

MCWP 3-25-3

**Marine Air Command and
Control System Handbook**



U.S. Marine Corps

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To Our Readers

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DEPARTMENT OF THE NAVY
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FOREWORD

The Marine air command and control system (MACCS) provides the Marine aviation combat element commander with the means to exercise command and control of organic and nonorganic aviation assets necessary to support Marine air-ground task force (MAGTF) operations. Fleet Marine Force Manual (FMFM) 5-60, *Control of Aircraft and Missiles*, addresses basic planning considerations for MACCS operations, employment, and interoperability among MACCS and joint Service agencies.

Marine Corps Warfighting Publication (MCWP) 3-25.3, *Marine Air Command and Control System Handbook*, complements and expands on the information in FMFM 5-60 by focusing on the employment of the MACCS as a whole. This publication emphasizes system interoperability, air command and control agency interface, and overarching planning considerations. Designated for MAGTF commanders, naval expeditionary force commanders, joint force commanders, and their staffs, MCWP 3-25.3 examines MACCS—

- Functions.
- Composition.
- Organization.

- Planning considerations.
- Employment options.

By investigating these areas, MCWP 3-25.3 provides the requisite information needed by commanders and their staffs to understand and evaluate the operational principles and capabilities of various MACCS employment options.

Reviewed and approved this date.

BY DIRECTION OF THE COMMANDANT OF THE MARINE
CORPS

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Marine Air Command and Control System Handbook

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Chapter 1

Fundamentals

The Marine air command and control system (MACCS) consists of various air command and control agencies designed to provide the Marine air-ground task force's (MAGTF's) aviation combat element (ACE) commander with the ability to monitor, supervise, and influence the application of Marine aviation's six functions. The Marine air control group (MACG) is responsible for providing, operating, and maintaining principal Marine air command and control system agencies.

FUNCTIONS

The Marine air command and control system contributes to Marine air-ground task force operations by—

- Providing the air command and control systems required to supervise and control the execution of the six functions of Marine aviation.
- Coordinating air operations with joint/multinational/Service and civil air command and control systems.
- Advising the MAGTF commander and joint force commander on the application and employment of Marine aviation.

ROLE

The Marine air command and control system provides the aviation combat element commander with the air command and control support facilities and infrastructure necessary to command, coordinate, and control air operations within an assigned area of operations or airspace sector and to coordinate MAGTF air operations with other Services. Principal MACCS agencies' activities are composed of air command and control suites that integrate manual and semiautomatic capabilities to provide air control and direction.

TASKS

The Marine air command and control system coordinates the employment of facilities, equipment, communications, procedures, and personnel that allow the ACE commander to plan, direct, and control aviation efforts in support of the MAGTF. The MACCS—

- Provides, maintains, and operates an air command and control system capable of expeditionary employment.
- Conducts airspace control and management within the Marine air-ground task force's area of operations or an assigned sector of responsibility.
- Conducts anti-air warfare operations to include the coordination and control of aircraft and surface-to-air missiles.
- Coordinates and controls assault support operations.
- Coordinates and controls air reconnaissance missions.

- Coordinates and controls offensive air support operations.
- Coordinates, conducts, and controls electronic warfare missions.
- Installs, operates, and maintains the ACE's expeditionary communications.
- Interfaces with air command and control agencies of other Services/countries.

CONTROL OF AIRCRAFT AND MISSILES

The control of aircraft and missiles is one of the six functions of Marine aviation. It allows the Marine air-ground task force commander to focus all his aviation capabilities into a coordinated effort. The Marine air command and control system provides the means for the MAGTF commander to exercise this function.

Centralized Command and Decentralized Control

Marine aviation's philosophy of command is one of centralized command and decentralized control. Centralized command promotes coordinated operations and economy of force while aiding in the integration of all aviation assets into a cohesive capability. Decentralized control allows shorter decision cycles by allowing tactical decisions to be made in the cockpit and at the subordinate control agencies with firsthand knowledge of the situation. Controllers and executors make time sensitive decisions within the framework of the commander's intent. The shorter communications/decision trail allows the MACCS to be more responsive to the MAGTF's needs.

Forms of Control

The Marine air command and control system uses air direction and air control to control aircraft and missiles within a designated area.

Air Direction. Air direction is the authority to regulate the employment of air resources (including both aircraft and surface-to-air weapons). It balances an air resource's availability against its assigned priorities and missions.

Air Control. Air control is the authority to direct the physical maneuver of aircraft in flight, or to direct an aircraft or surface-to-air weapon unit to engage a specific target. Air control is composed of airspace control and terminal control.

Airspace Control. Airspace control directs the maneuver of aircraft to use the available airspace effectively. MACCS agencies use positive control, procedural control, or a combination of positive and procedural control methods to control airspace. Positive control is the use of positive identification, tracking, and direction of aircraft within an airspace to effect control. Procedural control is the use of previously agreed upon and promulgated orders and procedures to effect control.

Terminal Control. Terminal control directs the delivery of ordnance, cargo, or personnel by aircraft to a specific geographic location or air target.

Airspace Management

Airspace management is the coordination, integration, and regulation of airspace usage in a defined dimension that results in the

optimum use of available airspace. Effective airspace management provides maximum freedom of use, consistent with the degree of operational risk acceptable to the commander, within the airspace. Effective airspace management requires the establishment of agreed upon points and procedures; both positive and procedural methods are used. The MACCS provides the capability to conduct airspace command and control and deconflict aviation assets with other supporting arms and airspace users through centralized planning of airspace control procedures. It exercises air direction and decentralized execution of the airspace control plan through its subordinate agencies.

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Chapter 2

Organization

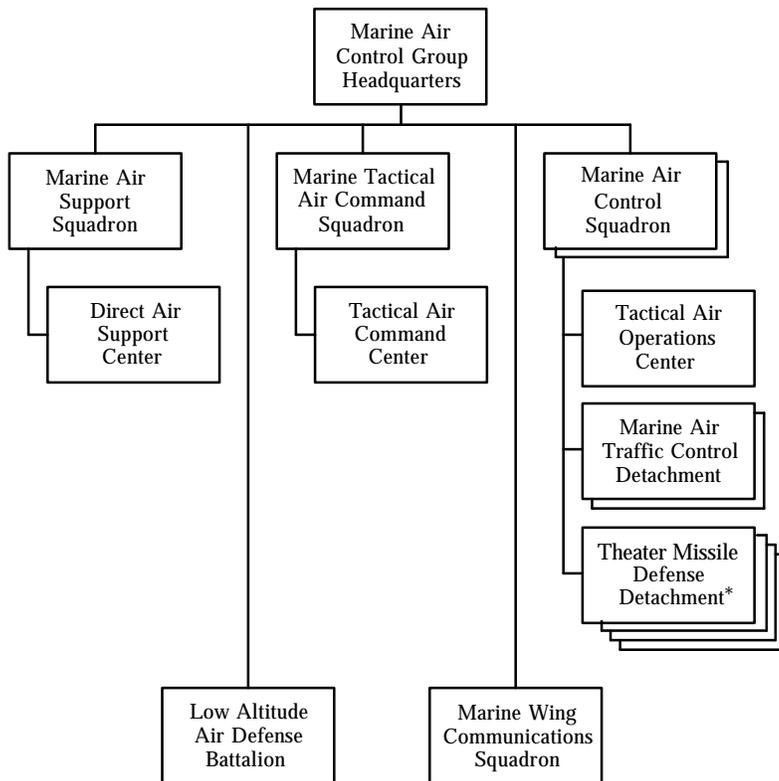
The Marine air command and control system is organized in tactical agencies and activities, each having a different function and task. These agencies are fielded and supported by squadrons within the Marine air control group and the ACE, ground combat element (GCE), and combat service support element (CSSE).

GENERAL

Principal Marine air command and control system agencies are supported by Marine air control group squadrons. Each Marine aircraft wing contains one Marine air control group. Figure 2-1 (page 2-2) depicts the MACG's administrative organization. Figure 2-2 (page 2-3) delineates the Marine air command and control system's organizational structure. Marine Corps warfighting publication (MCWP) series 3-25 provides detailed information on each principal MACCS agency. Table 2-1 (page 2-4) depicts forms of control exercised by each one.

TACTICAL AIR COMMAND CENTER

The Marine tactical air command center (TACC) is the senior agency of the Marine air command and control system. It provides the facilities for the ACE commander and the battlestaff to command, supervise, and direct MAGTF air operations. Other Service's comparable agencies include the Air Force's air operations center and the Navy's tactical air control center.



* There are only four theater missile defense detachments in the Marine Corps' active duty structure (see page 2-24).

Figure 2-1. Notional Marine Air Control Group Organization.

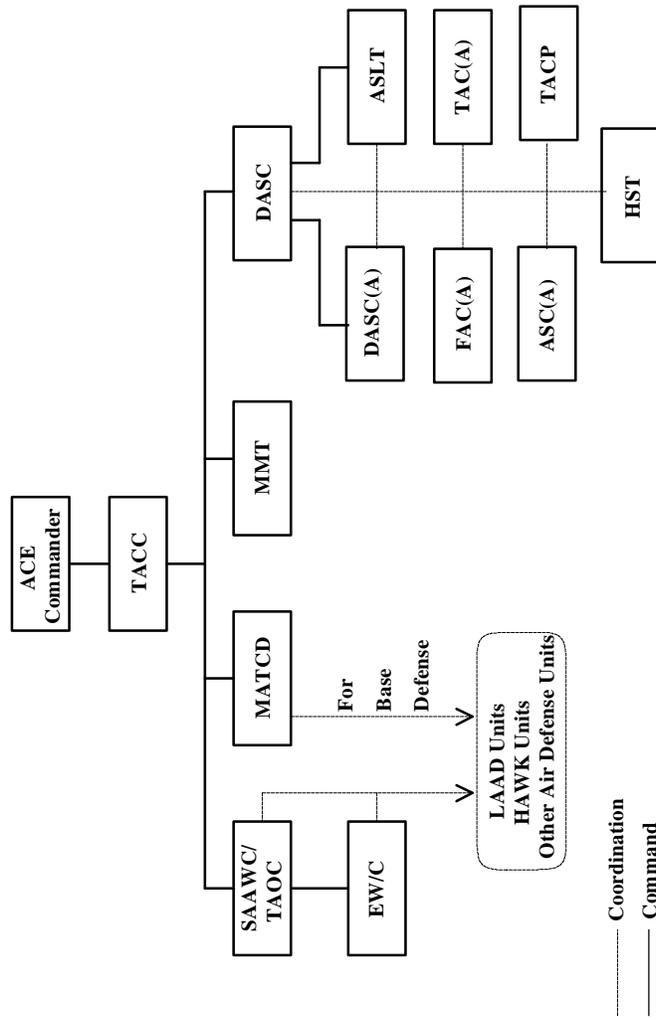


Figure 2-2. MACCS Organization.

Table 2-1. Control Exercised by MACCS Agencies.

	TACC	TADC	TAOC	EW/C	DASC	MATCD	MMT	FAC	FAC(A)	ASC(A)	TAC(A)
Command											
Air Control											
Positive Control											
Procedural Control											
Radar Control											
Terminal Control											
Air Direction											

The Marine tactical air command center interfaces with the MAGTF command element through the combat operations center/force fires coordination center.

Tasks

The Marine tactical air command center—

- Maintains complete information on the friendly situation, including the status of air and ground forces, the air situation, and ground combat information essential to the air effort.
- Maintains and disseminates critical enemy air and ground information.
- Manages all aircraft and surface-to-air weapons in the MAGTF's area of operations to ensure a balanced use of assets. This includes—

- Coordinating the employment of air defense systems (both aircraft and surface-to-air weapons) with the sector antiair warfare coordinator (SAAWC) and/or tactical air operations center(s) (TAOCs).
- Diverting aircraft from scheduled missions to meet higher, immediate priorities.
- Establishing alert conditions for ground alert aircraft.
- Directs and coordinates aircraft missions in support of the MAGTF and other support forces.
- Serves as the operational point of contact with air command and control agencies external to the MAGTF, to include other Services, nations, and host country agencies.
- Provides air defense warning conditions and weapons control status.
- Promulgates changes to rules of engagement (ROEs).
- Provides emission control and radiation control conditions in the MAGTF area of operations.
- Supervises the execution of designated electronic warfare operations.
- Coordinates the operations of subordinate agencies to ensure economy and unity of effort in the execution of the ACE commander's air plan. This includes—
 - Providing subordinate control agencies with appropriate air tasking orders, fragmentary orders, identification signals, aircraft call signs, alert conditions, and aircraft availability.

- Disseminating tactical information to subordinate Marine air command and control system agencies.
- Prescribes the succession of command and control responsibilities within the MACCS and compensates for any serious degradation within a component agency.
- Exchanges information between the aviation combat element's battlestaff and headquarters to effect efficient execution and planning of ACE operations.
- Conducts airspace coordination.

Concept of Employment

The Marine tactical air command center can be tailored to fit any size Marine air-ground task force. It can provide a small detachment capable of performing designated functions to support smaller contingencies, or, in its more common employment, it can provide a sophisticated agency with automated displays, air tasking order generation equipment, and data link feeds. Typically, the Marine TACC is employed with the lead element of a Marine expeditionary force (MEF). Functionally, it is divided into two mutually supporting sections: the current operations section and the future operations section. The current operations section executes the current day's air tasking order (ATO) and supervises the current air situation. The future operations section plans for those activities directed against an enemy for which detailed planning must be accomplished and aviation resources allocated. This planning creates the Marine portion of the joint air tasking order.

During amphibious operations, the Marine tactical air command center is incrementally phased ashore. Initially it is a tactical air direction center (TADC) subordinate to the Navy tactical air control center. It is responsible to the commander, amphibious task force for air operations in the amphibious objective area's (AOA's) landward sector. Upon completion of its build up, the TADC is normally identical to the Marine tactical air command center in equipment, organization, and function. The difference is the amount of authority and the scope of tasks assigned to the tactical air direction center. During the phasing of control ashore, the TADC assumes the title and responsibilities of the Marine TACC when airspace management functions are passed from afloat to ashore. See chapter 4 for more details on the phasing of control ashore process.

DIRECT AIR SUPPORT CENTER

The direct air support center (DASC) is the principal air control agency responsible for the direction of air operations that directly support ground forces. It functions in a decentralized mode of operation, but is directly supervised by the Marine tactical air command center. It is normally the first principal air control agency ashore during amphibious operations, landing in scheduled or on-call waves with the senior fire support coordination center (FSCC). The DASC provides similar services and functions as the Air Force's air support operations center, the Navy's helicopter direction center, and the Navy's tactical air control center, air support control section. It processes immediate air support requests, coordinates aircraft employment with other supporting arms, manages terminal control assets that support ground combat and combat service support forces, and controls assigned aircraft transiting its area of responsibility.

Tasks

The direct air support center—

- Coordinates preplanned direct air support missions from the air tasking order.
- Receives, processes, and coordinates requests for immediate direct air support.
- Adjusts preplanned schedules and diverts airborne assets if delegated authority by the aviation combat element commander (changes are coordinated with the FSCC).
- Coordinates the execution of direct air support missions with other supporting arms through the appropriate fire support coordination center and as required with the appropriate Marine air command and control system agencies.
- Receives and disseminates pertinent tactical information reported by aircraft performing direct air support missions.
- Provides aircraft and other air control agencies with advisory information to assist in the safe conduct of flight.
- Monitors, records, and displays information on direct air support missions.
- Maintains friendly and enemy ground situation displays to coordinate direct air support operations.
- Provides aircraft and other MACCS agencies with information concerning friendly and enemy situations.

- Refers unresolved conflicts in supporting arms to the senior fire support coordinator.

Concept of Employment

The direct air support center's configuration is extremely flexible and can be task-organized to meet a variety of requirements. The DASC normally collocates with the senior fire support coordination center. Optimally, this collocation is by physical proximity; however, an electronic link may be an acceptable alternative in situations where the direct air support center's siting requirements differ from the FSCC's. An airborne DASC, with limited communications nets, can also be operated from KC-130 aircraft. The direct air support center typically deploys with the lead element of a Marine expeditionary force.

If the direct air support center cannot physically collocate with the senior fire support coordination center, it can provide a task-organized air support liaison team to the FSCC. The liaison team maintains the necessary "face-to-face" coordination vital to the effective coordination and integration of direct air support missions and the employment of other supporting arms.

Smaller Marine air-ground task forces may not require all the capabilities offered by the direct air support center, but they may need assistance in the control of airborne assets for a limited time in a limited area. An air support element may assist in filling this air control need. Typically, an air support element is attached to either the MAGTF's aviation combat element or command element. An air support element typically functions as a landward extension of the Navy's tactical air control center and the Navy's

helicopter direction center. It provides direction for air support assets working in direct support of the ground combat element. An air support element normally works directly with the battalion tactical air control party.

TACTICAL AIR CONTROL PARTY

The tactical air control party (TACP), although an agency of the Marine air command and control system, is not administratively part of the Marine air control group. Instead, it is located within the ground combat element. The tactical air control party provides a way for ground commanders to access the MACCS to satisfy their direct air support requirements. It provides the ground commander with aviation advisory personnel and the means to integrate tactical air operations with supporting arms.

Tasks

The tactical air control party—

- Provides liaison and communications between the ground commander and appropriate air control agencies.
- Advises the ground commander on matters of tactical air support.
- Prepares and forwards requests for tactical air support.
- Exercises terminal air control for close air support.

Concept of Employment

Tactical air control parties are located in the Marine division headquarters, each regimental headquarters, each infantry battalion, and each light armored reconnaissance battalion. See FMFM 5-41, *Close Air Support and Close-in Fire Support*, for additional information on TACPs.

AIRBORNE TERMINAL CONTROL AGENCIES

Like the TACP, airborne terminal control agencies are considered part of the MACCS; however, the services provided by these airborne agencies are filled by personnel from Marine aircraft groups.

Tactical Air Coordinator (Airborne)

The tactical air coordinator (airborne) (TAC[A]) is a naval aviator who coordinates the action of combat aircraft engaged in close support of ground or sea forces. He serves as an on site airborne extension of the direct air support center. The DASC or Marine TACC determines the tactical air coordinator's (airborne) authority over aircraft operating within his assigned area. During helicopter operations in which a TAC(A) is employed in conjunction with an assault support coordinator (airborne), the relationship between the two is established by the ACE commander or designated representative. Tactical air coordinator (airborne) responsibilities are to avert conflicts among aircraft and to

coordinate the employment of air assets with other supporting arms. In fulfilling this responsibility, the TAC(A) coordinates as necessary with tactical air control parties, fire support coordination centers, subordinate forward air controllers (airborne), assault support coordinators (airborne), and the fire direction centers of artillery and naval surface fire support.

Forward Air Controller (Airborne)

The forward air controller (airborne) (FAC[A]) is an aviator specifically trained, qualified, and designated to perform air reconnaissance and surveillance, conduct terminal control of aircraft engaged in offensive air support operations, control artillery and naval surface fire support missions, act as a radio relay as required by ground forward air controllers, and control landing zone preparations (including the marking of landing zones). The FAC(A) operates from an aircraft. His mission is distinct and separate from that of a tactical air coordinator (airborne): the TAC(A) coordinates, the FAC(A) controls.

Assault Support Coordinator (Airborne)

The assault support coordinator (airborne) is an experienced aviator with extensive knowledge of the Marine air command and control system, assault support, airspace management, fire support coordination, and fixed and rotary-wing operational capabilities. The assault support coordinator (airborne)—

- Provides situational awareness to the assault support force concerning routing, weather, delays, and threat status.
- Relays immediate assault support requests to assist the DASC or the Navy's helicopter direction center.

- Serves as a conduit to the command, control, and communications system by relaying information to/from the assault support force.
- Exercises launch authority for immediate and on-call missions when authorized by the ACE or as directed by the DASC or the Navy's helicopter direction center.
- Coordinates with the TAC(A) for supporting arms in support of the airborne mission commander.
- Provides recommendations to the airborne mission commander concerning deviations in assault support asset routing during ingress and egress.

OTHER TERMINAL CONTROL AGENCIES

Helicopter Support Team

Commonly assigned to the force service support group's landing support battalion, helicopter support teams task-organize and equip to operate a helicopter pickup zone and/or landing zone. The supported helicopterborne force and supporting helicopter unit provide personnel and equipment to establish a helicopter support team. The helicopter support team—

- Assists in the pickup, movement, and landing of helicopterborne force, equipment, and supplies within a landing zone.
- Assists in the evacuation of casualties and prisoners of war from a landing zone.

Air/Naval Gunfire Liaison Company

The air/naval gunfire liaison company (ANGLICO) is composed of Marine and Navy personnel who are qualified for shore control of naval surface fire support and close air support. The ANGLICO is organic to the Marine expeditionary force. It is attached to an Army or allied division force when fire support is provided by U.S. naval surface fire support or naval air assets.

Each ANGLICO consists of a division liaison team and two brigade liaison platoons. Each brigade platoon consists of a brigade liaison team and two supporting arms liaison teams. Supporting arms liaison teams operate at the battalion level. Each supporting arms liaison team has two firepower control teams, which are assigned to support the battalion's forward companies. The division and brigade teams act as staff coordinators, actual control of aircraft is done by supporting arms liaison teams and firepower control teams. Supporting arms liaison teams and firepower control teams function as part of the MACCS when they control aircraft.

Each supporting arms liaison team consists of two officers and six enlisted personnel. The supporting arms liaison team officer in charge is a certified forward air controller naval aviator or naval flight officer. The supporting arms liaison team plans, requests, coordinates, and controls supporting arms for an Army battalion or a comparably sized allied unit. It works within the structure of the supported battalion's fire support element to give the battalion the capability to coordinate and control Marine and

1. The air/naval gunfire liaison company will be disbanded from the Marine Corps' organizational structure sometime in the near future. Nonetheless, the ANGLICO functions described in this section will still need to be performed. The organization that will pick up these functions has yet to be finalized.

Navy close air support assets. It can also provide terminal control of rotary-wing aircraft into helicopter landing zones.

Each firepower control team consists of one officer and five enlisted personnel. The firepower control team plans, requests, coordinates, and provides final control of supporting arms for a maneuver company. The firepower control team officer in charge is normally an artillery officer, trained as a universal spotter.

SECTOR ANTI-AIR WARFARE COORDINATOR

The sector anti-air warfare coordinator is the MAGTF's air defense battle manager. He is directly responsible to the aviation combat element commander for the supervision, management, and coordination of air defense operations within its assigned sector. The SAAWC is not an air command and control agency. He serves as an extension of the Marine tactical air command center, focusing on air defense planning and management. The SAAWC is responsible for coordinating and managing all active air defense weapons, including aircraft and surface-to-air weapons, within its assigned sector. He functions to the extent of authority delegated by the ACE commander.

Tasks

The sector anti-air warfare coordinator—

- Assists planners in developing an air defense course of action, determining employment of ground-based air defense units, and developing the air defense specific portions of the operations order.

- Manages, subject to the limits of authority delegated by the ACE commander, antiair warfare assets within an assigned sector.

Concept of Employment

The sector antiair warfare coordinator is typically collocated with a tactical air operations center. His staff provides near-term planning support to the Marine TACC, Navy antiair warfare coordinator, and the joint force area air defense commander for the employment of air defense assets within its assigned sector. The staff is also responsible for managing and supervising theater missile defense operations and may be delegated authority for coordination of theater missile defense attack operations within its assigned sector.

TACTICAL AIR OPERATIONS CENTER

The tactical air operations center is responsible for airspace control and management. It detects, identifies, and controls the intercept of hostile aircraft and missiles and provides navigational assistance to friendly aircraft. The TAOC provides real-time surveillance of assigned airspace and direction, positive control, and navigational assistance for friendly aircraft. It performs real-time direction and control of antiair warfare operations involving aircraft and surface-to-air weapons. By collecting and displaying information from its own sensors, other Marine Corps sources, and external sources, the tactical air operations center controls assigned airspace and directs and controls the fires of assigned air defense assets. It can be used to enhance the ability of the Marine tactical air command center to prosecute the ACE's support of deep operations. The TAOC's closest joint counterpart is

the Air Force's control and reporting center. The early warning and control site, a subelement of the tactical air operations center, is comparable to the Air Force's control and reporting element.

Tasks

The tactical air operations center—

- Detects, identifies, and classifies all aircraft within its assigned sector.
- Maintains tracks of identified contacts and provides en route control/navigational assistance as required.
- Provides interface between adjacent and higher air defense and command and control agencies.
- Recommends the employment of assigned weapons and surveillance systems and assigns geographical section/subsection responsibility of itself and component elements.
- Evaluates, selects, and assigns weapons to engage and defeat enemy air threats.
- Controls the engagement of enemy air threats by interceptors or surface-to-air weapons.
- Directs the operations of subordinate air defense agencies.
- Maintains a summary display of the air situation and disseminates this information to other designated agencies.
- Coordinates and executes emission control conditions set by higher authority.

- Operates as an alternate Marine TACC for limited periods of time as required.

Concept of Employment

The TAOC uses long- and medium-range air surveillance radars and data links with other Services' air command and control agencies to conduct air defense operations against manned and unmanned aircraft and theater missiles. It task-organizes its capabilities, from a single-sensor early warning and control center site to a multi-sensor tactical air operations center, to meet air defense requirements. The TAOC, or elements thereof, can be deployed to support any size Marine air-ground task force, but typically deploy with the lead element of a Marine expeditionary force. Its radars provide theater ballistic missile cueing to the theater missile defense detachment. There are only four theater missile defense detachments in the active Marine Corps force structure. All four theater missile defense detachments are administratively organic to one Marine air control squadron. Theater missile defense detachments are attached to other Marine air control squadrons as required to fulfill operational requirements. Theater missile defense detachments are addressed in greater depth later in this chapter.

The tactical air operations center normally builds its capabilities incrementally, using the early warning and control center site as the building block for a TAOC main site. One or more early warning and control center sites may be deployed from the TAOC's main site to enhance early warning and conduct limited air defense functions.

MARINE AIR TRAFFIC CONTROL DETACHMENT

The Marine air traffic control detachment (MATCD) is the primary terminal air traffic control organization within the Marine air command and control system. It is organized and equipped to satisfy the air traffic control requirements for MAGTF forward operating bases. The MATCD provides friendly aircraft with continuous all-weather radar approach, departure, and en route air traffic control services within assigned controlled airspace.

Tasks

The Marine air traffic control detachment—

- Provides radar/nonradar approach, departure, and en route air traffic control services within assigned terminal control areas. (A terminal control area is airspace of defined dimensions within which air traffic control services are provided.)
- Provides precision and nonprecision navigation aids.
- Provides automatic carrier landing system approach services (modes I, II, and III) for forward operating bases.
- Displays and disseminates appropriate air/ground information to designated adjacent and higher agencies.
- Coordinates air defense activities within designated base defense zones.
- Serves as the operational point of contact between the MACCS and national/international civil air traffic control agencies.

Concept of Employment

Each Marine air traffic control detachment has a full range of air traffic control capabilities including surveillance radar; identification, friend or foe (IFF); automatic carrier landing system radar, communications, and navigation aids; and a control tower. This capability gives the MATCD the ability to control aircraft up to 60 miles from a main air base. Each detachment is capable of fielding one Marine air traffic control mobile team (MMT). Typically, Marine air traffic control mobile team equipment is mounted in one or two high mobility multi-purpose wheeled vehicles. This equipment consists of communications equipment, a global positioning system receiver, and a navigation aid. An MMT, using nonradar procedural control, can control aircraft within 40 miles of its position.

The Marine air traffic control detachment and MMT report directly to the Marine tactical air command center on matters concerning air traffic control operations. The MATCD coordinates with the sector antiair warfare coordinator, tactical air operations center, and/or low altitude air defense (LAAD) commander on specific matters concerning air defense.

MARINE WING COMMUNICATIONS SQUADRON

The Marine wing communications squadron (MWCS) provides communications for the aviation combat element. Although it is not an air command and control agency, the Marine wing communications squadron provides the backbone for ACE communications. It is responsible for the installation, maintenance, and operation of two distinct communications structures: providing the aviation combat element commander with the means to direct the efforts of his subordinate commanders and providing

connectivity among Marine air command and control system elements. The MWCS installs, operates, and maintains expeditionary communications for the ACE, including the phased deployment of task-organized elements thereof.

Tasks

The Marine wing communications squadron—

- Assists in the systems planning and engineering of aviation combat element communications for command and control of Marine air-ground task force aviation assets.
- Provides the senior operational systems control center for the ACE communications system.
- Provides the senior airfield operational systems control center at up to two airfields per MWCS detachment.
- Provides the digital backbone communications in support of the ACE command element and Marine tactical air command center.
- Provides tactical automated switching and telephone services for the aviation combat element command element and Marine TACC.
- Provides electronic message distribution for the ACE command element, primary MACCS agencies, and tenant units at up to two airfields per Marine wing communications squadron detachment.
- Provides single channel radio communications support for the aviation combat element command element, Marine tactical air command center, and other ACE operations as required.

- Provides deployed wide area network, deployed local area network, and server support for the ACE command element and primary Marine air command and control system agencies.

Concept of Employment

Each Marine wing communications squadron consists of a headquarters element and MWCS detachments: two detachments for MWCS-28 and MWCS-38, one detachment for MWCS-18 and MWCS-48. The headquarters and one detachment normally deploy and collocate with the aviation combat element headquarters. When required, personnel and equipment from the operational platoons are used to support the integration of Marine air command and control system agencies into a single system, as well as supporting ACE headquarters.

GROUND-BASED AIR DEFENSE UNITS

Two units reside within the Marine air control group organization that do not provide specific air control agencies, but whose functions are inherently interrelated with Marine air command and control system air defense responsibilities: the LAAD battalion and the theater missile defense detachment.

Low Altitude Air Defense Battalion

The low altitude air defense battalion provides close-in, low altitude, surface-to-air weapons fires in defense of forward combat elements, vital areas, and installations. It also provides surface-to-air weapons support for units engaged in special/independent operations.

The LAAD battalion employs the Stinger missile system. Stinger is capable of engaging and destroying hostile low-flying fixed and rotary-wing aircraft and reconnaissance drones. Stinger is employed in two versions: a man-portable air defense system and a pedestal-mounted vehicular version (Avenger). The Avenger provides a shoot-on-the-move engagement capability through use of its forward-looking infrared radar and laser range finder.

Tasks. The low altitude air defense battalion—

- Maintains the capability as a highly mobile, vehicle-mounted and man-portable, surface-to-air weapon component of the MAGTF with the ability to deploy rapidly in the assault echelon of an expeditionary operation.
- Provides for the separate deployment of subordinate batteries and platoons to accommodate special tactical situations and task organizations.
- Plans and coordinates requirements for liaison and communications with appropriate commands to ensure the most effective integration of LAAD units within the integrated air defense system.

- Provides early warning of hostile air threats to other elements of the Marine air command and control system over appropriate voice/data nets. Typical LAAD battalion information sources include acquisition data from tactical defense alert radars and visual aircraft identification from individual Stinger teams.
- Provides surface-to-air weapons support for units engaged in special/independent operations.

Concept of Employment. The low altitude air defense battalion is organized and equipped for employment in an integrated air defense system in support of MAGTF, joint, or multinational operations, or for employment in independent/special operations. LAAD units are typically employed in a general or direct support role. A typical LAAD battalion structure includes 60 Avengers and 30 man-portable weapon systems. Each weapon system constitutes a Stinger team.

Theater Missile Defense Detachment

The Marine air control squadron's theater missile defense detachment² provides the MAGTF with organic surface-to-air missile fires in point defense against theater missiles; specifically, short- to medium-range theater ballistic missiles and cruise missiles. The theater missile defense detachment employs the expeditionary air defense system, an improved version of the Hawk missile system. To conduct its theater missile defense role, the

2. The Marine Corps is planning to divest itself of 50 percent of its Hawk assets in fiscal year 1998. It is likely that the remaining 50 percent will be divested in fiscal year 1999. As a result, the theater missile defense detachment number and capabilities will be proportionally diminished.

theater missile defense detachment deploys in conjunction with a tactical air operations center, relying upon the TAOC's AN/TPS-59 radar to provide cueing and targeting data.

Tasks. The theater missile defense detachment—

- Provides surface-to-air missile fires in assigned zones in defense of vital areas and installations against short- to medium-range theater ballistic missile and cruise missile attacks.
- Maintains a residual capability to defend designated vital areas against fixed and rotary-wing threats.

Concept of Employment. Four theater missile defense detachments exist in the active duty structure and five detachments exist within the reserve structure. Each detachment consists of a base section, a remote engagement section, and a sensor acquisition section. The base section contains four launchers, two high power illumination radars, one battery command post, and one continuous wave acquisition radar. The remote engagement section contains two launchers, one high power illumination radar, and one assault fire control console. The sensor acquisition section is composed of one continuous wave acquisition radar and radio assets. The active duty detachments are administratively assigned to one active duty Marine air control squadron. The reserve detachments are administratively assigned to one reserve Marine air control squadron. Each detachment is designed with a mirror image, liftable table of organization and table of equipment that can be assigned to any Marine air control squadron worldwide to meet theater missile defense augmentation requirements. Each detachment is capable of providing surface-to-air missile defense for one vital area.

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Chapter 3

Planning

Deliberate planning is required to realize the full benefits that can be contributed by the aviation combat element combat arm to the Marine air-ground task force. The ACE must be fully involved in the planning process to ensure aviation's actions serve the MAGTF commander's intent. Crucial to this process is the integration of the Marine air command and control system with MAGTF, joint, and multinational agencies.

FUNDAMENTALS

The need to accomplish deliberate planning within time constraints has led to the use of three different frameworks for planning: concurrent, parallel, and detailed. These frameworks complement each other to produce a timely planning cycle.

Concurrent Planning

Concurrent planning is simultaneously accomplished by two or more echelons of the same command or by corresponding echelons of different commands. The skillful use of concurrent planning helps to compensate for the time spent on detailed planning by successive echelons. The detailed planning process can become stalled at any echelon from lack of information. Subordinate commanders can begin concurrent planning prior to the issuance of written planning documents by using information announced at planning conferences and briefings. Concurrent

planning is kept on track by a common understanding of the commander's intent.

Parallel Planning

Parallel planning results from close and continuous coordination between corresponding units. Coordination requirements, the interrelationship of assigned tasks, and complex support requirements make parallel planning essential. Basic decisions made by individual commanders are based on a common understanding of objectives and procedures obtained from the free exchange of information between units.

Detailed Planning

Detailed planning should be exercised at all levels of command. Proper detailed planning promotes flexibility by allowing commanders to identify possible branches and sequels to planned operations. Commanders can then develop a full array of contingency plans to exploit any branch or sequel that may come into fruition.

PLANNING CONSIDERATIONS

The MAGTF commander and his staff plan aviation operations within the standard framework of METT-T:

- Mission.
- Enemy.

- Terrain and weather.
- Troops and support available.
- Time.

ASSIGNED MISSION

A thorough understanding of the mission is critical to its success. Commanders must issue mission orders with clear intent. Subordinate commanders must have a complete understanding of the mission and the commander's intent before they begin planning. Appendix A provides a planning review checklist that may be used when preparing to employ the MACCS.

CONTROL OF AIR OPERATIONS

MAGTF aviation effectiveness depends on the ability of ground assets to interface with airborne platforms. A fully functional Marine air command and control system maximizes aviation's effectiveness. Since a fully functional MACCS is never a certainty, plans must be simple and flexible enough to compensate for a margin of degradation. Options for minimizing the effects of agency casualties must be considered when planning for air operations, to include the identification of alternative agency plans. Airborne assets, such as the airborne DASC, can be useful in developing backup plans for controlling air operations. Planners must recognize that a lack of assets or a degraded interface among principal MACCS agencies and airborne assets will detrimentally affect aviation operations.

ACE PLANNING FACTORS

The Marine air-ground task force commander and staff must understand the planning required for integration of Marine forces as part of a joint or multinational force. Ground combat and combat service support element commanders and staffs must fully comprehend their planning roles relative to MAGTF air operations. The aviation combat element commander, staff, subordinate units, and MACCS personnel must firmly grasp planning factors relative to command and control of MAGTF air operations. The following factors should be considered when developing planning guidance (this list is not all-inclusive):

- Mission assigned.
- Type of operation (amphibious, joint, multinational, etc.).
- Threat quantity and quality (including electronic warfare capabilities).
- Characteristics (including terrain and size) of the joint force's area of responsibility, MAGTF area of operations/AOA, and airspace.
- Command, control, and coordination relationships within the MAGTF, amphibious task force, naval expeditionary force, joint force, etc.
- Characteristics, procedures, and responsibilities for airspace control sectors and air defense sectors.
- Anticipated duration of operations.
- Characteristics, definitions, and procedures for destruction, vital, and surveillance area(s).

- Availability, capability, and integration of MAGTF aviation assets.
- Plan for landing MAGTF aviation elements in their proposed locations and the time and conditions required to phase control ashore to MACCS agencies.
- Centralized command and coordination and decentralized control and integration of air operations with supporting arms fires.
- Weapons employment and rules of engagement.
- Promulgation and dissemination of the air control plan and ATO.
- Interoperability with other Service/nation assets.
- All-weather operations.

The ACE commander's planning responsibilities are located in FMFM 5-70, *MAGTF Aviation Planning*. For further information on the ATO and the ATO cycle, see Joint Pub 3-56.1, *Command and Control for Joint Air Operations*, and FMFM 5-70.

MACCS PLANNING ISSUES

The ACE provides the MAGTF with the assets required to perform the six functions of Marine aviation: anti-air warfare, offensive air support, assault support, electronic warfare, air reconnaissance, and control of aircraft and missiles. Control of aircraft and missiles is the enabling function that brings the other

five functions together into a focused effort. For a complete description of the six functions of Marine aviation, refer to FMFM 5-60, *Control of Aircraft and Missiles*. The ACE commander exercises command and control through the Marine air command and control squadron. The following sequence of planning issues, along with the planning considerations outlined in appendix B, are designed to provide planners insight into the planning needs of the MACCS.

Mission

When analyzing the assigned mission, planners should go beyond the assigned battalion, squadron, or Marine air control group mission and also assess the ground combat element, combat service support element, aviation combat element, MAGTF, and joint force missions. It is also essential to analyze the respective commanders' intents, concepts of operations, and the desired end state of the JFC (see app. A).

Assumptions

Planners should identify any assumptions that must be made early in the planning sequence to facilitate further development of the plan.

Friendly Force Composition

The integration of joint and multinational air command and control assets with the MACCS must be addressed. Planners must identify unique integration requirements. Integration considerations should include—

- Addressing MAGTF interface with the joint force. (Planners should ensure delineation of responsibilities with the appropriate component commanders and authorities.)
- Conducting detailed planning for MACCS integration with joint/multinational air command and control agencies.
- Effecting liaison with the International Civil Aviation Organization, host nation air traffic control facilities, and Federal Aviation Administration as required.
- Conducting detailed planning with MAGTF and joint force participants for the integration of unmanned aerial vehicles.

Threat

The threat assessment includes the air, ground, naval, and electronic orders of battle; reconnaissance (both ground and airborne); and terrorist or other unconventional threats. In gauging the threat assessment, MACCS planners should address the following issues.

Air Order of Battle. Planners must identify the enemy's air capabilities, ordnance, extent of training and morale, likely tactics, and intended priority targets.

Ground Order of Battle. Planners must identify the enemy's surface-to-surface missile capability to include range and accuracy of missiles, as well as their ability to displace rapidly and refire. Particular attention must also be given to the enemy's mechanized capability as it will affect the siting of friendly air command and control agencies.

Naval Order of Battle. Planners must identify the enemy's naval capabilities that may affect the MAGTF's ability to perform its mission. Particular emphasis may be placed on enemy ships capable of employing cruise missiles, naval surface-to-air missile capabilities, and shipborne air surveillance radar capabilities.

Electronic Order of Battle. Planners must examine the enemy's electronic warfare capability to include enemy electronic support and electronic attack tactics and platforms.

Unconventional Warfare. Planners must examine the emerging threat of unconventional warfare or terrorist operations to determine what security safeguards/procedures should be used to minimize disruption of operations.

Area of Operations

The area of operations must be clearly identified for proper planning to occur. Within the area of operations, planners should delineate the airspace control area and the air defense area. Typically, airspace control and air defense areas are divided into airspace control sectors, air defense regions, and, ultimately, into air defense sectors. In joint operations, planners should determine if the MAGTF has been granted responsibility for a particular air defense or airspace control sector(s). The joint force commander may not always give airspace to the Marine component. When this happens, Marine air command and control agencies still deploy in support of the MAGTF, but act under the direction of the designated joint region or sector airspace coordinator.

Terrain and Weather

Terrain and weather can significantly affect the MACCS's ability to operate effectively. Planners need to consider the following areas when evaluating the effects of terrain and weather on the MACCS.

Topography and Masking Effects. Planners assess the topography and masking effects of terrain to determine limitations on communications and ground-based radar coverage.

Mobility and Trafficability. Planners assess whether or not the terrain affords MACCS units/agencies sufficient mobility to support the established scheme of maneuver.

Vegetation. Planners identify vegetation in the area that will affect a Stinger teams' ability to visually acquire, track, and engage targets; affect communications and radar coverage; and impact site selections.

Atmospheric Conditions. Atmospheric conditions can adversely affect the ability of the MACCS to operate. Planners should anticipate and address environmental factors such as ducting layers, trapping radio and radar waves, and refracting electromagnetic energy.

Airspace Control

Airspace control entails the coordination, regulation, and integration of the assigned airspace, as well as the identification of all tracks within the assigned airspace. MACCS planners must address the following considerations for airspace control.

Sensor Plan. Planners should integrate all sensors to provide constant, redundant detection and tracking capabilities.

Handover Procedures. Planners must establish control procedures, both positive and procedural, for passing control of aircraft from one agency to another.

Handover Point. The handover point is a geographic location established by the Marine TACC's air control liaison officer and included as part of the airspace control order. The handover point provides a common, mutually acceptable reference point from where one agency can pass aircraft control to another agency.

IFF/Selective Identification Feature (SIF) Requirements. Planners establish procedures to assist radar-equipped MACCS agencies in the identification of friendly aircraft. Planners should identify and promulgate IFF/SIF modes and codes to assist control agencies in identifying friendly aircraft.

Airspace and Air Defense Control Measures

The assigned airspace must be segmented by volume and/or time through the establishment of airspace and air defense control measures. For a more detailed discussion of airspace and air defense control measures, refer to FMFM 5-60; FMFRP 5-61, *Integrated Combat Airspace C2 (ICAC 2)*; FMFRP 5-62, *Theater Air-Ground System (TAGS)*; or Joint Pub 3-52, *Doctrine for Joint Airspace Control in the Combat Zone*.

Lame Duck Procedures

Lame duck procedures are established and promulgated to provide aircraft that have experienced battle damage, and can neither establish communications nor squawk IFF, a way to recover

through MACCS or other friendly integrated air defense systems.

A risk assessment must be done prior to development of lame duck procedures. A determination must be made to weigh risk assessment in favor of either the lame duck aircraft or in favor of the designated air defense priority. If air superiority has been established and threat aircraft are engaged well forward of the air defense priorities, risk assessment would most likely favor the return of the lame duck aircraft. However, if the MAGTF's air defense priorities have been successfully targeted by enemy aircraft, risk assessment may favor air defense priorities. If risk assessment favors air defense priorities, the returning aircrew must, to the best of their ability, present a nonthreatening flight profile.

Air Control

Air control entails the authority to direct the physical maneuver of aircraft in flight or to direct an aircraft or ground-based air defense unit to engage a specific target. Planners should provide specific guidance in the following areas when addressing air control issues.

Engagement Authority. Each weapons system possesses different characteristics and capabilities used to identify and engage targets. Planners should consider each of these variables and delineate who has the authority to commit each weapon system against a target.

Combat Air Patrol and Tanker Control. Controlling agency responsibilities for specific combat air patrol and tanker orbits should be specified in appropriate orders and/or instructions.

Surface-to-Air Weapons Mode of Control. Planners should outline the degree of control (centralized, decentralized, or autonomous) that will typically be exercised over surface-to-air weapon units and occasions when each degree of control is needed.

Rules of Engagement. ROEs are directives issued by competent military authority which delineate the circumstances and limitations under which United States forces will initiate and/or continue combat engagement with other forces encountered (Joint Pub 1-02). The aviation combat element commander, based upon guidance received from the Marine air-ground task force commander, establishes rules of engagement for weapons systems resident in the ACE. Rules of engagement established by the ACE commander will be in consonance with ROEs directed by the National Command Authorities and joint force commander. Planners should consider how the rules of engagement will or will not limit the stand-off weapon systems' capabilities and design the airspace control measures and engagement zones accordingly.

Identification Criteria. Closely related to rules of engagement are identification criteria. Identification criteria describe the conditions required to declare unknown personnel or equipment as friendly, hostile, or neutral. ROEs can not be applied until after identification occurs. Planners should use the unique identification capabilities of each MACCS agency to assist in the identification of friendly, hostile, or neutral personnel and equipment.

Air Direction

Air direction is the authority delegated to subordinate MACCS elements to regulate the employment of air resources in order to balance their availability and priority of usage. Planners should

specifically consider the following items when addressing air direction.

Combat Air Patrol and Tanker Management. In air defense intensive operations, proper utilization and rotation of combat air patrol assets on/off the tanker ensures that aircraft are available to meet the threat. Planners should consider placement and orientation of tanker tracks to facilitate this function.

Launch and Divert Authority. The ability to launch or divert aircraft provides enhanced responsiveness to meet new threats. Scenarios for delegation of launch and divert authority for air defense, offensive anti-air warfare (theater missile defense attack operations), offensive air support (both close and deep air support), and assault support missions should be designed to provide enhanced flexibility in MAGTF air operations.

States of Alert. States of alert designate the preparedness of the air defense system based on the anticipated enemy air threat. Weapons and crews can not stay at battle stations for extended lengths of time without experiencing a degradation in alertness and capability. Varying states of alert allow commanders to maximize flexibility in employing assets and availability of air defense weapons systems. Commanders direct units to rest, move to new positions, perform maintenance, and arrange resupply during lesser states of alert.

Communications

Operational planners direct and supervise communications planning. Communications planning is an integral part of the Marine air command and control system employment plan. As a minimum, MACCS planners should—

- Identify critical information flow requirements for each agency supporting the control of aircraft and missiles.
- Enter the operation with a realistic expectation of what communications are required and what communications are available.
- Identify communications equipment and cryptographic devices compatibility.
- Create alternate communications channels to ensure continuity of communications between air command and control nodes. (Redundancy in the communications plan facilitates effective agency coordination.)
- Develop emission control plans to protect friendly communication devices and radars from enemy collection and jamming.
- Identify other intelligence sources available to the MAGTF as well as methods for integrating this information into Marine air command and control system air control nodes.

MACCS PLANNING CYCLE

Planners should strive to achieve unity of effort when conducting concurrent planning. Coordination with higher and adjacent planning staffs is continuous throughout the planning cycle. The continuous use of available planning channels, both internal and external maximizes the MACCS's employment effectiveness while it minimizes employment limitations.

Planning Channels Available Prior to Deployment

Operational Planning: MACG Level and Above. Figure 3-1 depicts the key planning channels available to the Marine air control group and battalion/squadron operational staffs prior to deployment. The MACG S-3 influences the plan or requests information from the airspace control authority (ACA), area air defense commander, or the joint force air component commander (JFACC) staff.

Note

The airspace control authority publishes the air-space control plan and airspace control order.

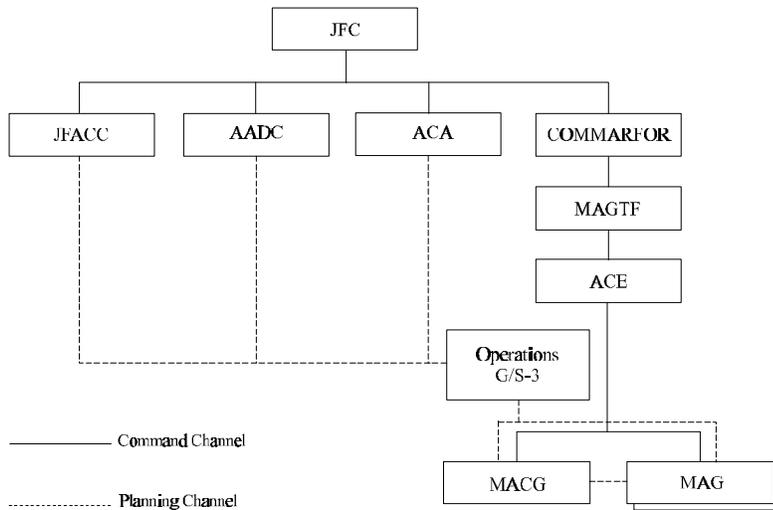


Figure 3-1. Predeployment Planning.

Coordination is effected through the aviation combat element G/S-3 or the Marine aircraft wing air control officer, also referred to as the air control liaison officer (ACLO).

As illustrated in figure 3-1, the vertical planning channel allows concurrent planning of air operations, airspace configuration, air defense, air support, and Marine air command and control system employment to occur between the Marine air control group and higher staff levels. A lateral planning channel also exists between the MACG and other Marine aircraft group operational staffs, which allows coordination of effort on command, control, and communications issues.

Planning Channels Following Initial Deployment

Figure 3-2 displays the planning channels typically used after forces deploy into theater. These planning channels include those used during predeployment planning, with the addition of planning channels for the Marine tactical air command center's future operations section and the ACE headquarters.

Future Operations Section. The future operations section is responsible for planning the MAGTF's future air operations. Future operations encompass the period beyond the scope of the current air tasking order. The future operations section evaluates the status of the current battle, coordinates with the Marine TACC's current operations section, coordinates resource availability with the aviation combat element headquarters, and conducts planning in accordance with the ACE commander's intent. The culmination of the future operations section's planning efforts is the publication of the Marine air-ground task force's portion of the joint air tasking order.

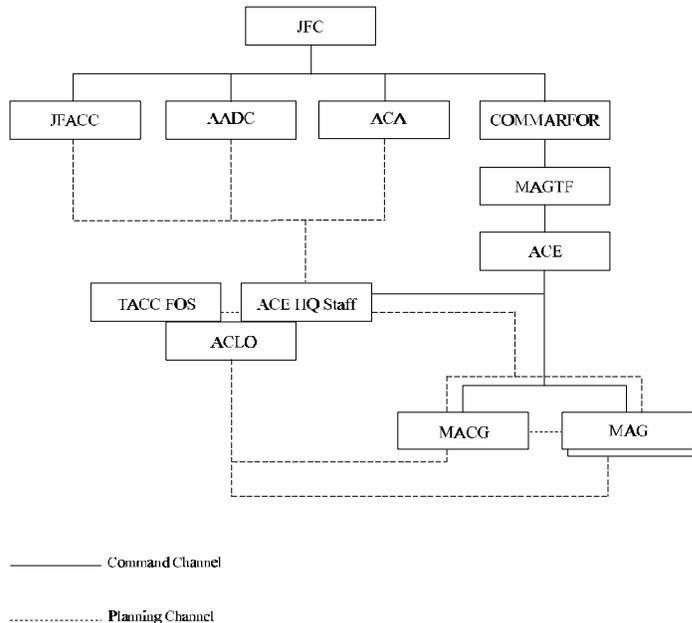


Figure 3-2. Planning Following Initial Deployment.

Future operations sections are task-organized, however, they typically include the G/S-3 watch officer, fixed and rotary-wing taskers, a weapons employment officer, and an air control liaison officer. To ensure effective planning between the Marine air control group and the future operations section, it is imperative that the ACLO be included as part of the future operations section. Additionally, intelligence and communications representatives are both necessary and beneficial to the future operations section's organization. As shown in figure 3-2, a planning channel exists between the Marine air control group and the future operations section. This channel is typically exercised between the MACG S-3 and the air control liaison officer.

ACE Headquarters Operational Planning. The aviation combat element headquarters plans the ACE's concept of operations and employment for the period beyond building the next air tasking order. The ACE headquarters staff concentrates on planning and coordinating with higher, adjacent, and external headquarters elements.

Marine air command and control system representation at the ACE headquarters is provided by the air control liaison officer. He is the critical link between the Marine air control group and the joint force air component commander, area air defense commander, and airspace control authority staffs to ensure that MACCS planning concerns are addressed. The alternate path for addressing Marine air command and control planning concerns is directly from the Marine air control group commander to the ACE commander.

Execution

The Marine tactical air command center's current operations section manages and directs the ACE's execution of the current battle (see fig. 3-3). The current operations section supervises the execution of the current ATO and retains the ability to adjust the plan during the execution phase. The current operations section not only interfaces with the future operations section but also exercises connectivity with joint/higher headquarters (e.g., the joint air operations center) as well as with subordinate MACCS agencies. Operators at subordinate agencies evaluate the effectiveness of previously developed plans with the developing tactical

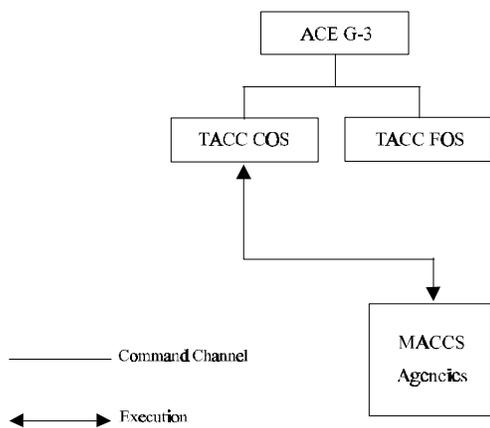


Figure 3-3. Execution.

situation and provide input to the current operations section to effect changes as required.

MACCS ESTIMATE OF SUPPORTABILITY

The Marine air command and control system’s estimate of supportability for each course of action is presented to the MACG commander during the course of action analytical briefing given at the conclusion of the course of action analysis stage of the Marine Corps planning process. This estimate provides advice to the Marine air control group commander concerning available employment options. The MACCS estimate of supportability is framed within the following categories:

- Mission.

- Situation and considerations.
- Analysis.
- Evaluation.
- Conclusions

See MCWP 5-1, *Operational Planning*, (under development) and FMFM 5-70 for additional details concerning the Marine Corps planning process and estimates of supportability.

MACCS PLANNING BRIEF

The Marine air command and control system concept of employment brief is given at the conclusion of the course of action comparison and decision stage of the Marine Corps planning process. MACCS planners receive additional guidance and a course of action decision from the Marine air control group commander following the brief. The planning staff utilizes the MACG commander's guidance and decision to finalize their plans and build the commander's brief. The commander's brief (see app. C) provides the detailed Marine air command and control system employment plan to subordinate squadron and battalion commanders within the Marine air control group. It allows subordinate commanders to see the full-scale MACCS employment plan prior to execution. This allows for any last minute adjustments to be made to the plan and ensures that the details and intent of the plan are well understood by each subordinate command. Completion of the commander's brief initiates passage into the orders development stage of the Marine Corps planning process.

Chapter 4

Operations

The aviation combat element commander is responsible to the Marine air-ground task force commander for the execution of the six functions of Marine aviation. The command and control function integrates the other five functions into a coordinated effort. The ACE commander uses the Marine air command and control system to execute command and control functions. This chapter discusses the execution, capabilities, limitations, and employment options inherent within the MACCS.

EMPLOYMENT

The Marine air-ground task force commander needs a flexible and responsive MACCS that is task-organized to meet the tactical situation. Marine air command and control system integration requires extensive planning and precise execution for effective employment. Employment is based primarily on the MAGTF's mission and objectives and involves a thorough analysis of the planning considerations discussed in chapter 3. The decisionmaking process must address the capabilities and limitations of the MACCS. It should also address the interface capabilities and requirements of joint/multinational and other Service air command and control agencies.

Capabilities

Observation. The Marine air command and control system provides the Marine air-ground task force commander with a cumulative picture that incorporates information from organic air surveillance radars and visual observation. Marine air command and control system radars provide the MAGTF with an air surveillance capability that can detect aircraft, unmanned aerial vehicles, cruise missiles, and theater ballistic missiles. MACCS agencies also play a crucial role in the collection and dissemination of threat information gained from visual and electronic observation.

Responsiveness. Decentralized control of air assets by the aviation combat element commander through the MACCS enables rapid reaction to changing situations and diversion of aircraft from one mission to another. This capability enables the MAGTF commander to seize and exploit battlefield opportunities in a timely manner.

Flexibility. The Marine air command and control system provides the ACE commander with the ability to immediately affect the current air situation by diverting aircraft to meet threats or by choosing various air defense systems to engage targets.

Range. Forward basing of Marine air command and control system elements, to include the use of airborne controllers/coordinators, can extend the depth of control that the MACCS provides to the aviation combat element commander. Forward basing facilitates the employment of air operations at various distances from the objective area. The MACCS's long-range air surveillance radars provide early detection of air threats and allow aircraft and ground-based weapons systems to engage at their

maximum ranges. Forward deploying early warning/control radars enhance detection and engagement capability.

Limitations

The following limitations must be considered when planning MACCS employment. The MCWP 3-25 series contains agency- and activity-specific details.

Mobility. Principal MACCS agencies use command and control equipment housed in large international standards organization containers. Transportation planning of these assets into a particular theater must address the loading and offloading of these containers, their movement to or from their carrier, and their initial movement in and around the port or airfield.

Some MACCS agencies do not possess the required mobility and transportation assets needed to move on a fluid battlefield. Additionally, nonorganic materials handling equipment is required to emplace and displace systems. Mobility shortfalls can be minimized while enhancing the MACCS's ability to echelon by mobile loading equipment when requisite transportation assets are available.

Footprint. The MACCS's radios and radars create a large electromagnetic footprint. The use of emission control and radiation control plans and the dispersal of MACCS agencies and emitters is essential to reduce the electromagnetic signature.

Logistics. MACCS agencies require intensive logistics support. Mobile electric power support and maintenance float for low density stocks must be addressed during employment planning.

Target Identification. The inability to identify an airborne or ground target can limit air operations. The use of visual means, maps, aerial imagery, aircraft and ground sensors and equipment, and good target descriptions increase target identification ability.

Line of Sight. Line of sight (a function of site elevation, obstructions, and curvature of the earth) affects many radars and communications systems. Terrain can cause masking of target areas or blind spots in radar and communications coverage. Proper site selection and placement of equipment maximize a radar's use and reduce line of sight limitations. The use of airborne radar platforms can also help fill in gaps caused by line of sight and terrain masking.

CONCEPT OF OPERATIONS

The concept of operations provides the basis for determining how the Marine air command and control system will employ. A key step in developing the concept of operations is the development of the aviation estimates of supportability. In developing the estimate, full consideration must be given to system capabilities and limitations and the ACE commander's planning guidance. The aviation combat element commander presents the estimate of supportability to the MAGTF commander. He reviews the aviation combat element's estimate in conjunction with the estimates provided by the ground combat element, combat service support element, and Marine air-ground task force staffs. The MAGTF commander then determines the overall concept of operations.

The ACE commander prepares his concept of operations based on the MAGTF commander's guidance. The aviation combat element's concept of operations is general in nature and provides an overall view of how air operations support the Marine air-ground task force commander's intent and scheme of maneuver. The concept of operations is the key to Marine aviation and the Marine air command and control system employment. The MAGTF's mission and scheme of maneuver dictate the type and amount of air operations required. The type and amount of air operations required can include those necessary to accomplish the mission when the ACE is assigned as the main effort or as a supporting effort. Considerations for the aviation combat element commander's concept of operations are further discussed in FMFM 5-70.

Marine air command and control system planners develop a concept of operations for employment from the aviation combat element commander's concept of operations. This concept of operations emphasizes inter- and intra-MACCS connectivity, coordination, and control procedures and measures within the MAGTF's area of operations and agency siting.

CONCEPT OF EMPLOYMENT

Following development of the concept of operations, Marine air command and control system planners develop the concept of employment. In the concept of employment, the MACCS is task-organized to support Marine air-ground task force operations. The goal is to provide the ACE commander with an air command and control system designed to serve the MAGTF. Principal considerations for employment of the system include airspace

to be controlled, number of assets (aircraft, command and control, materials handling equipment, etc.) available, anticipated tempo of operations, the threat, necessary communications connectivity, and relationships with other joint force elements. Additional considerations for MACCS concept of employment issues are located in a briefing guide format in appendix D. The following paragraphs provide baseline employment options for the Marine command and control system.

Marine Expeditionary Unit (Special Operations Capable)

The Marine expeditionary unit (special operations capable) (MEU(SOC)) provides a sea-based, forward-deployed Marine contingent capable of immediate response to crisis situations. Within the MEU(SOC)'s aviation combat element or command element is a Marine air control group detachment. This detachment does not provide the basic command and control elements necessary to form the basis of a Marine air command and control system. It provides elements from the MACCS that may be needed in quick reaction situations. The Marine air control group detachment typically includes—

- 1 Stinger section (5 teams).

Note

A Stinger platoon (3 sections) normally supports a MEU(SOC). However, due to high operational tempo, limited Stinger gunners, and limited amphibious shipping, only a reinforced Stinger section may deploy with the MEU(SOC).

- Marine air traffic control mobile team.

- Air support element.
- Communications detachment.

This detachment provides the MEU(SOC) with point air defense, nonradar air traffic control services (for one forward operating base), and communications connectivity. The Navy provides command and control services typically performed by the Marine air command and control system agencies.

Marine Expeditionary Force

The Marine expeditionary force is the largest of the MAGTFs. The aviation combat element consists of one or more Marine aircraft wings. Inherent in the Marine aircraft wing are all the components needed to field a fully capable Marine air command and control squadron. A notional Marine expeditionary force (with one Marine aircraft wing) contains the following MACCS agencies:

- Marine tactical air command center.
- Direct air support center.
- Two tactical air operation centers.
- Four Marine air traffic control detachments.
- Low altitude air defense battalion.
- Four theater missile defense detachments.
- Marine wing communications squadron.

Special Purpose MAGTF

A special purpose Marine air-ground task force is task-organized to accomplish a specific mission, operation, or regionally focused exercise. As such, special purpose MAGTFs can be organized, trained, and equipped to conduct a wide variety of expeditionary operations in response to a crisis or a peacetime mission. Marine air command and control system participation as part of a special purpose MAGTF is situation-dependent.

EXPEDITIONARY OPERATIONS

An expedition is a military operation conducted by an armed force to accomplish a specific objective in a foreign country. The missions of military expeditions may vary widely and are limited only by the range of political objectives that may require the use of military force. Examples of expeditionary operations include humanitarian assistance in times of disaster, establishing and keeping peace in a foreign country, protecting U.S. citizens abroad, retaliating for an act of aggression by a foreign political group, and destroying an enemy government by defeating its armed forces in combat. The defining characteristic of expeditionary operations is the projection of force into a foreign setting. Refer to MCDP 3, *Expeditionary Operations*, (under development) for a complete discussion of Marine expeditionary operations. During an expeditionary operation, the MACCS is introduced onto foreign soil as part of an amphibious operation or as a fly-in echelon that marries up with equipment off-loaded from maritime prepositioned ships.

MACCS in Amphibious Operations

Marine air command and control system facilities are phased ashore during an amphibious operation. Principal air command and control related functions (offensive air support and assault support, anti-air warfare, and airspace management) are incrementally passed from Navy agencies to MAGTF agencies. When addressing the use of MACCS agencies in amphibious operations, the term “amphibious” should be used only in the context of the type of operation vice the point of embarkation. The amphibious operation can be, and normally is, supported by Marine air command and control system agencies that arrive in the amphibious objective area from amphibious and commercial shipping, as well as from fly-in echelons.

Phasing Control Ashore

Phasing control ashore is the passing of authority to control and coordinate certain functions from the commander, amphibious task force (CATF) to the commander, landing force (CLF). Specific prerequisites are required before control of the airspace can be passed from the Navy’s command and control system to the MACCS. These prerequisites include air command and control agencies and air defense activities that—

- Can exist ashore.
- Can communicate on required nets.
- Can perform the command, control, and communications functions necessary to assume control functions ashore.

General Sequence of Phasing Control Ashore

Air command and control functions are traditionally sequenced ashore in five phases. The time for each phase is not defined; some phases will overlap or at times occur simultaneously. FMFM 1-7, *Supporting Arms in Amphibious Operations*, and FMFM 5-50, *Antiair Warfare*, detail specific procedures used in the phasing of control ashore process.

Initial Phase. The initial phase is characterized by the arrival of various “supporting arms controllers” ashore; namely the tactical air control party, forward observers, air support liaison teams, and naval gunfire spot teams. LAAD teams also come ashore during the initial phase. Terminal control of offensive air support and assault support missions is typically conducted by the TACP.

Second Phase. The second phase is characterized by the arrival of two specific agencies ashore: the direct air support center and the senior fire support coordination center. During this phase, terminal control of offensive air support and assault support missions are still performed by the tactical air control party. The DASC begins to exercise control and coordination functions for both offensive air support and assault support. A Marine air traffic control mobile team may also be brought ashore to establish temporary landing zones. An early warning/control site and the theater missile defense detachment may also be introduced in this phase. The Navy SAAWC determines control responsibilities for LAAD and Hawk assets ashore.

Third Phase. The third phase is characterized by the arrival of the tactical air operations center ashore. Control and coordination authority over offensive air support and assault support missions are exercised by the DASC. The tactical air operations center and the sector antiair warfare coordinator assume control and coordination of the theater missile defense detachment, LAAD teams, and any other air defense mission within their assigned

sectors. The TAOC and SAAWC report to the tactical air control center afloat.

Fourth Phase. The fourth phase is highlighted by the establishment of a tactical air direction center ashore. During this phase, the air command and control functions listed above are still being performed by the Marine air command and control system agencies listed in the third phase. Introduction of the TADC does not alter the actual control and coordination situation. However, the tactical air direction center mirrors the capabilities of the Navy tactical air control center and begins to build additional capabilities while monitoring the communications of the Navy tactical air control center and other aviation combat element agencies ashore in preparation for the passage of command authority.

Fifth Phase. The fifth phase is characterized by the passage of command responsibility from the commander, amphibious task force to the commander, landing force (afloat to ashore). This is highlighted by the reversal of Marine TACC and TADC roles between the CATF and CLF—the Marine tactical air command center is established and the Navy tactical air control center reverts to a TADC role. The landing force's aviation combat element normally moves ashore during this phase.

MACCS Operations With a Maritime Prepositioning Force

When operating with a maritime prepositioning force (MPF), the MACCS can be designed to meet the specific requirements of flexible deployment and employment options, rapid response, and force sustainment.

MPF and Amphibious Operations. Maritime prepositioning force and amphibious operations are complementary capabilities. Amphibious operations provide the means for forcible entry, while maritime prepositioning permits rapid deployment to areas where the introduction of the force will be unopposed and is expected to remain unopposed throughout the arrival and assembly of the MPF. Maritime prepositioning can be used for the rapid introduction of forces, to include the appropriate MACCS configuration to—

- Reinforce an amphibious operation.
- Occupy or reinforce an advanced naval base.
- Occupy and defend, preemptively, key chokepoints along sea and air lines of communication.
- Reinforce an ally with a credible force prior to hostilities.
- Establish a sizable force ashore in support of sustained operations ashore.
- Deter adventurism through the diplomatic signaling afforded by positioning the ships and/or altering Marine forces.
- Augment fleet defense by providing tactical air support from ashore.

MPF Development. The Marine expeditionary force tasks major subordinate commands, including the aviation combat element, to train specific units for the maritime prepositioning force mission. The MEF commander develops and sources the task organization for the MPF force list in response to the mission tasking in the initiating directive. Specific responsibilities for the Marine aircraft wing include—

- Ensuring that units on the notional MPF force list are trained and prepared for deployment.
- Developing and maintaining a supporting deployment plan for the force-listed ACE units.
- Activating deployment support organizations to assist subordinate units during marshaling and movement when required.
- Participating in fly-in echelon data refinement efforts when tasked by the MAGTF commander.
- Participating in MPF deployment exercises when directed.
- Maintaining notional distribution of the ACE's maritime prepositioned equipment/supplies down to the unit level.
- Developing plans necessary to execute the flight ferry for assigned self-deploying aircraft in support of MPF operations.

Survey, Liaison, and Reconnaissance Party

The survey, liaison, and reconnaissance party is a task-organized team consisting of survey and reconnaissance personnel that forms the initial element of an advance party in support of a maritime prepositioning force. MACCS participation on the survey, liaison, and reconnaissance party is crucial to ensuring that proper site selection, emplacement, and Marine air command and control system concerns are addressed.

MACCS Variables

Upon deployment to the area of operations, numerous factors can impact MACCS structure and operations. For example,

- The flow of MACCS equipment and personnel into the area of operations may present a unique system configuration with agencies providing nontraditional functions.
- The MACCS may be the first air command and control system established in a remote area or it may have to integrate with a host nation system.
- The MACCS could operate as the air command and control system for the duration of an operation.
- The MACCS could provide for transition of specific function(s) to other joint and multinational air command and control systems.

MACCS in Joint/Multinational Operations

The Marine air command and control system provides the MAGTF's interface to other Services/countries air command and control agencies in a joint or multinational operation. During these operations, the Marine air assets normally support the MAGTF mission. The Marine air-ground task force commander makes sorties available to the joint force commander for tasking through the joint force air component commander and for air defense, long-range air interdiction, and long-range reconnaissance. Sorties in excess of MAGTF direct support requirements are provided to the joint force commander for tasking through the joint force air component commander for the support of other components of the joint force or the joint force as a whole. See Joint Pub 0-2, *United Action Armed Forces (UNAAF)*, for more details

on the Marine Corps' policy for command and control of Marine Corps tactical aviation in sustained operations ashore.

Joint Force Functional Capabilities. The Marine tactical air command center is equipped with contingency theater automated planning system equipment and has access to the communications systems necessary to coordinate and distribute the joint air testing order. It is capable of hosting joint air operations center (JAOC) functions. The Marine TACC's ability to perform joint air operations center functions can be described as an enabling or transitional capability. This relationship allows the JAOC to quickly establish the first, joint, air command-capable command and control system in theater. Joint air operations center functions may pass to another air command and control agency as the tempo of air operations increases. Also, the Marine tactical air command center may host the JAOC as a "pass-through" agency in situations where joint air operations center functions are passed from afloat to ashore or vice versa.

The sector anti-air warfare coordinator and tactical air operations center provide the MAGTF commander with the capability to support joint force regional or sector air defense command functions. As the Marine air-ground task force commander's air defense battle manager, the SAAWC could function as the MAGTF commander's agent for executing the regional or sector air defense commander functions. The TAOC would provide the sector anti-air warfare coordinator with the voice and data communications connectivity necessary to effect the required interfaces.

Joint/Multinational Planning. Marine air-ground task force air operations must be integrated into joint force air operations planning. The ACE commander and the Marine air command and control system must represent the MAGTF's needs and requirements for air operations in its area of operations. First and

foremost, the MACCS is a Marine air-ground task force asset. This tenet should be weighed and appropriate compensation made before Marine air command and control system agencies assume joint force level air command and control or air defense responsibilities. The planning considerations described in chapter 3 apply equally to joint and multinational operations planning.

Liaisons. The Marine air-ground task force must ensure proper coordination and integration of its forces with joint/coalition forces. Representation on joint staffs and agencies, to include liaison personnel, is essential to ensure proper employment of forces. The ACE commander, in exercising authority to command, control, and coordinate MAGTF air operations through the Marine tactical air command center, should ensure joint staff/agency and liaison representation to the joint force, joint force air component commander, joint air operations center, air-space control authority, and area air defense commander's staffs.

Interoperability. Effective air operations by the various joint force components hinge on the ability of air command and control agencies to effectively integrate and exchange air combat situation displays and information on a real time basis. Extensive use of tactical digital information links and other data networks greatly facilitate the rapid, secure, and simultaneous exchange of combat information relative to air operations. Planning for interoperability includes detailed planning and coordination of equipment, personnel, and terminology.

EXECUTION

The MACCS is made up of various air command and control activities that are coordinated through a single command center. Whether conducting an amphibious operation or sustained operations ashore, basic procedures are used throughout the MACCS to optimize the ability of Marine aviation to function in specific capacities.

Direct Air Support

The execution of direct air support missions is the responsibility of the direct air support center. Direct air support missions are missions that are flown in direct response to a specific request from the supported unit. Close air support and assault support are two of the most common types of direct air support missions. The DASC typically collocates with the senior fire support coordination center and coordinates with the FSCC for the attack of targets needing detailed coordination with the grand scheme of maneuver. An airborne DASC may also be used as an extension of the direct air support center to coordinate direct air support activities in a designated area, to extend the DASC's communications coverage, or to fill the role of the direct air support center while relocating.

Close air support aircraft are handed off to the direct air support center from the tactical air operations center and routed through the DASC's designated area of responsibility. These aircraft are then handed off to either a tactical air coordinator (airborne) or the aircraft's terminal controller. If a TAC(A) is used, he serves as an airborne extension of the DASC and coordinates directly with forward air controllers (airborne) or the tactical air control

party's forward air controllers to deconflict aircraft and coordinate the employment of air resources with other supporting arms. Assault support missions will typically be handed off to a helicopter support team or an assault support coordinator (airborne).

Preplanned, scheduled direct air support missions are conducted as dictated by the ATO. Preplanned, scheduled missions have a target location and a specified time (or time period) when the target is scheduled to be attacked. Preplanned, on-call missions are used by the supported commander, through the DASC, to add flexibility to potential needs for air support. Preplanned, on-call missions do not have a designated target, but are assigned a time period when the aircraft is scheduled to be available for use. The supported unit commander manages these assets through the direct air support center. If the DASC has been given the authority by either the ground combat or aviation combat element commander to divert these assets, responsiveness can be increased.

Should the need arise for aircraft, forward air controllers and air officers within the GCE will transmit an immediate joint tactical air strike request over the tactical air request net. The tactical air request net is monitored by fire support coordination center and the DASC. The FSCC, monitoring the tactical air request net, reserves the right to override the request for additional direct air support, but typically uses a "silence is consent" approach to approve ground combat element requests for air support.

The direct air support center attempts to resolve requests for immediate direct air support at its level. It first verifies the target with the senior fire support coordination center and compares the target to the MAGTF commander's target priority list. If a preplanned, on-call mission is available to fill the request the DASC may assign the request to the on-call mission and then inform the FSCC and the requester. If resources are not available to fill the

request, and if the target is of a high enough priority to warrant immediate action, the DASC may request the Marine tactical air command center to divert a mission of lower priority to fill the joint tactical air strike request.

Note

The DASC may divert aircraft without permission from the Marine TACC if the ACE commander has delegated the authority to divert missions.

If missions cannot be diverted to fill the joint tactical air strike request, the Marine TACC's current operations section may coordinate with Marine aircraft groups to create additional sorties to fill the request or may request additional resources from the JAOC.

Deep Air Support

Deep air support is air action against enemy targets at such a distance from friendly forces that detailed integration of each mission with fire and movement of friendly forces is not required. Deep air support missions can be conducted on either side of the fire support coordination line. The determination of proximity to friendly forces determines whether control is required. Detailed coordination and communication with the senior FSCC are required to make this determination and to avoid delivering ordnance on or near friendly advance forces. Deep air support

missions include air interdiction and armed reconnaissance missions.

Deep air support missions are typically preplanned, but in the case of time critical targets, such as theater ballistic missile transporter erector launchers, may be immediate. Deep air support missions are typically part of a package that includes a variety of aircraft, each aircraft conducts different missions to support the attack against the deep air support target. A typical package may include aircraft conducting suppression of enemy air defenses, electronic warfare, fighter escort, aerial refueling, and the aircraft actually delivering the munitions against the target.

Deep air support missions typically receive threat updates and routing instructions from the tactical air operations center, but can also receive information from the DASC or an airborne DASC specifically tasked to provide support to the deep air support package. The TAOC, using its air surveillance radars, has the ability to provide positive control, within the limits of ground-based radar, to the deep air support mission and its support package during its ingress to the target and its return to force through the integrated air defense system. The direct air support center can provide similar functions using procedural control and coordinating with the TAOC for safe passage of the deep air support mission. Often, the location and type of target are the determining factor for assigning a control agency to deep air support missions.

When a request for an immediate deep air support mission is received at the Marine tactical air command center's current operations section, they must determine the priority and the time criticality of the target and weigh those factors against available assets. In the case of high priority, time critical targets, the Marine TACC may divert close air support missions to fill the

request. Otherwise, coordination will be effected as described for direct air support to fill the request. Immediate deep air support missions may not have the luxury of a dedicated support package. The Marine TACC may attempt to assemble a support package for the deep air support mission should the situation dictate.

Assault Support

Assault support missions are coordinated through the direct air support center in much the same manner as direct air support missions. Scheduled assault support missions are processed through the DASC and routed to their terminal controller, normally an assault support coordinator (airborne) or helicopter support team. In locations where a high degree of helicopter traffic is expected, such as a large troop and cargo lift, the assault support coordinator (airborne) coordinates the flow of helicopters into and out of the landing zone. He may also coordinate with helicopter support teams on the ground.

Requests for immediate assault support are transmitted by elements within the GCE or CSSE over the helicopter request net using an assault support request. (The helicopter request net is often combined with the tactical air request net.) The direct air support center receives the assault support request and attempts to fill the assault support request with available assets. If the request is of a high enough priority, the DASC may request that other assault support resources be diverted from their scheduled mission to fill the immediate request. If assets are not available, the DASC may request additional assets from the Marine tactical air command center. The Marine TACC, in turn, may divert other assault support aircraft or coordinate with the Marine aircraft group to provide additional sorties to fill the request. In the case of requests for medical evacuation, the direct air support

center is normally delegated divert authority by the ACE commander.

Aerial Refueling

The TAOC normally controls aerial refueling to expedite the aircraft join-up process, to maintain situational awareness on the amount of fuel giveaway remaining on the tanker aircraft, and to provide positive control to the tanker to deconflict the tanker with other aircraft transiting through the area.

Air Reconnaissance

Air reconnaissance missions are controlled in much the same manner as deep air support missions (except unmanned aerial vehicles). If operating from an airfield or forward operating base, the Marine air traffic control detachment provides initial coordination for the use of unmanned aerial vehicles. The MATCD ensures the unmanned aerial vehicle has the airspace necessary to elevate to its operating altitude. If the unmanned aerial vehicle is not operating from an airfield or forward operating base then restricted operating zones or restricted operating areas are usually established to provide deconflicted airspace for unmanned aerial vehicle launch and recovery. Because the unmanned aerial vehicle is usually operated near friendly troop locations, the DASC provides routing and procedural control of the unmanned aerial vehicle to deconflict the unmanned aerial vehicle from close air and assault support aircraft as well as to integrate it with the fire support plan. The TAOC and/or MATCD can be used to provide en route positive control or flight following services to unmanned aerial vehicles. The Marine air command and control system can also provide the conduit for rapid dissemination of

real-time and near real-time reconnaissance information and imagery for the MAGTF commander.

Electronic Warfare

Electronic warfare missions are treated in much the same manner as aerial refueling and deep air support missions. Coordination and routing for electronic warfare aircraft assigned to provide electronic attack for deep or close air support missions are normally controlled by the tactical air operations center and direct air support center, respectively. Air tracks detected by electronic warfare aircraft may be reported directly to the TAOC for correlation with known air tracks or forwarded via data link to be included in the overall air picture.

Antiair Warfare

Antiair warfare is that action required to destroy or reduce to an acceptable level the enemy air and missile threat. Antiair warfare includes the areas of offensive antiair warfare and air defense.

Offensive antiair warfare actions are those operations conducted against enemy air assets and air defense systems before they are launched or before they assume an attacking role. Offensive anti-air warfare includes such tasks as suppression of enemy air defenses and attacking enemy airfields. Like deep air support missions, the controlling agency for offensive antiair warfare missions is normally dependent on the location of the target. The DASC coordinates suppression of enemy air defenses in support of close air support missions. Suppression of enemy air defense systems need not be conducted by aircraft, but can also be conducted by other supporting arms such as artillery. Typically, the TAOC provides routing and threat updates to offensive antiair

warfare missions that do not require detailed integration with the fire and maneuver of ground forces. Requests for immediate suppression of enemy air defenses are submitted using the joint tactical air strike request over the tactical air request net. A joint tactical air strike request for suppression of enemy air defenses missions is processed in the same manner as other immediate requests for air support.

Air defense includes all defensive measures designed to destroy attacking enemy aircraft or missiles in the earth's atmosphere or to nullify or reduce the effectiveness of an enemy attack. Air defense includes both active and passive actions. Passive air defense is the responsibility of all commanders and includes such methods as early warning, cover, concealment, deception, dispersion, etc. Marine air-ground task force active air defense is coordinated at the Marine tactical air command center/sector anti-air warfare coordinator level and conducted at the TAOC level.

The MAGTF may be designated one or more sectors in which it will conduct and coordinate air defense efforts. Typically, a sector anti-air warfare coordinator is designated in each sector to coordinate the execution efforts of air defense agencies and units within the sector. He supervises the tactical air operations center in its execution of active air defense operations, plans future activities for air defense units within the sector, and makes recommendations to the ACE commander regarding the employment of air defense resources within the sector. He also coordinates with the Marine air traffic control detachment for the activation of base defense zones around forward operating bases. As the ACE commander's air defense battle manager, the SAAWC may be the Marine air-ground task force's agent for performing sector or regional air defense commander functions when operating as part of a joint force. The SAAWC coordinates air defense actions within its sector with higher and adjacent air defense agencies

and activities including (as applicable) area, regional, and sector air defense commanders.

The tactical air operations center executes active air defense tasks through the control of air defense weapons. It uses assigned air defense aircraft and surface-to-air weapons within its area to destroy enemy air and missile threats, determining which resource to use based on available air defense assets and the location and type of threat. The TAOC reports the results of engagements to the Marine tactical air command center, maintains status on weapon expenditures and remaining time on station for combat air patrol aircraft, and tracks the amount of fuel available from tanker aircraft. It is responsible not only for the control of air defense aircraft and surface-to-air weapons systems, but it is also responsible for the safe routing of itinerant air traffic through its assigned sector.

The SAAWC uses aircraft scheduled on the air tasking order for air defense missions and assigns these aircraft to the TAOC(s) based on air defense activity within the sector. He also manages the combat air patrols' use of aerial refueling assets. Air defense missions appear on the ATO as either preplanned, scheduled missions or preplanned, on-call missions. Preplanned, on-call missions are often called strip alert aircraft. If the need for additional air defense aircraft arises, the tactical air operations center requests additional assets from the SAAWC, who provides the TAOC with available assets, or if none are available, requests from the Marine TACC that a strip alert air defense mission be launched or that available airborne assets be refueled and returned to station.

Note

The ACE commander may delegate authority to the SAAWC to launch strip alert aircraft.

If aircraft are not available for immediate air defense missions, the Marine TACC's current operations section may elect to divert aircraft from another type of mission (direct air support, deep air support) to fill the void or request additional aircraft from the Marine aircraft groups or the joint air operations center.

As enemy air threats are detected, the sector anti-air warfare coordinator requests the Marine TACC to upgrade the air defense warning condition for particular areas. Commensurate with this, the SAAWC may also ask for upgrades to the weapons control status to engage the threat at the furthest possible range.

The tactical air operations center uses information gained from its air surveillance radars and data link-equipped aircraft and air control agencies to build a comprehensive air picture. This information is shared with other appropriately equipped data link agencies to build an air situation picture that portrays air activity throughout the joint force's operating area. To enhance this picture, the TAOC takes advantage of all available air surveillance sensors including aircraft equipped with TADIL-C, electronic warfare support aircraft, and MATCD sensor information. The TAOC typically deploys an early warning and control site to a location where terrain masking or line of sight limitations inhibit the detection afforded by radars located at the main site. The information gained through various, dispersed battlefield air surveillance sensors and electronic intelligence assets can provide a detailed air picture that significantly enhances identification of friendly aircraft and early warning of enemy air attack.

Airspace Management

Airspace management is the coordination, integration, and regulation of the use of airspace of defined dimensions. Airspace management functions are conducted at various levels throughout

the Marine air command and control system. The Marine tactical air command center conducts airspace management planning. It also receives requests for airspace control measures from various MACCS agencies and activities and other MAGTF elements to prepare input to the airspace control plan/order. The airspace control plan, developed by the airspace control authority, provides an exhaustive list of all available airspace control measures for use by the joint force. Additionally, the airspace control plan delineates the general procedures for using airspace within the joint theater of operations. The airspace control plan can generally be found as an annex or appendix of the joint operations order or plan. The airspace control order provides detailed airspace information to airspace users (aircrew) and airspace managers (Marine TACC, TAOC, DASC, air traffic control, etc.). The airspace control order contains modifications and additions to the airspace control plan. It is generally transmitted daily as part of the air tasking order. Also transmitted with the ATO is the special instructions (SPINS). The SPINS contain a variety of augmenting information such as specific time periods for the activation of air control measures and changes to the ROE or identification criteria.

Real-time airspace management is conducted by principal MACCS agencies. The direct air support center, tactical air operations center, and Marine air traffic control detachment use airspace control measures to effect control and direction of aircraft within their portion of the airspace. The MATCD effects coordination of airspace with host or allied nation aviation authorities to facilitate the processing of tactical air traffic from their forward operating bases to their area of action. Marine air traffic control mobile teams operating from tactical landing zones and forward arming and refueling points also control the flow of

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aircraft into and out of these areas, necessitating the need to coordinate its airspace with other MACCS agencies.

Immediate requests for airspace control measures are normally forwarded to the Marine tactical air command center. The Marine TACC's current operations section coordinates directly with the airspace control authority's staff to enact an airspace control measure or arbitrate a conflict. Additions or modifications to existing airspace control measures are forwarded from the airspace control authority to the Marine TACC, who provides that information to affected agencies.

Chapter 5

Training

Training of command and control personnel is key to successful mission execution. Training events should not only be quantitative, but also qualitative to achieve the desired level of competence. Marine air command and control system training focuses on training as a system. The MACCS' unique interface requirements demand joint and multinational training to ensure crew and system adeptness for operating in a myriad of scenarios. The types of training discussed in this chapter do not include all training conducted by the MACCS or its individual agencies, activities, or Marines. This chapter discusses selections of training opportunities used by the Marine air command and control system. See agency/activity specific publications in the MCWP 3-25 series for specific training details and opportunities.

MACCS INTEGRATED SIMULATED TRAINING EXERCISE

The MACCS integrated simulated training exercise (MISTEX) is a Marine air control group locally produced exercise. It involves detailed preparation of a simulated scenario and its subsequent execution at the MACCS level. The MISTEX prepares units for upcoming field training exercises or contingencies. Other than participating in an exercise, the MISTEX is perhaps the best way for the entire Marine air command and control system to work together to build combat readiness. Generally, an agency's weapons and tactics instructors (WTI) identify training deficiencies for

each agency and use the MISTEX as a vehicle to provide the necessary training.

MARINE AVIATION PLANNING PROBLEM

Marine aviation planning problem (MAPP) exercises are low cost, low overhead training that allows commanders to train their staffs to perform special integration and control functions to support their decisions in a simulated environment. Unit planners use MAPP exercises to determine command and control requirements and develop plans that support possible contingencies.

JOINT SERVICE TRAINING EXERCISE

The joint service training exercise (JSTE) is similar to the MISTEX. It trains commanders and their staffs to integrate the Marine air command and control system in a joint operation. JSTE scenarios support joint training from probable contingency operations worldwide.

FIELD TRAINING EXERCISES

Field training provides a unit with the most beneficial training opportunities available. Units live and operate in conditions similar to those expected in real world operations.

UNIT TRAINING

Unit training builds upon a unit's current level of combat readiness. Once a unit's combat readiness capabilities are identified,

commanders focus on the training of tasks that are essential to a unit's combat readiness. Unit training can take on many forms (e.g., command post exercises, simulated exercises, field training exercises). During unit training, MACCS personnel are intimately involved in the preparation of training plans and the coordination with higher, adjacent, and subordinate command, control, and support elements. Some common examples of MACCS unit training are as follows:

- An operational readiness evaluation is an internal unit drill used to test crew proficiency and readiness.
- The moving target simulator provides a realistic environment for individual Stinger crew members to hone their target acquisition, identification, and firing skills.
- Direct air support center drills provide DASC crew members the opportunity to conduct procedural control of simulated sorties in order to increase proficiency and understand the type of communications necessary to facilitate this control.

FORMAL SCHOOLS

All Marines are provided basic, entry-level schooling. Additional opportunities also exist for Marines to enhance their basic schooling and increase their qualifications and combat readiness. Some of the additional schools and courses are discussed below.

Weapons and Tactics Instructor Course

The Weapons and Tactics Instructor Course consists of approximately 6 weeks of academic orientation, command and control integration, and operational field instruction. Conducted twice annually, it is designed to provide one WTI per squadron/unit

per year. Course objectives are to graduate officers who are fully qualified in their military occupational specialty and qualified to plan and execute the air-ground mission. The course uses intensely integrated tactical exercises to refine students instructional abilities and hone their aviation planning and execution skills. Some MACCS-related courses embedded in the WTI Course are as follows.

DASC Crew Chief Course. The DASC Crew Chief Course is designed for the MOS 7242 (air support operations operator). It provides graduate-level DASC operations training to qualified enlisted DASC crew chiefs.

LAAD Section Leader Course. The LAAD Section Leader Course is a graduate level course in the employment of the LAAD section and its role in the MAGTF's integrated air defense system. It is open to qualified LAAD section leaders in MOS 7212.

TAOC Enlisted Weapons and Tactics Course. The TAOC Enlisted Weapons and Tactics Course is designed for MOS 7236 tactical air defense controllers. It teaches TAOC employment and the TAOC's role in the MAGTF's integrated air defense system. This course is open to qualified, enlisted senior weapons directors.

MMT Course. The Marine Air Traffic Control Mobile Team Course is designed for air traffic controllers (officer and enlisted). It focuses on the deployment of an expeditionary air traffic control capability to remote or newly established forward operating bases.

Marine Division Tactics Course

Marine Division Tactics Course is a course conducted by Marine Aviation Weapons and Tactics Squadron 1 for F/A-18 crew members and TAOC air intercept controllers. The Marine Division Tactics Course provides training in advanced fighter tactics and aircrew/controller integration.

Navy Fighter Weapons School

Designed for F/A-18 crew members and TAOC air intercept controllers, the Navy Fighter Weapons (TOPGUN) Course is similar to the Marine Division Tactics Course, but it also includes training in advanced fighter tactics.

Airspace Management Course

The Airspace Management Course is conducted at Keesler Air Force Base or by a mobile training team. The Airspace Management Course introduces students to the tools and methodology used in developing, negotiating, and establishing military special use airspace.

Joint Doctrine Air Campaign Course

Conducted at Maxwell Air Force Base, the Joint Doctrine Air Campaign Course is a joint Service course designed to introduce students to the tools and methodology used in building and formalizing a joint air operations plan.

Joint Air Operations Staff Course

The Joint Air Operations Staff Course allows the student to execute a developed air operations plan in a simulated mature theater. The course is taught at the Air Force Air Ground Operations School, Hurlburt Field, Florida.

AVIATION TRAINING AND READINESS INFORMATION SYSTEM

The Marine Corps' Aviation Training and Readiness Information System (ATRIMS) is a special purpose training management tool designed specifically for Marine aviation and MACCS units. ATRIMS automates the training and readiness (T&R) manual's syllabus and provides commanders an automated way to track individual and unit combat readiness percentages based on ATRIMS generated reports.

TRAINING AND READINESS SYLLABUS

The T&R syllabus standardizes MACCS personnel training and specifies performance requirement qualifications. The T&R syllabus prescribes the number of events, tasks to be accomplished on each event, and the re-fly factor for skill retention. Individual agency T&R syllabi are located in the T&R manual, volume V.

Volume I

T&R manual, volume I provides administrative guidance and instruction for trainers on how to use the unit's applicable T&R portion. The manual outlines four specific levels of training with each level equating to an individual Marine's combat readiness percentage. The combat readiness percentage corresponds to a

numeric percentage value of training accomplished by the Marine. The training levels are as follows.

Combat Capable Training. For MACCS personnel, this training is conducted by entry-level MOS schools and the crew member's first operational unit. It includes MACCS familiarization, system/ equipment operation, initial crew procedures, and initial core competencies. Upon completion, an individual will be at 60 percent combat readiness percentage.

Combat Ready Training. Combat ready training raises the skill level of MACCS personnel and introduces them to all of their core competencies. The combat readiness percentage reflects the hierarchical nature of core competencies. The skills and qualification of this tier of training are normally obtainable within the first year of assignment to a tactical unit. Upon completion of this phase of training, an individual will be at 75 percent combat readiness percentage.

Combat Qualification Training. Combat qualification training includes advanced training in core competencies. This tier of training is normally available to experienced personnel. Progression to this phase hinges upon performance in the combat ready phase. This tier moves a Marine from proficiency to agency supervision and field leadership positions. Upon completion, an individual will be at 95 percent combat readiness percentage.

Full Combat Qualification Training. Full combat qualification training is reserved for large-scale, integrated missions, events having unique mission taskings, or events that have a low probability of execution in combat and are relatively high risk, yet they warrant maintaining a limited number of individuals trained in their execution. This training tier contains a unit's highly capable and experienced personnel. Once personnel receive full

combat qualifications, they are expected to display, on a daily basis, the maturity and tactical acumen commensurate with this status. Upon completion of this training, an individual has a 100 percent combat readiness percentage.

Instructor/Specific Training. The T&R syllabus provides for special qualifications and instructor certifications for various MACCS personnel. The qualification and certification standards for these positions are located in the agency-specific 500 and 600 level syllabi.

Volume V

T&R manual, volume V is subdivided into chapters that are specific for the various MACCS agencies and operational positions. Individual training requirements, lectures, and “chaining” of training events constitute much of volume V. Chaining assists the trainer in updating currency standards for events directly affected by the accomplishment of other more advanced events. Each T&R syllabus event carries a specific percentage value.

Combat Readiness Percentage

The combat readiness percentage is a numerical representation of the percentage of the syllabus in which an individual is proficient. Combat readiness percentages are divided into four basic categories that compare to the level of qualification the individual has attained and demonstrated proficiency within the respective syllabus (i.e., combat ready qualification would equate to a combat readiness percentage between 75 and 95 percent).

EVALUATING TRAINING

The success of individual, crew, and unit training must be qualitatively measured to identify training deficiencies and create a baseline for designing future training. The Marine Corps Combat Readiness Evaluation System (MCCRES) and the T&R manual are examples of the evaluation tools used to identify training deficiencies. MCCRES is a standardized, Headquarters Marine Corps directed evaluation program designed to measure a unit's warfighting readiness. MCCRES specifies the mission performance standards that agencies are expected to perform during their wartime mission.

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Appendix A

Planning Review Checklist

General Situation

- Review joint force commander's mission statement.
- Review joint force commander's intent.
- Review joint force commander's phasing plan.
 - Preconditions for the next phase.
 - Main effort.
 - Defeat mechanism.
- Review MAGTF commander's mission statement.
- Review MAGTF commander's intent.
- Review MAGTF commander's phasing plan.
 - Preconditions for the next phase.
 - Main effort.
 - Defeat mechanism.

ACE Commander's Intent (Principal Objectives)

- Review ACE commander's mission statement.
- Review ACE commander's intent.
- Review ACE commander's main effort.
- Review ACE commander's defeat mechanism.
- Describe purpose with respect to the relationship of the force, enemy, area of operations, and operating environment.
- Describe how the purpose facilitates future operations.

ACE Commander's Concept of Operations

(Plan of Execution)

- Describe sequence of operations from the ACE perspective. This helps define the "how," "when," and "why" for subordinates.
- Define phases and how they relate to the MAGTF plan.
- Determine the criteria that will cause the ACE to shift from phase to phase.
- Determine who will be the main effort during various phases.
- Describe contingencies that would substantially alter the ACE plan.
- Identify enemy courses of action that have been wargamed against the ACE commander's concept of operations.

Additional Considerations

- Air intelligence preparation of the battlespace (IPB).
- Rules of engagement.
- Task organization.
- Delegation of authority and command and control.
- MAGTF air defense priorities.

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Appendix B

MACCS Planning Considerations

Mission

- Specified tasks.
- Implied tasks.
- Mission derivation based on MAGTF and ACE commander's intent.

Assumptions

Friendly Force Composition

- JFACC, ACA, and AADC.
- Other joint/multinational Service commands.
- MAGTF.
- MACCS.
- Focus on unique integration requirements.

Threat

- Air order of battle.
- Ground order of battle.

- Electronic warfare.
- Reconnaissance.
- Unconventional/special operating forces concerns.

AOA/Area of Operations Description

- Size.
- Airspace control area.
- Air defense area.
- Sectors of responsibility.

Terrain and Weather

- Topography.
- Masking effects.
- Mobility/trafficability.
- Vegetation/foilage.
- Environmental effects on communications and radar.

Airspace Control

- Surveillance plan.
 - Agency responsibilities.

- Identification authority.
- Radiation control plan.
- Radar contracts.
- Control of aircraft within the air traffic service terminal control area and/or base defense zone.
- Control of aircraft after departing air traffic service terminal control area.
- Control of aircraft by terminal controllers (FAC[A], TAOC, etc.).
- Control of aircraft during recovery operations.
- Control of unmanned aerial vehicles.
- Handover points.
- IFF/SIF requirements.

Airspace and Air Defense Control Measures

- Destruction area (base defense zones, missile engagement zones, fighter engagement zones, crossover zones/points).
- Airspace coordination measures.
- Routing.
- Control points.
- Orbit areas.

- Additional airspace control measures.
 - High-density airspace control zone.
 - Low level transit route.
 - Coordinating altitude.
 - Restricted operating areas/zones.
 - Standard use Army aircraft flight route.
 - International flight information region (civil airways).

Lame Duck Procedures

Air Control

- Engagement authority.
- Combat air patrol and tanker control.
- Surface-to-air weapons mode of control.
- ROEs.
 - Identification criteria.
 - Weapons control status.
 - Self-defense criteria.
 - ROEs changes necessitated at night.

Air Direction

- Combat air patrol and tanker management.
- Launch and divert authority (combat air patrol [launch only], offensive air support, assault support).
- States of alert.

Communications

- Requirements.
- Assets available.
- Equipment and crypto compatibility.
- Redundant architectures for critical information flow.
- Emission control plans.
- Intelligence connectivity.
- Contingency theater automated planning system integration.

Casualty Procedures

- Agency.
- Function.
- Communications.

Logistics

- Resupply and sustainment
 - Ordnance.
 - Fuel.
 - Class IX.
- Impact of plan for control of aircraft and missiles on logistical considerations and constraints.

Airborne Early Warning Considerations

- E-2/E-3 stations/orbits.
- Roles and responsibilities.
 - Primary.
 - Secondary.
 - Casualty/back-up plan.
- Communications.

Appendix C

MACCS Planning Brief

This brief's format, though comprehensive, is not exhaustive. The brief should be tailored to the audience and changes in either flow or content should be based on the tactical situation. In presenting the brief, the briefer(s) must ensure that it is presented in a cohesive and logical fashion. The focus must be on content vice form, and on ensuring that all in attendance understand each section's meaning and implications.

Commander's Intent

- Purpose of the battle/operation.
- Commander's battlespace vision.
- Commander's critical information requirements (elements critical to the commander's decisionmaking).

Joint/Multinational Interoperability Issues

- Interface with JFACC, ACA, and AADC staffs
- Airspace control area/sectors.
- Air defense area/region/sectors
- Interface with the International Civil Aviation Organization and host nation air traffic control facilities.

- ATO input and receipt procedures.

Command, Control, and Communications

Employment Plan

- Threat assessment and counter tactics.
- Air defense priorities.
- Offensive air support and assault support priorities.
- Available assets and locations.
- Surveillance coverage and radar contracts.
- Responsiveness to the threat.
- Destruction area (base defense zone, missile engagement zone, fighter engagement zone, crossover zone/point).
- Data link connectivity.
- Manual cross tell procedures.
- Orbit areas.
- Routing (minimum risk routes, IFF on/off line, fade and bug-out plans).
- Fire support coordination measures.
 - Airspace coordination areas.
 - Fire support coordination line.

- Free fire areas.
- Restricted fire areas.
- No fire areas.
- Intelligence preparation of the battlespace products.
 - Target areas of interest.
 - Named areas of interest.
- Additional airspace control measures, as applicable (high-density airspace control zone, restricted operating area/zone, low level transit route, etc.).
- Lame duck procedures.
- Combat air patrol management and control.
- Tanker management and control.
- Aircraft handover procedures.
- Initial air defense warning condition.
- Initial weapons control status.
- Initial states of alert.
- Initial surface-to-air weapons mode of control.
 - Authority to change mode.
 - Procedures for autonomous operations.
- Radiation control plan.

- ROEs.
 - Identification authority.
 - Engagement authority.
 - Identification criteria.
 - Commit criteria.
 - Self defense criteria.
 - Changes necessitated by night operations.
 - Reasonable assurance.
- Search and rescue/tactical recovery of aircraft and personnel.
 - Responsibility.
 - Procedures/communications.
 - Launch authority.
- Medical evacuation.
 - Responsibility.
 - Procedures/communications.
 - Launch authority.
 - Location of medical facilities.

- Communications.
 - Planned and exceptions.
 - Critical information flow.
 - Communications assignments.
 - Crypto change over time.
 - Emission control plan.
 - Intelligence connectivity.
- Casualty procedures.
 - Functional degradation.
 - Data link and voice communications.
- Delegation of authority.
 - Combat air patrol launch.
 - Offensive air support divert/launch.
 - Theater missile defense attack operations.
 - Assault support launch/divert.
 - Delay/abort.
- Summary of major responsibilities.
 - Joint/multinational agencies.

- Marine TACC/senior watch officer.
- TAOC/SAAWC.
- TAOC/senior air director.
- DASC/senior air director.
- Other applicable MACCS agencies.

Appendix D

Concept of Employment Brief

The concept of employment brief provides the vehicle for the MACG S-3 to communicate the initial MACCS employment plan to the MACG or ACE commander. It is informal and interactive, describing how planners intend to employ the MACCS to accomplish the assigned mission. Typically, at the MACG level, the MACCS planning staff includes the MACG S-3 staff and subordinate battalion and squadron S-3 officers.

The concept of employment brief should occur early in the planning process and thereby provide the initial employment framework and key decisions that enable subordinate planning staffs to accomplish concurrent and detailed planning. The concept of employment should accomplish the following:

- Describe the planned tactical employment of the MACCS.
- Describe how the assigned objectives and tasking will be accomplished.
- Present unresolved issues and issues requiring the commander's decision.
- Provide additional planning information to subordinate commanders to facilitate detailed planning and coordination.

CONCEPT OF EMPLOYMENT BRIEF FORMAT

The concept of employment brief format that follows should serve only as a guide for briefers. The brief must focus on content vice form, and thus the provided format is modified based on the tactical situation. Section A provides an overview of the MAGTF and ACE missions with emphasis on an assessment of the threat and identification of implied tasks. Section B addresses any assumptions that have been made. Section C specifically addresses critical command, control, and communications employment issues that must be agreed upon by the MACG/ACE commander to enable continued detailed planning. Section D provides the forum to make recommendations to the MACG/ACE commander concerning delegation of authority. Section E enables the planning staff to request additional guidance on certain issues from the MACG/ACE commander.

Section A. Mission Overview

- Enemy situation.
- Weather.
- Friendly situation.
- MAGTF mission.
 - MAGTF scheme of maneuver.
 - Significant concerns.
 - ACE specific tasks.

- Threat assessment and countertactics.
- ACE implied tasks.
- ACE broad sequence of events.

Section B. Assumptions

Section C. Command, Control, and Communications Employment Plan

- Air defense priorities.
- Available assets and locations.
- Surveillance plan.
- Responsiveness to the threat.
- Destruction area.
- Routing plan.
- Combat air patrol management and control.
- Identification/engagement authority.
- ROEs.
- Communications architecture.
- Critical information.

Section D. Issues Requiring ACE Commander's Approval

- Combat air patrol launch authority.
- Offensive air support launch/divert authority.
- Theater missile defense attack operations divert authority.
- Assault support launch/divert authority.
- Delay/abort authority.
- Reasonable assurance.

Section E. Unresolved Issues Requiring ACE/MACG Commander's Guidance

Appendix E

Glossary

Section I. Acronyms

AADC	area air defense commander
ACA	airspace control authority
ACE	aviation combat element
ACLO	air control liaison officer
ANGLICO	air/naval gunfire liaison company
AOA	amphibious objective area
ASC(A)	assault support coordinator (airborne)
ASLT	air support liaison team
ATO	air tasking order
ATRIMS	Aviation Training and Readiness Information System
CATF	commander, amphibious task force
CLF	commander, landing force
COMMARFOR	Commander, Marine Forces
COS	current operations section
CSSE	combat service support element
DASC	direct air support center
DASC(A)	direct air support center (airborne)
EW/C	early warning/control
FAC	forward air controller
FAC(A)	forward air controller (airborne)
FMFM	Fleet Marine Force manual
FMFRP	Fleet Marine Force reference publication
FOS	future operations section
FSCC	fire support coordination center

T&R training and readiness
TAC(A) tactical air coordinator (airborne)
TACC tactical air command center
TACP tactical air control party
TADC tactical air direction center
TADIL tactical digital information link
TAOC tactical air operations center
UNAAF United Action Armed Forces
U.S. United States
WTI weapons and tactics instructor

Section II. Definitions

A

airspace control authority – The commander designated to assume overall responsibility for the operation of the airspace control system in the airspace control area. (Joint Pub 1-02) Also called ACA.

airspace control order – An order implementing the airspace control plan that provides the details of the approved requests for airspace control measures. It is published either as part of the air tasking order or as a separate document. (Joint Pub 1-02) Also called ACO.

airspace control plan – The document approved by the joint force commander that provides specific planning guidance and procedures for the airspace control system for the joint force area of responsibility/joint operations area. (Joint Pub 1-02) Also called ACP.

air support element – The air support element is an element task organized by the Marine air support squadron to perform various air support control functions for the Marine expeditionary unit. The air support element is not a direct air support center, but is capable of assisting in the control of direct air support operations for a limited period of time in a limited area. The air support element can function as an extension of the Navy tactical air control center/helicopter direction center, in conjunction with the battalion tactical air control party. (FMFRP 0-14) Also called ASE.

air support liaison team – A team task organized by the Marine air support squadron to maintain liaison between the direct air support center and the fire support coordination center. The air support liaison team is not a direct air support center, but may augment an echelon capability during displacement of the direct air support center. An air support liaison team may be used to provide a team to the senior fire support coordination center when the direct air support center is not able to physically collocate with the fire support coordination center because of mobility or communications requirements with other agencies and supporting aircraft. (FMFRP 0-14) Also called ASLT.

area air defense commander – Within a unified command, subordinate unified command, or joint task force, the commander will assign overall responsibility for air defense to a single commander. Normally, this will be the component commander with the preponderance of air defense capability and the command, control, and communications capability to plan and execute integrated air defense operations. Representation from the other components involved will be provided, as appropriate, to the area air defense commander's headquarters. (Joint Pub 1-02) Also called AADC.

assault support coordinator (airborne) – An aviator who coordinates, from an aircraft, the movement of aviation assets during assault support operations. (FMFRP 0-14) Also called ASC(A).

C

commander, amphibious task force – The U.S. Navy officer designated in the initiating directive as commander of the amphibious task force. (Joint Pub 1-02) Also called CATF.

commander, landing force – The officer designated in the initiating directive for an amphibious operation to command the landing force. (Joint Pub 1-02) Also called CLF.

D

direct air support center – The principal air control agency of the Marine air command and control system responsible for the direction and control of air operations directly supporting the ground combat element. It processes and coordinates requests for immediate air support and coordinates air missions requiring integration with ground forces and other supporting arms. It normally collocates with the senior fire support coordination center within the ground combat element and is subordinate to the tactical air command center. (Joint Pub 1-02) Also called DASC.

direct air support center (airborne) – An airborne aircraft equipped with the necessary operations and communications facilities, and manned by the essential personnel, to function, in a limited role, as a direct air support center. (proposed modification to Joint Pub 1-02) Also called DASC(A).

F

forward air controller – An officer (aviator/pilot) member of the tactical air control party who, from a forward ground or airborne position, controls aircraft in close air support of ground troops. In the Marine Corps, a forward air controller is a naval aviator or naval flight officer, within the tactical air control party, who is specifically trained and qualified to exercise control, from the ground, of air support of ground forces. (FMFRP 0-14) Also called FAC.

forward air controller (airborne) – A specifically trained and qualified aviation officer who performs the dual tasks of conducting air reconnaissance/surveillance and exercising control from the air of aircraft engaged in air support of ground troops. (FMFRP 0-14) Also called FAC(A).

J

joint force air component commander – The joint force air component commander derives authority from the joint force commander who has the authority to exercise operational control, assign missions, direct coordination among subordinate commanders, redirect and organize forces to ensure unity of effort in the accomplishment of the overall mission. The joint force commander will normally designate a joint force air component commander. The joint force air component commander's responsibilities will be assigned by the joint force commander (normally these would include, but not be limited to, planning, coordination, allocation, and tasking based on the joint force commander's apportionment decision). Using the joint force commander's guidance and authority, and in coordination with other Service component commanders and other assigned or supporting commanders, the joint force air component commander will recommend to the joint force commander apportionment of air sorties to various missions or geographic areas. (Joint Pub 1-02) Also called JFACC.

M

Marine air command and control system – A system which provides the aviation combat element commander with the means to command, coordinate, and control all air operations within an

assign sector and to coordinate air operations with other Services. It is comprised of command and control agencies with communications-electronics equipment that incorporates a capability from manual through semiautomatic control. (Joint Pub 1-02) Also called MACCS. The two major types of control exercised by the Marine air command and control system are:

- a. **air direction** – The guidance and supervision which a commander employs to focus his resources on mission accomplishment. Air direction occurs as a sequence of the following activities:
 - (1) **apportionment** – The determination and assignment of the total expected effort by percentage and/or by priority that should be devoted to the various air operations and/or geographic areas for a given period of time.
 - (2) **allocation** – The translation of the apportionment into total numbers of sorties by aircraft type available for each operation/task.
 - (3) **tasking** – The process of translating the allocation into orders, and passing these orders to the units involved. Each order normally contains sufficient detailed instructions to enable the executing agency to accomplish the mission successfully.
 - (4) **fragmentary order** – An abbreviated form of an operation order, usually issued on a day-to-day basis, that eliminates the need for restating information contained in a basic operation order. It may be issued in sections.
- b. **air control** – The authority to effect the maneuver of aircraft. The elements of air control are:
 - (1) **air control agency** – An organization possessing the capability to exercise air control.
 - (2) **air controller** – An individual especially trained for and assigned the duty of the control (by use of radio, radar, or other means) of such aircraft as may be allotted to him for operation within his area.

(3) airspace control – A service which coordinates, integrates, and regulates the use of an airspace of defined proportions. It does not include measures to approve, disapprove, deny, or delay air operations.

(4) operational control – With respect to a flight, the exercise of authority over initiating, conducting, or terminating a flight.

(5) positive control – **1.** 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.

2. The tactical control of aircraft by a designated control unit, whereby the aircraft receives orders affecting its movements which immediately transfer responsibility for the safe navigation of the aircraft to the unit issuing such orders.

(6) procedural control – A method of airspace control that relies on a combination of previously agreed and promulgated orders and procedures.

(7) radar control – The operation of air traffic in a radar environment in which heading, altitude, and airspeed of the aircraft are directed by the control facility, and radar separation from other traffic is provided.

(8) terminal control – The authority to direct the maneuver of aircraft which are delivering ordnance, passengers, or cargo to a specific location or target. Terminal control is a type of air control. (FMFRP 0-14)

Marine air-ground task force – A task organization of Marine forces (division, aircraft wing, and service support groups) under a single command and structured to accomplish a specific mission. The Marine air-ground task force components will normally include command, aviation combat, ground combat, and combat service support elements (including Navy Support Elements). (Excerpt from Joint Pub 1-02) Also called MAGTF.

Marine air traffic control mobile team – A task organized element provided by the Marine air traffic control detachment to perform control of friendly aircraft operating within the assigned base defense zone of a forward operating base air facility/air site. The MATCD mobile team can provide continuous, control tower, non-radar approach, departure, and en route air traffic control services within its assigned terminal control area and base defense zone. Normally, a fully manned and equipped mobile team capability can be provided on a 24-hour basis for up to 72 hours without resupply or augmentation. (FMFM 5-50) Also called MMT.

maritime prepositioning force – A task organization of units under one commander formed for the purpose of introducing a MAGTF and its associated equipment and supplies into a secure area. The maritime prepositioning force is composed of a command element, a maritime prepositioning ships squadron, a MAGTF, and a Navy support element. (FMFRP 0-14) Also called MPF.

S

sector antiair warfare coordinator – An individual designated by the aviation combat element commander to function as his air defense battle manager. He functions to the extent of authority delegated to him by the aviation combat element commander. The sector antiair warfare coordinator is responsible for coordination and management of all active air defense weapons (aircraft and surface-to-air weapons) within his assigned sector. (FMFRP 0-14) Also called SAAWC.

T

tactical air command center – The principal Marine Corps air command and control agency from which air operations and air defense warning functions are directed. It is the senior agency of the Marine air command and control system which serves as the operational command post of the aviation combat element commander. It provides the facility from which the aviation combat element commander and his battlestaff plan, supervise, coordinate, and execute all current and future air operations in support of the Marine air-ground task force. The tactical air command center can provide integration, coordination, and direction of joint and combined air operations. (FMFRP 0-14, proposed modification to Joint Pub 1-02) Also called Marine TACC.

tactical air control party – A subordinate operational component of a tactical air control system designed to provide air liaison to land forces and for the control of aircraft. (Joint Pub 1-02) In the Marine Corps, tactical air control parties are organic to infantry divisions, regiments, and battalions. Tactical air control parties establish and maintain facilities for liaison and communications between parent units and airspace control agencies, inform and advise the ground unit commander on the employment of supporting aircraft, and request and control air support. (FMFRP 0-14) Also called TACP.

tactical air coordinator (airborne) – An officer who coordinates, from an aircraft, the action of combat aircraft engaged in close support of ground or sea forces. (Joint Pub 1-02) Within the Marine air command and control system, the tactical air coordinator (airborne) is the senior air coordinator having authority over all aircraft operating within his assigned area of responsibility. The tactical air coordinator (airborne), considered an

airborne extension of the direct air support center and fire support coordination center, contributes to coordination between the tactical air control parties, airborne forward air controllers, and the fire direction of artillery and naval gunfire. (FMFRP 0-14) Also called TAC(A)

tactical air direction center – An air operations installation under the overall control of the tactical air control center (afloat)/tactical air command center, from which aircraft and air warning service functions of tactical air operations in an area of responsibility are directed. (Joint Pub 1-02) Also called TADC.

tactical air operations center – The principal air control agency of the Marine air command and control system responsible for airspace control and management. It provides real time surveillance, direction, positive control, and navigational assistance for friendly aircraft. It performs real time direction and control of all antiair warfare operations, to include manned interceptors and surface-to-air weapons. It is subordinate to the tactical air command center. (Joint Pub 1-02) Also called TAOC.

Appendix F

References and Related Publications

Joint Publications (Joint Pubs)

- 0-2 Unified Action Armed Forces (UNAAF)
- 1-02 Department of Defense Dictionary of Military and Associated Terms
- 3-52 Doctrine for Joint Airspace Control in the Combat Zone
- 3-56.1 Command and Control for Joint Air Operations

Marine Corps Doctrinal Publications (MCDPs)

- 1 Warfighting
- 3 Expeditionary Operations (under development)

Marine Corps Warfighting Publications (MCWPs)

- 3-25.5 Direct Air Support Center Handbook
- 3-25.6 Marine Sector Antiair Warfare Coordinator Handbook
- 3-25.7 Tactical Air Operations Center Handbook
- 3-25.8 Marine Air Traffic Control Detachment Handbook
- 5-1 Operational Planning (under development)

Fleet Marine Force Manuals (FMFMs)

- 1-7 Supporting Arms in Amphibious Operations
- 5-41 Close Air Support and Close-in Fire Support
- 5-50 Anti-air Warfare
- 5-60 Control of Aircraft and Missiles
- 5-70 MAGTF Aviation Planning

Fleet Marine Force Reference Publications (FMFRPs)

- 5-61 Integrated Combat Airspace C2 (ICAC2)
- 5-62 Theater Air-Ground System (TAGS)