Chapter 2

COMMAND, CONTROL, AND COMMUNICATIONS

“[W]hoever can make and implement decisions consistently faster gains a tremendous, often decisive advantage. Decisionmaking in execution thus becomes a time-competitive process, and timeliness of decisions becomes essential to generating tempo.”

—Marine Corps Doctrinal Publication 1, Warfighting

Critical to the success of any military operation is the commander’s ability to make accurate tactical decisions more quickly than the enemy. Because commanders cannot be physically present over all the battlespace, they must rely on communication channels to relay their intent, gather information, and influence the battle. This chapter deals with Marine aviation philosophy of centralized command and decentralized control in the context of conducting DAS operations.

DAS provides the commander a significant capability to shape the battlespace and impose his will directly on the enemy. This would make command and control (C2) almost impossible if the commander had no way of communicating his intentions to aircrew and the aircrew had no way of communicating their mission results to the commander.

Specifically, to generate greater tempo relative to the threat, a simple, redundant, and reliable C2 system is required. The MACCS
MARINE AIR COMMAND AND CONTROL SYSTEM

The MACCS provides the MAGTF with the means to integrate, coordinate, and control all air operations within its area of operations and with joint/combined forces. The principal agencies of the MACCS concerned with DAS are the Marine tactical air command center (TACC), tactical air operations center (TAOC), and the direct air support center (DASC).

Marine Tactical Air Command Center/
Tactical Air Direction Center

The Marine TACC is the senior MACCS agency and is the focal point for aviation command and control. It is the operational command post for the ACE commander. Functionally, it is divided into mutually supporting sections: current operations, future operations, future plans, and air combat intelligence. The current operations section executes the current day’s air tasking order (ATO) and includes the deep battle cell. The Marine TACC is capable of functioning as the joint air operations center (JAOCC) when the Marine component provides the joint force air component commander (JFACC).

During amphibious operations, the Marine TACC is incrementally phased ashore. Initially, it is a tactical air direction center (TADC) subordinate to the Navy TACC.

is designed to accomplish these requirements. Several unique factors affect the ability of the MACCS to effectively conduct DAS management. The MACCS agencies utilized for C2 of DAS are discussed in this chapter.
The deep battle cell is responsible to the ACE commander for the management of all aviation assets assigned or available to the ACE used in the execution of deep air operations for the MAGTF. Located in the current operations section of the TACC, the deep battle cell will provide the ACE Commander/Senior Watch Officer with the status and results of all DAS missions. The deep battle cell and assessment cell may redirect DAS assets for the destruction of time sensitive targets at the discretion of the ACE and MAGTF commanders. During the planning and execution of DAS missions, the TACC’s future and current operations cells should ensure appropriate deconfliction and coordination are conducted with surface forces to prevent fratricide. The deep battle cell doesn’t control aircraft. It coordinates the necessary routing and provides the frequency and contact information to Marine air wings, Marine aircraft groups, and squadrons for re-tasking or diverting DAS missions through MACCS agencies. See MCWP 3-25.4, Marine Tactical Air Command Center Handbook, for a detailed discussion of the TACC.

**Tactical Air Operations Center**

The TAOC is subordinate to the Marine TACC. It provides routing, radar control, and surveillance for DAS aircraft en route to and from target areas. See MCWP 3-25.7, Tactical Air Operations Center Handbook, for specific details.

**Direct Air Support Center**

Typically, this center is the first principal MACCS agency established ashore in an area of operations and is subordinate to the Marine TACC. The DASC serves as the alternate TADC for a limited period when the TACC echelons move or become a casualty. The DASC processes immediate air support requests, coor-
dinates aircraft employment with other supporting arms, manages
terminal control assets supporting ground combat element (GCE)
and combat service support element (CSSE) forces, and proce-
durally controls assigned aircraft, UAVs, and itinerant aircraft
transiting through DASC controlled airspace.

The DASC does not normally control aircraft conducting DAS
missions due to the lack of detailed coordination between ground
forces’ DAS missions. However, the DASC may relay BDA and
mission reports from DAS missions to the senior FSCC when
required. (See appendix F for an example of in-flight reports.)
Normally, the DASC collocates with the GCE’s senior FSCC.
However, in a MAGTF with multiple GCEs, the DASC may be
physically or electronically collocated with the MAGTF CE’s
force fires coordination center (FFCC)/FSCC. Additionally, the
capability exists to operate an airborne variant of the DASC from
a KC-130 aircraft. The DASC airborne (DASC (A)) normally
serves as an airborne extension of the DASC, but can be
employed in lieu of a DASC for a limited duration. See MCWP
3-25.5, Direct Air Support Center Handbook, for a detailed
discussion of the DASC.

Supporting Arms Integration

The link between the DASC and the senior FSCC is critical for
the coordination and integration of the supporting arms capability
that DAS missions provide when they are conducted inside the
FSCL. Aircrews can pass visual reconnaissance reports that are
essential to timely battlefield targeting directly to the DASC,
which then passes this information to the Marine TACC/TADC
and the senior FSCC. The FSCC uses these visual reconnaissance
reports in the detect phase of the targeting cycle.
AIRSPACE CONTROL MEASURES

Airspace control measures increase operational effectiveness. They also increase DAS effectiveness by ensuring safe, efficient, and flexible use of airspace. Airspace control measures speed the handling of air traffic to and from the target area and minimize the chance of fratricide, and assists air defense identifying adversary aircraft or civilian interlopers.

The airspace control authority, designated by the MAGTF commander/JFC, coordinates and integrates the use of the airspace control area. The airspace control area is the airspace that is laterally defined by the boundaries of the area of operations. The airspace control area may be subdivided into airspace control sub-areas. (JP 3-52, Doctrine for Joint Airspace Control in the Combat Zone) The airspace control authority establishes an airspace control system that is responsive to the needs of the MAGTF commander/JFC, provides for integration of the airspace control system with that of the host nation, and coordinates and deconflicts user requirements.

The airspace control authority develops the airspace control plan (ACP) and, after the MAGTF commander/JFC approval, promulgates it throughout the area of responsibility/joint operations area. Implementation of the ACP through the airspace control order (ACO) must be complied with by all components.

The methods of airspace control vary throughout the range of military operations from war to military operations other than war (MOOTW). The methods range from positive control of all air assets in an airspace control area to procedural control of all such assets, with any effective combination of positive and procedural control measures between the two extremes. See JP 3-52 and MCWP 3-25, Control of Aircraft and Missiles, for further
discussion on airspace control authority and airspace control planning considerations.

DAS aircraft may use formal minimum risk routes (MRRs) and special corridors detailed in the ACO or use informal routing assigned by the TAOC to transit to and from their target areas. Once inside the target area, DAS aircraft may use procedural control measures detailed in the ACO, such as ACAs, to aid in fire support coordination and coordinating altitudes through the DASC to efficiently attack targets.

**Minimum Risk Routes**

MRRs are an airspace control measure used primarily for crossing forward line of own troops (FLOT) operations. These temporary corridors of defined dimensions are recommended for use by high-speed, fixed-wing aircraft that present known hazards to low-flying aircraft transiting the combat zone. MRRs are established considering the threat, friendly operations, known restrictions, known fire support locations, and terrain. MRRs also reduce the chance of fratricide between friendly aircraft on return-to-force (RTF) with other friendly aircraft and air defense units. If on-board aircraft communications cannot establish or transmit the appropriate identification, friend or foe (IFF) signal (lame duck) due to battle damage or system failure, the most non-threatening profile of which the aircraft are capable should be flown. MRRs provide a predictable flight path (ground track, altitude, and airspeed) to aide in the positive identification of aircraft. Depending on the threat’s air surveillance capabilities, limiting friendly aircraft to specific MRRs may make friendly aircraft more recognizable and vulnerable to enemy surface-to-air systems. Aircrew intentions should always be broadcast despite the ability to gain and maintain radio contact with friendly force air control agencies. See figure 2-1.
Special Corridors

Special corridors may be in place when DAS missions require transit over neutral countries not involved in the theater of operations. Special corridors are simply international flight plans that have been approved by the country being overflown to deconflict civilian and military aircraft. These established corridors have defined dimensions and should not be confused with MRRs. MRRs are released to friendly forces only via the ACP or ACO; whereas special corridors are released by civilian aviation authorities. Operation Deny Flight is an example where special corridors were used as North Atlantic Treaty Organization (NATO) aircraft transited through Croatian airspace to get to the combat zone.
Informal Routing

Informal routing may be generated by the controlling C2 agency and can be used to deconflict specific AI missions from other aircraft and fires where a more formal MRR is not required.

Airspace Coordination Areas

ACAs provide a universal, joint perspective defining specific areas of battlespace, enabling the JFC and component commanders to efficiently coordinate, deconflict and synchronize surface target attacks. The grid box reference system mentioned earlier procedurally deconflicts friendly ground forces with AR and SCAR missions. ACAs can be used as an informal airspace control measure and be subdivided into grid boxes measuring 15 nautical miles by 15 nautical miles, depending on the performance (range, sensors, and weapons) of participating aircraft, and the potential threats in the area. When AR or SCAR aircraft are employed they may be held at a control point (CP) outside their assigned grid box until other assets clear the area. Aircraft may check in with various controlling agencies as they proceed to the target area. The important thing to note is that if aircraft are talking with the controlling agency and are able to transmit the appropriate IFF signal, they can transit direct from their air base, to their assigned grid box, and back again.

In figure 2-2, ACAs Alpha and Bravo are depicted. Figure 2-3 shows how ACA “A” is further subdivided into grid boxes (15 nautical miles by 15 nautical miles). AR and SCAR missions will be assigned grid boxes in the ATO. For example, two AH-1W Cobras performing an AR mission are assigned grid box “A1A” in the ATO. The first A (A1A) is for ACA Alpha; the 1 (A1A) depicts the column; and the second A (A1A) is for the row. The upper left grid box of ACA Alpha is “A1A.”
Figure 2-2. Separate Grid Box Systems.

Figure 2-3. Grid Box Labeling and Identification.
See MCRP 3-16B and MCWP 3-25 for further techniques and procedures on informal and formal airspace control measures.

AIR INTERDICTION

During most AI missions, target locations are known and the C2 requirements are not as complicated as those found in other forms of offensive air support. Generally, during the execution phase of the mission, the MACCS will provide flight following and airborne threat warning to the AI package on the way to the target and facilitate their safe return. Due to the limits of ground base radar coverage, the MACCS may use a combination of positive and procedural control to protect and deconflict AI aircraft from other aircraft. Positive control procedures are typically provided to aircrew when the MACCS can positively track friendly aircraft and direct them through friendly airspace via radar. Procedural controls may be used when the MACCS is unable to monitor friendly aircraft directly or when there may be a high volume of air traffic. Typically, MRRs will be established to provide procedural control and aid in the identification of friendly aircraft. See MCWP 3-25 for a more detailed discussion of air control procedures.

While not a requirement, an additional consideration is the ability of the MACCS to maintain communications with the AI package during the conduct of their mission. This not only allows for increased situational awareness as to the progress and success of the mission, but also allows the commander the ability to dynamically retask these aircraft if required. The ability for the MACCS to maintain this communication is often strained due to the distance to the target and limited communications capabilities of the AI aircraft. The use of external C2 assets (such as AWACS, E-2C, airborne battlefield command and control center (ABCCC), etc.) may help eliminate some of MACCS limitations. These assets or organic MACCS agencies can relay BDA
information to the TACC deep battle cell. Aircrew returning from AI missions should transmit mission results to the DASC or DASC (A) to be relayed to the TACC.

**ARMED RECONNAISSANCE**

Central to the MAGTF’s desire to conduct AR is the ability to provide OAS at the most opportune time and place. AR provides the MAGTF an economy of force to cover and defend terrain not suited to other forces if an effective means of C2 exists. It is during AR that the MACCS must be most flexible and responsive. By providing the MAGTF commander with a real-time vision of his air support, he is able to apply his resources in the most efficient manner. It is also critical for aircrew to send real-time information through the MACCS while airborne. Although aircrew in-flight reports may not have been analyzed by intelligence experts, the ACE may combine these reports with other intelligence data to gain greater insight into the enemy situation and intentions.

The MACCS should ensure that a structure exists to provide this situational awareness to the commander and allow him to communicate his desires to those DAS aircraft executing missions. The ACE commander should ensure a consistent and redundant interface with the MAGTF’s FFCC or applicable FSCC.

The ACE can then translate the MAGTF commander’s desires as to the conduct of deep air support operations into tasking for his aircrew. This is especially critical during the conduct of AR missions. Unlike AI missions which are planned and flown against known targets, the dynamic nature of AR requires the ability to communicate changes to the aircrew as decisions are made by the MAGTF commander as time sensitive targets appear. As the ACE commander makes decisions in concert with the
MAGTF commander’s guidance, the TACC should direct mission changes to AR aircraft via the MACCS. The role of the deep battle cell within the TACC is most critical during AR missions.

**STRIKE COORDINATION AND RECONNAISSANCE**

SCAR aircraft provide the ACE commander with an extended view of the battlespace. The ACE commander, via the deep battle cell located in the TACC, will direct SCAR aircraft with monitoring and reporting on certain areas of the battlespace. For example, a SCAR aircraft can be sent to a specific ACA or avenue of approach to search for high priority targets on the MAGTF’s target list before other AR or AI platforms are committed.

SCAR platforms locate targets and collect information that should be passed to the deep battle cell in the TACC via a MACCS control agency. The deep battle cell will direct destruction with other DAS assets. Additionally, if the MAGTF target list changes or higher priority targets are located by other sources, then a MACCS control agency can relay this information to SCAR aircraft. If no SCAR aircraft are available, the TACC will direct AR aircraft through the MACCS to execute the mission.

**DAS COMMUNICATION**

Information exchange by tactical communication means is necessary to facilitate DAS and provide the MAGTF commander the situational awareness to shape his battlespace. Communications must be mission-tailored and robust to ensure links between aircraft and MACCS agencies are maintained to minimize the chance of fratricide and enhance mission effectiveness. Flexibility and responsiveness of DAS communications is made possible
by using a variety of techniques, including secure frequency agile equipment; appropriate countermeasures; disciplined emission control (EMCON); and standard communication nets.

The MACCS provides the ACE commander with the means to exercise C2 of organic and nonorganic aviation assets necessary to support MAGTF DAS operations. The MACCS consists of various air C2 agencies designed to provide the ACE commander with the ability to monitor, supervise, and influence the application of DAS from the TACC. This manual specifically deals with Marine DAS tactics, techniques, and procedures. However, Marines find themselves more often than not operating in joint, combined or multinational operations. Functional equivalents to the Marine TACC that may support Marine aviation in DAS operations are the Navy’s TACC and Air Force’s air operations center (AOC). In the joint or combined environment the JFC will designate a JAOC to orchestrate theater operations and tasking. See JP 3-56.1, Command and Control of Joint Air Operations, Naval Warfare Publication (NWP) 3-09.11M, Supporting Arms in Amphibious Operations, and MCWP 3-25.2, Multi-Service Procedures for Theater Air-Ground System for a detailed discussion of functional equivalent agencies and C2 of joint air operations.

During the conduct of AI operations beyond the FSCL, aircrew will check-in on a tactical air direction (TAD) net with the MACCS agency that provides deep air operations coordination. If possible, AI missions should be conducted on a single TAD net, where threat warning and other information can be passed. Also, if the deep battle cell or a SCAR platform has mission critical information to be passed, mission commanders can be contacted on this single TAD net. AR missions should check-in with the MACCS control agency providing deep battle coordination. However, due to the high volume of communication between
flight members conducting AR, it may be necessary to assign separate TAD nets to each ACA or grid box.

When conducting DAS inside the FSCL, aircrews should check-in with the TAOC after contacting the DASC. The DASC should pass friendly forces situational awareness and any information about other aircraft operating in the immediate vicinity. If the DASC is unavailable or cannot be contacted, aircrews will contact the local FSCC for friendly forces situational awareness. It is critical when conducting DAS inside of the FSCL that aircrew contact the appropriate organization to ensure their fires or effects from their fires do not cause friendly casualties or disrupt friendly maneuvers.

**SUMMARY**

DAS missions require a flexible, efficient, and controlled system to ensure the assets committed to these missions effectively apply their combat power in a timely manner. The use of SCAR platforms, a deep battle cell within the TACC, and the MACCS can greatly increase the planning and responsiveness of our limited DAS assets. Prior to executing DAS missions, the TACC must ensure coordination and communication with the senior FSCC to avoid delivering ordnance on or near friendly forces inside and outside the FSCL.

C2 is essential to all MAGTF operations and crucial to success in war. Therefore, it is important that timely and accurate information flows throughout the MACCS control agencies, and that radio in and out procedures are understood by all participating units and aircrew. Furthermore, aircrew should send in-flight reports as time and the situation allows. Airspace coordination measures, whether formal and informal or positive and procedural, will ensure the safe, efficient, and flexible control of aircraft and ground forces in the area of operations.