



## THEATER AIR GROUND SYSTEM (TAGS)

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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>1</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 must ensure 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 (AOC).** 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

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<sup>1</sup> For discussions with graphics of each service's TAGS element see ALSA publication [AFTTP\(I\) 3-2.17, TAGS](#).

responsible for the direction and control of air operations in its assigned area (normally 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 [reach-back](#) communications architecture/infrastructure necessary for mission execution, to include the [joint air request network](#) (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](#) (IO), 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 will normally delegate 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 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 AGOG will be augmented with the necessary ASOS capabilities.

**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/TGO centric air war in Afghanistan. Prior to March 2002, when land forces consisted of only limited numbers of Special Forces (SF) Operational Detachment Alphas (ODAs) 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 (SOF) 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 FAC(A)s. 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.

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](#) (ADCON) 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.

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 will 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

### **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 co-locates 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, AC2, 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 TSTs.

Joint Air Ground Cell Concept of Employment,  
August 2011

NOTE: In 2013, the name Joint Air-Ground Integration Cell (JAGIC) was changed to Joint Air-Ground Integration Center (JAGIC) in order to better align with Army doctrine's limited number of 'cell' possibilities

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 (BDA) 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.

✪ **Joint Surveillance Target Attack Radar System.** 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.

- ✦ **Airborne Warning and Control System (AWACS).** AWACS is an airborne element of the TACS and is normally the COMAFFOR's first tactical C2 element to arrive in the theater of operations. It is tasked with detecting airborne moving objects and providing tactical C2 of forces in an assigned AOR. Its primary mission is to

### 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 Joint STARS 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. Airpower assets like the E-8 Joint STARS (below left) were key in achieving the results depicted in photograph to the right.



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 will perform these roles as the primary C2 extension of the AOC, until such time that the CRC can be employed.

- ✦ **Unmanned aircraft (UA).**<sup>2</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. A description of some liaisons follows.

- ✦ **[Battlefield coordination detachment \(BCD\)](#).** The commander, Army force's (COMARFOR's) liaison element to the COMAFFOR/JFACC is the BCD located in the AOC. The BCD facilitates the direct coordination between tactical air and Army units for scheduled CAS planning. The BCD also processes the COMARFOR's AI target nominations and acts throughout planning and execution to ensure proper representation of ground component priorities in the overall process. Moreover, the BCD should inform the Army Force Commander of which nominated targets that were or were not included on the target list for incorporation into the ATO, and the approval status of preplanned CAS requests. This feedback loop is critical, as land commanders must know which requested targets did/did not meet the JFC's priority requirements for air attack. During the execution process, the BCD provides current land picture information to the AOC on both friendly and enemy ground forces.
- ✦ **[Ground liaison detachment \(GLD\)](#).** The GLD is a subordinate element of the BCD, whose primary function is to provide tactical level liaison between land elements and air elements providing air support to the [joint force land component commander](#) (JFLCC). GLDs are usually assigned to air wings or squadrons where they provide the following functions: assists tactical planning coordination between the flying unit and supported ground unit(s), briefs aircrew on the ground tactical situation, and relays mission results to the BCD.
- ✦ **[Naval amphibious liaison element \(NALE\)](#).** The commander, Navy forces (COMNAVFOR) provides the NALE to the COMAFFOR's AOC. The NALE is

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<sup>2</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

responsive to the AOC on matters pertaining to Navy and Marine [amphibious operations](#). The NALE processes COMNAVFOR requests for air support and monitors and interprets the maritime battle situation for the AOC.

- ✦ **[Marine liaison element \(MARLE\)](#)**. The MARLE is responsive to the COMAFFOR/JFACC on matters pertaining to Marine Corps operations. The MARLE provides feedback to organizations in the AOC on current and future joint air operations concerning integration of force requirements.
- ✦ **[Special operations liaison element \(SOLE\)](#)**. The SOLE is a team provided by the [joint force special operations component commander](#) (JFSOCC) and attached to the COMAFFOR/JFACC to coordinate, [synchronize](#), and deconflict special operations air, surface, and subsurface operations with [conventional](#) air operations. The SOLE director places SOF ground, maritime, and air liaison personnel in divisions of the AOC providing a SOF presence that is aware of the activities of SOF units in the field and visibility of SOF operations in the ATO and the [airspace control order](#) (ACO). The SOLE is the focal point in the AOC for CAS requests for SOF CAS requests. In this role the SOLE coordinates appropriate fire support coordinating measures, targeting, and airspace to integrate and synchronize fires to avoid duplication and fratricide.
- ✦ **[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. This interface facilitates better coordination and synchronization of Air Force assets supporting joint air operations. AFLE personnel are selected for their battle management expertise and knowledge of C2 concepts and procedures. Additional personnel specializing in the capabilities and tactics of aircraft, weapons systems, intelligence, and other specialty areas augment the AFLE cadre.
- ✦ **[Joint air component coordination element \(JACCE\)](#)**. The COMAFFOR/JFACC may establish one or more JACCEs with other components to better integrate operations with the supported [joint task force](#) (JTF) headquarters (if the theater JFACC is designated in support to a JTF) and to better integrate air component 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, and by coordinating the integration of JFACC requirements for [airspace coordinating measures](#), [joint fire support](#) coordinating measures, CAS, air mobility, and space requirements. As such, the JACCE is a liaison element, not a C2 node; thus, the JACCE normally has no authority to direct or employ forces. The JACCE should not replace, replicate, or circumvent normal request mechanisms already in place in the component/JTF staffs, nor supplant normal planning performed by the AOC and AFFOR staff.

- ✦ **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. At the battalion level, TACPs are normally organized to request and control aircraft. The TACP is the COMAFFOR/JFACC's primary representative to the tactical level land commander and provides terminal attack control. In the TACS chain of command, TACPs are under ASOC control. While they operate in the field co-located with the ground units they support, TACP personnel remain under the operational control (OPCON) of the COMAFFOR. The TACP consists of air liaison officers and joint terminal attack controllers.
- ✦ **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 air power. Acting as a land commander's expert on air operations, ALOs must be involved in the supported land commander's military decision making process so they can perform detailed air support planning with their own staff. ALOs are assigned to all land maneuver units at the corps, division, and brigade levels. At battalion level, the senior member of the TACP is called a battalion air liaison officer (BALO). A BALO is a specially trained and experienced noncommissioned officer or officer.
- ✦ **Joint terminal attack controllers (JTACs)**. The JTAC is the Army 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. The JTAC provides the ground commander recommendations on the use of CAS and its integration with ground maneuver.

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

- ✦ **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. Using organic staff members and communications equipment, the AAGS works in conjunction with the TACS to coordinate and integrate both Army component aviation support and air component support with Army ground maneuver. Army airspace C2 elements are at the senior Army echelon and may extend down through all tactical command levels to the maneuver battalion.
- ✦ **Navy Tactical Air Control System (NTACS)**. The NTACS is the principal air control system afloat. The NTACS is comprised of the Navy tactical air control center (TACC), tactical air direction center (TADC), and helicopter direction center. The Navy TACC is the primary air control agency within the AO from which all air operations supporting the amphibious task force are controlled.

✦ **Marine Air Command and Control System (MACCS)**. The MACCS consists of various air C2 agencies designed to provide the Marine air-ground task force (MAGTF) aviation combat element (ACE) commander with the ability to monitor, supervise, and influence the application of Marine Corps air. Like the Air Force, Marine aviation's philosophy is one of centralized control and decentralized execution.<sup>3</sup> The Marine force's focal point for tasking and exercising operational control over Marine Corps air forces is the tactical air command center (TACC), which performs similar duties for organic Marine aviation that the AOC performs. The direct air support center (DASC) is roughly equivalent to the Air Force's ASOC, while at lower echelons of command the Marine system uses the same TACP label for air support liaisons as the TACS-AAGS.

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. If designated by the JFSOCC, control of SOF airpower is normally exercised by a [joint special operations air component commander](#) (JSOACC). If a JSOACC has not been designated, then SOF airpower is controlled by its Service component within the joint force special operations command. Principal organizations and personnel that support coordination of CAS for SOF are the SOLE, the special operations C2 element, [special tactics teams](#), and JTAC-qualified SOF personnel.

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<sup>3</sup> For a discussion of the Marine Corps approach to centralized control and decentralized execution see [Marine Corps Doctrine Publication \(MCDP\) 6, Command and Control](#), Chapter 3.