



## THEATER AIR GROUND SYSTEM

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The digitalization of the operational environment has improved the ability of the [commander, Air Force forces](#) (COMAFFOR) to command [airpower](#). The speed and non-linear aspects of modern warfare, as well as the precision of today's weapons, dictate close coordination on the battlefield among the [joint force commander's](#) (JFC's) components. When all elements of the Services and special operations [command and control](#) (C2) systems integrate, the entire system is labeled the [theater air-ground system](#) (TAGS).<sup>12</sup>

Within the TAGS, the [theater air control system](#) (TACS) is the COMAFFOR's mechanism for tasking and controlling theater airpower. It consists of airborne and ground elements to conduct tailored C2 of counterland operations. The COMAFFOR ensures all elements of the TACS are in place and the various liaison positions throughout the command chain filled prior to, or as soon as possible after, the start of an operation or campaign. The structure of the TACS should reflect sensor coverage, component liaison elements, and the communications required to provide adequate support. **The TACS provides the COMAFFOR the capability to [centrally plan and control joint air operations](#) through the [air operations center](#) (AOC) while [facilitating decentralized execution](#) through the subordinate elements of the TACS.**

### Ground-Based C2 Elements

**Air operations center.** The AOC is the senior C2 element of the TACS and includes personnel and equipment from all the necessary disciplines to ensure the effective conduct of air component operations (e.g., communications, operations, intelligence, etc.). The AOC remains under command of the COMAFFOR and is the focal point for tasking and exercising [operational control](#) (OPCON) over Air Force forces.

**[Air support operations center](#) (ASOC).** The ASOC is the primary control agency of the TACS for execution of airpower in direct support of Army or joint force land component operations. As a direct subordinate element of the AOC, the ASOC is responsible for the direction and control of air operations in its assigned area (normally

<sup>12</sup> For discussions with graphics of each service's TAGS element see AFTTP 3-2.17, [TAGS](#).

short of the [fire support coordination line](#) (FSCL) requiring integration with other supporting arms and ground forces. The ASOC is collocated with the division joint air ground integration center to control operations in the Division-assigned areas, although an ASOC may be collocated with the corps headquarters to control Corps-assigned or areas unassigned to a tactical headquarters. The ASOC coordinates operations with the assigned [tactical air control parties](#) (TACPs) and the AOC. The primary functions of the ASOC include, but are not limited to:

- ✦ Executes the [air tasking order](#) (ATO) as directed by the COMAFFOR/[joint force air component commander](#) (JFACC) to meet the ground commander's objectives by coordinating and integrating airpower in support of air component operations.
- ✦ Provides procedural control of CAS aircraft operating in the [area of operations](#) (AO) inside the FSCL. Provides procedural control of other air component aircraft as required.
- ✦ Establishes, maintains, and operates the autonomous reach-forward and reachback communications architecture/infrastructure necessary for mission execution, to include the [joint air request net](#) (JARN).
- ✦ Provides decentralized execution of immediate air support in coordination with the established ground commander's weight of effort and priority of fires. Obtains clearance of fires from the appropriate fires echelon.
- ✦ Integrates, coordinates, directs and controls other air component missions, as required, within its assigned area (primarily inside the FSCL) in direct support of land maneuver [objectives](#), and as directed by the COMAFFOR/JFACC.
- ✦ Coordinates air missions that fly within the ASOC's control area but do not directly support the ground component and other supporting arms activities to deconflict with ground force maneuver and fires, in addition to receiving target and threat updates.
- ✦ Assists with [time-sensitive targeting](#) and friendly force location information to CAS, AI, suppression of enemy air defenses (SEAD), airlift/airdrop, intelligence, surveillance, and reconnaissance (ISR), information operations, cyberspace operations, space operations, and personnel recovery missions within their AO.
- ✦ Assists the division [air liaison officer](#) (ALO) with advising the ground maneuver staff on the proper integration of airpower during execution, to include CAS employment, target nominations for those AI and SEAD missions that support the ground force, and that part of airborne ISR and airlift that directly supports the land component.

Located within the supported ground commander's AO, during major operations the ASOC's designated area typically extends to the FSCL for actual control of mission execution, and may extend to the Corps' forward boundary for planning and advisory purposes. The AOC normally delegates launch or divert authority for alert CAS missions to the ASOC, providing a faster response time when air support is needed. The decision to delegate re-targeting authority to the ASOC for specific AI missions inside the FSCL will depend on actual circumstances, including the timeliness required for getting desired effects on target. Unless specifically delegated, however, targeting authority for all AI missions remains with the AOC.

**Air support operations group (ASOG) and air support operations squadron (ASOS).** The COMAFFOR presents TACS capabilities to ground forces through ASOGs and ASOSs. The ASOG is provided to a corps and the ASOS is provided to a division. These are variable-sized

organizations that provide air support liaison, planning, and execution capabilities. The exact makeup of personnel and capabilities varies depending upon the mission assigned to the corps or division and the level (operational or tactical) at which the corps or division is operating. The ASOG provides a liaison capability at corps and may

### **OPERATION ENDURING FREEDOM THEATER AIR CONTROL SYSTEM**

During the initial stages of Operation ENDURING FREEDOM, there was no conventional Army Corps deployed to Afghanistan. Thus, an ASOC was not deployed to handle the CAS and AI/terminal guidance operations centric air war in Afghanistan. Prior to March 2002, when land forces consisted of only limited numbers of Special Forces Operational Detachment Alphas deployed in Afghanistan, the lack of an ASOC had little effect on air operations. In March 2002, Operation ANACONDA signaled a change from Special Operations Forces-centric operations, to conventional land force operations. However, the conventional forces used in Operation ANACONDA were a Division (-), not a Corps...thus, still no ASOC deployed to Afghanistan. This hampered airpower in a number of different ways. Real-time target updates, target prioritization for air assets, and aircraft deconfliction in the target area were often accomplished solely by on-station forward air controllers (airborne). The lack of an ASOC caused counterland assets to spend valuable time and fuel looking for correct/any information on the ground order of battle. Moreover, mission essentials such as frequencies to contact ground forces, preliminary 9-line briefings, or any target information other than a set of friendly coordinates were lacking. These shortcomings hampered the integration required to ensure efficient counterland operations.

also provide the nucleus of the [joint air component coordination element](#) (JACCE). When corps is designated as the land component senior tactical echelon then the ASOC may be presented at corps and the ASOG will be augmented with the necessary ASOS capabilities.

The ASOC is normally sourced and formed from an ASOS and the ASOS commander is typically dual-hatted as the ASOC. In this dual role, the ASOC director normally exercises OPCON and [administrative control](#) as delegated from the COMAFFOR. Further, when operating within a joint environment, the ASOC director normally exercises TACON of joint forces made available for tasking. The ASOC director usually acts as the Division ALO and the COMAFFOR's primary representative to the senior tactical level ground commanders. Air Force ASOCs do not deploy independently, and rely on their associated ground forces for much of their logistics support. They may be tailored in size depending on the task and character of the conflict.

### **Joint Air-Ground Integration Center (JAGIC)**

In recent years, numerous Service and joint after-action reports and lessons learned from real-world operations have highlighted problems with airspace control, fires, and effects integration. The JAGIC is designed to enhance joint collaborative efforts to deconflict joint air-ground assets. Establishing the JAGIC within the Army division tactical operation center collocates decision making authorities from the land and air component with the highest level of situational awareness. To support the maneuver commander's concept of operations, the JAGIC collaborates to more effectively execute the mission and reduce risk at the lowest levels. It includes an AF ASOC, appropriate TACP, highest echelon Army Fires Cell, C2, and other Army or special operations command and control or liaison elements. When airspace control is combined with the joint integration of intelligence, targeting and fires, the commander can employ intelligence, surveillance, and reconnaissance (ISR) assets such as unmanned, fixed and rotary wing aircraft effectively. The commander can also leverage joint ISR capabilities to find, track, and target the enemy and more rapidly decide, target, deconflict and precisely engage emerging high value time sensitive targets.

JAGIC Concept of Employment

Three principles should be considered when employing an ASOC. First, an ASOC should not be divided other than to relocate it. The ASOC derives synergy and efficiency from a group of highly trained Airmen working together in concert. Second, the ASOC should be located in a relatively secure location. If taken out through enemy action, friendly ground forces lose a significant force multiplier. However, security should be weighed against radio limitations. In order to control airpower, an ASOC

needs the ability to communicate with aircraft. Thus, the third principle is that the ASOC should be located where it can maintain line of sight communications with aircraft to its maximum operating depth. While high frequency and satellite radio enhance the range of the JARN, many aircraft communications are restricted by several factors. Radio power, antenna size, etc., are factors that impact communications ranges. Terrain is another consideration. If located in a valley, the ASOC's communication range is reduced because of line-of-sight restrictions.

**Control and Reporting Center (CRC)**. The CRC is a deployable ground-based C2 element that supports air operations execution. The CRC provides the C2 of air operations by managing, disseminating, and assigning missions as specified in the ATO. The CRC can relay current target information to the ingressing CAS aircraft and receive battle damage assessment from egressing aircraft for immediate relay to the ASOC.

The CRC performs centralized C2 of joint operations by conducting threat warning, battle management, weapons control, [combat identification](#), and strategic communications. It can facilitate decentralized execution of air defense and [airspace control](#) functions by detecting and identifying hostile airborne objects or by scrambling and diverting air defense aircraft. In a limited capacity, the CRC can relay AOC/ASOC information to and from aircraft. The CRC integrates a comprehensive air picture via multiple data links from air-, sea-, and land-based sensors and surveillance and control radars.

### **Airborne C2 Elements**

Airborne C2 manages airborne assets operating beyond the normal communication coverage of ground TACS elements and can act either as a self-contained airborne command post or as a relay for ground-based command centers such as the ASOC. With properly trained aircrew, airborne C2 performs various AOC and ASOC functions to expedite C2 while extending the range of radio communications of C2 nodes. Moreover, airborne C2 platforms ensure continuity of operations in the event that elements of the TACS are not yet deployed or have been disabled. Attack aircraft checking in for CAS or AI targets within an AO often communicate with airborne C2 opposed to talking directly with the ASOC, due to radio and line-of-sight limitations. The E-3 Airborne Warning and Control System (AWACS), the E-8 Joint Surveillance Target Attack Radar System (JSTARS), and CRCs can act as an extension of the AOC/ASOC and function as a key link in the C2 network for counterland operations.

★ **JSTARS.** JSTARS is an integrated Army-Air Force airborne C2 platform. It provides deep look, ground moving target indicator radar for real-time detection of moving surface targets, rotating antennas, and low, slow-flying fixed and rotary wing aircraft and synthetic aperture radar for stationary targets. The system provides ground situational awareness data to multiple air and ground C2 nodes.

## COUNTERLAND OPERATIONS AT AL KHAFJI

During the evening of 29 January 1991, the Iraqi Army set elements of three divisions in motion southward out of their static positions in occupied Kuwait. While their ultimate objectives are not known, there is no question that all three advances were aimed at engaging coalition forces, with the largest ground battle developing in the Saudi town of Ra's al Khafji. As news of the initial contacts with Iraqi ground forces flowed into the air control center at Riyadh, additional sorties by E-8 JSTARS surveillance aircraft and fighters armed for air interdiction were ordered.

While JSTARS located, tracked, and provided vectors to the columns of advancing Iraqi vehicles, flights of fighters, bombers, attack aircraft, and attack helicopters from all of the Services closed in for the kill. Close air support was flown in and around Khafji itself in support of engaged coalition ground forces, resulting in heavy losses to the Iraqi 5th Mechanized Division. Further north, the other two lines of Iraqi advance suddenly found themselves very exposed, with their own movement serving only to highlight themselves as targets. Coalition air interdiction missions took full advantage of this, using a variety of night vision devices and precision guided munitions to inflict even greater damage and stop the Iraqi advance. After losing hundreds of vehicles and taking thousands of casualties, the Iraqis abandoned the attack as a costly failure.



- ✦ **AWACS.** AWACS is an airborne element of the TACS and is normally the COMAFFOR's first tactical C2 element to arrive in a theater of operations. It is tasked with detecting airborne moving objects and providing tactical C2 of forces in an assigned operational area. Its primary mission is to conduct air surveillance, identify airborne objects, and control air operations. AWACS provides the deep look capability to support offensive and defensive air operations. It provides low-level and extended radio coverage for the control of air operations. AWACS performs these roles as the primary C2 extension of the AOC, until such time that the CRC can be employed.
- ✦ **Unmanned aircraft (UA).**<sup>13</sup> Besides their proven ISR, target cueing, and weapons capability, UAs can act as a communications link when equipped with appropriate communications gear. This can be very useful in small-scale operations or [stability operations](#) when low-supply and high-demand aircraft such as AWACS or JSTARS are unavailable. UAs should be treated similarly to manned systems with regard to the established doctrinal warfighting principles. Like manned aircraft, the operation of UAs should adhere to the guidance contained in this publication. While the JFC retains the authority to determine the use and control of UA forces, there are some unique issues for planners and commanders to consider when employing these systems.

## Liaison Elements

Effective liaison coordination is a crucial enabler to successful counterland operations. Both the other Service and component liaisons in the AOC and the COMAFFOR's liaisons to the other services/components play a critical role in enabling successful counterland operations. These liaison elements include the following.<sup>14</sup>

- ✦ **[Battlefield coordination detachment \(BCD\)](#)**. The BCD operates as the liaison between the Army forces commander and the air component commander.
- ✦ **[Ground liaison detachment \(GLD\)](#)**. The GLD is a subordinate element of the BCD that coordinates between the Air Force supporting unit and supported ground forces.
- ✦ **[Naval and amphibious liaison element \(NALE\)](#)**. The NALE coordinates Navy and Marine amphibious, maritime, and air operations with the air component commander.
- ✦ **[Marine liaison element \(MARLE\)](#)**. The MARLE is the Marine Corps forces commander's representative to the air component commander.
- ✦ **[Special operations liaison element \(SOLE\)](#)**. The SOLE is the special operations forces commander's representative to the air component commander who

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<sup>13</sup> The USAF refers to some of its larger UAs as remotely piloted aircraft [RPA] to differentiate its operators who have been trained to similar standards as manned aircraft pilots

<sup>14</sup> A detailed description of these liaison elements can be found in JP 3-03, [Joint Interdiction](#) and JP 3-30, [Command and Control of Joint Air Operations](#).

coordinates and synchronizes SOF air and surface operations with conventional air operations.

- ✧ **Air Force liaison element (AFLE)**. If the COMAFFOR is not the JFACC, then AFLEs are presented to the other Service component designated JFACC as a tailored organization that provides interface with the COMAFFOR.
- ✧ **Joint air component coordination element (JACCE)**. A JACCE is a small team of airpower experts used to facilitate coordination between the air component commander and other component commanders, or the joint force commander.
- ✧ **Tactical air control party (TACP)**. The TACP is the principal Air Force liaison element aligned with Army maneuver units from division through battalion. The primary mission of TACPs is to advise their respective land commanders on the capabilities and limitations of airpower as well as assist the ground commander in planning, requesting, and coordinating CAS.
- ✧ **Air liaison officer (ALO)**. An ALO is aligned with a land maneuver unit and functions as the primary advisor to individual ground commanders on the capabilities and limitations of airpower.
- ✧ **Joint terminal attack controllers (JTACs)**. The JTAC is the ground commander's qualified (certified) Service member, who, from a forward position, directs the action of combat aircraft engaged in CAS and other air operations in the ground commander's operational area.

### **Other Service's Air-ground Control Systems**

Each of the other Service commanders has an organic system similar to TACS designed for C2 of their air operations within the TAGS. They include the following.<sup>15</sup>

- ✧ **Army Air-Ground System (AAGS)**. Closely related to, and interconnected with, the TACS is the AAGS. The AAGS provides for interface between Army and tactical air support agencies of other Services in the planning, evaluating, processing, and coordinating of air support requirements and operations.
- ✧ **Navy Tactical Air Control System (NTACS)**. The NTACS is the principal air control organization for assets afloat. It includes the Navy tactical air control center (NAVY TACC), tactical air direction center, and helicopter direction center.
- ✧ **Marine Air Command and Control System (MACCS)**. The MACCS is comprised of various C2 agencies that provide the Marine aviation combat element commander with the ability to monitor, supervise, and influence the application of Marine Corps air.

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<sup>15</sup> Further information and description of other Service's Air-ground control systems can be found in JP 3-30, [\*Command and Control of Joint Air Operations\*](#).

During the conduct of an amphibious operation, elements of both Navy and Marine systems are used to different degrees from the beginning of the operation until the C2 of aircraft and missiles is phased ashore. Under the commander, amphibious task force, the Navy TACC, typically onboard the amphibious flagship is normally established as the agency responsible for controlling all air operations within the allocated airspace regardless of mission or origin, to include supporting arms. As the amphibious operation proceeds, C2 of aviation operations is phased ashore and command responsibilities for landing force air operations shift from the Navy to the Marines as MACCS agencies are established on the ground. For further discussion of air support to amphibious operations, see JP 3-09.3, [Close Air Support](#).

✪ **Special Operations Air-Ground System (SOAGS)**. Theater special operations are normally under the control of the JFSOCC. The SOAGS consists of organizations and personnel that support CAS for SOF, including the SOLE, the special operations C2 element, special tactics teams, and JTAC-qualified SOF personnel.

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