-time coordination with external airspace agencies such as a U.S. Air Force combat reporting centers or U.S. Marine Corps direct air support centers.*

(4) (U) Airspace Control Order. *Airspace control order issuing and dissemination times from theater designated airspace control authority and methods for digital and non-digital units to receive it.*

(5) (U) Air Tasking Order. *Air tasking order issuing and dissemination times and methods for digital and nondigital units.*

(6) (U) Key and Enduring Airspace Coordinating Measures. *For example, this can be coordinating altitude, coordinating level.*

(7) (U) Priorities for Airspace Use for Each Phase of the Operation.

(8) (U) Risk Acceptance Guidance. *This can be the form of a matrix.*

(9) (U) Risk Reduction Measures.

(10) (U) Air and Missile Defense Rules of Engagement.

(11) (U) Constraints. *List any restrictions on airspace use placed on the commander by a higher commander that will restrict the freedom of action of the commander. Sources include higher headquarters airspace control and air and missile defense appendixes, airspace control plan, area air defense plan, airspace control order, and special instructions.*

(12) (U) Combat Identification Procedures. *Add detail to provide airspace personnel sufficient information to ensure friendly aircraft are accurately identified. For example, adding supplemental guidance for manually entering or correcting aircraft identification that is not correctly or incompletely identified in the common operational picture. Refer to Appendix 1 (Air and Missile Defense) to Annex E (Protection).*

(13) (U) Procedures for Manual Aircraft Reporting.

**[page number]**  
**[CLASSIFICATION]**

Figure F-1. Sample airspace control appendix (cont.)

<p><b>[CLASSIFICATION]</b></p> <p><b>APPENDIX 10 (AIRSPACE CONTROL) TO ANNEX C (OPERATIONS) TO [OPERATION PLAN/ORDER [number] [(code name)]—[(classification of title)]</b></p> <p><b>4. (U) <u>Sustainment</u>.</b> <i>Provide information as necessary for sustainment of airspace control and air traffic service unique equipment. Refer to Annex F (Sustainment) as required.</i></p> <p><b>5. (U) <u>Command and Signal</u>.</b></p> <p style="padding-left: 40px;">a. (U) <u>Command</u>. <i>State the location of key airspace control leaders. Identify who is authorized to make airspace control decisions for the commander.</i></p> <p style="padding-left: 40px;">b. (U) <u>Liaison Requirements</u>. <i>State the functional area liaison requirements not covered in the base order.</i></p> <p style="padding-left: 40px;">c. (U) <u>Signal</u>. <i>Address any functional area-specific communications requirements or reports. Provide operations task link (OPSTASK Link) information for establishing data links. Refer to Appendix I (Air and Missile Defense) to Annex E (Protection) if the information is located there. Provide rules and procedures for using airspace control digital systems and other digital software such as chat programs, e-mail, and instant messaging including chat rooms to be used, types of information, monitoring requirements, and message verification requirements. Refer to Annex H (Signal) as required.</i></p> <p><b>ACKNOWLEDGE:</b> <i>Include only if attachment is distributed separately from the base order.</i></p> <p style="text-align: center;">[Commander's last name] [Commander's rank]</p> <p><i>The commander or authorized representative signs the original copy of the attachment. If the representative signs the original, add the phrase "For the Commander." The signed copy is the historical copy and remains in the headquarters' files.</i></p> <p><b>OFFICIAL:</b></p> <p>[Authenticator's name] [Authenticator's position]</p> <p><i>Use only if the commander does not sign the original attachment. If the commander signs the original, no further authentication is required. If the commander does not sign, the signature of the preparing staff officer requires authentication and only the last name and rank of the commander appear in the signature block.</i></p> <p><b>ATTACHMENTS:</b> <i>List lower level attachment (such as tabs, and exhibits).</i></p> <p><b>DISTRIBUTION:</b> <i>Show only if distributed separately from the base order or higher-level attachments.</i></p> <p style="text-align: center;">[page number] <b>[CLASSIFICATION]</b></p>
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Figure F-1. Sample airspace control appendix (cont.)

## Appendix G

# Airspace Control During Defense Support of Civil Authorities

This appendix augments the thorough description of how the Army conducts defense support of civil authorities. The appendix provides an overview of defense support of civil authorities. It then discusses coordinating airspace during defense support of civil authorities and joint airspace control. Lastly, it addresses employment considerations of unmanned aircraft systems.

## DEFENSE SUPPORT OF CIVIL AUTHORITIES OVERVIEW

G-1. During defense support of civil authorities, in particular disaster response operations, aircraft are in high demand. Therefore, Army leaders must understand how to coordinate airspace control procedures to operate effectively along with other organizations to reduce the chance of accident or injury. *Defense support of civil authorities* is support provided by U.S. Federal military forces, Department of Defense civilians, Department of Defense contract personnel, Department of Defense component assets, and National Guard forces (when the Secretary of Defense, in coordination with the governors of the affected states, elects and requests to use those forces in Title 32, United States Code, status) in response to requests for assistance from civil authorities for domestic emergencies, law enforcement support, and other domestic activities, or from qualifying entities for special events (DODD 3025.18). Defense support of civil authorities (DSCA) includes operations that address the consequences of natural or man-made disasters, accidents, terrorist attacks, and incidents in the United States and its territories. When the size and scope of events exceed the capabilities or capacities of domestic civilian agencies a governor or federal civilian agency requests support.

G-2. For Army forces, DSCA typically involves aviation support. Army aviation support includes air movement of logistics; transportation of personnel and equipment; medical evacuation; command and control support to federal, state, and local authorities; air evacuation; and information collection support to civilian law enforcement operations. Further, federal military and National Guard aviation units support civil authorities for counterdrug programs, civil disturbances, and border surveillance operations.

G-3. For Army aviation support for DSCA, several emergency support function (ESF) annexes of the national response framework guide employment. ESF annexes describe the roles and responsibilities of federal departments and agencies as ESF coordinators, primary agencies, or support agencies. The following ESF annexes are relevant to Army aviation support:

- ESF #1 – addresses transportation, including airspace control.
- ESF #5 – addresses emergency management coordination.
- ESF #7 – addresses logistics and sustainment management.
- ESF #8 – addresses medical evacuation and mass casualty evacuation flights.
- ESF #9 – addresses interagency search and rescue operations.

## COORDINATING AIRSPACE DURING DEFENSE SUPPORT OF CIVIL AUTHORITIES

G-4. To facilitate cross-governmental coordination, the Federal Emergency Management Agency establishes a joint field office (“joint” in this context means interagency) to coordinate a national-level response. A joint field office is a temporary federal facility for coordination and liaison across agencies and jurisdictions. The cross-governmental coordination between Department of Defense (DOD) and other participating agencies ensures all units operate in an integrated and synchronized manner. Within the joint

field office, the air operations branch facilitates the coordination of aviation assets during disaster operations. DODD 3025.18 and JP 3-28 contain detailed information for implementing DSCA.

G-5. During DSCA, the national airspace remains under the control of the Federal Aviation Administration (FAA) (part of the Department of Transportation). The FAA assumes the role of the airspace coordinating authority. In this capacity, the FAA develops the airspace control plan. This plan describes processes and procedures for the safe employment of air assets, both military and civilian, operating within the rescue and recovery area. Other military operations within the scope directed by the joint force air component command use the airspace control plan.

G-6. The airspace control plan directs all assets, military or civilian, operating in or through the disaster area and assumes civil air traffic control facilities will control all air traffic and provide visual and instrument flight rule separation. Strict adherence to the airspace control plan and FAA air traffic control procedures ensures safe, efficient, and expeditious use of airspace while still enabling all participants to accomplish their respective missions. Lessons from recent DSCA underpin the importance of coordinating and integrating airspace use through airspace elements, at all echelons, and letting the highest airspace element interface with the joint force and state and federal agencies, if necessary and appropriate. This prevents other airspace users from inundating local state and federal agencies with requests. The air component command for the United States Northern Command (USNORTHCOM) is Air Force North (1st Air Force).

G-7. To augment the FAA's airspace control plan, each state maintains an airspace control plan signed by the adjutant general, maintained by 1st Air Force. The 601st Air and Space Operations Center (AOC [United States Air Force]), 1st Air Force, plans, directs, and assesses air and space operations for the North American Aerospace Defense Command, and USNORTHCOM. The AOC provides aerospace warning and control for North American Aerospace Defense defensive counterair activities, as well as directs Air Force air and space capabilities supporting USNORTHCOM homeland security and DSCA missions. As required, the joint force air component commander coordinates with the FAA and issues supplementary instructions to air commanders to accommodate changes required for emergency operations by military aircraft. To assist with coordination, all military and civilian agencies and organizations provide liaisons to the joint force air component command and coordinate all air activities with FAA representatives. While this is true for federal military missions, Air Force North (AFNORTH) offers the contingency response air support schedule (CRASS) to all agencies supporting disaster response operations.

G-8. While the CRASS is similar to an unclassified air tasking order, it is not a "tasking" document. It serves as a visibility document intended to maximize visibility of air operations in the disaster area or joint operations area among all participants. AFNORTH uses unclassified means to disseminate CRASS and amplifying information (airspace control plan, airspace control order, or special instructions). The CRASS provides increased situational awareness of all aircraft—including non-DOD—operating in the joint operations area. The CRASS includes all interagency missions, as well as planned flying by other agencies supporting the disaster, including nongovernmental organizations and Army National Guard aviation assets operating in State active duty or Title 32 status.

G-9. The fidelity of the CRASS depends on the information provided by non-DOD agencies and organizations. AFNORTH publishes it using a common application to ensure data access. It requires increased coordination with State emergency operations centers, law enforcement agencies, and other agencies to ensure accuracy. While compliance with the airspace control plan, airspace control order, or special instructions is not mandatory for non-DOD agencies, AFNORTH encourages these agencies to contribute to the CRASS work sheet. Participation is voluntary, and while not mandatory, it is highly encouraged. AFNORTH updates all information in accordance with the classified air tasking order cycle. AFNORTH (1st Air Force), coordinates with state emergency operations center and other agencies to ensure fullest dissemination of required information. Required information is also available on the AFNORTH public domain Web site: (<http://1afnorth.region1.ang.af.mil/default.aspx>).

## **JOINT AIRSPACE CONTROL**

G-10. During DSCA, airspace control is transferred to the joint force air component command. All apportioned military aircraft operating in the joint operations area are line-tasked in the air tasking order.

For those assets not directly tasked by the joint force air component command, applicable mission information appears in the airspace control plan and special instructions section of the air tasking order for command, control, and coordination purposes. All participating military aircraft adhere to the air control plan and applicable air tasking order and special instructions.

G-11. AFNORTH's regional air movement coordination center, located at Tyndall Air Force Base, stands up during emergencies and contingencies to provide management of airflow into and out of designated airfields for the purpose of maximizing personnel and cargo throughput. The regional air movement coordination center coordinates with military command posts present at available airfields to determine constraints and limitations that affect airflow into those airfields. Subsequently, the regional air movement coordination center coordinates with the FAA, National Guard Bureau, and the Air Force's Tanker Airlift Control Center to determine and issue time slots for aircraft transiting the available airfields.

G-12. AFNORTH's (1st Air Force), standing AOC (601st), is particularly suited for DSCA taking place within the USNORTHCOM's area of responsibility. Additional tactical command and control systems (ground based or airborne) may be required to deploy to the area based on the availability of the local communications and command and control nodes.

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*Note:* The 1st Air Force controls military airspace within the USNORTHCOM area of responsibility except in Alaska, where the 11th Air Force Air and Space Operations Center supports Joint Task Force–Alaska. The 13th Air Force controls military airspace in Hawaii in support of United States Pacific Commands area of responsibility.

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G-13. Coordinating DOD search and rescue support within the continental United States falls to the responsibility of 1st Air Force (see ADP 3-28 for more details). To support DSCA, 1st Air Force is prepared to deploy numerous air component coordination elements as well as additional liaison elements to support other major commands.

G-14. Air National Guard air control squadrons provide operationally ready command and reporting center mission control elements for support of theater air operations. These elements include radar surveillance and tracking, radar service to tactical aircraft, supervision of subordinate deployed air control units, and data link of a combined air picture to higher headquarters.

G-15. Many Navy ships are well suited for air command and control support during DSCA. They possess robust communications capabilities. For example, Navy tactical air command and control centers are located on amphibious naval assault ships. They are able to assist the joint force air component command in air space planning, integration, and deconfliction of multiagency air assets.

G-16. Elements of the Marine air command and control system (known as MACCS) may deploy a capability for DSCA. Common agencies would include the direct air support center, Marine air traffic control detachment, tactical air operations center, tactical air command center, or task organized elements of one or all of these.

G-17. Air Force airborne warning and airspace control aircraft may deploy to provide a detailed air picture to the airspace control authority. These airborne control centers can become the link between the FAA controllers on the ground, working out of a military facility, and aircraft in and around the incident site.

## **UNMANNED AIRCRAFT SYSTEMS EMPLOYMENT CONSIDERATIONS**

G-18. Over the last 10 years, the use of unmanned aircraft has grown exponentially. However, within the United States and its territories, the use of unmanned aircraft is severely restricted. During DSCA, commanders use unmanned aircraft systems as a last resort, when manned assets are neither available nor practical. Often they choose to employ an unmanned aircraft system because they require the capability the operation. These systems give the commander many capabilities, but often unmanned aircraft systems may not be the most efficient, timely, or practical method of achieving the commander's desired effect. Sometimes a manned platform can provide the desired capability in a much more timely and efficient

manner. Commanders decide to employ unmanned aircraft systems judiciously. Use of unmanned aircraft systems requires approval at high levels within the DOD and the FAA prior to employment in DSCA.

## **CONTROL OF UNMANNED AIRCRAFT SYSTEMS**

G-19. Command relationships for unmanned aircraft systems operations should be defined in advance of mission accomplishment. In general, the controlling joint task force typically exercises operational control of available unmanned aircraft systems.

G-20. Unmanned aircraft system operators supporting domestic missions should anticipate coordinating their actions through the joint task force to supporting the joint force air component commander. These operators also anticipate and prepare to include their operations in the air tasking order. Regardless of the nature of operations, unmanned aircraft systems command and control structures must be thoroughly planned (well in advance, when possible), responsive to both operator and user inputs, and flexible enough to handle changes to the operation. This is particularly important for retasking of unmanned aircraft systems assets.

G-21. Certain unmanned aircraft systems such as Global Hawk can operate far above normal commercial traffic while providing situation assessment to ground commanders. Intermediate systems such as the Predator have supported recent disaster operations, dramatically increasing situational awareness at the joint field office level. If available and authorized, these systems can provide near-real-time surveillance to command posts for extended periods. The approval process is not automatic. Requests for unmanned aircraft system surveillance support goes through the joint force air component command and joint task force to the joint field office for joint staff approval. The joint force air component command coordinates with the FAA and includes the mission on the air tasking order when approved. The FAA issues notices to airmen as required.

## **LIMITATIONS ON THE USE OF UNMANNED AIRCRAFT SYSTEMS**

G-22. There are numerous limitations involving unmanned aircraft systems operations in the United States. The three most important are legal restrictions, FAA restrictions, and weather restrictions.

### **Legal Restrictions**

G-23. Legal restrictions on the use of unmanned aircraft systems in domestic operations are numerous. Use of DOD intelligence capabilities for DSCA missions—such as incident awareness and assessment, damage assessment, and search and rescue—requires prior Secretary of Defense approval, together with approval of both the mission and use of the exact DOD intelligence community capabilities. Certain missions require not only approval of the Secretary of Defense, but also coordination, certification, and possibly, prior approval by the Attorney General of the United States. Additionally, several Department of Defense directives (DODDs) and Chairman, Joint Chiefs of Staff instructions (CJCSIs) cover military support to civil authorities. For example, DODD 3025.12, DODD 5525.5, and CJCSI 3710.01B apply to domestic unmanned aircraft systems operations. Additionally, the Chairman of the Joint Chiefs of Staff standing execution order for DSCA (referred to as the CJCS DSCA EXORD) provides guidance on operational parameters and limitations on using DOD intelligence capabilities for DSCA missions. Further, per DODD 5525.5, military forces cannot use military systems for surveillance and pursuit of individuals.

G-24. All requests for unmanned aircraft systems must be approved by the Secretary of Defense. Operators of unmanned aircraft systems supporting civilian law enforcement agencies must be cognizant of, and fully comply with, DODD 5525.5 and any operational parameters and limitations specified in the Chairman of the Joint Chiefs of Staff standing execution order for DSCA regarding collection, retention, and dissemination of unmanned aircraft systems sensor data and imagery. Operators cannot conduct surveillance on specifically identified U.S. persons, unless expressly approved by the Secretary of Defense, consistent with U.S. laws and regulations. Additionally, civilian law enforcement agencies will handle any data collected by such surveillance operations. Finally, per current Office of the Secretary of Defense guidance, National Guard forces conducting domestic unmanned aircraft systems operations are normally in Title 10 (United States Code) status, unless the Secretary of Defense determines Title 32 (United States Code) status is more appropriate.

## **Federal Aviation Administration Restrictions**

G-25. By far, access to the national airspace system proves the biggest challenge to operating unmanned aircraft systems in the United States, its territories, and possessions. Since unmanned aircraft systems differ from manned systems, unmanned aircraft systems do not meet the same standards for operations in the national airspace system required for manned systems (the ability to—see and avoid other aircraft, for example). To fly unmanned aircraft systems in other-than-military restricted airspace or warning areas, unmanned aircraft systems operators must apply for a certificate of waiver or authorization (certification of authorization) from the FAA granting permission to fly the unmanned aircraft systems in the national airspace system. Processing this certification of authorization can take up to 60 days, although work is underway to shorten this process. If conditions dictate, operators can receive emergency certification of authorizations in hours. Additionally, unmanned aircraft systems operators prepare to meet other FAA requirements such as qualification training for operators and knowledge of the airspace regulations for the type of airspace in which the unmanned aircraft systems will operate.

G-26. The joint force air component commander provides guidance regarding the certification of authorization approval process due to their long-term relationship established with the FAA. Regardless of the status of a certification of authorization application, active coordination with the FAA when planning to operate military unmanned aircraft systems in the domestic airspace of the United States cannot be overemphasized. Timely coordination with the FAA gives an operator a greater chance of gaining approval to operate unmanned aircraft systems where and when required. In those instances where no pre-existing certification of authorization exists, the joint force air component command and the FAA have a process to expedite certification of authorization approval for extreme cases.

G-27. The FAA can activate a temporary flight restriction in the vicinity of disaster and hazard areas or approve an emergency certification of authorization for the unmanned aircraft systems to operate. Unmanned aircraft systems operations within an approved temporary flight restriction should be added to the verbiage contained in the temporary flight restriction. For operations outside the temporary flight restriction, operators require an additional certification of authorization.

## **Weather Restrictions**

G-28. Severe weather presents operational challenges to most unmanned aircraft systems. Planners have to carefully consider the weather in the intended area of operations to determine if manned systems are more suitable for the desired mission. In-flight conditions—such as icing, heavy precipitation, or instrument meteorological conditions at the launch and recovery site—often preclude unmanned aircraft systems operations. Throughout the DSCA mission, unmanned aircraft systems employment depends on the current and forecasted weather conditions of the affected area.

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# Glossary

The glossary lists acronyms and terms with Army or joint definitions. Where Army and joint definitions differ, (Army) precedes the definition. The proponent manual for terms is listed in parentheses after the definition.

## SECTION I – ACRONYMS AND ABBREVIATIONS

<b>AADC</b>	area air defense commander
<b>AADP</b>	area air defense plan
<b>AAGS</b>	Army air-ground system
<b>AAMDC</b>	Army air and missile defense command
<b>ACA</b>	airspace control authority
<b>ACM</b>	airspace coordinating measure
<b>ACMREQ</b>	airspace control means request
<b>ACO</b>	airspace control order
<b>ACP</b>	airspace control plan
<b>ADAFCO</b>	air defense artillery fire control officer
<b>ADAM/BAE</b>	air defense airspace management/brigade aviation element
<b>ADP</b>	Army doctrine publication
<b>ADRP</b>	Army doctrine reference publication
<b>ADS-B</b>	automatic dependent surveillance-broadcast
<b>AFNORTH</b>	Air Force North
<b>AGL</b>	above ground level
<b>ALO</b>	air liaison officer
<b>AMD</b>	air and missile defense
<b>AMSL</b>	above mean sea level
<b>AO</b>	area of operations
<b>AOC</b>	Air and Space Operations Center
<b>AOR</b>	area of responsibility
<b>ASOC</b>	air support operations center
<b>ATO</b>	air tasking order
<b>ATS</b>	air traffic service
<b>ATTP</b>	Army tactics, techniques, and procedures
<b>AUTL</b>	Army Universal Task List
<b>AWACS</b>	Airborne Warning and Control System
<b>AWS</b>	airspace workstation
<b>BCD</b>	battlefield coordination detachment
<b>BCT</b>	brigade combat team
<b>BFT</b>	blue force tracking
<b>CAB</b>	combat aviation brigade
<b>CAS</b>	close air support
<b>CGRS</b>	common geographic reference system

<b>CJCSI</b>	Chairman, Joint Chiefs of Staff instruction
<b>COA</b>	course of action
<b>cont.</b>	continued
<b>COP</b>	common operational picture
<b>CP</b>	command post
<b>CRASS</b>	contingency response air support schedule
<b>CRC</b>	control and reporting center
<b>DA</b>	Department of the Army
<b>DASC</b>	direct air support center
<b>DCA</b>	defensive counterair
<b>DOD</b>	Department of Defense
<b>DODD</b>	Department of Defense directive
<b>DSCA</b>	defense support of civil authorities
<b>DTED</b>	digital terrain elevation data
<b>ESF</b>	emergency support function
<b>FAA</b>	Federal Aviation Administration
<b>FAAD</b>	forward area air defense
<b>FAC(A)</b>	forward air controller (airborne)
<b>FL</b>	flight level
<b>FM</b>	field manual
<b>FSCM</b>	fire support coordination measure
<b>G-3</b>	assistant chief of staff, operations
<b>G-5</b>	assistant chief of staff, plans
<b>GARS</b>	Global Area Reference System
<b>GPS</b>	Global Positioning System
<b>HAE</b>	height above ellipsoid
<b>IFF</b>	identification, friend or foe
<b>IFN</b>	Intra-forward area air defense (FAAD) Network
<b>inHg</b>	mercury
<b>JACCE</b>	joint air component coordination element
<b>JAOC</b>	joint air operations center
<b>JAOP</b>	joint air operations plan
<b>JARN</b>	joint air request net
<b>JFACC</b>	joint force air component commander
<b>JFC</b>	joint force commander
<b>JFLCC</b>	joint force land component commander
<b>JP</b>	joint publication
<b>JTAC</b>	joint terminal attack controller
<b>JTF</b>	joint task force
<b>JUH-MTF</b>	joint user handbook-message text format
<b>MAGTF</b>	Marine air-ground task force

<b>MGRS</b>	Military Grid Reference System
<b>MIL-STD</b>	military standard
<b>MSL</b>	mean sea level
<b>NATO</b>	North Atlantic Treaty Organization
<b>OPCON</b>	operational control
<b>S-3</b>	operations staff officer
<b>S-5</b>	plans staff officer
<b>SIPRNET</b>	SECRET Internet Protocol Router Network
<b>TACP</b>	tactical air control party
<b>TADIL</b>	tactical digital information link
<b>TAGS</b>	theater air-ground system
<b>TAIS</b>	tactical airspace integration system
<b>TAMD</b>	theater air and missile defense
<b>TAOC</b>	tactical air operations center
<b>U.S.</b>	United States
<b>UAP</b>	unit airspace plan
<b>USAF</b>	United States Air Force
<b>USMTF</b>	United States message text format
<b>USNORTHCOM</b>	United States Northern Command
<b>UTM</b>	universal transverse mercator
<b>WGS 84</b>	World Geodetic System 1984

## SECTION II – TERMS

### **airspace control**

A process used to increase operational effectiveness by promoting the safe, efficient, and flexible use of airspace. (JP 3-52)

### **airspace control system**

An arrangement of those organizations, personnel, policies, procedures, and facilities required to perform airspace control functions. (JP 3-52)

### **airspace coordinating measures**

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

### **area of operations**

An operational area defined by the joint force commander for land and maritime forces that should be large enough to accomplish their missions and protect their forces. (JP 3-0)

### **battle rhythm**

A deliberate daily cycle of command, staff, and unit activities intended to synchronize current and future operations. (JP 3-33)

### **defense support of civil authorities**

Support provided by U.S. Federal military forces, Department of Defense civilians, Department of Defense contract personnel, Department of Defense component assets, and National Guard forces (when the Secretary of Defense, in coordination with the governors of the affected states, elects and requests to use those forces in Title 32, United States Code, status) in response to requests for assistance from civil authorities for domestic emergencies, law enforcement support, and other domestic activities, or from qualifying entities for special events. (DODD 3025.18)

### **execution**

Putting a plan into action by applying combat power to accomplish the mission. (ADP 5-0)

### **joint fires**

Fires delivered during the employment of forces from two or more components in coordinated action to produce desired effects in support of a common objective. (JP 3-0)

### **joint fires observer**

A trained Service member who can request, adjust, and control surface-to-surface fires, provide targeting information in support of Type 2 and 3 close air support terminal attack control, and perform autonomous terminal guidance operations. (JP 3-09.3)

### **mission command**

The exercise of authority and direction by the commander using mission orders to enable disciplined initiative within the commander's intent to empower agile and adaptive leaders in the conduct of unified land operations. (ADP 6-0)

### **mission command system**

The arrangement of personnel, networks, information systems, processes and procedures, and facilities and equipment that enable commanders to conduct operations. (ADP 6-0)

### **operational environment**

A composite of conditions, circumstances, and influences that affect the employment of capabilities and bear on the decisions of the commander. (JP 3-0)

### **planning**

The art and science of understanding a situation, envisioning a desired end state, and laying out effective ways of bringing that future about. (ADP 5-0)

### **positive control**

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

### **procedural control**

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

### **rehearsal**

A session in which a staff or unit practices expected actions to improve performance during execution. (ADRP 5-0)

### **unified action**

The synchronization, coordination, and/or integration of the activities of governmental and nongovernmental entities with military operations to achieve unity of effort. (JP 1)

### **working group**

A grouping of predetermined staff representatives who meet to provide analysis, coordinate, and provide recommendations for a particular purpose or function. (ATTP 5-0.1)

## References

Field manuals are listed by new number followed by old number.

### REQUIRED PUBLICATIONS

These documents must be available to intended users of this publication.

ADRP 1-02. *Operational Terms and Military Symbols*. 31 August 2012.

JP 1-02. *Department of Defense Dictionary of Military and Associated Terms*. 8 November 2012.

### RELATED PUBLICATIONS

These documents contain relevant supplemental information.

### JOINT AND DEPARTMENT OF DEFENSE PUBLICATIONS

Most joint publications are available online: <[http://www.dtic.mil/doctrine/new\\_pubs/jointpub.htm](http://www.dtic.mil/doctrine/new_pubs/jointpub.htm)>.

CJCSI 3710.01B. *DOD Counterdrug Support*. 26 January 2007.

DODD 3025.12. *Military Assistance for Civil Disturbances (MACDIS)*. 4 February 1994.

DODD 3025.18. *Defense Support of Civil Authorities (DSCA)*. 29 December 2010.

DODD 5525.5. *DOD Cooperation with Civilian Law Enforcement Officials*. 15 January 1986.

JP 1. *Doctrine for the Armed Forces of the United States*. 2 May 2007.

JP 3-0. *Joint Operations*. 11 August 2011.

JP 3-01. *Countering Air and Missile Threats*. 23 March 2012.

JP 3-07.3. *Peace Operations*. 1 August 2012.

JP 3-09. *Joint Fire Support*. 30 June 2010.

JP 3-09.3. *Close Air Support*. 8 July 2009.

JP 3-17. *Air Mobility Operations*. 2 October 2009.

JP 3-28. *Civil Support*. 14 September 2007.

JP 3-30. *Command and Control for Joint Air Operations*. 12 January 2010.

JP 3-33. *Joint Task Force Headquarters*. 30 July 2012.

JP 3-50. *Personnel Recovery*. 20 December 2011.

JP 3-52. *Joint Airspace Control*. 20 May 2010.

### ARMY PUBLICATIONS

Most Army doctrinal publications are available online: <<http://www.apd.army.mil/>>.

ADP 3-0. *Unified Land Operations*. 10 October 2011.

ADP 3-28. *Defense Support of Civil Authorities*. 26 July 2012

ADP 5-0. *The Operations Process*. 17 May 2012.

ADP 6-0. *Mission Command*. 17 May 2012.

ADRP 3-0. *Unified Land Operations*. 16 May 2012.

ADRP 5-0. *The Operations Process*. 17 May 2012.

ADRP 6-0. *Mission Command*. 17 May 2012.

ATTP 5-0.1. *Commander and Staff Officer Guide*. 14 September 2011.

FM 3-01 (FM 44-100). *U.S. Army Air and Missile Defense Operations*. 25 November 2009.

FM 3-01.7. *Air Defense Artillery Brigade Operations*. 11 February 2010.

FM 3-01.94 (FM 44-94). *Army Air and Missile Defense Command Operations*. 08 April 2005.

## References

---

- FM 3-52.1. *Airspace Control Multi-Service Tactics, Techniques, and Procedures for Airspace Control*. 22 May 2009.
- FM 3-52.2. TAGS: *Multi-Service Tactics, Techniques, and Procedures for the Theater Air-Ground System*. 10 April 2007.
- FM 5-19 (FM 100-14). *Composite Risk Management*. 21 August 2006.
- FM 6-99.2 (FM 101-5-2). *U.S. Army Report and Message Formats*. 30 April 2007.
- FM 7-15. *The Army Universal Task List*. 27 February 2009.
- FM 27-10. *The Law of Land Warfare*. 18 July 1956.

## OTHER PUBLICATIONS

- AAP-6. *NATO Glossary of Terms and Definitions (English and French)*. 17 April 2012.
- AJP-3.3.5. *Doctrine for Joint Airspace Control*. 5 April 2006.
- MIL-STD-3011. *Joint Range Extension Application Protocol (JREAP)*.
- MIL-STD-6011. *Tactical Data Link (TDL) 11/11B Message Standard*.
- MIL-STD-6016. *Tactical Data Link (TDL) 16 Message Standard*.
- MIL-STD-6017. *Variable Message Format (VMF)*.
- Title 10, U.S. Code. *Armed Forces*.
- 32, U.S. Code. *National Guard*. Title

## WEB SITES

- AFNORTH at <<http://1afnorth.region1.af.mil/default.aspx>>.

## PRESCRIBED FORMS

- None.

## REFERENCED FORMS

- DA Form 2028. *Recommended Changes to Publications and Blank Forms*.

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By order of the Secretary of the Army:

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