Chapter 2

The Missions, Functions, and Organization of Marine Aviation

“Marine aviation units are an integral element of an air-ground combat system. They are not merely joined at the top when the time comes to fight. They are fully integrated from top to bottom, and they train that way full-time.”

—Gen Carl E. Mundy

Marine Corps aviation is organized, trained, and equipped to provide a task-organized ACE for any size MAGTF. The ACE is not a formal command. The term “ACE” categorizes the functionality of specific forces within the MAGTF. For any MAGTF, the ACE is composed of task-organized Marine aviation forces under a single commander. The ACE commander is the MAGTF commander’s principal advisor and subject matter expert on all aviation activities.

The ACE must be prepared to support MAGTF expeditionary operations from both sea-based and shore-based facilities. The ACE’s primary mission is to support the MAGTF during all phases of expeditionary operations as well as during sustained operations ashore.

2001. Functions of Marine Aviation

The tasks of Marine aviation fall into six functional areas (see fig. 2-1 on page 2-2): offensive air support, antiair warfare, assault support, air reconnaissance, electronic warfare, and control of aircraft and missiles. Planners initially consider the functional area, not the means (i.e., particular weapons systems), when analyzing the fundamental requirements of accomplishing any given objective.

a. Offensive Air Support

OAS involves air operations that are conducted against enemy installations, facilities, and personnel in order to directly assist in the attainment of MAGTF objectives by destroying enemy resources or isolating enemy military forces. Its primary support of the warfighting functions is to provide fires and force protection through CAS and DAS. The application of OAS can sometimes be decisive by directly or indirectly affecting an enemy’s center of gravity. OAS allows the commander to influence the battle by projecting firepower to shape events in time and space. It also allows the commander to shape the battlespace by delaying enemy reinforcements, degrading critical enemy functions, and manipulating enemy perceptions, which ultimately results in protection of the force. Marine fighter/attack squadrons (VMFAs), Marine fighter attack (all weather) squadrons (VMFA[AW]s), Marine attack squadrons (VMAs), Marine light/attack helicopter squadrons (HMLAs), and Marine unmanned aerial vehicle squadrons (VMU) provide OAS during OAS missions. OAS includes two categories: CAS and DAS.

(1) CAS. CAS is an air action performed by fixed-wing and rotary-wing aircraft against hostile targets that are in close proximity to friendly forces. CAS requires detailed integration of each air mission with the fire and movement of friendly forces.

(2) DAS. DAS is an 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. Close coordination of the fire and maneuver of friendly forces is a qualifying factor for a DAS
mission. DAS missions are flown on either side of the fire support coordination line. These missions include air interdiction and armed reconnaissance.

(a) Air Interdiction Operations. An air interdiction operation destroys, neutralizes, or delays the enemy’s military potential before it can be brought to bear effectively against friendly forces. This type of operation is a response to a known target that is briefed in advance.

(b) Armed Reconnaissance Missions. An armed reconnaissance mission finds and attacks targets of opportunity (i.e., enemy materiel, personnel, facilities) in assigned areas. This type of operation is a response to targets that are not known or briefed in advance.

b. Antiair Warfare

AAW is the actions used to destroy or reduce the enemy air and missile threat to an acceptable level. It includes such measures as the use of interceptors, bombers, antiaircraft guns, surface-to-air and air-to-air missiles, and electronic attack and the destruction of an air or missile threat both before and after it is launched. Other measures used to minimize the effects of hostile air action are cover, concealment, dispersion, deception (including electronic), and mobility. The primary purpose of AAW is to gain and maintain whatever degree of air superiority is required; this permits the conduct of operations without prohibitive interference by opposing air and missile forces. AAW’s other purpose is force protection.

AAW uses both offensive and defensive means to accomplish its objectives and to directly support the warfighting functions of fires and force protection. Self-defense against enemy air is a task for all rotary-wing aircraft. Additionally, the low-altitude air defense (LAAD) battalion, VMFA, VMFA(AW), VMA, and HMLA are all specifically tasked to perform AAW. The Marine air

Figure 2-1. The Six Functions of Marine Aviation.

Assault Support
- Combat Assault Transport
- Air Delivery
- Aerial Refueling
- Air Evacuation
- Tactical Recovery of Aircraft and Personnel (TRAP)
- Air Logistical Support
- Battlefield Illumination

Air Reconnaissance
- Visual Reconnaissance
- Multisensor Imagery Reconnaissance
- Electronic Reconnaissance

Control of Aircraft and Missiles
- Air Direction
- Air Control
  - Airspace Management
  - Airspace Control

AAW
- Offensive Antiair Warfare (OAAW)
- Air Defense
  - Active Air Defense
  - Passive Air Defense

OAS
- CAS
- DAS
  - Air Interdiction
  - Armed Reconnaissance

EW
- Electronic Attack (EA)
- Electronic Protection (EP)
- Electronic Warfare Support (ES)
control squadron (MACS) provides personnel and equipment for the operation of the tactical air operations center (TAOC). The TAOC’s mission is to detect, identify, and control the interception of hostile aircraft and missiles.

(1) Offensive Antiair Warfare. Offensive antiair warfare (OAAW) are operations conducted against enemy air assets and air defense systems before they can be launched or assume an attacking role. OAAW operations in or near the objective area consist mainly of air attacks that destroy or neutralize hostile aircraft, airfields, radar, air defense systems, and supporting areas. OAAW also includes attacks against enemy theater missile operations and suppression of enemy air defenses (SEAD). Offensive counterair [OCA] is the joint term for an operation that destroys, disrupts, or limits enemy air power as close to its source as possible.

(2) Air Defense. 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 involves both active and passive measures.

(a) Active Air Defense. Active air defense includes the use of aircraft, air defense weapons, supporting weapons (i.e., weapons not primarily used in an air defense role), and EW. The approved joint term for this is defensive counterair (DCA).

(b) Passive Air Defense. Passive air defense includes all measures other than active defense that are taken to minimize the effectiveness of hostile air action. These measures include the use of protective construction, concealment, camouflage, deception, dispersion, cover, and electronic protection. Passive air defense is a command responsibility of every unit commander.

c. Assault Support

Assault support contributes to the warfighting functions of maneuver and logistics. Maneuver warfare demands rapid, flexible maneuverability to achieve a decision. Assault support uses aircraft to provide tactical mobility and logistic support to the MAGTF for the movement of high-priority personnel and cargo within the immediate area of operations (or the evacuation of personnel and cargo). It also uses Marine aerial refueler transport squadrons (VMGRs) to provide in-flight refueling. Specific assault support tasks are discussed in the following subparagraphs. See MCWP 3-24, Assault Support, for additional information.

(1) Combat Assault Transport. Combat assault transport provides mobility and logistic support to the MAGTF. It is used to deploy forces efficiently in offensive maneuver warfare, bypass obstacles, or quickly redeploy forces. Combat assault support allows the MAGTF commander to build up his forces rapidly at a specific time and location.

(2) Air Delivery. Air delivery is the transportation of equipment and supplies to FOBs or remote areas. Delivery can be accomplished with helicopters or loads can be air dropped from fixed-wing aircraft such as the KC-130. Air drops are normally used when surface or helicopter transports cannot be used because of range, closed lines of communications, a lack of adequate airfields, a prohibitive ground tactical situation, high tonnage, or reduced response time.

(3) Aerial Refueling. Aerial refueling allows MAGTF aircraft, both fixed- and rotary-wing, to conduct flight-ferrying operations, extend time on station, and extend mission range.

(4) Air Evacuation. Air evacuation is the transportation of personnel and equipment from FOBs or remote areas. This includes flights from areas of operations to secure rear areas, medical evacuations, and extraction of forces. Transport helicopters and fixed-wing transport aircraft perform air evacuations.

(5) Tactical Recovery of Aircraft and Personnel. The tactical recovery of aircraft and personnel (TRAP) is performed by an assigned and briefed aircrew for the specific purpose of the recovery of personnel, equipment, and/or aircraft.
TRAP is a subcomponent of combat search and rescue (CSAR) and/or joint combat search and rescue (JCSAR) missions, but it is only executed once the location of survivors is confirmed. It does not involve dedicating aircraft assets to locating survivors. Tactical recovery occurs once the general location of survivors is confirmed. A TRAP mission may include personnel to conduct a local ground search if required. Marine Corps tactical aircraft are not normally equipped to conduct the search portion of CSAR or the over water portion of search and rescue missions. The composition of a tactical recovery mission may vary from a single aircraft and aircrew to an assault support mission package that consists of multiple fixed-wing and rotary-wing aircraft with an onboard compliment of security, ground search, and medical personnel.

(6) Air Logistical Support. Air logistical support operations are conducted by fixed-wing aircraft and provide assault support of MAGTF forces on the ground. Air logistical support delivers troops, equipment, and supplies to areas beyond helicopter range and lift capability or when surface transportation is slow or unavailable.

(7) Battlefield Illumination. Battlefield illumination can be provided by both fixed-wing and rotary-wing aircraft. Illumination may be visible to the naked eye or invisible (i.e., visible only with night vision equipment). Battlefield illumination can last for a few minutes or several hours.

d. Air Reconnaissance

Air reconnaissance employs visual observation and/or sensors in aerial vehicles to acquire intelligence information. It supports the intelligence warfighting function and is employed tactically, operationally, and strategically. The three types of air reconnaissance are visual, multisensor imagery, and electronic. All aircraft units constantly perform visual air reconnaissance. The Marine tactical electronic warfare squadron (VMAQ), VMU, VMA, VMFA, VMFA(AW), HMLA, and other air reconnaissance platforms can be equipped with sensors to conduct other than visual reconnaissance. For additional information, see MCWP 2-11, MAGTF Intelligence Collection, and MCWP 2-15.4, Imagery Intelligence, for more information.

(1) Visual Reconnaissance. Visual reconnaissance may be conducted by any airborne platform. It consists of an observer or pilot visually searching a route, point, or area. Visual aerial reconnaissance is frequently used in support of the delivery of offensive fires such as artillery support, naval surface fire support, or CAS.

(2) Multisensor Imagery Reconnaissance. Multisensor imagery reconnaissance includes photography from standard cameras, photograph and radar imagery from the advanced tactical aerial reconnaissance system (ATARS), and infrared imagery. Multisensor imagery reconnaissance is used to detect and pinpoint the location of enemy installations, facilities, and concentrations of forces. It is also used to support terrain analysis.

(3) Electronic Reconnaissance. Electronic reconnaissance is used to detect, locate, identify, and evaluate enemy electromagnetic radiation. Electronic reconnaissance is performed with passive interception equipment that recovers signals and determines signal direction, source, and characteristics. It gathers data that, when processed into intelligence, is used to update the electronic order of battle and technical intelligence.

e. Electronic Warfare

EW is any military action involving the use of electromagnetic and directed energy to control the electromagnetic spectrum or to attack the enemy. EW supports the warfighting functions of fires, command and control, and intelligence through the three major subdivisions: electronic attack, electronic protection, and electronic warfare support. Only the VMAQ is specifically equipped to perform all aspects of EW.

(1) Electronic Attack. Electronic attack is that division of EW that involves the use of electromagnetic energy, directed energy, or antiradiation weapons to attack personnel, facilities, or equip-
ment with the intent of degrading, neutralizing, or destroying enemy combat capability.

(2) Electronic Protection. Electronic protection involves the actions taken to protect personnel, facilities, and equipment from the effects of friendly or enemy employment of EW that degrade, neutralize, or destroy friendly combat capability.

(3) Electronic Warfare Support. Electronic warfare support is tasked by or under the direct control of an operational commander. It involves the actions needed to search for, intercept, identify, and locate sources of intentionally and unintentionally radiated electromagnetic energy for the purpose of immediate threat recognition.

f. Control of Aircraft and Missiles

The control of aircraft and missiles integrates the other five functions of Marine aviation by providing the commander with the ability to exercise command and control authority over Marine aviation assets. It enhances unity of effort and disseminates a common situational awareness. It involves the integrated employment of facilities, equipment, communications, procedures, and personnel. It also allows the ACE commander to plan operations and to direct and control aircraft and missiles to support accomplishment of the MAGTF’s mission. The control of aircraft and missiles supports the warfighting function of command and control. The ACE commander maintains centralized command, while control is decentralized and executed through the Marine air command and control system (MACCS), which is described in chapter 4.

The Marine air control group (MACG) is responsible for providing, staffing, operating, and maintaining the principal MACCS agencies. These agencies include the TACC, TAOC with the early warning/control (EW/C) center, Marine air traffic control detachment (MATCD), DASC, and the direct air support center (airborne) (DASC[A]). All Marine aircraft have the capability to provide some form of airborne coordination and control during assault support missions, and HMLAs and VMFA(AW)s can provide FAC(A) or tactical air coordinator (airborne) (TAC[A]) services supporting the MACCS. The methods of aviation control are depicted in figure 2-2 and discussed in the following paragraphs.

(1) Air Direction. Air direction is the authority to regulate the employment of air resources (including both aircraft and surface-to-air weapons) to maintain a balance between their availability and the priorities assigned for their use. The purpose of air direction is to achieve a balance between the MAGTF’s finite aviation resources and the accomplishment of the ACE’s mission.

(2) 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 weapons unit to engage a specific target. Air control includes airspace management and airspace control.

Figure 2-2. Categories of Air Control.
(a) **Airspace Management.** Airspace management is the coordination, integration, and regulation of the use of airspace based on defined dimensions. Commanders use airspace management to optimize the available airspace and to allow the maximum freedom consistent with the degree of acceptable operational risk. The MACCS provides the ACE commander with the ability to conduct airspace management.

(b) **Airspace Control.** Airspace control is the authority to direct the maneuver of aircraft so that the best use is made of assigned airspace. Airspace control provides for the coordination, integration, and regulation of the use of defined airspace. It also provides for the identification of all airspace users. The authority to exercise airspace control is inherent to the commander whose unit is responsible for particular blocks of airspace, types of missions, or types of aircraft. Airspace control does not include measures to approve, disapprove, deny, or delay air operations. MACCS agencies accomplish airspace control through the use of positive control, procedural control, or a combination of the two. Positive control is a method of airspace control that relies on positive identification, tracking, and direction of aircraft within an airspace. It is conducted with electronic means by an agency with the appropriate authority and responsibility. Procedural control is a method of airspace control based on a combination of previously agreed and promulgated orders and procedures.

# 2002. Marine Aviation Organization

Administratively, Marine aviation is organized into three active duty and one reserve Marine aircraft wings (MAWs). MAWs are designed to provide units in support of MAGTF or other operations. Each MAW has a unique organizational structure (see app. A and fig. 2-3). The MAW may be reinforced with assets from other MAWs to provide the necessary assets to meet mission requirements. It is organized into a MAW headquarters, several Marine aircraft groups (MAGs), a MACG, and a Marine wing support group (MWSG).

The wing headquarters and subordinate groups are task-organized based on the assigned mission. When the MAW is deployed as the ACE for a MEF, the MAW headquarters becomes the ACE’s command element. Each group consists of specialized squadrons and/or battalions that perform one or more of the six functions of Marine aviation. The MACG contains the bulk of the MAW’s command and control assets. The MWSG contains the personnel and equipment that are necessary to provide direct aviation ground support to the MAW. The MAW is capable of performing all six functions of Marine aviation. Through task organization, a wing can provide deployable detachments that are capable of accomplishing any or all Marine aviation functions. Aviation organizations smaller than a wing normally task-organize to provide only a specific portion of the six aviation functions.

The following paragraphs provide a brief description of the MAW’s subordinate units and how they relate to the functions of aviation. Table 2-1 contains a summary of aviation units and corresponding functions. MCRP 5-12D, *Organization of Marine Corps Forces*, contains a detailed discussion.

### a. Marine Air Control Group

The MACG coordinates all aspects of air command and control, air reconnaissance, and air defense within the MAW. When deployed as part of the MAGTF ACE, it provides the command and staff functions for the MACG commander and coordinates the employment of aviation command and control equipment, facilities, and personnel in support of the ACE.

![Figure 2-3. Notional Marine Aircraft Wing.](image-url)
Table 2-1. Marine Aviation Units and Functions.

<table>
<thead>
<tr>
<th>Type of Aviation Unit</th>
<th>AAW</th>
<th>Assault Support</th>
<th>OAS</th>
<th>EW</th>
<th>Air Reconnaissance</th>
<th>Control of Aircraft and Missiles</th>
</tr>
</thead>
<tbody>
<tr>
<td>MAW</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>MACG</td>
<td>Support</td>
<td>Support</td>
<td>Support</td>
<td>Support</td>
<td>Support</td>
<td>X</td>
</tr>
<tr>
<td>MTACS</td>
<td></td>
<td>DASC</td>
<td>DASC</td>
<td></td>
<td>DASC</td>
<td>TACC</td>
</tr>
<tr>
<td>MASS</td>
<td></td>
<td>DASC</td>
<td>DASC</td>
<td></td>
<td>DASC</td>
<td>DASC</td>
</tr>
<tr>
<td>MACS</td>
<td></td>
<td>TAOC ATC</td>
<td>ATC</td>
<td></td>
<td>TAOC ATC</td>
<td>TAOC ATC</td>
</tr>
<tr>
<td>LAAD</td>
<td>X</td>
<td>Support</td>
<td></td>
<td></td>
<td>Support</td>
<td>X</td>
</tr>
<tr>
<td>MWCS</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Communications</td>
</tr>
<tr>
<td>MWSG</td>
<td>Support</td>
<td>Support</td>
<td>Support</td>
<td>Support</td>
<td>Support</td>
<td>Support</td>
</tr>
<tr>
<td>MAG (VF/VA)</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>Support</td>
</tr>
<tr>
<td>MALS (fixed wing)</td>
<td>Support</td>
<td>Support</td>
<td>Support</td>
<td>Support</td>
<td>Support</td>
<td>Support</td>
</tr>
<tr>
<td>VMGR</td>
<td>Support</td>
<td>Support</td>
<td>Support</td>
<td>Support</td>
<td>Support</td>
<td>DASC(A)</td>
</tr>
<tr>
<td>VMAQ</td>
<td>Support</td>
<td>Support</td>
<td>Support</td>
<td>X</td>
<td>X</td>
<td>Support</td>
</tr>
<tr>
<td>VMU</td>
<td>Support</td>
<td>Support</td>
<td>Support</td>
<td>Support</td>
<td>X</td>
<td>Support</td>
</tr>
<tr>
<td>VMFA</td>
<td>X</td>
<td>Escort</td>
<td>X</td>
<td>Support</td>
<td>X</td>
<td>Support</td>
</tr>
<tr>
<td>VMFA (AW)</td>
<td>X</td>
<td>Escort</td>
<td>X</td>
<td>Support</td>
<td>X</td>
<td>FAC(A)/TAC(A)</td>
</tr>
<tr>
<td>VMA</td>
<td>X</td>
<td>Escort</td>
<td>X</td>
<td>Support</td>
<td>X</td>
<td>Support</td>
</tr>
<tr>
<td>MAG (VH)</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>Support</td>
<td>X</td>
<td>Support</td>
</tr>
<tr>
<td>VMM</td>
<td>Self-defense</td>
<td>X</td>
<td>Support</td>
<td>Support</td>
<td>Support</td>
<td>Airborne control and coordination</td>
</tr>
<tr>
<td>MALF (rotary-wing)</td>
<td>Support</td>
<td>Support</td>
<td>Support</td>
<td>Support</td>
<td>Support</td>
<td>Support</td>
</tr>
<tr>
<td>HMH (CH-53D)</td>
<td>Self-defense</td>
<td>X</td>
<td>Support</td>
<td>Support</td>
<td>Support</td>
<td>Airborne control and coordination</td>
</tr>
<tr>
<td>HMH (CH-53E)</td>
<td>Self-defense</td>
<td>X</td>
<td>Support</td>
<td>Support</td>
<td>Support</td>
<td>Airborne control and coordination</td>
</tr>
<tr>
<td>HMM</td>
<td>Self-defense</td>
<td>X</td>
<td>Support</td>
<td>Support</td>
<td>Support</td>
<td>Airborne control and coordination</td>
</tr>
<tr>
<td>HMLA Utility</td>
<td>Self-defense</td>
<td>X</td>
<td>Support</td>
<td>Support</td>
<td>Support</td>
<td>Airborne control and coordination</td>
</tr>
<tr>
<td>HMLA Attack</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>Support</td>
<td>X</td>
<td>Airborne control and coordination</td>
</tr>
</tbody>
</table>

X—The unit performs that function of Marine aviation as part of its primary mission. However, all Marine aircraft are specifically designed to be multi-mission capable and provide significant support for multiple functions.

Support—The unit provides general support for that function in varying degrees based on equipment capabilities and the situation.

Specifically indicated support (armed reconnaissance, DASC, escort, etc.)—Many units perform a specific type of support for one or more of the six functions of Marine aviation. The ability to provide this type of support is often dependent on equipment and/or aircraft mission configuration or specialized personnel training, and it must be specifically requested. For MACG units, the MACCS agency provided by the unit is indicated.
The major task performed by the MACG is planning and coordinating the support of the command and control function of Marine aviation. The MACG ensures that its subordinate squadrons and battalions are organized, supplied, and prepared to execute the MACCS’ mission.

(1) Marine Tactical Air Command Squadron. The Marine tactical air command squadron (MTACS) provides equipment, maintenance, and operations for the TACC of the ACE. It equips, operates, and maintains the majority of the manning for the current operations section of the TACC. It also provides and maintains a facility for the TACC future operations and future planning sections and installs and maintains associated automated systems. As a result of the recent merger of the Marine wing headquarters squadron (MWHS) into the MTACS, MTACS will also provide administrative, logistic, and supply support (including the wing commander’s mess) for the Marine wing headquarters.

The MTACS’s major task is to provide the command post for the ACE commander. This involves the planning and coordination of air operations, deployment and employment issues, and logistic and supply support.

(2) Marine Air Control Squadron. The MACS provides air surveillance, control of aircraft and surface-to-air weapons for AAW, continuous all weather radar and nonradar air traffic control (ATC) services, and airspace management in support of a MAGTF.

The MACS provides deployable detachments that are capable of air surveillance, airspace management, and control of aircraft and SAMs for AAW in support of the MAGTF. It also provides deployable detachments that can provide ATC services at existing or expeditionary airfields (EAFs) and remote area landing sites.

(3) Marine Wing Communications Squadron. The MWCS provides some of the ACE’s major communications support, including planning and engineering. The squadron also provides operational systems control centers, digital backbone communications support, tactical automated switching and telephone services, electronic message distribution, external single-channel radio and radio retransmission communications, wide area network (WAN) and deployed local area network (LAN) servers, and support of cryptographic sites.

(4) Marine Air Support Squadron. A Marine air support squadron (MASS) provides DASC capabilities for control and coordination of fixed-wing and rotary-wing aircraft operating in direct support of MAGTFs. The MASS’s major tasks include conducting operational planning for MAGTF direct air support operations; receiving, coordinating, and processing immediate requests for air support; providing equipment, facilities, and personnel for operation of air support elements; and maintaining continuous control of direct air support while displacing.

(5) Low Altitude Air Defense Battalion. The mission of the LAAD battalion is to provide close-in, low altitude surface-to-air weapons fires in defense of the MAGTF. LAAD battalions defend forward combat areas, maneuver forces, vital areas, installations, and/or units engaged in special or independent operations. Major tasks of the LAAD battalion include—

1. Providing support of subordinate batteries.
2. Maintaining a primary capability as a highly mobile, vehicle-mounted, and man-portable surface-to-air weapons component of the MAGTF.
3. Providing surface-to-air weapons support for units engaged in special and/or independent operations.
4. Providing for the separate deployment of subordinate batteries and platoons to accommodate special tactical situations and task organizations.

(6) Marine Unmanned Aerial Vehicle Squadron. The VMU operates and maintains a UAV system in order to provide unmanned aerial reconnaissance support to the MAGTF via the ACE TACC. VMU tasks include—
Conducting reconnaissance, surveillance, and target acquisition.

Performing airborne surveillance of designated target areas, MAGTF areas of interest and/or influence, and other areas as directed.

Performing airborne surveillance for search and rescue and TRAP.

Performing reconnaissance of helicopter approach and retirement lanes in support of vertical assaults.

Providing real-time target information to the DASC and fire support coordination center (FSCC).

Providing information to assist in adjusting indirect-fire weapons and to support and facilitate DAS and air interdiction.

Collecting battle damage assessments (BDAs).

b. Marine Aircraft Group

The MAG provides the staff support necessary for the effective command of subordinate squadrons of the MAG. The MAG is usually composed of functionally similar aircraft squadrons and their support units. Table 2-2 delineates the types of squadrons and aircraft present in a MAG.

<table>
<thead>
<tr>
<th>Squadron Type</th>
<th>Aircraft Type</th>
<th># of Squadrions</th>
<th># of Primary Aircraft Authorized</th>
</tr>
</thead>
<tbody>
<tr>
<td>VMA</td>
<td>AV-8B</td>
<td>7</td>
<td>16</td>
</tr>
<tr>
<td>VMFA</td>
<td>F/A-18A/C</td>
<td>12</td>
<td>12</td>
</tr>
<tr>
<td>VMFA (AW)</td>
<td>F/A-18D</td>
<td>6</td>
<td>12</td>
</tr>
<tr>
<td>VMAQ</td>
<td>EA-6B</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>VMGR</td>
<td>KC-130</td>
<td>5</td>
<td>12</td>
</tr>
<tr>
<td>VMAT</td>
<td>AV-8 Training</td>
<td>1</td>
<td>30</td>
</tr>
<tr>
<td>VMFAT</td>
<td>F/A-18 Training</td>
<td>1</td>
<td>12 F/A-18A/C</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>17 F/A-18D</td>
</tr>
<tr>
<td>VMFT</td>
<td>Aggressor Squadron F-5</td>
<td>1</td>
<td>11 F-5E</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>1 F-5F</td>
</tr>
<tr>
<td>VMGRT</td>
<td>KC-130 Training</td>
<td>1</td>
<td>8</td>
</tr>
<tr>
<td>VMU</td>
<td>UAV</td>
<td>2</td>
<td>5</td>
</tr>
<tr>
<td>HMH</td>
<td>CH-53E</td>
<td>6</td>
<td>16</td>
</tr>
<tr>
<td>HMH&lt;sup&gt;2&lt;/sup&gt;</td>
<td>CH-53D</td>
<td>5</td>
<td>8</td>
</tr>
<tr>
<td>HMM</td>
<td>CH-46E</td>
<td>18</td>
<td>12</td>
</tr>
<tr>
<td>HMLA</td>
<td>UH-1N</td>
<td>10</td>
<td>9 UH-1N</td>
</tr>
<tr>
<td></td>
<td>AH-1W</td>
<td></td>
<td>12 AH-1W</td>
</tr>
<tr>
<td>HMT</td>
<td>Helicopter Training</td>
<td></td>
<td></td>
</tr>
<tr>
<td>HMM(T)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>HMM(T)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>1 CH-46E</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>1 CH-53E</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>1 CH-53D</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>1 UH-1N/AH-1W</td>
<td></td>
<td></td>
</tr>
<tr>
<td>VMM</td>
<td>MV-22</td>
<td>TBD</td>
<td>12</td>
</tr>
<tr>
<td>VMM(T)</td>
<td>MV-22 Training</td>
<td>1</td>
<td>TBD</td>
</tr>
</tbody>
</table>

<sup>1</sup> The total number of squadrons, including reserve units.

<sup>2</sup> The primary aircraft authorization for each squadron is a fixed number. However, the actual number of aircraft in a squadron varies based on production timelines, scheduled depot-level maintenance cycles, aircraft transfers, etc.

<sup>3</sup> Although CH-53D squadrons have retained their HMH designation, they are considered medium lift like a CH-46E squadron, instead of heavy lift like a CH-53E squadron.
The MAG is the smallest aviation unit that is designed to conduct operations with no outside assistance except access to a source of supply. MAGs normally contain either fixed-wing or rotary-wing aircraft in order to streamline logistic support requirements. MAGs can be task-organized to include any combination of fixed-wing and rotary-wing aircraft, as well as other supporting units. A MAG can also be task-organized into an ACE for a particular mission in order to provide one or more aviation functions to a MAGTF. When it is deployed as a MAGTF’s ACE, the MAG headquarters becomes the tactical command element for the ACE. Currently, there are two types of MAGs within the MAW: the fixed-wing MAG (MAG VF/VA) and the rotary-wing MAG (MAG VH).

(1) Marine Aviation Logistics Squadron (Fixed-Wing/Rotary-Wing). The MALS provides aviation logistic support, guidance, and direction to MAG squadrons on behalf of the commanding officer. It also provides logistic support for Navy-funded equipment in the supporting MWSS, MACS, and Marine wing mobile calibration complex. There is normally one MALS in each MAG VH and MAG VF/VA. The MALS provides—

- Intermediate-level maintenance for aircraft and aeronautical equipment.
- Aviation supply support for aircraft.
- Class V(A) ordnance and ammunition logistic support.
- Coordination with the MWSG, the MACG, the MAW calibration complex, and other supporting Navy and Marine Corps activities and/or agencies in planning for the support required to execute the Marine Aviation Logistic Support Program (MALSP).
- Maintaining the capability to deploy and provide MALSP support packages.

The primary mission of a MAG (VF/VA) is to provide AAW and OAS support for MAGTF operations from a variety of main bases, FOBs, and aircraft carriers. The MAG may consist of any combination of VMAs, VMFAs, VMFA(AW)s, VMGRs, VMAQs, or Marine aviation logistics squadrons (MALSs) (fixed wing). It also usually contains one or more training squadrons.

The primary mission of the MAG VH is to provide assault support for MAGTF operations in any location or environment required. The MAG VH may include any combination of HMLAs, Marine medium helicopter squadrons (HMMs), Marine heavy helicopter squadrons (HMHS), MALS, and one or more training squadrons. As the MV-22 is introduced into the fleet, all HMMs and most of the CH53D squadrons will eventually transition to Marine medium tilt-rotor squadrons (VMMs).

(2) Marine Aerial Refueler Transport Squadron. The VMGR’s primary tasks are to provide tactical aerial refueling service to Marine aviation units and to serve as an aircraft platform for the DASC(A). Other tasks include assault air transport for air-landed and air-delivered personnel, supplies, and equipment; ground refueling service to aircraft when other suitable means of aircraft refueling are not available; and air transport service for the evacuation of casualties and noncombatants. The VMGR maintains an all weather capability and the ability to operate from a variety of bases.

(3) Marine Tactical Electronic Warfare Squadron. The VMAQ conducts airborne EW in support of Fleet Marine Force (FMF) operations to meet the EW and air reconnaissance functions of Marine aviation. Major tasks include—

- Conducting airborne electronic attack and EW support operations.
- Conducting electronic attack in support of MAGTF training.
- Processing and providing mission data on EW missions for updating and maintaining an electronic order of battle.
- Maintaining the capability of operating from aircraft carriers, advance bases, and EAFs.
Maintaining the capability to operate during darkness and under all weather conditions.

Maintaining the capability to deploy or conduct extended-range operations that require aerial refueling.

(4) Marine Fighter/Attack Squadron. The VMFA intercepts and destroys enemy aircraft under all weather conditions and attacks and destroys surface targets.

Note: In this publication, the term all weather is used to indicate that the aircraft can perform all or part of its primary mission in all “types” of weather, not all “extremes” of weather. This capability is linked more to the type of equipment on board the aircraft, than to the effect of the weather on the aircraft. For example, all Marine aircraft are designed with the capability to fly in fog, rain, sleet, snow, etc. However, only aircraft equipped with special sensors like radar can realistically perform their mission without visual references. The term adverse weather is used to indicate that, while the weather is bad, a visual reference can still be maintained.

VMFA tasks include—

- Intercepting and destroying enemy aircraft.
- Maintaining the capability to attack and destroy surface targets.
- Providing escort of friendly aircraft under all types of weather conditions.
- Maintaining the capability to deploy and operate from aircraft carriers and advance bases.
- Conducting day and night CAS under all types of weather conditions.
- Maintaining the capability to deploy or conduct extended-range operations by using aerial refueling.
- Maintain the capability to conduct SEAD operations.

(5) Marine All-Weather Fighter Attack Squadron. The VMFA(AW) attacks and destroys surface targets under adverse weather conditions during both day and night operations; conducts multisensor imagery reconnaissance; provides supporting arms coordination; and intercepts and destroys enemy aircraft under all types of weather conditions. VMFA(AW) tasks include—

- Conducting day and night CAS under adverse weather conditions.
- Conducting day and night DAS under all weather conditions, including armed reconnaissance, radar search and attack, air interdiction, and strikes against enemy installations.
- Conducting multisensor imagery reconnaissance, this includes pre-strike and post strike target damage assessment and visual reconnaissance.
- Conducting day and night supporting arms coordination, including forward air control airborne, tactical air coordination airborne, and artillery and/or naval gunfire (NGF) spotting.
- Intercepting and destroying enemy aircraft.
- Maintaining the capability to operate from aircraft carriers, advance bases, and EAFs.
- Maintaining the capability to deploy or conduct extended-range operations by using aerial refueling.
- Maintaining the capability to conduct SEAD operations.

(6) Marine Attack Squadron. The VMA attacks and destroys surface targets under day and night visual meteorological conditions. It also provides helicopter escort. VMA’s major tasks include—

- Conducting CAS, armed reconnaissance, air interdiction, and strikes against enemy installations.
- Conducting air defense operations.
- Maintaining the capability to operate during darkness and under instrument flight conditions.
- Maintaining the capability of deployment or extended operations by employing aerial refueling.
- Maintaining the capability to operate from aboard carriers, other suitable seagoing platforms, EAFs, and remote tactical landing sites.
- Conducting armed escort missions in support of assault support operations.
(7) Marine Heavy Helicopter Squadron (CH-53D). The HMH (CH-53D) supports the assault support function of Marine aviation by providing assault helicopter transport of heavy weapons, equipment, and supplies during amphibious operations and subsequent operations ashore. CH-53D squadrons have retained their HMH designation, but only CH-53E squadrons are now considered to be capable of heavy lift. The CH-53D is now considered a medium lift helicopter, like the CH-46E. The main tasks for the CH-53D include—

- Providing combat assault transport of heavy weapons, equipment, and supplies.
- Providing combat assault transport of troops.
- Conducting tactical retrieval and recovery operations for downed aircraft, equipment, and personnel.
- Conducting assault support for evacuation operations and other maritime special operations.
- Providing support for mobile FARPs.
- Maintaining the capability to operate from amphibious shipping, other floating bases, and austere shore bases.
- Maintaining the capability to operate at night, in adverse weather conditions, and under instrument flight conditions at extended ranges.

(8) Marine Heavy Helicopter Squadron (CH-53E). The HMH (CH-53E) provides assault helicopter transport of heavy weapons, equipment, and supplies during amphibious operations and subsequent operations ashore. The main tasks for the CH-53E include—

- Providing combat assault transport of heavy weapons, equipment, and supplies.
- Providing combat assault transport of troops.
- Conducting tactical retrieval and recovery operations for downed aircraft, equipment, and personnel.
- Conducting assault support for evacuation operations and other maritime special operations.
- Providing support for mobile FARPs.
- Maintaining the capability to operate from amphibious shipping, other floating bases, and austere shore bases.
- Maintaining the capability to deploy and conduct extended range operations by employing aerial refueling.

(9) Marine Medium Helicopter Squadron. The HMM provides assault transport of combat troops in the initial assault waves and follow-on stages of amphibious operations and subsequent operations ashore. HMM’s major tasks include—

- Providing combat assault troop transport.
- Providing combat assault transport of supplies and equipment.
- Conducting assault support for evacuation operations and other maritime special operations.
- Providing support for mobile FARPs.
- Maintaining the capability to operate from amphibious shipping, other floating bases, and austere shore bases.
- Maintaining the capability to operate at night, in adverse weather conditions, and under instrument flight conditions at extended ranges.
- Augmenting local search and rescue assets and provide aeromedical evacuation of causalities.

Tactical HMMs will begin replacing the CH-46E and CH-53D helicopters with the MV-22 tilt-rotor aircraft beginning in fiscal year 2003.

(10) Marine Medium Tilt-Rotor Squadron. The Marine medium tilt-rotor squadron (VMM) provides transportation of combat troops, supplies, and equipment across the spectrum of expeditionary operations. VMM’s primary function is to provide combat assault troop transport. It also provides combat assault transport of supplies and equipment, as a secondary function. Other VMM tasks include—

- Conducting combat assault support for evacuation operations and other maritime special operations.
- Providing support for forward arming and refueling points.
- Providing airborne command and control for assault support operations.
Maintaining a self-defense capability for air-to-air and ground-to-air threats.
Maintaining the capability to operate from naval ships and expeditionary airfields.
Maintain the capability to operate at night, in adverse weather, and under instrument flight conditions from extended ranges.
Maintain the capability for deployment and/or extended range operations employing aerial refueling.
Augmenting local search and rescue assets.
Providing aeromedical evacuation of casualties from the field to suitable medical facilities or other aeromedical aircraft.
Performing organizational maintenance on assigned aircraft in all environmental conditions.

(11) Marine Light/Attack Helicopter Squadron. The HMLA provides combat utility helicopter support, attack helicopter fire support, and fire support coordination during amphibious operations and subsequent operations ashore. The primary tasks of utility helicopters include—
Providing an airborne command and control platform for command elements.
Providing armed escort for assault support operations.
Providing combat assault transport of troops, supplies, and equipment.
Providing airborne control and coordination for assault support operations.
Augmenting local search and rescue assets.
Providing aeromedical evacuation of casualties from the field to suitable medical facilities or other aeromedical aircraft.
Maintain the capability to operate from amphibious shipping, other floating bases, and austere shore bases.
Maintaining the capability to operate at night, in adverse weather conditions, and under instrument flight conditions at extended ranges.

The primary tasks of attack helicopters include—
Providing fire support and security for forward and rear area forces.
Conducting point-target and/or antiarmor operations.
Conducting anti-helicopter operations.
Providing armed escort, control, and coordination for assault support operations.
Controlling, coordinating, and providing terminal control for supporting arms, including CAS, artillery, mortars, and NGF.
Conducting armed and visual reconnaissance.
Maintaining the capability to operate from amphibious shipping, other floating bases, and austere shore bases.
Maintaining the capability to operate at night, in adverse weather conditions, and under instrument flight conditions at extended ranges.

(12) Marine Wing Support Group. The MWSG’s mission is to provide aviation ground support for the MAW and to provide command and control, administration, supply, and logistic support assets to subordinate units performing aviation ground support for Marine aviation. The MWSG’s primary task is to provide the capability to establish and maintain airfields and FOBs, and their associated aviation ground support requirements, for the conduct of ACE operations in support of the MAGTF.

(13) Marine Wing Support Squadron. The Marine wing support squadron’s (MWSS’s) mission is to provide for all essential aviation ground support requirements for a designated fixed-wing or rotary-wing component of an ACE. The MWSS also provides aviation ground support for all supporting or attached units of the MACG. The MWSS’s primary tasks include providing—
Internal airfield communications.
Weather forecasting and services.
Aircraft crash, fire, and rescue services.
Structural fire fighting services.
Aircraft and ground equipment refueling.
Essential engineering services.
Motor transport operations internal to the ACE.
Messing facilities.
Organic nuclear, biological, and chemical capabilities.
Routine and emergency sick call services.
Security and law enforcement services.
Air base command functions.

See MCWP 3-21.1, Aviation Ground Support, and MCWP 3-35.7, MAGTF Meteorology and Oceanography [METOC] Support, for additional information.

2003. Aviation Combat Element Task Organization

An ACE is the core element of a MAGTF that is task-organized to conduct aviation operations. It provides all or a portion of the six functions of Marine aviation. The ACE is usually composed of an aviation unit headquarters and various other aviation units or their detachments. It can vary in size from a small aviation detachment of specifically required aircraft to one or more MAWs. The ACE may contain other Service or foreign military forces assigned or attached to the MAGTF. The ACE itself is not a formal command.

The ACE is task-organized to contribute to battlespace dominance in support of the MAGTF’s mission, project combat power, and conduct air operations. The ACE is task-organized to support the MAGTF based on the MAGTF commander’s mission and his estimate of the aviation capabilities required to accomplish that mission. The MAGTF commander presents these requirements to the Marine Service component commander, and the selection of actual aviation units or detachments is determined by the tasked wing commander(s). Selected assets are task-organized to meet the MAGTF commander’s requirements.

The ACE is normally built around an existing aircraft unit (squadron, group, or wing) reinforced as necessary with the appropriate command and control, combat, combat support, and combat service support (CSS) (including aviation logistic) units and detachments. In creating an ACE, the operational requirements of the mission, capabilities and limitations of specific units and equipment, and the availability of units determine the choice of units, type of equipment, and source location. Marine aviation forms the ACE of the three standing MEFs. However, this is merely the starting point for constructing the ACE for a MEF in time of war. For actual deployment, the ACE would be reinforced with units and/or detachments from the other two active duty MAWs and the Reserves. If providing the ACE to a Marine expeditionary unit (special operations capable) (MEU [SOC]), the ACE will usually be sourced from a single MAW.

Satisfying the MAGTF commander’s aviation requirements is paramount. However, the identification of specific units for assignment to the ACE is driven by many factors in addition to the aviation functions required to support the MAGTF mission. Some of these factors are as follows:

- Mode of deployment (amphibious shipping, strategic airlift or sealift, aircraft carriers, self-deployment, or a combination).
- Mode of operations (from aircraft carriers and/or amphibious ships, FOBs, EAFCs, or a combination).
Availability of supporting infrastructure (runways, shelters, electricity, and fuel).
Special qualifying criteria, training requirements and/or, operational experience.
Length and responsiveness of logistic support determines sustainability.
Replenishment rate of consumables, specifically aviation fuel and ordnance.
Anticipated missions and expected intensity of flight operations.

The MEF ACE can be built around one or more MAWs, or any portion of the MAW, that fulfills the required functions of Marine aviation. It may consist of one or more MAGs (fixed-wing or rotary-wing), a MACG, and a MWSG. The MAW also provides task-organized forces for smaller MAGTFs, such as a Marine expeditionary unit (MEU) and special purpose MAGTFs (SPMAGTFs). See figures 2-4 for a notional MEF and 2-5 for a notional MEU ACE.

The MEU ACE normally consists of a reinforced helicopter squadron that includes attack aircraft and two fixed-wing assault support aircraft (the latter are based in the continental United States). The notional MEF ACE is task-organized to provide assault support, low-level air defense, CAS, and airborne command and control. It includes a MACG detachment, MWSS detachment, fixed-wing MALS detachment, and rotary-wing MALS detachment.

SPMAGTFs, are organized, trained, and equipped with narrowly focused capabilities. Each SPMAGTF is designed to accomplish a specific mission, often of limited scope and duration. This special purpose force may be any size but is normally small (the size of a MEU). It may contain other Service or foreign military forces assigned or attached to the MAGTF. The ACE composition for a SPMAGTF varies, but normally it is the size of a MEU ACE or smaller. For example, a SPMAGTF ACE may be created to operate and fly missions in support of host nation forces out of an EAF. In such a case, the SPMAGTF might consist predominantly of Marine aviation units supported by only a small security and logistic force. In other cases, the SPMAGTF ACE may represent a relatively small portion of the force.

Since the ACE is formed around an aviation headquarters, it will only contain one senior aviation unit. In the case of a MEF, the wing that comprises the ACE will be task-organized with units from a single wing and/or reinforced with as many groups and squadrons from other wings as are required to support the MAGTF’s mission. For MEFs with multiple divisions in the GCE, the ACE may require the combined assets and personnel of several wings in order to meet this requirement. However, these assets and personnel remain under one ACE commander. This single ACE commander concept is essential to Marine aviation’s doctrinal philosophy of centralized command and decentralized control (discussed in detail in chap. 4).

The ACE may be employed from ships or forward expeditionary land bases and can readily transition between sea and land bases without loss of capability. It has the capability to conduct command and control across the battlespace. The ACE is one of the two arms of the MAGTF specifically designed to conduct combat operations.