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BY DIRECTION OF THE COMMANDANT OF THE MARINE CORPS

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FOREWORD

Marine aviation traces its origin to 1912, when First Lieutenant Alfred A. Cunningham reported for naval aviation training. By 1914 Marines had started using aircraft and would see Marine aviation flying its first combat missions during the ending months of World War I. Through operations in Nicaragua, Haiti, China, World War II, Korea, Vietnam, and Southwest Asia, Marine aviation has distinguished itself as a formidable contributor to the Marine air-ground task force (MAGTF) combined arms team.

This publication focuses on the Marine Corps philosophy of command and control, planning, operations, and emerging concepts and capabilities for commanders and staff officers who are responsible for planning and executing offensive air support operations. Offensive air support doctrine first began within the Marine Corps in 1935 when the *Tentative Landing Operations Manual* was published and has developed over the past 65 years into today's Marine Corps Warfighting Publication (MCWP) 3-23, *Offensive Air Support*. This doctrine does not discuss the specifics of unit-level tactics and procedures. It provides insight as to how Marine aviation is used to shape the deep, close, and rear battlespace as an integrated combat arm of the MAGTF.

This publication supersedes Fleet Marine Force Manual (FMFM) 5-40, *Offensive Air Support*, dated 27 March 1992.

Reviewed and approved this date.

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OFFENSIVE AIR SUPPORT

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CHAPTER 1. HISTORICAL PERSPECTIVE OF OFFENSIVE AIR SUPPORT

Although the Marines started using aircraft as early as 1914, technology advances leading to offensive air support (OAS) did not come about until World War II. The ending months of World War I saw the Marine Corps flying combat missions from France. A shortage of Royal Air Force (RAF) pilots and surplus of RAF aircraft led to a beneficial partnership between the RAF and the Marines. The RAF and Marine squadrons operated along side each other in support of the British and Belgian ground forces that were gathering momentum against the crumbling German army. Their general mission assigned by General Pershing was to attack any rear-area targets that might hinder the Germans retreat. By the end of the war, 1st Marine Aviation Force, in its brief period of action, had lost 4-dead, shot down 12 Germans, and flown 57 bombing missions.

During the interwar years, OAS began to become integral to Marine Corps operations. In the air over Haiti, the Dominican Republic, China, and Nicaragua, Marine aviation assisted the ground operations, not only in combat, but also in reconnaissance, transportation, and supply. Close air support (CAS) became more effective due to dive bombing techniques and weaponeering. By trial and error, Marine aviation worked out basic tactics for CAS. By the end of the 1920s, the Marine air-ground team had become a reality. Major Roy Geiger and Colonel Rowell oversaw aviation operations as the *Tentative Landing Operations Manual* was published in 1935. In that historic document, Marine aviation's doctrine for reconnaissance, fighter escort, protection of the landing forces, artillery spotting, and CAS was formally established as the aviation units' responsibilities. The General Board of the Navy restated the Marine air's mission in 1939 to support the Fleet Marine Force (FMF) in amphibious landing operations and to support the troops once they had passed the beachhead. Marine aviation was to provide backup squadrons for the Navy's regular carrier squadrons.

When the United States entered World War II, the aviation doctrine developed at Quantico was used during the amphibious landings throughout the Pacific. OAS was performed time and again by forward-based aircraft of the Cactus Air Force on Guadalcanal in support of Marines on the ground. Unfortunately, Marine aviation resources (aircraft, aircrews, and support) had become so heavily involved with antiair warfare (AAW) and air interdiction (AI) missions of land-based air power that their original purpose, providing CAS for the Marines on the ground, had been subordinated if not completely forgotten. Marine aviation involved in action against ground targets during the early stages of action, seemed to be used against selected targets, as opposed to ground liaison-directed attacks against Japanese troops or fortifications immediately impeding an advance. Marines were given their targets before leaving the ground, vice receiving airborne instructions characteristic of CAS missions.

In February 1945, Marine CAS finally arrived during the drive to the Philippine capital of Manila, where the Marine SBD Dauntlesses were directed to provide CAS 20 to 30 miles ahead and behind the Sixth Army. These patrolling aircraft were available to support immediate CAS missions requested by the advancing ground forces. Development in CAS TTPs continued during the Philippine campaign with the use of radio communications to call in napalm attacks. A single very high frequency (VHF) channel could not carry all the traffic and the Marines switched to medium-frequency channels and napalm became one of the most successful weapons in the Philippines.

By 1950, Marine aviation was experiencing two major developments that would shape its foreseeable future: the advent of the jet and the helicopter. Carriers from which the fighters operated allowed more fuel and more on-station time; however, the short-legged jets could not loiter above the battlefield as compared to the propeller driven F4U Corsairs. AI missions were beginning to be dominated by the jet aircraft because of their range and speed. CAS and armed reconnaissance

(AR) missions were still primarily tasked to the Corsairs due to their capability to remain on station for longer periods of time.

Korea saw the maturation of OAS both in the Pusan perimeter and operations in the landing at Inchon. Rockets and napalm were an effective combination for CAS missions ahead of Marines and Army troops on the ground during these early operations. As the action shifted inland and met stiffer resistance, antitank strikes with napalm, bombs, and rockets inundated the North Korean T-34 tanks.

During the Chosin Reservoir campaign, Marine CAS under forward air control had become an accepted tool. Forward operating bases reduced response times and allowed greater time on station for CAS and AR missions. Deep air support (DAS) missions cut off Chinese resupply routes and bridges and disrupted enemy concentrations and supply areas vital to the success of the ground forces.

Vietnam introduced the attack helicopters for use in OAS missions. AH-1 Hueycobras, the first designed-for-the-purpose gunships to be placed in production, initially flew fire-support and armed reconnaissance missions. The Cobras later operated from amphibious transport docks (LPDs) against enemy ferry and barge traffic, providing both forward air controller (airborne) (FAC[A]) and CAS sorties.

The Marine tactical air direction center (TADC) established at DaNang, with subordinate organizations of the tactical air operations center (TAOC) and direct air support center (DASC), represented a quantum leap in command and control (C2) of aircraft for the Marines. “Hot pad” alert and airborne alert CAS aircraft with tanker support provided the ground commanders a continuous supply of aircraft through the Marine air command and control system (MACCS).

Other additions to OAS capabilities that came near the end of Vietnam were the introduction of the EA-6A Prowler, A6-A Intruder, and precision-guided weapons. The Prowlers became vital to OAS missions by suppressing new threat systems like the SA-2 to provide suppression of enemy air defenses (SEAD) for the strike packages. The Intruders provided commanders a true all-weather, day and night AI capability. The introduction of electro-optical and laser-guided bombs (LGBs) aided in economy of force. These highly accurate weapons increased mission success rates while reducing the number of aircraft required to destroy or neutralize targets.

Significant technological advances since the end of the Vietnam era have contributed to more effective and efficient capabilities in Marine aviation. The use of this new, sophisticated technology: air-to-ground radar, forward-looking infrared (FLIR) sensors, precision-guided munitions, Airborne Warning and Control System (AWACS) and targeting platforms, demonstrated new OAS capabilities available to commanders for shaping the battlespace. Improved communication systems have allowed the commander to obtain real- or near-real-time information for formulating decisive actions to create an environment in which the enemies either lose their physical capability or their will to resist.

Marine aviation performed different types of OAS missions during Desert Storm. For example: AH-1W Cobras provided CAS by knocking out Iraqi tanks and armored personnel carriers; F/A-18Ds performed “Fast FAC” missions by marking targets in “kill boxes” for other OAS aircraft; and other F/A-18s, A-6Es, and AV-8Bs performed long range strikes, AR, and CAS missions.

Since the end of the Gulf War, Marine aviation continues to provide OAS to the joint force commander (JFC) and MAGTF commander in military operations. The continuing advance of smart weapons technology and tactics provides greater aircraft standoff ranges to the enemy’s surface to air threat while minimizing ordnance inaccuracies to hit the target. Operations Restore Hope in Somalia in 1992, Operation Deliberate Force in Bosnia in 1995, Operation Desert Fox in Iraq in 1998, and Operation Allied Force in Kosovo in 1999 are all military operations other than war (MOOTW) where Marine Corps OAS has been applied.

OAS missions in Operation Desert Fox saw the first employment of global positioning system (GPS) weapons such as the joint standoff weapon (JSOW) by Marine aviation. The joint direct attack munition (JDAM) was successfully employed for the first time as recently as February 2000 by Marines while operating in Operation Southern Watch over Iraq.

As one of the six functions of Marine aviation, OAS provides the JFC and MAGTF commander the flexibility to conduct operations when and where they choose to shape the battlespace. Even though more recent conflicts have supported MOOTW where ground forces are not employed, Marine aviation is still used as it was envisioned in 1914, to provide a full spectrum offensive capability.

CHAPTER 2. OFFENSIVE AIR SUPPORT IN MARINE AVIATION

Modern tactics facilitate the use of combined arms. They combine the effects of various arms-infantry, armor, artillery, and aviation to achieve the greatest possible effect against the enemy. The strengths of the arms complement and reinforce each other. At the same time, the weaknesses and vulnerabilities of each arm are protected or offset by the capabilities of the other. (Extracted from Marine Corps Doctrinal Publication [MCDP] 1-3, *Tactics*)

OFFENSIVE AIR SUPPORT IN MAGTF OPERATIONS

Combined arms operations are central to the Marine Corps' maneuver warfare philosophy. The MAGTF's organization exploits the synergy inherent in closely integrated air and ground operations, generating maximum combat power in the area of operations. Combined arms present the enemy not merely with a problem, but with a dilemma—a no win situation. The commander combines supporting arms, organic fires, and maneuver in such a way that any action the enemy takes to avoid one threat makes the enemy more vulnerable to another.

Single battle concept allows the commander to effectively focus the efforts of all the elements of the force to accomplish his/her mission. Under the single battle concept, the area of operations consists of three major areas - deep, close, and rear. To orchestrate actions throughout the area of operations, the commander must determine what, where, when, and how to apply OAS in MAGTF operations.

OAS involves "those air operations conducted against enemy installations, facilities, and personnel to directly assist in the attainment of MAGTF objectives through the destruction of enemy resources or by the isolation of the enemy's military forces" (Marine Corps Reference Publication [MCRP] 5-12C, *Marine Corps Supplement to the Department of Defense Dictionary of Military and Associated Terms*). The MAGTF commander uses OAS to shape the battlespace for future operations, create windows of opportunity for decisive action, restrict the enemy's freedom of action, and disrupt the cohesion and tempo of the enemy's operations.

The MAGTF exemplifies a balanced combined arms team. For example, during Desert Storm, 1st Marine Division began a series of "roving gun" artillery raids, firing on suspected enemy positions in Kuwait. These raids were designed to provoke an enemy reaction, with aerial observers, tactical air on station, and artillery waiting to engage the Iraqis should they come out of their fortified positions.

EA-6Bs protected Marine artillery from Iraqi counterbattery fire by providing jamming. As Iraqi artillery returned fire, their positions became exposed to aerial observers, who then marked the target for Marine artillery, F/A-18s, and AV-8Bs. These raids were very successful in keeping the Iraqis off balance and presented them a dilemma—a no win situation—return fire and become exposed to OAS aircraft and artillery counterbattery fire or do nothing.

As one of the six functions of Marine aviation, OAS provides the MAGTF commander the capability to project firepower to shape the events in time and space to influence the battle. See figure 2-1, page 2-2.

EFFECTS OF OFFENSIVE AIR SUPPORT

OAS allows the commander to shape the deep, close, and rear battlespace and ultimately results in the protection of the forces by delaying enemy reinforcements, degrading critical enemy functions, and manipulating enemy perceptions. OAS operations deliver firepower against selected enemy targets and capabilities to directly assist in the attainment of MAGTF objectives by destroying enemy resources or isolating the enemy. Neutralization and destruction are the principal effects achieved by OAS operations.

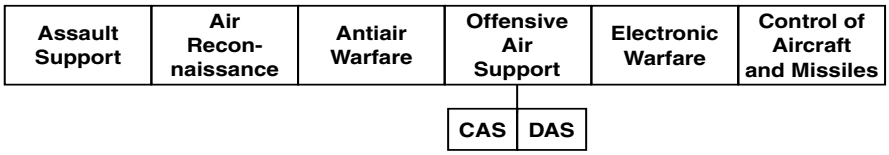

Figure 2-1. Six Functions of Marine Aviation and Subcategories of OAS.

Neutralization

Neutralization effects of OAS missions render areas and weapons ineffective or delay enemy forces for a specified period of time. These missions provide temporary neutralization of hostile fires and can protect friendly forces during movement. Other missions can include attacks against installations or areas the enemy uses to support combat activity.

Destruction

The destructive effects of OAS missions destroy enemy forces, equipment, supplies, and installations. They are of primary interest to the MAGTF commander. Due to the number of sorties and amount/types of ordnance required, total destruction of enemy forces, equipment, supplies, and installations is hard to achieve. Destruction missions are therefore reserved for high priority targets.

CATEGORIES

The MAGTF's single-battle concept exploits the combined-arms nature of MAGTF operations. The capabilities of OAS, including its speed, range, and mobility, provide the necessary aviation based fires to support committed maneuver units and shape the battlespace to enable decisive MAGTF operations. Its primary support of warfighting functions is provided through CAS and DAS. The degree of coordination with MAGTF units determines the OAS categories.

Close Air Support

CAS is air action by fixed- and rotary-wing aircraft against hostile targets that are in close proximity to friendly forces and which require detailed integration of each air mission with the fire and movement of those forces (Joint Publication [JP] 1-02). This detailed integration is accomplished using positive control. Positive control is provided by terminal controllers, i.e., FACs or FACs (airborne) (FAC[A]s).

Deep Air Support

DAS 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 are flown on either side of the fire support coordination line; the lack of a requirement for close coordination with the fire and movement of friendly forces is the qualifying factor (MCRP 5-12C). DAS missions include AI, AR, and strike coordination and reconnaissance (SCAR). See figure 2-2.

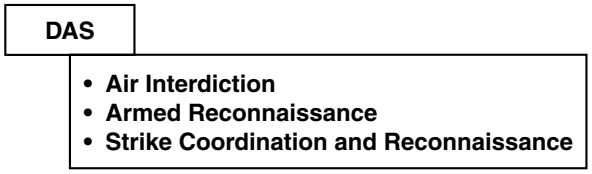

Figure 2-2. DAS Missions.

Air Interdiction Missions

AI missions destroy, neutralize or delay the enemy's military potential before it can be brought to bear effectively against friendly forces. These missions re-

spond to known targets briefed in advance. AI usually involves the employment of large strike packages against targets such as command, control, and communication (C3) nodes, bridges, railways, etc. AI denies the enemy the use of a particular area, route or facility. AI can neutralize, destroy, or even delay the enemy's military potential before it is brought to bear against friendly forces. The particular mission will determine AI support requirements. AR, electronic warfare (EW), SEAD, airborne early warning (AEW), and tactical air-launched decoys (TALDs) are support requirements that may be involved in the planning and execution of a successful AI mission.

Armed Reconnaissance Missions

AR missions locate and attack targets of opportunity (i.e., enemy materiel, personnel, and facilities) in assigned areas. AR differs from AI because AR target's locations are not known or briefed in advance. AR provides the MAGTF commander an economy of force to cover and defend terrain not suited to other forces and—

- Identifies enemy forces and engages them before they can threaten MAGTF forces.
- Denies the enemy undetected movement and use of key terrain.
- Provides timely warning of enemy intentions or attacks.
- Prevents or degrades the enemy's mobility.
- Collects and reports high-value information on the enemy's disposition.
- Covers large areas of open terrain by observation and fire.

Fire support coordinating measures protect armed reconnaissance aircraft from friendly fire. Armed reconnaissance missions do not exclude other supporting fires from the sector in which they operate. If supporting arms are necessary, the DASC, fire support coordination center (FSCC), and/or the force fires coordination center (FFCC) conduct the necessary coordination.

Strike Coordination and Reconnaissance Missions

SCAR missions are closely linked with AR missions. SCAR missions acquire, report, and coordinate the destruction of targets. SCAR aircraft may discover enemy targets and provide a target mark or talk-on for other AR missions or accurately locate targets for AI missions. SCAR missions can be flown by any AR aircraft that has been assigned an area to coordinate the attacks of other DAS flights. During Desert Storm, F/A-18Ds served as SCAR platforms by coordinating AR missions to attack targets in "kill boxes."

Some planning considerations for SCAR missions are:

- Does not require a FAC(A) qualification or terminal control.
- SCAR missions can be performed by any type of aircraft capable of executing AR missions.
- May provide target, location, description, threat, and area weather.
- Prevents redundant targeting.
- Confirms or locates surface to air threats.
- Assist with bomb or battle damage assessment (BDA).
- Assists the MACCS in the flow of aircraft through radio relay.
- Generally different from a reconnaissance mission in that SCAR missions locate and coordinate target destruction and will typically be armed with munitions and systems that better enhance target designation.

See MCWP 3-23.1, *Close Air Support*, and MCWP 3-23.2, *Deep Air Support*, for more information.

REQUIREMENTS FOR EFFECTIVE OFFENSIVE AIR SUPPORT

Effective OAS planning and execution revolve around a few basic requirements to achieve desired mission results. When any one or any combination of these requirements is omitted, mission results may not be as effective. For example, an OAS aircraft may be shot down or may miss the target due to the inability to suppress the enemy's air defenses. The aviation combat element (ACE) may be conducting OAS, but at what risk or to what effect? The requirements for effective OAS are as follows.

Air Superiority

To attain air superiority, efforts must be made to create an operating area that allows attack aircraft to prosecute targets without prohibitive interference from enemy fighter aircraft. This can be achieved by conducting an aggressive antiwar warfare (AAW) operation prior to conducting OAS or by tasking aircraft as fighter escort during OAS operations. It is imperative that the MAGTF ground combat element (GCE) understands why air superiority is important. If the enemy can interfere with our attack aircraft by launching fighters, then they can potentially launch attack aircraft against our GCE.

Suppression of Enemy Air Defenses

SEAD is important in that it can create a "relative sanctuary" that enables attack aircraft to concentrate on killing targets vice self-protection. Traditionally, the perception of SEAD responsibilities have fallen upon artillery. While artillery is well suited in this role, ACE planners must plan for SEAD requirements when indirect fire assets may not be available, i.e.; interdiction missions beyond the range of organic artillery/mortars. High-speed antiradiation missiles (HARMs), imbedded suppression, joint weapons (J-weapons), and jamming (EA-6B) should all be considered when addressing the SEAD effort.

Cooperative Weather

The greatest air superiority and SEAD campaign can be executed, and prohibitive interference or unacceptable attrition can still be experienced if low ceilings force attack aircraft to prosecute targets "under the weather." From 1950 to the present, 85 percent of aircraft combat attrition can be directly attributed to antiaircraft artillery (AAA). Aircraft forced to low altitude are in the heart of the AAA envelope. Inclement weather can negatively influence more than friendly attrition. Target acquisition, aircraft sensor performance, laser attenuation, and terminal control can be affected by inclement weather. Planners must look at available OAS assets, be knowledgeable of their capabilities and limitations, and optimize the way in which they employ them.

Effective Targeting

By their very nature, fixed targets are generally less difficult to effectively target, mark, and attack than mobile targets. Whether attacking fixed or mobile targets, a detailed pre-mission targeting effort is critical to the effectiveness of the attack. This is especially critical for mobile and time-sensitive targets. Based on the nature of mobile targets, collection assets must be optimized to provide the most updated and quality location information on a target. The overall MAGTF collection plan must encompass and be integrated with the overall MAGTF targeting plan and priorities. Priorities of MAGTF organic and nonorganic collection assets must focus on the targeting priorities within the MAGTF battlespace. Focusing the collection assets targeting priorities also focuses the terminal control assets and marking capabilities across the MAGTF battlespace. The MAGTF will always plan to use FAC(A)s and SCAR aircraft to optimize the effects of the attack aircraft on a target.

Effective Marking

Effective marking aids in the proper identification and location of targets to prevent fratricide, and greatly increases the probability of a hit/kill. For fixed targets, the availability of imagery, photographs, detailed maps, and precise coordinates will increase the likelihood of mission success. This type of data may be provided by organic assets within the Marine Corps or may require the use of joint or national assets. Reactive targeting will usually require a mark to aid in target acquisition. To facilitate strike aircraft target acquisition, a number of marking methods are currently available. FACs, FAC(A)s, and SCAR aircraft should strive to provide the most accurate and reliable marking method for the situation. The use of redundant marks is highly recommended. In addition to the use of traditional marks (e.g., smoke, white phosphorous), recent developments have made use of laser, infrared, and GPS technology to acquire targets.

Effective Weaponeering

Effective aircraft and weapon to target match must be evaluated and implemented to achieve an economy of force in attacking targets in the battlespace. See appendix A, Ordnance Selection Guide.

Capable Platforms/Sensors

To increase the probability for a successful target attack, the delivery platform needs to be technologically advanced. Historically, the most difficult task associated with the majority of OAS missions has been target acquisition. Attack platforms need accurate weapon systems and sensor equipment to aid in target acquisition/designation in day and night operations. These new systems include night targeting FLIRs, infrared (IR) pointers, generation III night vision devices (NVD's), 10-digit GPS targeting accuracy, precise laser designators, trackers, range finders and precision-guided munitions (PGMs). See appendix B, Aircraft Weapons and Capabilities Guide.

Flexible Control

A responsive C3 system is required to ensure that proper OAS customers get what they need and when they need it. Tactical airborne controllers (TAC[A]s), FAC(A)s and deep reconnaissance and targeting platforms should be provided whenever possible and tactically feasible. The increased situational awareness will yield great dividends. Positive information flow, both ways, with a simple and redundant back-up plan is the key to successful control.

Prompt Response

OAS must be timely to be successful. The techniques available to reduce response time can be grouped into three categories: basing posture, alert states, and mission classification.

Forward Basing

Forward basing reduces the transit time to and from the battlespace, and also allows attack aircraft more time on station. Forward basing will, however, incur both logistical and security requirements.

Alert States

This is a "queuing" system that directs aircraft to be able to take-off in 60, 30, 15 or 5 minutes. As the C3 system receives requests for OAS, the alert states can be upgraded to provide OAS as required by battlespace conditions. Airborne alerts may be utilized. This represents the fastest response time, but also potentially the greatest wear on assets.

Mission Classification

The classification of the OAS mission will directly impact the timeliness of the support. Preplanned scheduled missions will occur at the planned time on target (TOT). On-call missions will be dependent on the alert state from which the asset was launched. Immediate mission response times will vary based on the distance the asset was diverted from the target area.

MISSION CLASSIFICATION

The ACE executes OAS missions as either preplanned or immediate air support. The ACE executes both types of support in response to specific requests. Requesting units submit a joint tactical air strike request (JTAR) via the FSCC for preplanned missions. Requests require approval at each level. After approval, the FSCC sends the request to the ACE (via the Marine TACC) for planning and execution. A sample JTAR is provided in appendix C. For immediate missions, requesting units normally contact the DASC directly by radio on the tactical air request net/helicopter request net. Silence by the FSCCs indicates consent for immediate missions. To minimize response time to the MAGTF's direct air support requirements, the TACC may delegate launch/divert authority to the DASC. The type of request determines the type of support. The ACE also executes OAS missions based on direction received from the MAGTF FFCC through the TACC.

The battlespace shaping matrix and the reactive attack guidance matrix are two tools produced by the FFCC that aid the TACC in processing JTARs and immediate mission requests. These missions result from the MAGTF current fires section and the TACC executing reactive targeting on primarily mobile targets identified in planning. These targets are predominately in the deep battlespace and have a more clearly identified location based on current collection data. In this way, the MAGTF uses OAS in a flexible enough manner to attack the appropriate targets based on the current situation. See MCWP 3-25.5, *Direct Air Support Center Handbook*, for more information on processing JTARs and immediate air support requests.

Preplanned Missions

Preplanned air support is in accordance with a program and planned in advance of operations. Preplanned missions are either scheduled or on-call.

Scheduled

Prepared scheduled missions are executed at a specific time against a specific target at a known location. Scheduled missions allow aircrew to conduct detailed planning. Weapons loadout, flight composition, and flight profiles are optimized to maximize mission success. Scheduled missions provide the most economical use of aircraft and ordnance.

On-Call

Preplanned on-call missions involve aircraft that are preloaded for a particular target or array of targets and target area and placed in an appropriate ground/air alert status. Aircrew can conduct mission planning based on the information that is available, but not to the same detail of a scheduled mission. On-call missions allow the requesting commander to employ OAS assets as the tactical requirement arises based on prior mission analysis.

Immediate Missions

Immediate missions meet requests that arise during battle, strike unanticipated targets, and are generally urgent in nature. Immediate missions cannot be identified far enough in advance to permit detailed mission coordination and planning. Aviation assets are diverted from other missions via the MACCS to execute immediate requests. Although the diverted aircraft may not be carrying the optimal ordnance load to prosecute the specific target set, a swift attack can exploit an unexpected enemy weakness or maintain the momentum of an attack.

SUMMARY

OAS is one method MAGTF commanders can employ their MAGTF combined arms team to shape the battlespace (deep, close, and rear). Its primary support of the warfighting functions is to provide the MAGTF fires and force protection through neutralization and destruction. OAS is subdivided into two categories; CAS and DAS. CAS missions require detailed integration of each air mission with the fire and movement of friendly forces. DAS missions lack the requirement for detailed integration with the fire and movement of friendly forces and comprise of AI, AR, and SCAR missions. OAS missions can be affected by one or any combination of requirements discussed in this chapter. Preplanned and immediate air support are two types of OAS mission classifications that can affect the timeliness of support.

CHAPTER 3. COMMAND AND CONTROL

MAGTF commanders will retain operational control of their organic air assets. The primary mission of the MAGTF aviation combat element (ACE) is the support of the MAGTF ground element. During joint operations, the MAGTF air assets will normally be in support of the MAGTF mission. The MAGTF commander will make sorties available to the JFC, for tasking through the joint force air component commander (JFACC), for air defense, long-range interdiction, and long-range reconnaissance. Sorties in excess of MAGTF direct support requirements will be provided to the JFC for tasking through the JFACC for the support of other components of the joint force or the joint force as a whole.

Nothing herein shall infringe on the authority of the theater or JFC in the exercise of operational control, to assign missions, redirect efforts (e.g., the reapportionment and/or reallocation of any MAGTF tactical air [TACAIR] sorties when it has been determined by the JFC that they are required for higher priority missions), and direct coordination among his subordinate commanders to insure unity of effort in accomplishment of his overall mission or to maintain integrity of the force. (Extracted from JP 0-2, *Unified Action Armed Forces [UNAAF]*)

In OAS operations, as with all MAGTF operations, the C2 system is used to build a comprehensive picture of the battlespace. The principal objectives of the MACCS are to enhance unity of effort, integrate elements of the C2, and help maintain the commander's situational awareness. From this situational awareness, commanders and operators involved in the planning and execution of OAS operations are able to make decisions regarding the actions needed to force the enemy to do our will. This chapter reviews C2 methods, resources, and measures used to facilitate the MAGTF and ACE commander in making decisions needed for effective and efficient conduct of OAS operations.

COMMAND

MAGTF commanders are the individuals responsible for the conduct and operations of forces under their command. A MAGTF consists of a command element, ACE, GCE, and combat service support element (CSSE), each with its own commander.

The ACE commander is responsible to the MAGTF commander for the conduct of OAS operations. Other element commanders provide support to the ACE commander in the form of planning, resources, and logistic support necessary to conduct OAS operations. The involvement of all element commanders in the planning and conduct of OAS operations is necessary to lend unity of effort to the MAGTF.

ACE commanders normally delegate authority for the detailed planning and execution of OAS operations to their MACCS. From their command post at the tactical air command center (TACC), ACE commanders or their designated authorities provide centralized command and decentralized control over the execution of OAS operations.

CONTROL

Varying degrees of control and operations can exist within OAS and are dependent on each particular situation. The MAGTF commander's guidance establishes precise guidelines for control. The MACCS uses air direction and air control to control OAS aircraft within a designated area.

- Air direction is the authority to regulate the employment of air resources. Air direction balances an air resource's availability against its assigned priorities and missions.
- Air control is the authority to direct the physical maneuvering of aircraft in flight or to direct an air-

craft 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 available airspace effectively. Positive control, procedural control or a combination of positive and procedural control is used when conducting OAS operations.

Terminal Control

Terminal control directs the delivery of ordnance in the target area for OAS aircraft and facilitates the detailed integration with the fire and movement of friendly forces. The two types of weapons release authority during the final attack portion of OAS missions are positive control and reasonable assurance.

Positive Control

Positive control will be used to the maximum extent possible. Two forms of positive control used by ground commanders during CAS missions are direct and indirect control prior to aircraft employing ordnance.

Reasonable Assurance

Reasonable assurance is a circumstance in which the supported ground commander assumes an acceptable level of risk in allowing aircrews to attack targets by releasing ordnance without positive control during CAS missions. Having the target in sight and identified may be one of the requirements to operate under reasonable assurance. The MAGTF commander establishes the procedures for situations where reasonable assurance may be used.

Marine Air Command and Control System Coordination

The ACE commander uses the MACCS to plan and direct ACE operations and to employ aviation assets in a responsive, timely, and effective manner.

The MACCS gives the ACE commander the ability to exercise centralized command and decentralized control of MAGTF air assets and operations. The MACCS allows interface of MAGTF air with joint or combined operations. The MACCS is an air C2 system, which provides the ACE commander the means to command, coordinate, and control air operations within an assigned sector as directed by the JFC or MAGTF commander. It also allows the ACE commander to coordinate air operations with other Services.

The MACCS consists of various air C2 agencies designed to provide the ACE commander with the ability to monitor, supervise, and influence the application of Marine aviation's six functions. The Marine air control group (MACG) is responsible for providing, operating, and maintaining principal MACCS agencies.

The ACE commander plans, directs, and coordinates all aspects of aviation employment to exercise centralized command. Decentralized control is the control of aviation assets by MACCS agencies responsive to the ACE commander and the dynamic changes in the battlespace. Those MACCS agencies that OAS missions will usually interface with are the DASC, the tactical air control party (TACP), and the TAOC.

Dependent on the situation, OAS aircraft may interface with airborne control agencies such as the tactical air coordinator (airborne) TAC(A), assault support coordinator (airborne) ASC(A) or FAC(A). See figure 3-1. A detailed description of these control agencies and the philosophy of control of aircraft and missiles are found in MCDP 6, *Command and Control*, MCWP 3-23.1, MCWP 3-23.2, MCWP 3-25, *Control of Aircraft and Missiles*, MCWP 3-25.3, *MACCS Handbook*, and MCWP 3-25.5.

AIRSPACE CONTROL MEASURES

Airspace control measures increase operational effectiveness. They also increase OAS effectiveness by ensuring the safe, efficient, and flexible use of airspace. Airspace control measures speed the handling of air traffic within the area of operations.

Air C2 systems use airspace control measures to help control the movement of OAS aircraft over the battlespace. Airspace control measures are not mandatory or necessary for all missions.

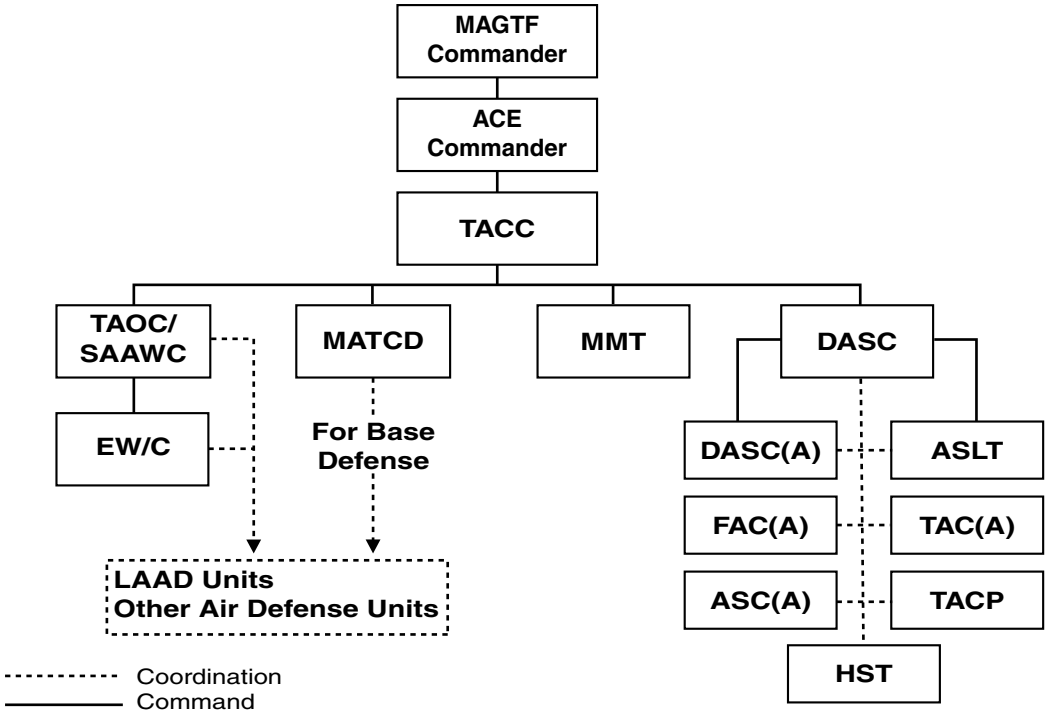

Figure 3-1. MACCS Organization.

The airspace control authority (ACA) is delegated by the JFC or MAGTF commander to assume overall responsibility for the operation of the airspace control system in the area of operations (AO). The MACCS executes the positive and procedural control of aircraft as published by the ACA in the airspace control plan (ACP), airspace control orders (ACOs), and special instructions (SPINS).

Marine doctrine stresses blending positive and procedural control as appropriate to control its airspace. Where positive control relies on positive identification, tracking, and direction of aircraft within an airspace by electronic means, procedural control relies on a combination of previously agreed upon and promulgated orders and procedures (extracted from JP 1-02). The three important control documents are depicted in figure 3-2.

Airspace Control Plan

ACP is a document that provides specific planning guidance and procedures for the airspace control system for the area of responsibility/joint operations area.

Airspace Control Order

ACO is an order implementing the ACP that provides the details of the approved requests of airspace control measures. ACO is published as part of the air tasking order (ATO) or as a separate document.

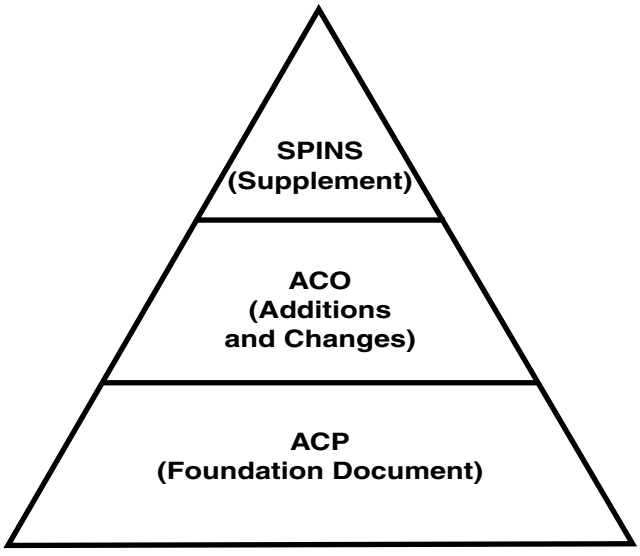

Figure 3-2. Air Control Documents.

Special Instructions

SPINS are published with the ATO and contain information reflecting specific time periods throughout the ATO cycle in which the air control measures identified in the airspace control plan and ACOs are to be activated. It can also contain updates to the rules of engagement, standard conventional loads, and identification criteria.

OAS operations require different forms of airspace and terminal control measures that are unique to CAS and DAS. Procedures for CAS are going to be different than those required for AR or SCAR missions. For more detailed information on airspace and terminal control measures specific to OAS missions, refer to MCWP 3-23.1, MCWP 3-23.2, and MCWP 3-25.

COMMAND AND CONTROL REQUIRED TO PHASE CONTROL ASHORE

Phasing control ashore is the passing of authority to C2 certain functions from the amphibious task force commander to the landing force commander. Operational maneuver from the sea (OMFTS) concepts call for a minimum footprint ashore. C2 functions are initially accomplished from the sea, therefore, reducing the footprint ashore. However, some C2 agencies may be established ashore when required. Current doctrine states that the DASC is normally the first principal air control agency established ashore during amphibious operations. The DASC is normally collocated with the senior FSCC.

The development of current Marine Corps concepts may evolve to make the DASC the only Marine aviation agency to be located ashore. Its responsibility for the direction of air operations in direct support of ground forces and its inherent mobility make it the logical choice to be the ACE's expeditionary agency ashore. Current doctrine regarding the phasing of control ashore in expeditionary operations are detailed in MCWP 3-22, *Antiair Warfare*, MCWP 3-23.1, MCWP 3-25.3, and FMFM 1-7, *Supporting Arms in Amphibious Operations*.

JOINT FORCE COMMAND AND CONTROL RELATIONSHIPS

Joint air operations are those air operations performed with air capabilities/forces made available by other Service components in support of the JFC's operation or campaign objectives or in support of other components of the joint force. The JFC may designate a JFACC to apportion those air capabilities/forces that the MAGTF makes available to the joint force. The JFC has the authority to exercise operational control, assign missions, direct coordination among subordinate commanders, redirect and organize his/her forces to ensure unity of effort in the accomplishment of the overall mission. These same rules apply to forces assigned to the MAGTF.

The JFACC will use the JFC's guidance and authority, and in coordination with other assigned or supporting commanders, to apportion air sorties to various missions or geographic areas. As a result, the MAGTF in joint and multinational operations may have OAS from both organic Marine Corps direct support capabilities/forces and those capabilities/forces allocated to it by the JFACC.

Successful use of joint air resources to support the JFC's campaign requires unity of effort, centralized planning, and decentralized execution. The JFC may designate a JFACC to coordinate joint air operations. The processes and framework used are consistent across the range of military operations.

The JFC integrates the actions of assigned, attached, and supporting forces into unified area of responsibility (AOR)/joint operations area (JOA)-wide joint air operations. The JFC orchestrates the actions of assigned, attached, and supporting capabilities/forces in time, space, and purpose to create synergism and avoid duplication of effort. This is done through the use of control measures and coordinated plans. When designated, the JFACC, ACA, and area air defense commander (AADC) will integrate joint air operations with joint airspace control and joint air defense operations in support of the JFC's campaign. Although these functions may be performed by different individuals, joint doctrine states that normally one individual is assigned to be the JFACC, ACA, and AADC to ensure seamless integration of these functions.

The JFACC's command post is the joint air operations center (JAOC). The JAOC is structured to operate as a fully integrated facility and staffed to fulfill the JFACC's responsibilities. The two organizations or functions that should be common to all JAOCs are combat plans (future joint air operations) and combat operations (execution of the daily joint ATO). The JAOC includes senior component liaisons who serve as conduits for direct coordination between the JFACC and their respective component commanders. The liaisons help integrate and coordinate their component's participation in joint air operations and coordinate and deconflict component direct support air operations with joint air operations.

The Marine Corps forces (MARFOR) ACE and other components should provide the JFACC with a description of their direct support plan through the Marine liaison officer (MARLO) to allow for coordination and deconfliction of targeting efforts between each component and within the JFC staff and agencies. In addition, the MAGTF's direct support sorties that are not available for joint air tasking must still comply with the ACP, ACO, and SPINS. Refer to JP 0-2, JP 3-0, *Doctrine for Joint Operations*, JP 3-09, *Doctrine for Joint Fire Support*, JP 3-56.1, *Command and Control of Joint Air Operations*, MCWP 3-2, *Aviation Operations*, and MCWP 3-25 for information about command relations for air support in joint force operations.

The JFC may not always appoint a JFACC when joint air operations are the only operations or the duration and scope of air operations are of a very limited nature. The JFC may elect to plan, direct, and control joint air operations. When a JFACC is not assigned, a staff section or individual will be assigned the mission of planning, coordinating, and executing joint air operations. The JFC normally assigns missions and issues mission-type orders to all components. With receipt of the mission goes the authority for each Service component commander to conduct operations in accordance with the JFC's intent and operational concept.

Each component brings unique capabilities to a joint operation. Successful theater operations require effective synchronization of ground, air, naval, space, and special operations forces. Coordinated air operations permit JFCs to rapidly develop the battlespace to meet their operational objectives by dominating the airspace and striking the enemy in depth. The theater air-ground system (TAGS) is a system of systems, a synergy of the various component air-ground systems, which orchestrate the planning and execution of air-ground operations.

Component C2 elements are combined to form the TAGS. Figure 3-3 shows the equivalent functional agencies/elements/centers in terms of similarity of tasks accomplished by the MACCS. Joint force components must work together in planning and executing joint air operations that accomplish JFC-assigned objectives, comply with JFC guidance, and satisfy various component commanders' requirements. The JFACC structures the TAGS based on capabilities provided by various components.

U.S. Marine Corps	U.S. Army	U.S. Navy	U.S. Air Force	Special Operations Forces (SOF)
TACC/ TADC	BCD	TACC/ TADC	AOC	JSOAOC
TAOC	____	AWC	CRC	____
DASC	____	ASCS/ HCS	ASOC	SOCCE
FSCC	FSE/ A2C2	SACC	____	____
TACP	____	____	TACP	SOLE
FAC(A)	____	FAC(A)	FAC(A)	____
TAC(A)	____	TAC(A)	TAC(A)	____
FAC	____	____	FAC	SOTAC

Legend			
A2C2 =	Army airspace command and control	FSE =	fire support element
AOC =	air operations center (USAF	HCS =	helicopter control section
ASCS =	air support control section	SOCCE =	special operations command and control element
AWC =	air warfare commander	SOTAC =	special operations terminal attack controller
CRC =	control and reporting center		

Figure 3-3. Component Air C2 Agency Functional Equivalents.

SUMMARY

During joint operations, the UNAAF policy for C2 on Marine tactical air in sustained operations ashore will be followed. The MAGTF's air assets will normally be in support of the MAGTF mission and MAGTF commanders retain operational control of their organic air assets. The JFC may appoint a JFACC. The JFACC will use the JFC's guidance and authority to apportion MAGTF air sorties to various missions or geographic areas in coordination with other assigned or supporting commanders. As a result, the MAGTF in joint and multinational operations may have OAS from both organic Marine assets and those capabilities/forces allocated by the JFACC. The MACCS allows the commander the ability to exercise centralized command and coordination and decentralized control of MAGTF air assets. The capabilities of the MACCS allow the synchronization of MAGTF air assets into joint operations. The positive and procedural types of aircraft control are published in the ACP, ACO, and SPINS and are executed by the MACCS. The airspace control measures will vary for different types of OAS operations. CAS and DAS operations have unique control requirements necessary for each one. The airspace and terminal control measures will increase the operational effectiveness and safety of aircraft operating in the AO.

CHAPTER 4. PLANNING

> Planning encompasses two basic functions—envisioning a desired future and arranging a configuration of potential actions in time and space that will allow us to realize that future. Planning is thus a way of figuring out how to move from the current state to a more desirable future state—even if it does not allow us to control the transition precisely. (Extracted from MCDP 5, *Planning*)

The MAGTF is task-organized to exploit the combat power inherent in closely integrated air and ground forces. Due to its expeditionary nature, the Marine Corps has been structured so that a large percentage of its fire support is provided by organic aviation assets. Considering this fact, it is imperative that every effort is made to ensure these assets are utilized effectively. In varied threat conditions and/or "target rich" environments, tactical air assets will rarely be sufficient to meet every demand. The MAGTF and ACE staffs must understand the requirements for effective OAS and tailor their plans to meet these requirements.

The MAGTF commander's intent and guidance are essential in the creation of OAS plans. Each step of the planning process ensures clear understanding of his/her vision and desired end state, while ensuring the plan is built to support the MAGTF's single battle.

Within the MAGTF, OAS planning supports deep, close, and rear operations to shape the battlespace. The key to planning OAS is through appropriate representation of warfighting functions; C2, maneuver, fires, intelligence, logistics, and force protection. Planners consider and integrate the warfighting functions when analyzing how to accomplish the mission. When all the warfighting functions are harmonized the maximum impact is obtained to accomplish the desired objective within the shortest time possible and to maximize the efficient use of limited OAS assets. See MCWP 5-1, *Marine Corps Planning Process*, for more detailed discussion on the warfighting functions.

To gain and maintain tempo, commanders and their staffs must be involved in all modes and levels of planning by ensuring a constant flow of information vertically within the chain of command and laterally among staff sections. At the small-unit level, this information exchange can be simple and direct—commander to commander or operations officer to operations officer. In larger-sized units, such as the component or Marine expeditionary force (MEF), a more formal arrangement that uses liaison officers and a distinct planning organization is necessary due to the scope and detail involved. The requirement to align with higher headquarters planning organizations and to properly address the entire planning continuum will also be a factor in determining the size and complexity of the planning organization.

Planning is an event-dominated process. Therefore, planning organizations should be designed to enhance planning for significant events such as changes in OAS missions. Conversely, time-driven processes are necessary, yet subordinate, aspects of planning. Planners must address both time- and event-driven processes while maintaining the proper perspective between the two. For example, the ATO is critical to the planning and execution of OAS operations, and it is produced in a cycle that requires timely input from subordinates. Nevertheless, the ATO is produced in support of the plan—it is not the plan.

This chapter will focus on the MCPP for OAS operations. The targeting cycle and the air tasking cycle will also be addressed as to how they support and are linked with the planning process for OAS in MAGTF operations.

PLANNING ELEMENTS

The MCPP is scalable from the component level down to the squadron level. Typically, resources, information, and time available for planning are limited at the lower levels; therefore, planning organizations must form or adapt to meet these limitations. Command and staff relationships are established and function within a defined organizational structure.

These relationships are key to providing the C2 necessary to effect OAS operational success.

Lower command levels, like squadrons and air groups, adapt and consolidate certain MCPP planning responsibilities and functions within their limited structures. Normally at these command levels, most MCPP procedures are performed by the commanders and their primary staff officers and selected special staff officers.

Only at higher levels of command (MEF or wing) are specialized planning staff elements and organizations formed. The MCPP at the component and MEF levels is primarily conducted by three planning organizations: future plans, future operations, and current operations. Their efforts must be coordinated for the smooth transition from the long-term planning to execution. To ensure integrated planning, these agencies must have warfighting function representation from within the command, as well as subordinate and adjacent commands. Staffing limitations may require placing some of this expertise in general support of the planning effort as a whole.

Future Plans Section

The future plans section focuses beyond the immediate next battle or next phase that is being planned to provide a link between higher headquarters and the future operations section. The future plans sections plans the command's next mission. Upon receipt of a mission from higher headquarters, this section initiates the planning process and develops an outline plan. Depending on the situation, it may focus on a phase of the campaign, develop reconstitution requirements or plan deployment. This section's responsibility is to get the mission correct with regard to the MAGTF's/ACE's capabilities, command relationship requirements, and battlespace geometry. The future plans section may also develop sequels, support relationships for the next phase, and develop plans to ensure that the force does not reach a culminating point. It transitions to the future operations section the outline plan that provides the prominent features of a mission that precedes detailed planning.

Future Operations Section

The future operations section is the focal point of the planning process. It usually forms the nucleus of the operational planning team (OPT) and coordinates with both the future plans and current operations sections to integrate planning of the next battle. The future operations section fully integrates the other staff sections' plans officers, warfighting function representatives, and subordinate unit liaison officers into the planning process. It takes the outline plan from future plans section and uses it as the basis for further planning. The future operations section focuses on changes to MAGTF or major subordinate command (MSC) missions, develops branch plans and sequels, and recommends potential commander's critical information requirements (CCIR). This section interacts with intelligence collection and the targeting process to shape the next battle. The current operations section may provide a representative to the future operations section to guarantee that the transition process is continuous.

Current Operations Section

During operations, the current operations section receives the operation order (OPORD) at the transition brief. The current operation section—

- Coordinates and executes the OPORD.
- Prepares and transmits OPORDs.
- Monitors operations of the force.
- Tracks CCIRs and immediately reports relevant information to the commander.
- Analyzes battlespace information.

Branch plans are normally passed to the current operations section during the transition brief. When an unforeseen enemy action begins to develop, the current operations section will refine already existing branch plans or develop a branch plan. To support the commander, the current operations section may develop new courses of action (COAs), allocate resources, and prepare fragmentary orders (FRAGOs) to modify the current OPORD. This section assesses shaping actions and the progress toward the commander's decisive actions, monitors the status of forces and materiel, monitors rear area operations, coordinates terrain management, maintains essential

maps and information, and provides the future operations section with situational awareness.

Operational Planning Team

An operational planning team (OPT) may be formed to focus the planning effort and gather relevant planning expertise. Normally, the OPT is built around a core of planners from either the future plans section or the future operations sections. See figure 4-1. The OPT may also be augmented by warfighting function representatives, liaison officers, and subject matter experts needed to support planning. See MCWP 5-1 for more information on OPTs. The OPT serves as the linchpin between future plans, future operations, and current operations sections.

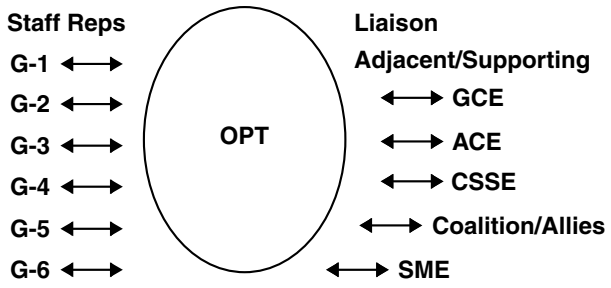

Figure 4-1. Appropriate Representation.

Not only does the MAGTF use integrated planning within the staff, but it uses the OPT as a vehicle to integrate planning among MSCs. See figure 4-2. The MSC command elements and their respective OPTs pass information to their common higher headquarters, the MAGTF, while integrating and coordinating their own efforts among themselves.

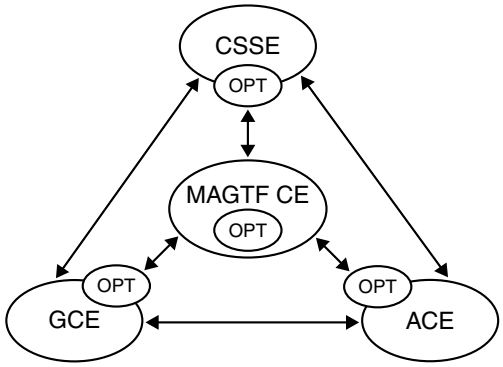

Figure 4-2. Staff Planning Relationships.

The subordinate command's OPT liaison officers are key contributors to the planning process and the future operations plan. These liaison officers provide timely and accurate movement of information between the OPT and their commands. Normally, this officer's primary responsibility is to the planning effort.

MAGTF PLANNING

The MAGTF begins the planning process through **mission analysis**. See figure 4-3. It reviews and analyzes orders, guidance, and other information provided by higher headquarters and produces a unit mission statement. Intelligence preparation of the battlespace (IPB) begins immediately and continues throughout MAGTF planning. During mission analysis it produces an initial cut on high-value targets (HVTs). Intelligence and IPB products support the staff in identifying or refining centers of gravity (COGs) and to determine critical vulnerabilities.

During **COAs development**, planners use the MAGTF commander's mission statement (which includes the higher headquarters commander's tasking and intent), commander's intent, and commander's planning guidance to develop COA(s). This provides further clarity and focus of the targeting effort to achieve the commander's purpose and the desired end state. During COA development the mutually supporting concepts of maneuver and fire identify

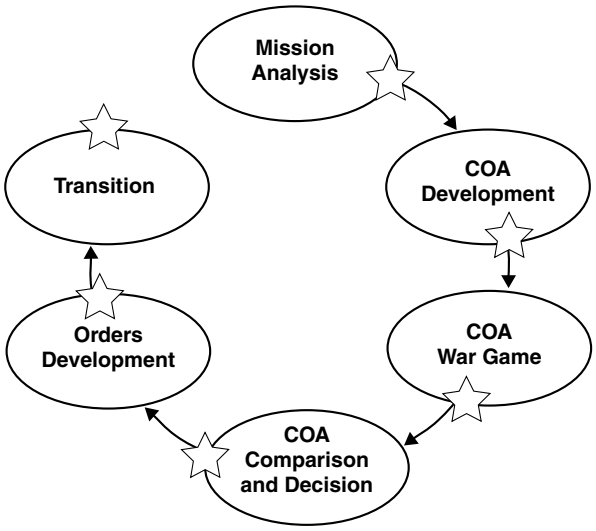

Figure 4-3. Marine Corps Planning Process.

HVTs. In the COA development, the supporting concept of shaping the battlespace is materialized. The targeting effort refines those HVTs identified and begins to develop specific high-payoff targets (HPTs). HPTs are those targets that give planners the greatest effect for the least expenditure of time and resources and lead them to decisive action to achieve their purpose. The MAGTF commander makes decisions on OAS with recommendations for HPTs from the GCE, ACE, and CSSE commanders. See MCWP 3-16A, *Tactics, Techniques, and Procedures for the Targeting Process*, for more information on target development.

COAs wargaming assists planners in identifying friendly and possible enemy strengths and weaknesses, associated risks, and asset shortfalls for each COA. When we wargame COAs, planners determine what specific conditions need to be set that will lead them to defeat the enemy COGs. It is during this stage of the planning that HPTs are finalized and the fire support plan is modified.

In **COA comparison and decision**, the commander evaluates all friendly COAs against established criteria, then evaluates them against each other. The commander then selects the COA that will best accomplish the mission. After the commander selects the COA, targeting objectives and priorities are submitted to the targeting board to support the plan. If the plan is joint or sequential to an ongoing operation, the targeting board inputs may be required earlier to meet deadlines of the ATO process. Based on the selected COA, the MAGTF commander will apportion aviation assets to achieve the effort required for OAS. The MAGTF commander may request additional aviation assets from the JFC to meet MAGTF objectives through recommendations from the ACE commander and MAGTF force fires coordinator. See MCWP 3-2, *Aviation Operations*, for more information on apportionment of MAGTF aviation assets.

During **orders development**, the staff uses the commander's COA decision, mission statement, and commander's intent and guidance to develop orders that direct unit actions. Orders serve as the principal means by which the commander's decision, intent, and guidance are expressed. It directs actions and focuses the ACE's and other subordinate's tasks and activities toward accomplishing the mission.

Transition is an orderly handover of a plan or order as it is passed to those tasked with execution of the operation. It provides those who will execute the plan or order with the situational awareness and rationale for key decisions necessary to ensure there is a coherent shift from planning to execution. During execution, the plan is continuously updated and modified as necessary to ensure the desired effects meet MAGTF objectives.

AVIATION COMBAT ELEMENT PLANNING

The TACC is the operational command post from which the ACE commander and staff plan, supervise, coordinate, and execute OAS operations. The ACE plans concurrently with the MAGTF and aircrew in support of OAS operations. The constant flow of information flows vertically within the chain of command and horizontally within the ACE. An OPT may also be formed at the ACE level to facilitate coordination between MAGTF and subordinate commands. See MCWP 3-2 for more information on the TACC and ACE staff organization for aviation planning.

The ACE supports the MAGTF commander's concept of operations and helps determine which attack options are best suited for prosecuting OAS targets. Aviation assets organic to the ACE provide the MAGTF commander lethal and nonlethal fires to limit, disrupt, delay, divert, destroy, and damage the enemy for mission success.

Targets assigned to the ACE for OAS operations are based on the MAGTF's mutual supporting concepts of maneuver and fires. From the ACE commander's interpretation of the MAGTF commander's mission and intent, the ACE staff will develop specified and implied tasks to quantify the effects of OAS in support of the MAGTF's concept of fires. This section will focus on OAS planning at the ACE level.

During mission analysis, the ACE staff analyzes the MAGTF commander's objectives and guidance as follows:

- Objectives are the MAGTF commander's operational goals to be achieved. They provide a means

to determine priorities and they set the criteria for measuring mission success.

- Guidance sets the limits or boundaries on objectives and how they are attained. It provides the framework to achieve the objectives and establishes force employment scope and restrictions. Rules of engagement (ROE) are an example of guidance.

The ACE reviews and analyzes orders, guidance, and other information provided by the MAGTF. The ACE commander's intent guides the ACE staff throughout OAS planning and execution. Intelligence supports the ACE from the beginning of planning phase through the execution of OAS operations. IPB is a systemic, continuous process of analyzing the threat and the environment. The IPB process helps the ACE commander selectively apply and maximize his/her OAS power at critical points in time and space. IPB of the battlespace for OAS is focused on the following:

- Current enemy situation, previous enemy actions, and enemy doctrine.
- Locate HPTs in the battlespace.
- Identify critical components of HPTs.
- Are HPTs point or area targets? Specifically, do potential HPTs have small critical components or are the critical components spread over a large area?
- Aid the targeting cell, with the help of the G-2 and JMEM/AS, in the determination of the probability of damage (PD) required to meet MAGTF fires effects. Specific recommendations for suitable PD on individual targets are provided in chapter 6 of the JMEM/AS *Weaponeering Guide* and appendix D.

The TACC's future plans section prepares an initial estimate of aviation requirements as soon as preliminary guidance and information about the assigned mission or operation is available. It may include only the number and type of OAS aircraft required and is deduced from the ACE's estimate of the MAGTF's general mission and enemy capabilities. The initial estimate is presented to the MAGTF commander during the MAGTF's mission analysis.

During COAs development, the TACC's future plans section uses the ACE commander's mission statement (which includes the MAGTF commander's tasking and intent), commander's intent, and commander's planning guidance as to how OAS can best be employed to influence and support developing COA(s). This provides further clarity and focus of the planning effort to achieve the commander's purpose, and the desired end state. HPTs identified for OAS by the MAGTF are planned by the ACE staff to achieve the desired PD for the least amount of time and resources in achieving the MAGTF commander's objectives.

The following considerations affect the ACE staff in developing the level of effort required by the ACE to support each COA:

- What are the types of aircraft and ordnance available to achieve the required PD on target?
- What are the requirements of subordinate unit missions and their need for support?
- Support requirements (e.g., SEAD, fighter escort, aerial refueling).
- Does the level of effort for the PD required on target directly relate to the MAGTF commander's objectives?
- Factors that may restrict the types of ordnance and delivery options available; such as target location error, distance to the target, weather, visibility, terrain, and target area defenses.
- Target acquisition probabilities for selected weapon systems. See JMEM/AS *Target Acquisition Manual* for detailed information on target acquisition.
- Is the desired time of attack on target focused in support of the MAGTF's concept of operations?
- Are restrictions imposed by National leaders and ROE to prevent an undesirable degree of escalation due to theater conditions?
- Proximity of non-targets to avoid unwanted collateral damage to friendly forces, infrastructure, civilians or prisoners of war.
- Ability of the MACCS to monitor the battlespace to provide OAS operations proper cueing and threat warning, specifically ingress routes, target areas, and egress routes. If the MACCS is unable to provide the surveillance required to support DAS operations, the ACE needs to coordinate through the MAGTF commander to request joint or combined early warning assets to provide the surveillance coverage required.

When planning for the use of fixed-wing and rotary-wing aircraft for continuous combat operations, it is important that planners know the daily sustained and surge sortie rates for each aircraft. Aircraft require

maintenance cycles and a minimum amount of time to load, arm, fuel, and service. A planner will determine the turnaround time (time to load, arm, fuel, and service) and the total number of sorties each type aircraft can fly per day. See MCWP 5-11.1, *MAGTF Aviation Planning*, for more information.

The weapon system planning document is available for each aircraft and provides the planned sustained and surge combat rates for a particular aircraft. It is used for planning logistic and maintenance requirements for specific aircraft. It may be used as a guide, but planners should be familiar with actual aircraft capabilities and sustained requirements. The weapon system planning document is classified and can be obtained from Headquarters, United States Marine Corps (APP) or NAVAIR, via the chain of command.

COAs wargaming assists ACE planners in identifying friendly and possible enemy strengths and weaknesses, associated risks, and asset shortfalls for each COA. When HPTs tasked for OAS operations are used in a war game, specific conditions are set leading to the achievement of the MAGTF commander's desired effects from aviation fires. Wargaming may reveal additional logistical and aviation support requirements to support MAGTF deep operations for selected COAs. It is during this stage in the planning process that OAS force requirements are finalized and the plan is modified for each COA. The aviation estimate of supportability for OAS is provided to the MAGTF commander prior to the MAGTF's course of action comparison and decision step. At a minimum, the aviation estimate of supportability—

- Provides the COAs that can best be supported by the ACE.
- Outlines advantages and disadvantages of possible COAs.
- Identifies significant aviation limitations and/or problems of an operational or logistical nature.
- Highlights measures that can be taken to resolve existing aviation problems including requesting additional theater assets.

In COA comparison and decision, the ACE planning staff evaluates all COAs against established criteria. The COAs are then evaluated against each other. The ACE commander selects the COA deemed most likely to accomplish OAS missions in support of the MAGTF commander's concept of operations. The ACE commander makes decisions and recommendations with the MAGTF force fires coordinator, GCE commander, and CSSE commander to the MAGTF commander. The TACC's future plans section constructs a detailed estimate of aviation support requirements. Requirements provided to the MAGTF commander will include:

- Do the number of aviation assets meet the level of effort required to achieve the MAGTF commander's objectives?
- Will surge or sustained OAS operations limit the ACE's ability to support other current or future MAGTF and/or joint operations based on aircraft availability, ordnance availability, and logistical support requirements?
- Is the level of risk acceptable?

The MAGTF commander uses the recommendations of the ACE commander and staff and the MAGTF force fires coordinator to make OAS targeting and apportionment decisions. They may recommend to the MAGTF commander that joint aviation assets or weapon systems are required to support MAGTF deep battle operations. From the selected COA, the MAGTF's apportionment of the aviation effort toward OAS is translated by the ACE into allocation of sorties for CAS and DAS missions. See MCWP 3-2, MCWP 3-25.4, and the ATO process, in this chapter, for more information on the apportionment and allocation of aviation assets.

During orders development, the TACC's future operations section takes the commander's COA decision, intent, and guidance to develop orders that direct the actions of the unit. Preparing aviation documents varies with the nature and complexity of the operation and can include air allocation requests or air support requests. The ATO serves as the principal means by which the ACE commander expresses his/her decision, intent, and guidance for OAS missions. The ATO translates the allocation of OAS assets into an allotment of sorties tasking specific squadrons assigned to OAS missions and support requirements. Concurrent with the ATO development, the ACE staff coordinates with prospective squadrons that will be assigned OAS missions. This facilitates continuous information sharing, maintains flexibility, and makes efficient use of time. See MCWP 3-2, MCWP 3-25.4, and the ATO process, in this chapter, for more infor-

mation regarding the ACE commander's allotment of sorties.

Transition is the orderly handover of a plan or order as it is passed to those tasked with execution of the operation. The ATO provides OAS mission executors with the situational awareness and rationale for key decisions necessary to ensure a coherent shift from planning to execution. The TACC's current operations section supervises and coordinates the ATO execution.

TARGETING CYCLE

As discussed during the planning process, targeting begins during the mission analysis as the commander identifies the enemy COG during the battlespace area evaluation. An intelligence estimate should have produced an initial cut of HVTs, which can be a starting point for enemy COG analysis. At the end of mission analysis, the final determination of COGs and associated CVs give a focused point of departure for follow-on targeting effort.

In COA development, further clarity and focus to the targeting effort by identifying specific OAS goals and objectives are achieved. Wargaming determines what specific conditions need to be set that will lead to the defeat of enemy COGs. The targeting effort refines those identified vulnerabilities and begins to develop specific HPTs that have the greatest effect for the least expenditure of time and resources and lead to the achievement of purpose.

Many of these targeting products will be passed to the targeting board or joint targeting coordination board (JTCB) if conducting joint operations. See figure 4-4 for targeting links to the MCPP. Targeting inputs may be required earlier in the planning process to meet input deadlines of the ATO process. The targeting board has both an inward and outward focus. The targeting board is the principal tool of the MAGTF to ensure that the fires and targeting efforts of the MAGTF and its major subordinate commands are linked and mutually supporting a single battle.

The targeting cycle was developed as an aid to decisionmaking. It provides for a logical progression in the development of targeting solutions needed for OAS operations. It proceeds from the definition of the problem to an assessment of the solution. The cycle allows the targeting officer to test multiple solution paths and to refine both the understanding of the problem and the proposed solutions. The cycle adapts to circumstances. It can be used from global war planning to micro-contingency operations. The cycle is not tied to any particular weapons system, theater or operations, level of conflict or automated operational support systems.

There are two targeting cycle models that the different Services use in their individual targeting process. The first has a four-step process and is used by the United States Army (USA) and United States Marine Corps (USMC). See figure 4-5. The second process is six steps and is widely used by the United States Air Force (USAF) and United States Navy (USN), and is also the cycle used at the joint level. Although the two

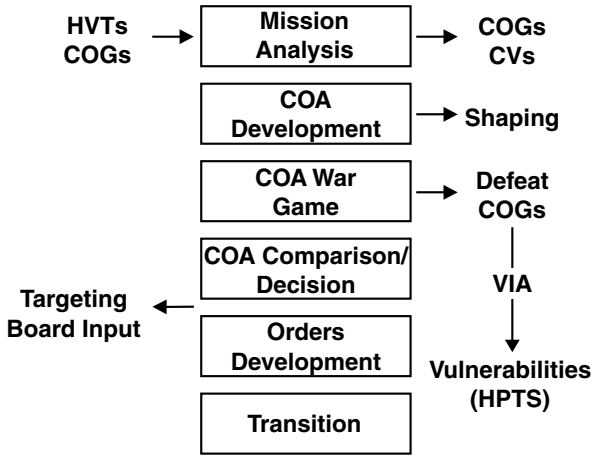

Figure 4-4. Targeting Links to MCPP.

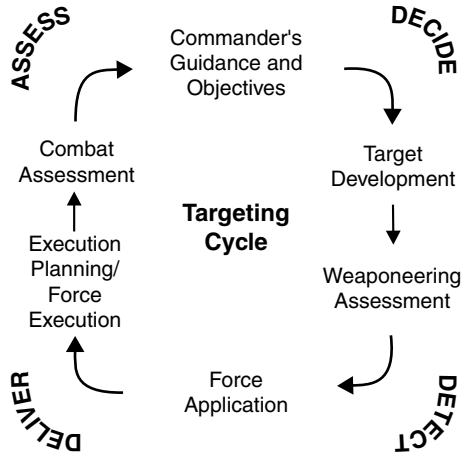

Figure 4-5. D3A and Joint Targeting Cycle.

processes appear different they each cover the same information. These cycles are absolutely central to targeting as a discipline for the following two reasons:

- They provide a structure for the targeteer to use in developing warfighting recommendations for the commander.
- Nothing that is done in targeting makes any sense unless it is done in a logical process.

FOUR-STEP PROCESS (USMC, USA)

Normally, targeting within the MAGTF command element is performed by the FFCC targeting cell. In a MAGTF, the focus is on deep operations with necessary transition to close operations. The MAGTF must integrate decide, detect, deliver, and assess (D3A) with the air tasking cycle since the MAGTF commander's primary tool for OAS operations is aviation. For additional information on the MAGTF targeting cycle, see MCWP 3-42.1, *Fire Support in MAGTF Operations*, and MCWP 3-16, *TTP for Fire Support Coordination*.

Step 1. Decide

Decide is the most important step because it provides the overall focus and prioritizes attack planning. It helps the targeting team decide which targets must be acquired and attacked, which attack option to use, and who will engage the target at the prescribed time. It also determines requirements for combat assessment. This step covers the activities found in the joint (six-step) cycle of: Objectives and Guidance, Target Development, Weaponeering Assessment, and Force Application. The decide step begins with the commander's mission analysis and considers IPB, the enemy situation, and potential enemy COAs. Friendly COAs are established and wargamed. Once a COA is determined, OPORDs are issued to subordinate units. Objectives and guidance are determined by the unit mission, commander's intent and concept of operations, and commander's initial planning guidance. The Decide phase covers target development through the generation of target value analysis (TVA). TVA entails a detailed analysis of enemy doctrine, tactics, equipment, organizations, and expected behavior for a selected COA. TVA methodology provides a relative ranking of HPTs through wargaming that achieves the commander's mission. After wargaming, a clearer picture is established of: which target acquisition assets will be tasked, how information will be processed, which means will be used to attack, and what requirements exist for combat assessment. To select an attack means, targeting officers must perform a weaponeering assessment and consider force application questions. The targeting outputs from these efforts are:

- High-payoff target list (HPTL)—HPTs identified in the order of priority whose loss to the enemy will contribute to the success of the friendly COA.
- Attack guidance matrix—which targets will be attacked, how, when, and the desired effect.
- Target selection standards—accuracy and other specific criteria that must be met before targets can be attacked.
- Requirements for BDA.

Step 2. Detect

Detect is conducted during the execution of an OPORD, target acquisition assets gather information. From this information, targets are validated and tracked. Not all information gathered is useful from a targeting perspective; however, it does develop the commander's situational awareness of the battlefield. Targets may be impossible to attack (out of range) or undesirable to attack (in range but moving to a more advantageous location for attack). Critical targets that cannot or are not attacked must be tracked to ensure they are not lost. Tracking targets may make assets unavailable for acquiring other targets. As targets are tracked, appropriate attack systems are tasked. These duties lie roughly parallel to the joint cycle step of execution planning/force execution.

Step 3. Deliver

Deliver is the main function of attacking targets in accordance with the commander's attack guidance. The tactical situation drives a technical solution, including specific attack unit, ordnance, and time of attack. This means a target scheduled to be hit at long range may not be acquired until it is in close. The long-range asset that was scheduled to hit this target may not be flexible enough to bring weapons to bear on it when it is in close. Therefore, another unit or ordnance (technical solution) may be brought to bear.

This step is equivalent to the joint cycle step of execution planning/force execution.

Step 4. Assess

Assess provides feedback on the question: "Has the commander's guidance been met?" If the commander's guidance has not been met, then the detect and deliver functions of the targeting cycle must continue to focus on the targets involved. Just as in the sixth step of the joint cycle, combat assessment, the feedback may also result in changes to decisions made during the decide step.

SIX-STEP PROCESS (JOINT, USN, USAF)

The MAGTF also maintains an up and out focus by interfacing with the JTCB to push MAGTF support requirements up and ensure they are given due consideration by higher headquarters. The targeting board also is a check to ensure MAGTF targeting efforts support JFC goals and objectives.

An effective and efficient target development process and air tasking cycle are essential for the JFACC/JFC staff to plan and execute joint air operations. This joint targeting process should integrate capabilities and efforts of national, unified, joint force, and component commands, which possess varying capabilities and different requirements. The process is also the same in war and MOOTW. See JP 3-56.1.

Step 1. Objectives and Guidance

Objectives and guidance provide the purpose for the rest of the targeting process. Objectives drive the targeting and determine the target priorities. Objectives and guidance should be both quantifiable and unambiguous in order to be effective. Damage criteria are resolved and collection requirements set. Restrictions, such as no-fire areas (NFAs), are established. Objectives and guidance begin at the national level as broad concepts and should end as short-term, well-defined mission objectives at the appropriate command level.

Objectives

Objectives are goals that give targeting officers a means to determine targeting priorities and provide the criteria for measuring mission success. Objectives come from our national security objectives, national military objectives, and command objectives. Objectives should be observable, measurable, and achievable ultimately leading to a "desired end state."

Guidance

Guidance consists of the ground rules or policies that govern how objectives are pursued. It provides the framework to achieve objectives and establishes the force employment scope and restrictions. Guidance comes from national guidance, principles of war, law of armed conflict, ROE, and command guidance.

Step 2. Target Development

Target development is the systematic evaluation of potential target systems. It is the process by which we determine which targets are most likely to satisfy the objectives and the specific nature, extent, and duration of damage we need to inflict on those targets. The goals of target development are as follows:

- To compile a prioritized list of installations, forces, etc. that if attacked will have the greatest likelihood of accomplishing the commander's objectives.
- To determine the necessary level of damage and the precise locations for the damage on each target which will affect that target to the degree necessary to contribute to accomplishing the commander's objectives.

Once the commander's objectives are known, the targeting officer determines what enemy activity must be defeated to achieve economic, political, and military objectives. Target development evaluates which elements should or could be attacked. It focuses on HPTs that support the objectives.

HPTs are those that are relevant to objectives and guidance and suitable for disruption, degradation, neutralization, exploitation or destruction. Critical nodes (points where system components or elements are linked—dependent on one another) within HPT systems must be identified. This requires detailed information and is no small task. Once critical nodes are identified, target validation must be performed.

A valid target is one that complies with objectives and guidance, contributes to the enemy capability to wage war, is operationally significant, permissible under law of armed conflict (LOAC), and complies with ROE. Restricted and protected targets must be separated from those approved for attack. The output of the target development phase is a prioritized list of potential targets.

This prioritized list must be unconstrained as to weapons or resources required to affect it. Even if a valid target is impervious to any weapon, it is still a valuable target. New weapons that hold the target at risk or the ROE for employing a previously restricted weapon may change. Once target development is completed, the next step is choosing the best weapon that achieves the objective, to the target.

Step 3. Weaponeering Assessment

Weaponeering assessment quantifies the expected results of nonlethal and lethal effects. The number one concern is to select the weapon that promises to inflict the kind and extent of damage required by the objectives, understanding the target system, and the effect on the enemy. Weaponeering solutions give an estimate of the expected performance of a nominal weapon in an infinite number of identical trials.

The estimate for nonlethal weapons (electronic attack) is usually more qualitative (ability to harass, deceive, jam, suppress, disrupt, and deny access) than quantitative. For lethal effects, a specific objective stating the desired level of damage is necessary (destroying the function occurring in a building versus destroying the building structurally). To achieve a specific level of damage, one must consider target vulnerability, weapons effects, delivery errors, weapon reliability, weapons system capabilities, and weapon quantities. Alternate weapons, weapons systems, and delivery tactics must be investigated. Weaponeering is not a means to validate or justify target development.

Collateral damage, the damage to objects that are not a primary target, must be calculated. Collateral damage may be positive (more than one target/target element affected) or negative (unintentional damage to other assets). Weaponeering calculations may reveal the need to seek changes to guidance regarding the desired level of damage, employment tactics or restrictions on weapons employment.

Time constraints may not allow for weaponeering of all targets. Therefore, calculations must proceed in a prioritized manner. The end result of the weaponeering step is a list of targets based on vulnerability.

Step 4. Force Application

Force application involves matching the responsive targets, which satisfy the objectives, to a delivery method and munitions. The intent is not to reach solutions that favor a weapon, but to select the most appropriate tool to perform the work. If a decision is made to employ a specific weapon as part of the objective formulation process, then all of the steps of the targeting cycle that follow are corrupted because solutions will be derived to accommodate the weapon and not the objective.

At the operational level, force application estimates are extensively used in developing long range plans, outlining time to complete particular phases of an operation, depicting how targets may be attacked, and providing a way to integrate and use various weapons. The expected damage desired to meet the objective is based on command guidance and target susceptibility. Force application planning concentrates on optimizing force sizing and support requirements. The reality of scarce resources dictates that the required force (strike package) must be balanced against logistical capabilities and operational realities. Therefore, the prioritized target list may not be implemented exactly in order.

Targeting officers must understand weather, threats, logistics, and friendly tactics and employment procedures to select the optimum weapon/weapons system. Attrition and penetration analysis must be weighed. These analyses will point out tradeoffs to the commander. In situations where time and resources are insufficient, decisions and recommendations may be made with incomplete information.

Standard conventional loads (SCLs) are optimized for use against targets sets that will be targeted repeatedly during OAS operations. In most theaters, ATOs will have predetermined SCLs developed by the weaponeers on MAGTF, joint or multinational staffs. These SCLs reduce planning time and ease reactive

weaponeering during the force execution phase of CAS and DAS missions. The force application phase results in the recommendation of which type of OAS aircraft and type of munitions to be utilized.

Step 5. Execution Planning/Force Execution

This step involves the preparation of inputs to the ATO/OPORD/operation plan (OPLAN) and immediate target tasking. It provides all information subordinate units require, such as aim point coordinates, weapon load/SCL, fuzing, attack timing (for deconfliction), and combat assessment tasking. Tasking may direct actual routing, axis of attack, and weapons release settings. Units expect and require target materials (maps, charts, imagery) and must be informed of specific requirements needed up the chain for accurate combat assessment. At the unit level, commanders review changing threat and weather data and may modify the weapon selection. This may force units to use weapons and weapon systems unlike those the targeting officer has planned on during weaponeering and force application. Predicted conditions may have changed since orders were generated. Weather may be better (or worse), driving a change to the scheduled munitions. Weapons with greater capability may have been delivered, etc. These changes may require changing the BDA plan.

Step 6. Combat Assessment

The combat assessment (CA) encompasses combat operations, strike effectiveness, enemy repair and reconstitution capabilities, impact on enemy, and reliability of friendly equipment-munitions-tactics. During target development, weaponeering assessment, force application and execution planning/force execution, further inputs were made to provide the framework necessary to conduct accurate combat assessment. CA provides the commander with information on the status of the course of the war, helps formulate subsequent battle plans, serves as a benchmark for validating objectives, and collects valuable empirical data on weapon and weapon system performance. Assessment objectives must be determined before data analysis begins. CA provides information for beginning the next targeting cycle. The three major components of CA are:

- BDA is the evaluation of a strike against an individual target. BDA is composed of physical damage assessment, functional damage assessment, and target system assessment.
- Munitions effect assessment (MEA) determines weapon effectiveness and reliability. MEA is conducted concurrently and interactively with BDA. MEA identifies deficiencies in weapons, fuzing, and related materials. The output from MEA is used in recommendations for new requirements and identifying tactics to overcome degraded weapons functioning.
- Reattack recommendations (RR) address the effectiveness of overall strike operations against command objectives (total impact on the enemy's war-fighting/war sustaining capability). It examines effectiveness of tactics, penetration aids, and enemy/friendly countermeasures. RR has also been called re-strike and mission assessment.

CA must be done in a timely manner so that other assets may be directed to targets not sufficiently damaged by the first attack. However, it must be done accurately or destroyed targets will be reattacked while undamaged targets will escape attack. Imagery has usually been the primary source for determining CA, but all source data must be used, especially in light of the growing number of hardened targets.

AIR TASKING CYCLE

The MAGTF commander must synchronize the action of air, land, sea, space, and special operations forces to achieve operational objectives in joint and major operations. The concept of operations, phasing, and sustainment, which must support all higher campaign plans, will most likely be developed in parallel with, or subsequent to, the JFC's and commander in chief's (CINC's) campaign plan. Air assets provide a formidable variety of OAS capabilities to the MAGTF commander. Air-delivered weapons, and other strike operations conducted in the execution phase of the targeting cycle, provide a MAGTF with the opportunity to exploit all aspects of an enemy's structure from close actions to rear areas, including infrastructure and war supporting industries. Before execution can begin,

however, all of these capabilities and assets must be molded into a coherent and integrated plan.

Aviation planning within the MAGTF is a continuous process that takes into account the current situation, previous actions, and future requirements. The ACE is actively involved in the air planning process at three levels: the aviation combat element, the MAGTF command element, and the joint force headquarters. The GCE and CSSE conduct their own planning; they address aviation requirements and submit requests for aviation support to the MAGTF commander, who considers them for inclusion into the ACE operation or frag order.

The air tasking cycle is an integral part of the MAGTF planning process. It provides the effective and efficient employment of the air capabilities/forces made available. The cycle provides a repetitive process for the planning, coordination, allocation, and tasking of air missions/sorties within the guidance of the MAGTF commander. It provides a concept of aviation operations for a 24-hour period. By using and completing the cycle, planners can ensure that finite aviation assets are used to achieve their maximum effect with correct prioritization based on the main effort. The precise ATO tasking timeline from commander's guidance to the start of ATO execution is specified by the JFC but normally spans a 36- to 72-hour period.

When operating as a component of the joint force, MAGTF air operations planners must consider the effect of joint air operations requirements on the ACE's ability to support MAGTF operations. Therefore, the MAGTF commander must consider the interrelationship between the MAGTF air tasking cycle and the joint air tasking cycle relative to apportionment of available sorties. The MAGTF commander may issue special instructions that address the JFC's apportionment guidance for MAGTF-provided air sorties to the joint force.

Prior to the MAGTF commander apportioning and allocating sorties for the MAGTF, up-front sorties are provided to the JFC for tasking through the JFACC (if designated) for air defense, long-range interdiction, and long-range reconnaissance. The MAGTF commander provides excess sorties of MAGTF direct support requirements to the JFC. These excess sorties are for the support of other joint force components or the joint force as a whole. JP 0-2 describes the preferred method of employing MAGTF aviation in joint operations and the policy for C2 of MAGTF TACAIR in sustained operations ashore.

During joint operations, MAGTF air assets will normally be in support of the MAGTF mission. However, nothing will infringe on the authority of the JFC to assign missions or redirect the efforts of MAGTF sorties to ensure unity of effort or to maintain integrity of the force.

In addition to offering sorties in excess of MAGTF direct support requirements to the JFC, the ACE commander should identify additional requirements for air operations and determine whether they can be sourced from within the MAGTF or if they require joint air assets. In the later case, the MAGTF commander may request the needed assets from the JFC.

For operations that involve joint or combined forces, the six-step joint air tasking cycle is used to plan joint air missions. It begins with the JFC's air apportionment process and culminates with the combat assessment of previous missions. In joint operations, the MAGTF will conform to the joint air tasking cycle. The MAGTF and joint air tasking cycles are depicted in figures 4-6 and 4-7. Refer to JP 3-56.1 for more information on the joint air tasking cycle.

The JFACC or ACE commander generates the ATO to task and disseminate the plan to components, subordinate units, and C2 agencies the targets and specific missions of projected sorties, capabilities, and forces. It normally provides both general and specific instructions for OAS missions. The ATO also includes special instructions and may also include the ACO. See MCWP 3-2, MCWP 3-25.4, *Marine Tactical Air Command Center Handbook*, and JP 3-52, *Doctrine for Joint Airspace Control in a Combat Zone*, for further discussion of the ATO.

MAGTF Air Tasking Cycle

As previously stated, the ultimate goal of the air tasking cycle is to produce an organized and integrated air execution plan in the form of an ATO. Because the air tasking cycle is continuous, multiple ATOs are going through various stages of the air tasking cycle at any single moment in time. MCWP 3-25.4 describes a

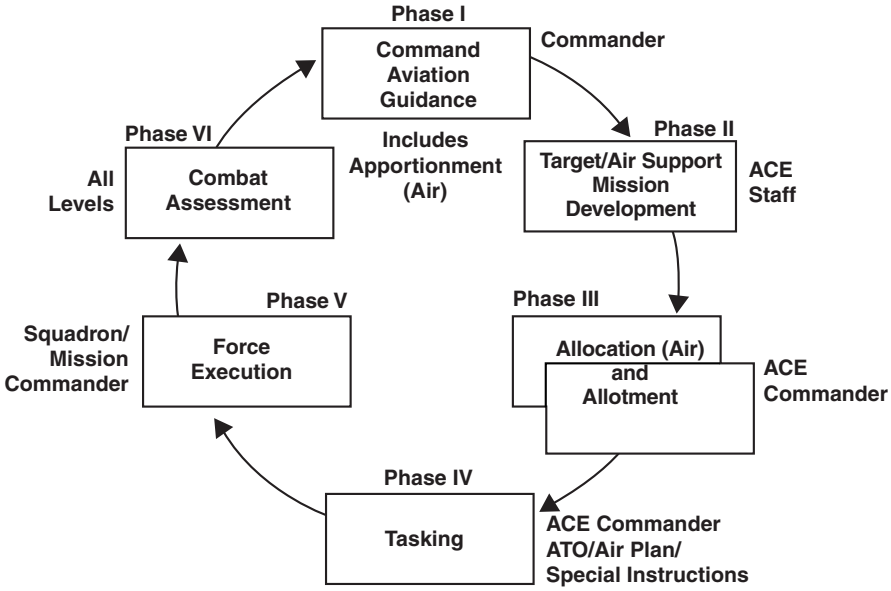

Figure 4-6. MAGTF Air Tasking Cycle.

notional number of four ATOs that would normally be at various stages of completion within the air tasking process. Respectively, these would be the ATO undergoing assessment (yesterday's), the ATO in execution (today's), the ATO in production (tomorrow's), and the ATO in planning (the day after tomorrow's). Depending on the theater of operations, the number of ATOs in planning may vary greatly depending on such factors as the size and scope of the operations, available staff personnel, and expected duration of the contingency.

The air tasking cycle is the key tool used by aviation planners to plan air operations that support the MAGTF's mission and produce the MAGTF ATO or air plan. The six-phase MAGTF air tasking cycle is compatible with the six-phase joint air tasking cycle. The six phases of the MAGTF air tasking cycle are command aviation guidance, target/air support mission development, allocation and allotment, tasking, force execution, and CA.

The MAGTF air tasking cycle requires detailed planning and resources allocation by the Marine TACC's future operations section. The future operations section coordinates with the ACE headquarters staff and the ACE's subordinate units and agencies to accomplish its planning and tasking

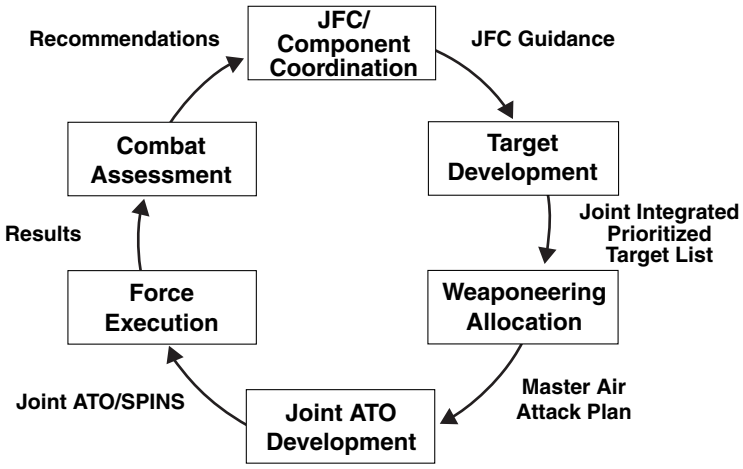

Figure 4-7. Joint ATO Cycle.

requirements. The MAGTF ATO is the final product of the MAGTF air tasking cycle.

Command and Aviation Guidance

The MAGTF air tasking cycle begins when the commander assigns a mission to the ACE commander. The commander's guidance and objectives identify targeting priorities, procedures, joint fire support coordinating measures, ROE, and a definition of direct support sorties. The development of the concept of fires and targeting guidance is the responsibility of the MAGTF force fires coordinator and is based on the commander's intent and input from the major subordinate element commanders. The MAGTF commander uses the recommendations of the ACE commander and staff and the MAGTF force fires coordinator to make apportionment decisions. These decisions identify the total level of effort that should be dedicated to OAS to accomplish the assigned mission. As the battle progresses, the MAGTF commander revises apportionment decisions to meet the requirements of the current situation. Apportionment is usually expressed as a percentage of the total aviation effort and helps to ensure the efficient use of limited aviation resources. If the MAGTF is part of a joint force, the MAGTF mission statement may include the JFC's apportionment guidance for Marine aviation if Marine sorties are to be provided to the joint force. Figure 4-8 is an example of the MAGTF commander's apportionment for an amphibious operation.

Note: Excess sorties are those sorties available for tasking, but are not needed by the MAGTF. Sorties provided for air defense, long-range interdiction, and long-range reconnaissance are not excess sorties and will be provided up front to the JFC as required. See JP 3-56.1 for more details.

Target/Air Support Development

The specific objectives described by the commander are used to focus specific target and air support mission development. All potential targets and air support requests are processed through the appropriate staff sections, which will identify, prioritize, and select specific targets/air support missions that meet the commander's objectives and guidance and support the concept of operations.

The ACE commander and staff assist the MAGTF force fires coordinator in the overall target planning by providing guidance in the evaluation and selection of aviation targets. Targets are selected from joint target lists (JTLs) (if any), requests from all elements of the MAGTF, intelligence recommendations, EW inputs, and current intelligence assessments.

Air support mission requests are generated, evaluated, and prioritized in the same manner as targets. Since all of these missions require the allocation of ACE assets and those assets are usually finite, the ACE command and staff play a central role in their evaluation. The MAGTF commander will ultimately approve the prioritization of both the target list and the air support mission list.

Allocation and Allotment

After receiving the commander's apportionment directive and understanding the targeting/air support mission requirements, the ACE commander allocates the

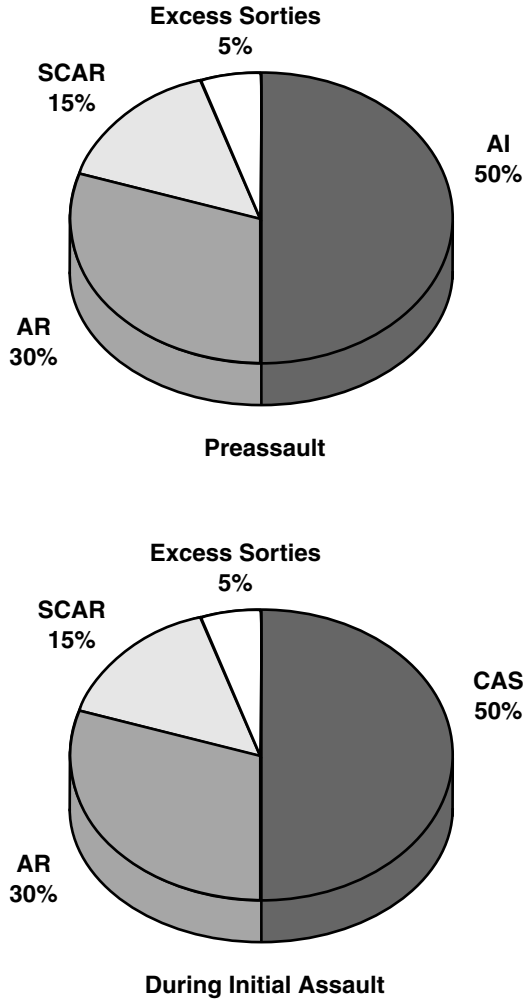

Figure 4-8. Apportionment and Guidance.

planned effort. Allocation is the translation of the air apportionment decision into the total numbers of sorties (by aircraft type) available for each operation or task. Allocation includes the submission of all air support requests (CAS, DAS, AAW, assault support, and C2). The ACE commander presents the allocation request to the MAGTF commander. Once the allocation request has been approved, the allocated sorties are distributed or allotted to support the MAGTF and its elements. Allotment decisions allow MAGTF elements to plan and coordinate the integration of OAS sorties into their fire and maneuver efforts. The GCE and CSSE commanders determine the appropriate distribution of these sorties.

Tasking

Tasking is the process of translating allocation and allotment decisions into an ATO or air plan and then passing the tasks to the units involved. The MAGTF ATO or air plan assigns missions and mission support responsibilities to specific squadrons.

If a Marine headquarters is designated as the ACA and/or JFACC, ATO interoperability with other Services depends to some degree on the contingency theater automated planning system (CTAPS). CTAPS is a hardware and software system that is used to disseminate the ATO to operational units to fly specified OAS and OAS support missions, as well as maintain aircraft and aircrew at specified alert states. CTAPS functions are currently scheduled to be replaced by the USAF's Theater Battle Management Core System (TBMCS) program. TBMCS is an umbrella program that assimilates the ATO's production, dissemination, and execution that currently reside in the CTAPS. Chapter 6 contains more information on TBMCS.

Force Execution

Aircraft squadrons assign individual aircrews and aircraft to specific mission numbers and issue squadron flight schedules once they receive the ATO or air plan. Actual mission planning and coordination with the MAGTF command element, ACE, GCE, and CSSE staffs are performed by the designated mission commander. Task-organized flights of aircraft then execute assigned OAS missions. During execution, the ACE commander exercises C2 of OAS missions from the TACC through the MACCS, including the dynamic retasking of assets to meet the challenging situation.

Combat Assessment

Effective campaign planning and execution require the continuing evaluation of the impact of OAS operations on the overall campaign plan. CA is focused at the MAGTF level; however, it is done at all levels. Normally, the ACE G-3/S-3, assisted by the G-2/S-2, is responsible for coordinating combat assessment of ACE missions.

CA evaluates OAS operation's effectiveness in achieving command objectives. The ACE staff continually evaluates the results of air operations and provides these evaluations to the MAGTF commander for consolidation and overall evaluation of current operations. CA assesses the effects, relative to friendly objectives and strategy, of specific OAS missions and OAS operations in general against the specific targets attacked, whole target systems, and remaining enemy warfighting capabilities. It should include BDA, MEA, and RR. It must take into consideration the capabilities, forces, munitions, and attack timing employed.

Assessors should weigh future enemy COAs and remaining enemy combat capabilities against established targeting/air support mission priorities to determine future objectives and RR. The ACE staff assessment is forwarded to the MAGTF commander to determine overall mission success and to recommend changes regarding COAs. CA marks the end of the air tasking cycle, but it also provides the inputs for the next air tasking cycle and subsequent command guidance, target/air support mission development, allocation and allotment, tasking, force execution, and CA.

Joint Air Tasking Cycle

JFC/Component Coordination

JFC/component coordination ensures that air operations are supporting the JFC's overall concept of operations, planning guidance is provided by the JFC in the form of air allocation. Air allocation is 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. (Extracted from JP 3-56.1)

This guidance is nothing more than a general statement by the JFC as to how air assets are to be employed in support of the overall campaign effort. This guidance is often provided in the form of a percentage

breakdown of the various missions that can be performed by air assets (e.g., interdiction, CAS, SEAD, AR). This guidance provides the ability for the JFC to ensure that air assets are supporting the effort in the correct way. For example, if the JFC is planning a major ground offensive, a higher percentage of CAS might be directed in the apportionment decision.

While the apportionment decision is JFC guidance, the JFC does not create this guidance. In reality, the JFACC and the JAOC staff prepares a recommended apportionment decision for the JFC's approval at the initial coordination meeting between the JFC and the functional component commanders. Obviously, the JFACC has numerous duties within the air tasking cycle and cannot create all of the required decisions and documentation without the support of the JAOC staff. The primary staff element within the JAOC that coordinates the initial steps of the air tasking cycle is the guidance apportionment and targeting (GAT) cell.

The GAT function cannot be specifically defined since its members, location, and methods of meeting will vary from JAOC to JAOC depending on the theater. Ultimately, the GAT cell and its associated functions can be viewed as a group of people, a location within the JAOC, a series of meetings or any combination of all of these things. What is important to understand is that GAT is one of the core staff work forces for producing the hard products and decisions that fuel the air tasking cycle. The GAT functions as surrounding the air tasking cycle steps to ensure that the work gets done. See figure 4-9.

Target Development

Target development begins while the JFC, JFACC, and other component commanders formalize apportionment guidance. At the same time the JAOC staff is receiving requests (i.e., JTAR) from component and service staffs for potential targets and gathering information on available assets to apply against these targets.

The GAT staff takes the air support request messages and begins to form a draft of the joint integrated prioritized target list (JIPTL). The JIPTL is a subset of the JTL indicating which targets will be actively considered for air strikes. Once JFC apportionment guidance is provided, the draft JIPTL is completed and prepared for presentation to the JFC at the JTCB.

The target development step of the air tasking cycle culminates when the JFACC/JAOC staff present the draft JIPTL at the JTCB. The JTCB is normally chaired by the deputy JFC and attended by representatives from all affected components and Service staffs. Once the draft JIPTL has been modified as directed by the deputy JFC, the actual JFC approves the JIPTL for further planning.

Weaponeering Allocation

Weaponeering allocation begins once the JIPTL is approved by the JTCB. The targets are compared to their individual target folders to determine weapons requirements. This step should simply require accessing weaponeering work that was already accomplished in the larger joint targeting cycle. At this point, the difficult process of matching available assets to specific targets begins in the master air attack plan (MAAP) meeting within the JAOC. The GAT staff provides the necessary staffing and expertise required to formulate the overall air employment plan.

The MAAP is an overview picture of actual targets and the air assets that will be used against them. In addition to mission information, it also contains JFC and JFACC guidance, support plans, target updates and a variety of other supporting documentation. The MAAP is simply the raw information that must be converted into a useful document for dissemination to the field.

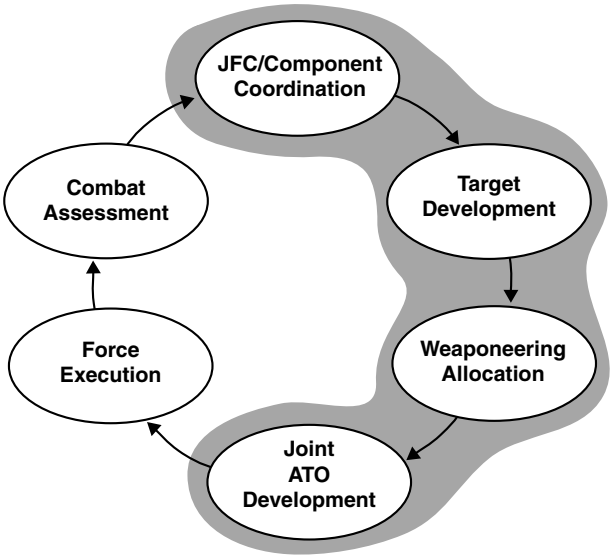

Figure 4-9. GAT Interaction.

Joint ATO Development

Joint ATO development begins once the MAAP is completed. The MAAP is then converted into an ATO through automated systems. These automated systems are used throughout the air tasking cycle to steadily build and mold asset, target, and guidance information until it has reached a stage of processing referred to as the MAAP.

CTAPS is the overall system for planning, directing, monitoring, and executing the air tasking cycle. The ATO is produced within this system along with other messages required for C2 of large numbers of aircraft. CTAPS is in the process of being replaced by the TBMCS. The tools available within CTAPS are as numerous as they are varied in publishing the ATO.

Force Execution

Force execution starts with disseminating the ATO to the field. The responsibility for overseeing the ATO is transferred from the GAT staff and JAOC plans division to the operations side of the JAOC structure. The TAGS is a supporting structure that facilitates the final two steps of the air tasking cycle. See figure 4-10. The TAGS is comprised of field units, hardware and software, and command relationships.

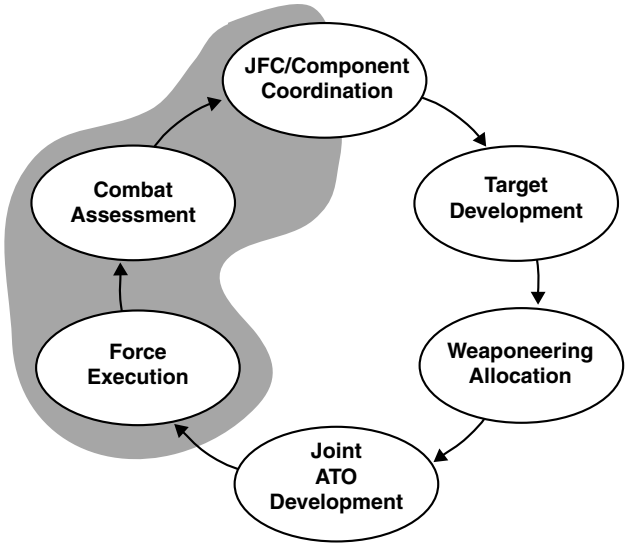

Figure 4-10. TAGS Interaction.

From the beginning of JFC apportionment to the time the ATO is disseminated to the field units, the operations side of the cycle is kept informed of the progress of the ATO. The first way this occurs is through a sortie allotment message sent from the JFC to the components after the apportionment decision has been made and compared to the air support request information provided by the components. The basic purpose for this message is to allow the operational commanders to begin preparations for how they will fill the taskings of the upcoming ATO.

Combat Assessment

CA evaluates combat operations effectiveness to achieve command objectives. Effective campaign planning and execution require a continuing evaluation of the impact of joint force combat operations on the overall campaign.

The CA concept of operations should include BDA, MEA, and RR. It must take into consideration the capabilities/forces employed, munitions, and attack timing in assessing the specific mission and joint air operations success and effects against the specific targets attacked, target systems, and remaining enemy warfighting capabilities relative to the objectives and strategy.

Future enemy COAs and remaining enemy combat capabilities should be weighed against established JFC and JFACC targeting priorities to determine future targeting objectives and reattack recommendations. Although CA marks the end the air tasking cycle, it also provides inputs for process re-initiation and subsequent target development, weaponeering and/or allocation, joint ATO development, force execution, and CA.

Restrictions may be due to ROE, an unacceptable level of collateral damage or cultural features restricting a delivery profile for the optimum weapon. Some challenges that planners may be faced with during the planning process may have never been encountered or weaponeered before and may require a creative and imaginative solution for these and/or other restrictions like the following example.

During Operation Deliberate Force in 1995, mission planners were tasked with targeting a radar control van in an urban environment. The radar control van was being used by Bosnian-Serbs to track and target North

Atlantic Treaty Organization (NATO) aircraft with surface-to-air missiles (SAMs).

Besides being located in an urban environment, an even greater challenge for mission planners was that the radar control van was operating next to a hospital, further restricting munitions and attack options due to ROE. Due to the high probability of collateral damage and high risk assessment for aircraft, the commander's approval was required on mission planning prior to force execution.

The mission planned for an inert 2,000 pound warhead to be equipped with a laser-guided control assembly. The laser-guided weapon would minimize the chances for collateral damage due to its high accuracy, as well as the inert warhead.

The time of the attack also minimized the probability for collateral damage and the attack tactics reduced the threat to aircraft from enemy air defenses. In an early morning strike, the radar control van was hit with pinpoint accuracy during the force execution. CA revealed after sunrise that the impact of the 2,000-pound warhead had destroyed the radar control van and moved it one-half mile down the street while inflicting minimal collateral damage and none to the hospital.

SUMMARY

The MAGTF's inherent combat power is enhanced through the application of combined arms. The MAGTF integrates aviation assets with organic fire support assets to effectively support the scheme of maneuver. The MAGTF commander uses OAS throughout the operational spectrum to assist in attaining objectives. The firepower, mobility, and flexibility provided by OAS are critical to establish favorable conditions for close, deep, and rear operations.

OAS operations must be carefully planned to maximize OAS's principal effects of neutralization and destruction. The MCPP is used by the MAGTF and ACE and integrated vertically and horizontally through the OPT.

Commanders organize their staffs to gather, manage and process information critical to decisionmaking. The targeting cycle (D3A) provides a logical progression of targeting solutions, while the MAGTF air tasking cycle produces an organized and integrated air execution plan in the form of an ATO. For operations that involve joint or combined forces, the six-step joint targeting and air tasking cycles are used to assist in planning joint air operations. In joint operations, the MAGTF will conform to joint cycles.

CHAPTER 5. OPERATIONS

The Marine Corps' warfighting philosophy emphasizes an integrated combined-arms approach that employs rapid, flexible maneuver. Maneuver warfare seeks to shatter the enemy's cohesion through a variety of rapid, focused, and unexpected actions to gain a relative advantage. The advantage can be positional, temporal or psychological and creates a turbulent and rapidly deteriorating situation for the enemy.

Marine aviation operates as an integral part of the MAGTF. The ACE is task-organized to specifically provide the MAGTF with the necessary mobility, flexibility, force protection, and fires. OAS, either fixed-wing or rotary-wing aircraft, provides the MAGTF a true combined-arms capability. The MAGTF commander uses his/her combined arms team to create a dilemma for the enemy. If the enemy counteracts one, the enemy becomes vulnerable to another. If the enemy cannot move or employ its forces or is unable or unwilling to sustain losses, the enemy's initiative and tempo are lost. For example, a DAS mission is tasked with destroying a C2 facility. This target is collocated with a Fan-Song radar that supports SA-2s (SAM). The target is 450 miles from the forward operating base and requires aerial refueling from KC-130s. As the strike package (AV-8Bs, F/A-18s, and EA-6B) approaches the target area, the Fan-Song radar targets an AV-8B in the strike package. The EA-6B directs jamming and F/A-18s fire HARMs at the Fan-Song radar. The enemy is now faced with a dilemma, continue tracking with the Fan-Song radar to support the launched SAM and have HARMs impact radar, have the Fan-Song radar neutralized by jamming or shut down the radar and be pulverized by precision-guided weapons (PGWs) aimed at the C2 facility.

Both mission requirements and aircraft capabilities will drive the mix of aircraft required to accomplish certain OAS missions. From the example above, the ATO listed the respective units, aircraft, weaponeering, support requirements, and designated the mission commander to accomplish this mission. The KC-130 provided the aerial refueling to get the aircraft to the target; the AV-8Bs destroyed the target with PGWs; and the F/A-18s and EA-6B provided SEAD with HARM and jamming. Appendix B lists different aircraft's capabilities.

This chapter discusses fundamentals in the execution of OAS operations. See MCWP 3-23.1 and MCWP 3-23.2 for detailed information on OAS operations.

INTELLIGENCE SUPPORT

Intelligence provides continuous updated information to OAS operations during planning as well as prior to and during mission execution. These crucial inputs update target development by assessing enemy capabilities, centers of gravity, force dispositions, relationships, intentions, operations, vulnerabilities, defenses, enemy warfighting sustainability, passive defense measures, and possible enemy COA. Intelligence also supports OAS operations by providing environmental assessments (such as effects adverse weather, darkness, and seasonal and temperature effects).

Intelligence through inflight reports and BDA may also provide us with the enemy's location. Certain weapons require very specific target coordinates, such as the JSOW and JDAM, to be effectively employed. These two types of munitions are GPS guided weapons and are only as accurate as their coordinates from the World Geodetic System 1984 (WGS-84) datum. The target location error (TLE) for these individual weapons needs to be within 7.5 meters for JSOW and 7.2 meters for JDAM. The TLE is the combination of linear (elevation) and circular (latitude and longitude) errors combined.

THREAT LEVELS

Threat levels determine OAS feasibility. The three threat levels are low, medium, and high. There is no

clear dividing line between the threat levels. Air defense systems that present a low or medium threat level for one type of aircraft may present a high threat level for another type of aircraft. A medium threat level during the daylight hours may be a low threat level at night.

Current intelligence updates the threat levels for OAS operations. C2 requires accurate and timely intelligence updates to ensure effective OAS execution. A change in threat level may force a DAS mission's risk level to be too unacceptably high without fighter escort or SEAD support. An immediate CAS mission may be better suited for rotary-wing aircraft based on a lower threat level and use of economy of force, as compared to a medium threat and more sorties required if fixed-wing aircraft were utilized.

A change in threat level may also require a change in tactics. For example, an OAS aircraft aborts his/her target attack due to being targeted by a ZSU 23-4. Other aircraft in the strike package are able to flex from the primary low altitude to a secondary medium altitude target attack to avoid the ZSU 23-4. This change in medium altitude tactics has taken the ZSU 23-4 from a high threat to a low threat. Inversely, however, finding and destroying the target may be more difficult due to the increase in altitude making target acquisition more difficult and increasing weapon's ballistic error.

Threat levels alone do not determine if an OAS mission should be flown. See *Air Force Tactics, Techniques, and Procedures* (AFTTP) 3-1, for a discussion of threat air defense assessment and planning.

- A low threat level allows OAS operations to proceed without prohibitive interference. Aircrews are free to select tactics that ensure effective use of weapons systems and ordnance. A low threat implies that a sanctuary exists from which aircrew can operate. This can be a vertical sanctuary from which aviation assets can operate above the threat or a lateral sanctuary from which aircraft can operate using standoff.
- A medium threat level allows acceptable exposure time of friendly aircraft to enemy air defenses. This threat level can restrict OAS flexibility in the immediate target/objective area.
- A high threat level exists when the enemy has an air defense system that includes integrated fire control systems and electronic warfare capabilities. This threat level severely affects the ability to conduct OAS operations. In a high threat environment, aircraft are exposed to the threat throughout their time of flight in the target area.

SUPPORT REQUIREMENTS

The ACE is tasked with providing MAGTF operations with the six functions of Marine aviation. Both mission requirements and aircraft capabilities will drive the types and numbers of aircraft required to accomplish OAS missions. During OAS operations, aircraft may be tasked in direct support of AI missions or to provide an airborne alert in a general support role for CAS and AR missions. Aircrews, as well as commanders and tactical air controllers, need to know how support requirements affect the performance of OAS missions. Mission planning identifies the threats and support requirements for OAS operations. Support requirements are tasked through the ATO and executed by the TACC. The TACC provides functional interface for employment of MAGTF aviation with joint and multinational support assets. Support requirements during OAS operations can consist of the following.

Fighter Escort

Since there is no way intelligence can predict where or when enemy fighters may attack, fighter escort aircraft provide protection for OAS missions. Fighter escort aircraft provide prestrike sweeps, close escort, and combat air patrols.

Prestrike sweeps clear a path free from enemy fighters through the target area for the OAS aircraft. The range at which the prestrike sweep is in front of OAS aircraft is dependent on the threat and commander's guidance.

Close escort fighters maintain contact with OAS aircraft. This type of escort provides better situation awareness for both fighters and OAS aircraft as to each other's location, as well as the threat's position relative to them, in the battlespace.

Combat air patrols (CAPs) provide OAS aircraft a fighter escort, normally from a roving or fixed location

in the battlespace. The CAP is positioned to act as a barrier between OAS aircraft and enemy fighters.

Classified tactical manuals contain the strengths and weaknesses when utilizing these different types of fighter escort tactics when performing OAS operations. The following are employment considerations.

Offensive Air Support Aircraft Self-Defense Capability

Although many of today's OAS aircraft have a self-defense capability, providing a fighter escort will allow more time for OAS aircrew to concentrate on air-to-ground tactics, while the fighter escort aircraft focus on sanitizing the battlespace for air-to-air threats. When OAS aircraft provide their own self-defense, they are typically less effective due to higher fuel consumption rates, decreased maneuverability, and reduced air-to-air ordnance loads while carrying air-to-ground ordnance.

Enemy Surveillance Capability

Close escort aircraft may highlight the position of the strike package; however, they have better situational awareness on OAS aircraft. A prestrike sweep may provide an early warning to enemy air defenses but may divert the enemy fighters away from OAS aircraft.

Enemy Air Defenses

If OAS aircraft are exposed to enemy air defense systems, it is more than likely that the fighter escort aircraft may be exposed to the same threat. SEAD support may only be sufficient to provide OAS aircraft protection from the threat.

Rules of Engagement

ROE may limit or prohibit the circumstances under which beyond visual range (BVR) missiles may be employed against enemy aircraft. Under very restrictive ROE, mission commanders and planners need to weigh the advantages and disadvantages of having a prestrike sweep or close escort to provide fighter support.

Electronic Warfare

EW aircraft protect OAS aircraft through electronic jamming and deception. Electronic jamming denies or disrupts the enemy's ability to detect or track OAS aircraft electronically. Electronic deception sends misleading information about the OAS aircraft's speed, altitude, size, and direction.

EW requires detailed integration and coordination to protect OAS aircraft exposed to enemy threat air defenses. AI is typically the only OAS mission where detailed mission planning and coordination are conducted between EW and OAS aircrew. During CAS, AR, and SCAR missions, EW aircraft may be tasked with an airborne alert to provide on-call or reactive EW support for OAS aircraft.

The following are some considerations for EW support during OAS operations:

- Preemptive EW is superior to reactive EW.
- Tactics and electronic countermeasures for unanticipated threats.
- Tactics and standing operating procedures to simplify EW coordination in OAS mission's other than AI.
- The length of time EW support is available for OAS aircraft.
- Enemy fighters capability to degrade EW support.
- EW interference with communication, aircraft weapon systems and EW suites, and weapons.

Suppression of Enemy Air Defenses

SEAD reduces attrition of OAS aircraft by degrading the effectiveness of enemy air defense systems. SEAD uses supporting arms (i.e., artillery, naval gunfire, J-weapons, and aircraft) and other available means (i.e., GCE or EW) to deter, suppress, or destroy the enemy. SEAD is integrated with not only OAS aircraft, but also supporting aircraft during OAS missions. SEAD aircraft integrated into OAS missions may be enough to change the enemy's normal air defense operating procedures. HARMs and antiradiation missiles (ARM) can suppress or destroy radar sites. The following are some SEAD fundamentals required to support OAS aircraft:

- SEAD effects are short-lived, and OAS aircraft need to minimize their time exposed to enemy air defenses.
- Adhere to OAS aircraft's routing of flight and timing to maximize SEAD effects.

- SEAD is a suppression tactic not a destruction tactic for enemy air defenses.
- Preemptive SEAD provides the best protection for OAS aircraft.
- Limited SEAD weapons may require reactive SEAD tactics.

Tankers

OAS support requirements depend upon the mission. Aerial tankers are required when targets and operating areas are far from the OAS operating bases. Tankers may also be required to provide an airborne alert in support of OAS missions.

Reconnaissance

Reconnaissance can provide BDA and target locations for OAS missions. It may satisfy requests for information (RFIs), intelligence requirements pertaining to targets, target areas, threat capabilities, terrain, and weather.

Deception

Deception techniques can be used against enemy radars, communications intelligence (COMINT) sites, and other enemy assets. Effectively executed deception tactics draw the enemy's interest and forces away from OAS aircraft and its intended target area. Some deception techniques are listed below:

- Chaff corridor to deny enemy radar operator's coverage.
- EW techniques to present false targets to enemy radars.
- Use aircraft to make misleading transmissions to deceive enemy COMINT sites.
- Decoy aircraft or drones are used to pose a threat from a different direction than the actual threat.
- Preemptive changes in altitude and heading to avoid enemy air defenses.

Confusion

Confusion can deny or delay the enemy's ability to analyze the OAS threat and to take appropriate action. OAS aircraft use EW, chaff, aircraft maneuvering, deception, and concurrent ground operations to mask OAS objectives.

Operations Security

The less information the enemy has concerning OAS operations, the easier it is to conduct successful deception and confusion. Operations security (OPSEC) may be compromised by the use of the following:

- Radios, radars, radar altimeters or other emissions.
- Flight profiles which place OAS aircraft in enemy search or early warning radar coverage areas.
- The inability for OAS aircraft to use secure voice communication capabilities.
- Predictable flight profiles which place OAS aircraft in danger of enemy air defense systems.

Support requirements can greatly affect the success of any OAS mission. These supporting elements allow OAS aircraft to arrive in the target area and safely return to base. Supporting elements degrade the enemy's air defense capability and reduce the number of aircraft exposed to the threat. They also enhance aircrew's target acquisition, ordnance delivery accuracy, and target area tactics.

The combination of OAS aircraft and support aircraft requires close coordination to be effective. AI missions may have the luxury of detailed planning and coordination prior to the execution of their mission; however, SCAR, AR, and CAS missions are more than likely going to have to coordinate airborne, relying on tactical procedures or SOPs to suppress or destroy the enemy's air defense threat.

CAPABILITIES AND LIMITATIONS

OAS is an integral part of the MAGTF combined arms team. The MAGTF performs OAS missions during day, night, and all-weather conditions. Dependence on OAS increases when—

- Targets are beyond the range of other supporting arms.
- Air attack is more appropriate.
- Other supporting arms are not available.

An aircraft's capability to perform OAS is determined by the aircraft's weapon systems and ordnance load. By matching the best aircraft and ordnance capable of destroying, delaying, disrupting or diverting the enemy forces, economy of force is ensured in MAGTF operations. One aircraft may have a far superior onboard weapon systems capability to detect enemy forces; however, it may not have the best ordnance load for the desired effects against the enemy.

The following is an example of using economy of force to determine which aircraft is best suited to accept an immediate CAS mission against a convoy of enemy armored personnel carriers (APCs). The DASC has two sections on station, one section of F/A-18s and one section of AH-1Ws. Both sections have checked in "as fragged" from the ATO. The ATO tasked the F/A-18 section to be loaded with MK-82s and the section of AH-1Ws to be loaded with PGMs. By matching the appropriate ordnance load to the target, the section with PGMs would be the first choice due to this type of ordnance being better suited against armored vehicles.

Sometimes the best aircraft weapon system or ordnance load will not be available for immediate employment in CAS or AR against time sensitive targets. However, from the example above, if all that was available was a section of F/A-18s with MK-82's, the enemy may still be disrupted, neutralized or delayed in support of the ground commander's scheme of maneuver or MAGTF commander's targeting priorities for AR missions.

C2 seeks to optimize the use of limited OAS assets to meet the commander's objectives. See appendix A and appendix B for more information.

Capabilities

OAS's principal advantage is the ability to attack targets other supporting arms cannot. Aircraft deliver great destructive power and can neutralize or destroy heavily fortified positions and point targets. OAS offers the following capabilities.

Variety of Attack

Aircraft can perform a variety of attacks. This allows aircrews to perform attacks suited for target acquisition and employment of ordnance against the target. An aircraft's ability to attack a target from any direction increases OAS flexibility. Aircraft can carry a wide variety of ordnance, allowing them to neutralize targets that interfere with MAGTF operations.

Observation

Aircrews performing OAS missions can observe large areas and relay information concerning enemy activity in areas hidden from ground observation. This capability aids MAGTF units in locating the enemy. An OAS aircrews' ability to find, observe, and attack the enemy is a significant advantage over other firepower systems.

Responsiveness

An aircraft's ability to mass rapidly at the desired point provides surprise, shock, and violence out of proportion to actual numbers. Aircraft can concentrate in the objective area from dispersed locations, allowing a commander to bring overwhelming firepower to bear on the enemy. Diverting OAS aircraft from one mission to another allows the MAGTF to take advantage of fleeting battlefield opportunities.

Flexibility

Aircraft control is highly flexible. FACs or FAC(A)s can provide terminal control of OAS missions. If required, control can shift from one agency to another. Aviation's ability to integrate with other supporting arms enhances the MAGTF's combined arms options.

Radius of Action

Aircraft can operate from forward operating bases (FOBs), aircraft carriers or amphibious platforms. Inflight refueling, rapid ground refueling or forward arming and refueling point (FARP) operations extend the normal combat radius of support aircraft.

Firepower and Mobility

Aircraft firepower and mobility permit a wide spectrum of attacks. Attacks can range from a single aircraft against many targets to many aircraft against a single, vital target. Independence from terrain obstacles, such as rivers, hills, etc., and speed provide aircraft with a mobility advantage over surface-borne supporting arms.

Accuracy

Modern aircraft systems and weapons allow accurate location and delivery of firepower. Flight computers, precision navigation equipment, and other aircraft sys-

tems allow accurate delivery of unguided ordnance. Precision-guided weapons (laser-guided weapons, electro-optical-guided weapons, and GPS-guided weapons) allow for pinpoint accuracy. Accuracy allows aircraft to attack moving targets and targets close to friendly troops without endangering personnel. The ability to locate and deliver accurate firepower greatly reduces the number of aircraft and sorties required to neutralize or destroy a target.

Availability

Aviation should provide the maximum number of aircraft required to support MAGTF operations. Maintaining aircraft in an alert status during the assault permits parts or all of an aviation unit to be directed against a critical target with minimum delay. Availability also depends on basing considerations (seabasing, FOB operations) and location.

Morale Factor

Aircraft can improve the morale of friendly troops and destroy the morale of enemy forces. The MAGTF commander should exploit the psychological effects of OAS efforts to greatly reduce the will of enemy forces to continue, especially when faced with the prospects of having to also defend against subsequent maneuver operations.

Limitations

OAS limitations must be considered during operations to maximize its effectiveness. The following are some considerations specific to OAS.

Limited Visibility

Darkness and periods of limited visibility (smoke, haze, sunrise, and sunset) present the greatest limitations to OAS. FLIR, radar, NVDs, and GPS are available, but cannot duplicate unlimited visibility and daylight conditions.

Weather

Weather may drive a typical low threat-level mission to a high threat-level mission. Weather is a limiting factor that many commanders have overlooked in past history. OAS needs favorable weather for proper, efficient, and safe execution. The true all-weather capability that OAS aircraft provide to the MAGTF commander may be limited to AI missions due to GPS-guided weapons being the only viable ordnance employment opportunity. CAS, AR, and SCAR may be prohibited for days due to poor weather conditions. Weather can inhibit aircrews' ability to positively identify targets, employ ordnance or avoid terrain.

Target Identification

Target identification, especially targets close to friendly forces, is one of the most difficult problems for OAS aircrews. Targets must be identified visually, with maps, aerial imagery, aircraft sensors or systems (FLIR, radar, NVDs, laser), accurate target coordinates and elevation (GPS-guided weapons) or accurate target description (talk-on). Use of target marking will enhance rapid and positive target identification.

Time On Station

An aircraft's time on station depends on many factors (e.g., distance from base to target area, fuel consumption, ordnance load, fuel reserves). Aircraft operating at low altitude burn more fuel, so in an attempt to reduce fuel use and increase time on station, aircraft may orbit or hold at high altitudes (dependent on threat level) or conserve fuel by landing or ground turning if required (rotary-wing) while awaiting a mission.

Radius of Action

Fuel on board limits radius of action. Increasing the ordnance load beyond a certain point reduces the amount of fuel an aircraft is able to carry. Refueling, while airborne or at FOBs, reduces this limitation but requires additional coordination and logistical support.

Communications

Coordination of OAS missions with the fire and maneuver of MAGTF forces requires reliable, secure, and redundant radio communications. Real-time information is crucial and cannot be overemphasized. Without prompt and accurate information, OAS missions may not achieve the desired effect on the enemy.

Resources

Aircraft and aircrew need turnaround time for OAS missions. This time includes the requirement to get intelligence updates, brief, coordinate with other units, aircraft turnaround (refuel, load ordnance, and service), and crew rest. As a general rule, it typically takes about one squadron worth of aircrew and aircraft to perform a 24-hour mission, assuming that the mission only requires a section (two) of aircraft on station at any given time.

Enemy Defenses

Enemy defenses can affect the range and effectiveness of OAS missions due to additional fuel requirements and support aircraft required for self-defense. SEAD may be required against enemy SAMs and AAA. A prestrike sweep, combat air patrol (CAP), or close escort of fighters may be required against enemy fighters.

REACTIVE WEAPONEERING

Precise planning has always been a critical part of any attack mission, but such planning takes time that is normally in short supply. During OAS operations FACs, FAC(A)s, and aircrew may have to quickly react to exploit success on the battlefield.

Reactive weaponeering improves the air-delivered ordnance effectiveness during CAS and AR missions. Generally, weaponeering for CAS and AR is not tailored for a specific target but is designed based on the effectiveness against a variety of target sets. OAS aircraft may be tasked with SCLs listed in the ATO in anticipation of certain target sets they are likely to engage in the battlespace. The overall objective of reactive weaponeering is to optimize the use of air-delivered ordnance, minimize effort and exposure to the threat, and maximize target destruction.

TACTICS

OAS missions revolve around en route, ingress, attack, and egress tactics. These tactics are dependent upon several conditions (e.g., weather, threat, visibility, range, timing, terrain, night). During the execution of OAS operations, the mission commander or flight leads may determine it is more beneficial to change the game plan or alter tactics to increase the probability for mission success.

En Route

En route tactics can be high, medium or low altitude. The tactical considerations as to which altitude should be flown depend on the enemy's air defense capability, range, weather, enemy radar detection, aircrew's workload, and radio communication, etc. En route tactics are normally associated when aircraft cross the forward edge of the battle area (FEBA) until they arrive at the contact point.

Ingress

Ingress tactics apply from arrival at the contact point or until the target attack phase begins at the initial point. Ingress tactics take into account the same considerations as en route tactics. Timing, easily identifiable terrain and cultural features, and navigational update points are other essential concerns for easing the transition from the en route phase to the attack phase.

Attack

Attack tactics for OAS missions are typically the phase that encompasses the initial point or battle position to munitions impacting the target. Attack tactics vary according to the type of OAS aircraft and type of airborne ordnance being employed. Tactics range from low altitude pops, medium altitude dive deliveries, and high altitude level deliveries for fixed-wing aircraft, and hover and fire from battle positions for rotary-wing aircraft. The overriding factor that drives attack tactics is target acquisition. If aircrews are unable to identify the target, either positively or through reasonable assurance, they will not be able neutralize or destroy the target. More discussion on GPS-guided weapons (JDAM and JSOW) and future employment considerations is in chapter 6. Other factors that will affect attack tactics are terrain, weather, enemy air defense capabilities, and visibility, etc.

Egress

Egress tactics reduce OAS aircraft exposure to enemy air defenses and provide for mutual support between elements. Egress tactics deny engagements by enemy air defenses and provide self-defense capabilities, and mutual support between formations through hostile territory. Other factors that will affect egress tactics are terrain, weather, enemy air defense capabilities, visibility, etc. More information on OAS tactics are detailed in the MCWP 3-23.1, MCWP 3-23.2, individual aircraft tactical manuals, and *Strike Leader Attack Training Syllabus* (SLATS) Notebook.

DEEP AIR SUPPORT

DAS allows the MAGTF commander to shape the battlespace. DAS disrupts the enemy's operational cycle, forces premature deployment of forces, and denies sanctuary. It also may delay enemy reinforcements; degrade critical enemy functions or capabilities (C2, air support, logistic); manipulate enemy perceptions; attack enemy formations, lines of communications, and C2 centers. By itself, DAS is ineffective. DAS is effective when integrated with other MAGTF operations that force the enemy to accelerate the consumption of essential resources and forces the enemy out of their observe, orient, decide, act; observation, orientation, decision, action (OODA) loop. The following are considerations during DAS execution:

- Timing. A common reference time is essential for accomplishing the high degree of coordination necessary for effective DAS, especially when conducting AI missions.
- Security. Standard cryptologic and authentication procedures are contained in the OPORD, ATO, and SPINS. These procedures ensure the safe conduct of DAS operations.
- Check-in. Check-in procedures establish the required flow of information between aircrews and control agencies.
- Deconfliction. DAS missions are deconflicted through positive and procedural controls. Armed reconnaissance areas (ARAs), minimum-risk routes (MRRs), and timing and target areas are a few methods for deconflicting aircraft in the AO.
- Target marking. Although not required for DAS missions, SCAR platforms may be able to mark targets or verbally "talk-on" AR aircraft onto targets. This will expedite both target acquisition and aircraft attacking the target.
- Attack control. The approval to deliver airborne munitions during DAS missions from the supported FSCC is not required, obtained prior to takeoff or in some cases obtained prior to entering the controlling FSCC's AOR. SCAR platforms are not qualified FAC(A)s and, therefore, do not issue clearance to drop/fire. Positive identification or reasonable assurance is required guidance for aircrews to deliver ordnance.
- BDA. Accurate BDA is critical for determining if targets should be reattacked and also updates the enemy order of battle.
- Night/limited visibility DAS. Aircrew require a high degree of proficiency when conducting DAS under night or adverse weather conditions. These conditions depend heavily on systems and sensors. There are three general categories of night/limited-visibility employment:
  - Visual employment must rely on lower ambient light conditions, battlefield fires or artificial illumination to successfully target attacks.
  - System-aided relies on radar, laser, FLIR, and television (TV) systems for target acquisition during night and in adverse weather conditions.
  - NVDs allow aircrew to detect and attack targets at night.
- DAS with laser-guided systems. Laser-guided systems provide the MAGTF with the ability to locate and engage high-priority targets with an increased first-round hit probability. While laser-guided systems provide additional capabilities, they do have distinct limitations.

For additional information on DAS operations, see MCWP 3-23.2.

CLOSE AIR SUPPORT

CAS provides the MAGTF with flexible, responsive fire support and is able to accurately employ a wide range of weapons. CAS can surprise the enemy and create opportunities for the maneuver or advancement of ground forces. CAS is equally suited to support offensive and defensive operations to include MOOTW. More importantly, CAS may at times be the only supporting arm available to the commander. The following are considerations during CAS execution:

- Timing. A common reference time is essential for accomplishing the high degree of coordination necessary for effective CAS.
- Security. Standard cryptologic and authentication procedures are contained in the OPORD, ATO, and SPINS. These procedures ensure the safe conduct of CAS operations.

- Check-in. Check-in procedures establish the required flow of information between aircrew and control agencies.
- CAS briefing form. This form is better known as the "nine-line brief." It is the U.S. standard brief for all aircraft conducting CAS. The NATO CAS briefing consists of a ten-line briefing format.
- Target marking. The aircrews ability to locate the target is aided by the supporting units ability to mark the target.
- Final attack control. Terminal controllers provide the following functions during the final attack:
  - Corrections from the mark to locate the target.
  - Clearance to drop/fire.
  - Reasonable assurance.
  - Reattacks.
  - Abort procedures.
- BDA. Accurate BDA is critical for determining if targets should be reattacked and also updates the enemy order of battle.
- Night/limited visibility CAS. Terminal controllers and aircrew require a high degree of proficiency when conducting CAS under night or adverse weather conditions. These conditions depend heavily on systems and sensors. There are three general categories of night/limited-visibility employment:
  - Visual employment must rely on lower ambient light conditions, battlefield fires or artificial illumination to successfully attack targets.
  - System-aided relies on radar, laser, FLIR, and TV systems for target acquisition during night and in adverse weather conditions.
  - NVDs allow aircrew to detect and attack targets at night.
- CAS with laser-guided systems. Laser-guided systems provide the MAGTF with the ability to locate and engage high-priority targets with an increased first-round hit probability. While laser-guided systems provide additional capabilities, they do have distinct limitations.

For additional information on CAS operations, see MCWP 3-23.1.

BASING MODES

OAS aircraft may be operationally based in a number of ways. The more traditional basing modes include main operating bases on land and seabasing aboard naval ships afloat. Fixed-base and shipboard deployment generally offers the widest range of available ordnance, mission equipment, logistic support, etc., but these locations are often well removed form the battle area. As a result, aircraft may have farther to fly to reach OAS target areas and have a longer turnaround time between missions. In addition to using main operating bases and ships, aircraft can be deployed to FOBs and FARPs.

Forward deployment of OAS aircraft offers several advantages. Operating from locations close to the battle area can increase loiter time in the objective area, extend effective combat radius, and, perhaps most importantly, make the OAS firepower more responsive to the MAGTF commander by shortening the response time. Preplanned logistic support is vital to ensure that sufficient ammunition, fuel, and servicing equipment are in position and ready for use when needed. FARPs are one method of employing FOBs.

MILITARY OPERATIONS OTHER THAN WAR

Modern military operations are becoming increasingly involved in MOOTW. OAS operations in MOOWT involve situations other than large-scale, sustained military operations. MOOTW focuses on deterring war, resolving conflict, promoting peace, and supporting civil authorities in response to domestic crises. As in war, MOOTW's goals are to achieve national objectives as quickly as possible and to conclude the operations on terms that are favorable to the United States and its allies.

As in all military operations, commanders will focus on a center of gravity in MOOTW. OAS missions will be oriented to exert influence on the center of gravity. The MOOTW environment is unique in that it can transition quickly from combat to noncombat and back

again and often has constraints on the forces, weapons, tactics employed, and the level of violence.

Depending on the environment, mission, and location of MOOTW operations, the degree of control may need to be more rigorous, and the ROE may need to be more restrictive than for higher scale operations. Consequently, in MOOTW environments prone to such dynamic change, all air missions, including both fixed- and rotary-wing of all components, must appear on the appropriate ATO and/or flight plan. In addition, aircraft may have to monitor a common frequency and operate on designated identification, friend or foe (IFF) modes and codes.

Aircraft may operate without an ATO mission number in high-density aircraft environments, such as in a properly designated high-density airspace control zone (HIDACZ) or amphibious objective area published on the ACO. This type of rigorous control is necessary during such MOOTW because the mix of friendly, enemy, and neutral aircraft and mission constraints requires the commander to strictly control flights in the AOR/JOA (i.e., peace operations).

To achieve their objectives in MOOTW, commanders may utilize OAS. See JP 3-07, *Joint Doctrine for Military Operations Other Than War*, for more specific information on different types of MOOTW that are listed below:

- Arms control.
- Combatting terrorism.
- DOD support to counterdrug operations.
- Enforcement of sanctions/maritime intercept operations.
- Enforcing exclusion zones.
- Ensuring freedom of navigation and overflight.
- Humanitarian assistance.
- Military support to civil authorities.
- Nation assistance, support to counterinsurgency.
- Noncombatant evacuation operations.
- Peace operations.
- Protection of shipping.
- Recovery operations.
- Show of force operations.
- Strikes and raids. Support to insurgency.

JOINT AND MULTINATIONAL OPERATIONS

Joint air operations are performed with air capabilities/forces made available by other service components in support of the JFC's operation or campaign objectives or in support of other components of the joint force. The JFC 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 JFACC will use the JFC's guidance and authority in coordination with other assigned or supporting commanders. As a result, the MAGTF in joint and multinational operations may have OAS from both organic USMC direct support capabilities/forces and those capabilities/forces allocated to it by the JFACC.

More information about air support in a joint force can be found in JP 0-2, JP 3-0, JP 3-56.1, JP 3-09, and MCWP 3-25. Marine aviation forces capable of OAS in the joint environment are not exempted from JFC up-front tasking. The JFC may redirect MAGTF sorties for air defense, reconnaissance, long-range AI, as well as for AR or SCAR if the JFC determines that they are required for higher priority missions than for CAS. The JFACC is the supported commander for the JFC's overall AI effort. Detailed information on AI and CAS in the joint environment is contained in JP 3-03, *Doctrine for Joint Interdiction Operations*, JP 3-09.3, *Joint Tactics, Techniques, and Procedures for Close Air Support (CAS)*, Air Force Doctrinal Document 2-1.3, *Counterland* (Draft), and JP 3-56.1, *Command and Control for Joint Air Operations*.

OFFENSIVE AIR SUPPORT IN AMPHIBIOUS OPERATIONS

Amphibious Assaults

The principle supporting arms in amphibious operations are aviation, naval gunfire, and artillery. OAS operations needed to support an amphibious assault will be outlined in the air plan annex of the OPLAN. Because amphibious OAS missions are usually in high

demand, the fire support plan should complement the use of aviation, naval gunfire, and artillery fires.

Prior to D-day, OAS will largely be responsible for shaping the battlespace. Missions that OAS aircraft may perform in advance of the amphibious task force landing are neutralization or destruction of enemy forces within the landing area, interdiction of enemy forces capable of interfering with the assault landings, and airborne delivery of mines.

On D-day, OAS aircraft will be the primary supporting arm for the landing force while artillery is moving ashore. Naval gunfire may be limited by its range when employing ship-to-objective maneuver (STOM) tactics from over the horizon. Missions that OAS aircraft may perform on D-day are pre-H-hour neutralization of beaches, drop zones, and helicopter landing zones, preplanned and immediate CAS, SCAR, AR, and AI. Post D-day, OAS operations will most likely consist of CAS missions in support of tactical objectives, and DAS missions that shape the battlespace for subsequent operations.

OAS missions will be from aircraft capable ships when using OMFTS concepts. The air plan will be oriented toward missions that have the aircraft returning to the sea base for turnaround maintenance and crew changes, with the possibility of using FARPs ashore. The distance from the sea base to the objective and the aircraft endurance must be balanced against the required response time. OAS missions may be augmented by joint and coalition aircraft that are both land-based and sea-based on an aircraft carrier. Their inclusion places responsibility on the MAGTF for ensuring good communications and coordination with OAS augmentation forces.

Amphibious Raids

Amphibious raids are conducted as independent operations or in support of other operations, such as another landing, land operations or air or naval operation. Depending on the purpose of the raid, they may be conducted by stealth or appropriately supported so that they resemble the early stages of an amphibious assault. An amphibious raid is planned and executed in the same general manner as an amphibious assault, except a raid always includes provision for withdrawal of the raid force. Surprise is essential for the success of an amphibious raid. Therefore, OAS missions prior to a raid will most likely be either absent or limited to those few that are essential for success. Amphibious raids are well rehearsed, with limited objectives and of short duration. Therefore, fire support planning can be more detailed and of less volume than for that required for an amphibious assault. The need for surprise and the distance to the objective may conspire to make aviation fires the primary fire support for a raid.

Using OMFTS concepts, STOM tactics lend themselves to amphibious raids, especially when employing assault support aircraft from over the horizon. OAS missions in this environment will be most useful when planned to interdict critical targets just prior to the raid, and provide fires on the landing zone/objective for the landing force. OAS missions should be planned to be available for the duration of the raid, including the withdrawal.

Amphibious Demonstrations

The amphibious demonstration is intended to confuse the defender as to time, place or strength of the main operation. An amphibious demonstration normally includes the approach of demonstration forces to the demonstration area, at least a part of the ship-to-shore movement, and employment of supporting fires. A brief but intense preliminary bombardment by naval gunfire will usually be the preferred fire support for a demonstration. Because of the requirement for the demonstration force to execute supporting fires of a nature and scope that ensures credibility, OAS missions may be conducted. However, the danger of losing an aircraft and crew or capture of aircrew supporting an amphibious demonstration may curtail OAS missions in support of those operations.

Amphibious Withdrawals

Amphibious withdrawals are conducted to disengage forces for employment elsewhere. They may be conducted under enemy pressure or voluntarily. Withdrawal begins with establishment of defensive measures in the embarkation area and ends when all elements of the force have been extracted and embarked or re-embarked on designated shipping. With respect to OAS planning, amphibious withdrawals are characterized by having abridged planning processes, curtailed fire support means, and circumstances that

may render it advisable to conduct the operations under adverse weather and limited visibility conditions.

During an amphibious withdrawal, OAS missions will be instrumental in interdicting deep targets, and covering the withdrawal of the heavy elements such as artillery and tanks. The withdrawal of heavy elements usually will take place under cover of darkness. The primary difference for fire support in an amphibious assault versus an amphibious withdrawal is that in the assault, supporting arms and control facilities are progressively built up ashore, whereas, in a withdrawal, supporting arms and control facilities are progressively decreased ashore until all functions are performed afloat. Sea-based OAS assets will be vital in providing cover to the dwindling forces ashore.

SUMMARY

Effective OAS operations begin with accurate and timely intelligence. This information is critical for target development as well as situational updates on threats and the environment. Support requirements can vary from one to any combination of: fighter escort, electronic warfare, SEAD, tankers, reconnaissance, deception, confusion, and operations security.

OAS has the capability to reach targets beyond the range of other supporting arms or when supporting arms are not available. OAS also has its limitations to include number of assets, availability, time on station, and ability to operate in adverse weather conditions.

DAS provides the MAGTF commander the ability to shape the deep battlespace. CAS provides flexible and responsive fire support in coordination with friendly ground units in the close and rear battlespace. Forward basing allows OAS aircraft to reduce their response time and increase their time on station in support of MAGTF objectives.

Since the end of the Gulf War, Marine OAS continues to support joint and multinational operations in MOOTW around the world. The future warfighting concept of expeditionary maneuver warfare (EMW) will take OAS doctrine well into the 21st century in support of the MAGTF.

CHAPTER 6. EMERGING CONCEPTS AND CAPABILITIES

Seabasing of OAS aircraft requires detailed advance planning. Due to limited deck space, the planning staff will need to determine the number and type of aircraft required to accomplish a mission prior to assembling the time-phased force and deployment data (TPFDD). OAS assets may compete with assault support assets for deck space in a sea-based scenario. Using the EMW concept, OAS aircraft may operate exclusively off an aircraft carrier or other amphibious platform.

Future developments concerning fighting in built-up or urban areas will change OAS tactics. New equipment may be developed to minimize collateral damage of both infrastructure and people. New weapons may be introduced to solve this problem or use of precision-guided munitions may be employed. Advances in unmanned aerial vehicles (UAVs) may evolve to the point where Marines fighting in urban areas will direct fires from an uninhabited combat air vehicle circling in an overhead station instead of calling for manned aircraft.

Experiences in Mogadishu and Chechnya have shown that the urban environment is especially dangerous for rotary-wing aircraft operations. The lethality of enemy fires employed from concealed locations may prevent rotary-wing assets from prosecuting urban targets with a reasonable margin of safety. Fixed-wing OAS aircraft may be more difficult to target by enemy air defenses in an urban environment due to their greater speed and altitude capability. However, these abilities by fixed-wing aircraft to avoid the threat also make it more difficult for them to identify targets.

EXPEDITIONARY MANEUVER WARFARE

EMW is the Marine Corps capstone operational warfighting concept for the 21st century. EMW applies the philosophy of maneuver warfare and our expeditionary culture to Marine Corps operations across the spectrum of potential 21st century conflict. This capstone concept specifies necessary capabilities to organize, deploy, and employ Marine forces across the spectrum of conflict and enables a single, integrated force in conjunction with the Navy. It provides for more effective strategic agility by expanding our current capabilities to a more scalable, expeditionary, forward presence, combined arms force that is organized, trained, and equipped to project sustainable power ashore without reliance on host-nation infrastructure or support.

EMW will also expand our operational reach from expeditionary sites to objectives further within the theater of operation and increase tactical flexibility to sequence from one mission profile to another without needing to reorganize, re-equip or retrain.

JOINT STRIKE FIGHTER

The joint strike fighter (JSF) program will provide the Marine Corps' next generation aircraft, replacing the AV-8B and F/A-18C/D with a single STOVL platform. It will solve the tactical aircraft age and attrition problems and meet Marine aviation's goal to neck-down to a single type of fixed-wing aircraft. But more importantly, the JSF program will provide the Marine Corps with a superior performance, stealthy, state-of-the-art, multimission jet aircraft that can operate with full mission loads from amphibious class ships or austere expeditionary airfields. To maintain the Marine Corps' force-in-readiness responsibilities, Marine aviation must sustain the OAS capabilities of its legacy aircraft until they are replaced. The JSF's combination of stealth, basing flexibility, and superior performance will revolutionize OAS.

WEAPONS

The road map for precision weapons leads to JDAMs, JSOWs, and future improvements to the family of JDAM and JSOW variants. JDAM and JSOW have

GPS/inertial navigation system (INS) guidance that provides the capability of an accurate weapon in all weather, day or night, giving it a true precision capability. With the introduction of these GPS-guided weapons (GGWs), ground commanders can now schedule preplanned OAS missions, either on-call or scheduled, and not be restricted by previous weather limitations that were imposed on MAGTF OAS aircraft.

JDAM is a variant of the 1,000 and 2,000-pound general purpose bomb. JSOW has variants of antiarmor and antipersonnel cluster munitions, as well as a variant of the general purpose bombs. Both types of GGWs possess the capability for aircrews to release the ordnance and have the ordnance successfully guide to the target without the aircrews ever seeing the target.

These two families will replace laser-guided weapons and complement cluster and general-purpose munitions. As these GGWs continue to increase the capabilities for OAS employment, their new capabilities have some of the following limitations:

Target Location Error

These weapons require a TLE of less than 55 feet in the horizontal plane and 75 feet in the vertical plane to be effectively employed. Until the target location, designation, and hand-off system (TLDHS) is fielded by TACPs, GPS/INS-guided weapons will be limited to AI and preplanned CAS missions. Immensurated coordinates within the TLE for GGWs are currently obtained for AI and CAS mission planning through imagery obtained on targets or target areas in the battlespace. CAS, AR, and SCAR aircraft currently do not possess the capability to accurately locate targets within the maximum TLE for these weapons.

Reasonable Assurance

These weapons are only as accurate as the target coordinates that the weapons receive from the host aircraft. The inaccuracy of the coordinates that JDAM and JSOW receive reflects the circular error probable (CEP) that these weapons may miss their target. During conditions that preclude aircrew from positively identifying the target, supported ground commanders only available option for CAS may be through the employment of GGWs with reasonable assurance on the TLE. The supported ground commander assumes the acceptable risk level in allowing aircrews to attack targets by releasing ordnance without positive control. Reasonable assurance is not a routine procedure. Precise guidelines for the use of reasonable assurance when employing GGWs will need to be established and distributed throughout the MAGTF and supporting forces. One of these guidelines will be the requirement to establish GGWs risk estimate distances to friendly ground forces when employing these weapons in close proximity to friendly ground forces during CAS operations. See MCWP 3-23.1 for more information on positive control and reasonable assurance.

Nonfixed or Mobile Targets

GGWs are currently employed on fixed targets. Targets that have the capability to move during the time of flight of the weapon may not be affected by GGWs. GGWs currently are targeted at precise coordinates and guide terminally to that point in the battle space. Until GGWs possess the capability to track moving targets during the terminal phase of the weapon to impact on the target, other munitions are better suited for employment against mobile targets. PGMs like helicopterborne fire-and-forget missile (HELLFIRE); tube-launched, optically-tracked, wire command-linked guided missile (TOW); IR maverick; laser maverick; and LGBs, as well as nonprecision weapons like the MK-20 Rockeye and general purpose bombs, will have a better CEP (more effective), pose less of a risk for fratricide, and be a more efficient use of limited MAGTF aviation assets at engaging nonfixed or mobile targets.

THEATER BATTLE MANAGEMENT CORE SYSTEM

TBMCS is the follow-on program to the contingency CTAPS. It is composed of a 27-workstation host system located in the TACC, with remotes located throughout the MAGTF. Employed at the force and unit level, TBMCS provides the JFACC and subordinate staffs with a single point of access to real or near real time information and planning data necessary. TBMCS software can be divided into five functional categories: planning, execution management, resource

management, reporting and analysis (intelligence) and common tools.

TBMCS will provide the JFACC and subordinate staffs with an automated spectrum of C2 capabilities, enabling the planning and execution of air operations. Within the MAGTF, TBMCS provides the ACE commander the tools necessary to generate, disseminate, and execute the ATO in a joint, coalition, and USMC-only contingency. It is modular and scalable, allowing the commander the ability to support ATO requirements for any size MAGTF, to include JFACC capability.

TARGET LOCATION, DESIGNATION, AND HAND-OFF SYSTEM

The TLDHS is a modular, man-portable equipment suite that will provide the ability to quickly acquire targets in day, night, and near-all-weather visibility conditions. When used in conjunction with the digital advanced communication terminal, operators will be able to accurately determine their own locations as well as that of their targets, digitally transmit (hand-off) data to supporting arms elements, and designate targets for laser-seeking, precision-guided munitions (PGMs) and laser spot trackers (LSTs). The TLDHS will be fielded to FO teams, naval gunfire (NGF) spot teams, tactical air control parties (TACPs) and reconnaissance teams.

The TLDHS is composed of two subsystems: the target locator, designator subsystem, which is the lightweight laser designator range-finder (LLDR), and target hand-off subsystem (THS). The LLDR and THS can be used independently or together as the TLDHS to provide the target location, designation, and hand-off capability.

TLDHS provides increased accuracy and timeliness of fire support and improved effects of fires on target for surface and air-delivered munitions. It also provides increased operator mobility due to the reduction in size, weight, and modular design over existing systems and reduction in fratricide due to accuracy of enemy target location.

TLDHS is currently in the engineering, manufacturing, and development phase. IOC is scheduled for FY03 with FOC in FY05.

SUMMARY

The inherent flexibility of the Marine Corps combined arms doctrine, maneuver warfare philosophy, expeditionary nature, and versatile C2 system create a MAGTF that is well prepared for the 21st century. To meet the challenges of the future, OAS doctrine continues to evolve with new MAGTF operational capabilities. Changes to equipment bring an enhanced capability to project power when and where it is needed, while new tactics enable the employment of OAS aircraft and ordnance with maximum advantage.

APPENDIX A. ORDNANCE SELECTION GUIDE

This annex details associated families of weapons and preferred types of ordnance for targets. For more detailed information on weapon capabilities, see *JMEM/AS Weaponeering Guide* and individual aircraft tactical manuals.

Family	Types of Ordnance
Aerial Mines	MK-52 MK-55 MK-56
Antiradiation Missiles (ARMs)	AGM-88 HARM
CBUs	MK-20 Rockeye CBU-78 Gator AGM-154A/B JSOW (cluster versions)
GP Bombs	MK 82, 83, 84
Incendiary Bombs	FAE
Rockets and Guns	2.75” and 5” rockets 20, 25, 30, 40, and 105 mm cannons
PGM	AGM-65 IR & Laser Maverick AGM-84D Harpoon AGM-84E SLAM AGM-114 Hellfire AGM-154A/B/C JSOW (C model is unitary version) BGM-71 TOW CALCM GBU 10, 12, 16, 24 GBU-31 JDAM
Target	**Preferred Ordnance**
Personnel	CBUs and GP Bombs
Armored Vehicles	PGMs, CBUs, GBUs
Field Artillery	PGMs, GP Bombs, CBUs
Rockets and Surface-to-Surface Missiles	PGMs, CBUs, GP Bombs
Antiaircraft Artillery (fixed-sites)	PGMs, CBUs, GP Bombs
Antiaircraft Artillery (mobile)	PGMs, CBUs, GP Bombs
Antiaircraft Artillery (mobile)	PGMs, CBUs, GP Bombs
Runways	GP Bombs
Aircraft in the open and revetted	PGMs, CBUs, Guns, Rockets, GP Bombs
Aircraft shelters and bunkers	Penetrating PGMs, GP Bombs, CBUs
Air-launched missile support facilities	PGMs, GP Bombs
Air-launched missile support facilities	PGMs, GP Bombs
Fortified fighting positions and concrete pillboxes	PGMs and GP Bombs with penetration capability

Target (Continued)	Preferred Ordnance (Continued)
Simple log bunkers	PGMs and GP Bombs with penetration capability
C3 centers and other hardened underground targets	PGMs with penetrating warheads
Bridges	PGMs, GP Bombs
Dams	PGMs and GP Bombs with penetration capability
Locks	PGMs and GP Bombs
Trucks and tracked prime movers	CBUs, PGMs, GP Bombs
Route segments (highway and railroad)	PGMs and GP Bombs for cratering
Railroad equipment and railyards	PGMs and GP Bombs
Tunnels	PGMs with penetration warheads
Ships	ARMs, Harpoon, PGMs, CBUs
SAM systems (with central guidance radars)	PGMs, ARMs, CBUs, GP Bombs
SAM systems (with standalone radars)	PGMs, ARMs, CBUs, GP Bombs
SAM support facilities	PGMs, GP Bombs
Radar sites	PGMs, CBUs, GP Bombs, ARMs
Communication facilities (above ground)	PGMs, GP Bombs
Communications vans and vehicles	PGMs, CBUs, GP Bombs
Antennas	GP Bombs, PGMs
Supply and POL facilities (supply storage)	GP Bombs and CBUs with incendiary capability
Supply and POL facilities (in the open/buildings)	GP Bombs and CBUs with incendiary capability
Supply and POL facilities (POL storage)	GP Bombs, PGMs
POL pumping station	GP Bombs, PGMs
Ports and naval bases	PGMs, GP Bombs
POL refineries	PGMs, GP Bombs
Ammunition production installations	PGMs, GP Bombs
Light manufacturing and repair installations	PGMs, GP Bombs
Above ground buildings	PGMs, GP Bombs
Composite ground forces (CP, vehicles, fuel supply, ammo, support vehicles, etc.)	PGMs, CBUs
Power plants	PGMs, GP Bombs, CBUs

APPENDIX B. AIRCRAFT WEAPONS AND CAPABILITIES GUIDE

Aircraft	Service	Ordnance	Laser Tracker	Laser Designator	GPS	Marking Capability	Other Systems	Comm
AV-8B	USMC	GBU[1] GP Bombs CBU AGM-65 IR & Laser Maverick 2.75"/5.0"Rockets 25mm Cannon LUU-2 Flares LUU-19 Flares	Yes [2]	Yes[3]	Yes	IR[3] Rockets	FLIR NVG Radar[4]	UHF/VHF
A/OA-10A	USAF	GBU[1] GP Bombs CBU Aerial Mines AGM-65 IR & Laser Maverick 2.75" Rockets 30mm Cannon LUU-1/-2 Flares LUU-5/-6 Flares	Yes	No	No	Rockets	NVG	UHF/VHF
AC-130H/U	USAF	105mm Howitzer 40 mm Cannon 20 mm Cannon	No	Yes[5]	Yes	GLINT 105mm WP 105mm HE 40mm LTD	Beacon FLIR LLLTV Radar	UHF/VHF HF SATCOM
B-1B	USAF	GP Bombs	No	No	No	None	Radar	UHF/VHF HF SATCOM
B-52H	USAF	GP Bombs AGM-142 CBU Aerial Mines TALCM AGM-84 Harpoon	No	No	Yes	None	Beacon FLIR LLLTV NVG Radar	UHF/VHF HF SATCOM
F-14	USN	GBU GP Bombs CBU 20mm Cannon LUU- 2 Flares	No	Yes	No	Laser Rockets	FLIR NVG Radar	UHF/VHF
F-15E	USAF	GBU GP Bombs AGM-130 AGM-65 IR Maverick AGM-154 JSOW CBU 20mm Cannon	No	Yes	Yes	Laser	FLIR Radar	UHF/VHF
F-16 C/D & C/J	USAF	GBU [6] GP Bombs AGM-65 IR & Laser Maverick AGM-154 JSOW CBU AGM-88 HARM[7] 20mm Cannon	Yes	Yes[8]	Yes[9]	Laser Rockets	LATRIN NVG Radar	UHF/VHF

Aircraft	Service	Ordnance	Laser Tracker	Laser Designator	GPS	Marking Capability	Other Systems	Comm
F/A-18 A/C/D	USN A/C USMC A/C/D	GBU GP Bombs AGM-65 IR[10]& Laser Maverick AGM-154 JSOW[10] CBU-99 GBU-31 JDAM[11] 2.75”/5.0” Rockets AGM-88 HARM Aerial Mines 20mm Cannon LUU-2 Flares LUU-19 Flares AGM-84D Harpoon	Yes	Yes	Yes	IR Pointer Laser Rockets	FLIR NVG Radar	UHF/VHF
S-3B	USN	GP Bombs CBU 2.75"/5.0” Rockets Aerial Mines LUU-2 Flares AGM-84D Harpoon	No	No	No	Rockets	FLIR Radar	UHF/VHF
UH-1N	USMC	7.62mm MG 50cal MG 2.75" Rockets	No	No	Yes	IR Pointer Rockets	FLIR LRF NVG	UHF/VHF
AH-1F	USA	BGM-71 TOW 2.75” Rockets 20mm Cannon	No	No	No	Rockets	NVG	UHF/VHF
AH-1W	USMC	BGM-71 TOW GM-114 Hellfire 2.75"/5.0” Rockets 20mm Cannon LUU-2 Flares	No	Yes[12]	Yes	IR Pointer Laser Rockets	CCDTV FLIR NVG	UHF/VHF
AH-64 A/D	USA	AGM-114 Hellfire 2.75” Rockets 30mm Cannon	Yes	Yes [13]	Yes	Laser Rockets	DTV FLIR IDM NVG Radar	UHF/VHF
OH-58D	USA	AGM-114 Hellfire	Yes	Yes	No	Laser Rockets	FLIR NVG TVS	UHF/VHF HF

[1] Though these aircraft can carry and release GBUs, only AV-8Bs with Litening II have an onboard designation capability for terminal guidance.
[2] Only AV-8B night attack have this capability.
[3] Only AV-8B with Litening II capability.
[4] Only AV-8B with radar upgrade have this capability.
[5] AC-130H can only designate laser code 1688.
[6] F-16 without LANTIRN capability require off-board designation for terminal guidance.
[7] Only F-16 w/HTS (HARM targeting system).
[8] Only F-16 w/LANTIRN capability.
[9] GPS on some aircraft (Blocks 40/41; 50/52).
[10] Only FA-18 Lot 11 and above have this capability.
[11] Some FA-18 Lot 16 and all FA-18 Lot 17 and above have this capability.
[12] AH-1W can designate codes 1111-1788, but has maximum effectiveness from 1111-1488.
[13] AH-64s can not designate codes 1711 to 1788.

APPENDIX C. JOINT TACTICAL AIR STRIKE REQUEST

All U.S. Armed Forces use the JTAR Request Form (DD Form 1972) to request CAS. The use of this form is mandatory unless otherwise authorized by a higher authority. A sample JTAR request form is shown in figure C-1. (The paraphrased instructions starting on page C-3 are included for reference only.)

JOINT TACTICAL AIR STRIKE REQUEST — See JCS Pub 12, Vol II, for instructions for preparation.

SECTION I - MISSION REQUEST — DATE

1. UNIT CALLED | THIS IS | REQUEST NUMBER | SENT | TIME | BY

2. PREPLANNED: [A] PRECEDENCE _____ [B] PRIORITY _____
IMMEDIATE: [C] PRIORITY _____ | RECEIVED | TIME | BY

3. TARGET IS/NUMBER OF

[A] PERS IN OPEN ____ [B] PERS DUG IN ____ [C] PERS IN OPEN ____ [D] MORTARS, ARTY ____

[E] AAA ADA ____ [F] RKTS MISSILE ____ [G] PERS IN OPEN ____ [H] VEHICLES ____

[I] BLDGS ____ [J] BRIDGES ____ [K] PERS IN OPEN ____ [L] SUPPLIES, EQUIP ____

[M] CENTER (CP, COM) ____ [N] AREA ____ [O] PERS IN OPEN ____ [P] MOVING N E S W ____

[Q] REMARKS ____

4. TARGET LOCATION IS

[A] _____ (COORDINATES) [B] _____ (COORDINATES) [C] _____ (COORDINATES) [D] _____ (COORDINATES)

[E] TGT ELEV _____ [F] SHEET NO. _____ [G] SERIES. _____ [H] CHART NO. _____

5. TARGET TIME/DATE

[A] ASAP _____ [B] NLT _____ [C] AT _____ [D] TO _____

6. DESIRED ORDNANCE/RESULTS

[A] ORDNANCE _____ [B] DESTROY _____ [C] NEUTRALIZE _____ [D] HARASS/INTERDICT _____

7. FINAL CONTROL

[A] FAC/RABFAC _____ [B] CALL SIGN _____ [C] FREQ _____ [D] CONT PT _____

8. REMARKS

1. IP _____
2. HDNG _____ MAG _____ OFFSET: L / R
3. DISTANCE _____ NM
4. TGT ELEVATION _____ FEET MSL
5. TGT DESCRIPTION _____
6. TGT LOCATION _____
7. MARK TYPE _____ CODE _____
8. FRIENDLIES _____
9. EGRESS _____
10. BCN - TGT _____ MAG BCN GRID ____/____
11. BCN -TGT _____ METERS TGT GRID ____/____
12. BCN ELEVATION _____ FEET MSL

Figure C-1. Joint Tactical Air Strike Request Form.

SECTION II - COORDINATION

9. NGF	10. ARTY	11. AIO/G-2/G-3
12. REQUEST ☐ APPROVED ☐ DISAPPROVED	13. BY	14. REASON FOR DISAPPROVAL
15. AIRSPACE COORDINATION AREA A IS NOT IN EFFECT B NUMBER		16. IS IN EFFECT A (FROM TIME) _____ B (TO TIME) _____

17. LOCATION	18. WIDTH (METERS)	19. ALTITUDE/VERTEX
A _____ FROM COORDINATES B _____ TO COORDINATES		A _____ (MAXIMUM VERTEX) B _____ (MINIMUM)

SECTION III - MISSION DATA

20. MISSION NUMBER	21. CALL SIGN	22. NO. AND TYPE AIRCRAFT	23. ORDNANCE
24. EST/ACT TAKEOFF	25. EST TOT	26. CONT PT (COORDS)	27. INITIAL CONTACT
28. FAC/FAC(A)TAC(A) CALL SIGN/FREQ	29. AIRSPACE COORDINATION AREA	30. TGT DESCRIPTION	31. TGE COORD/ELEV

32. BATTLE DAMAGE ASSESSMENT (BDA) REPORT (USMTF INFLTREP)

LINE 1/CALL SIGN _____
LINE 2/MSN NUMBER _____
LINE 3/REQ NUMBER _____
LINE 4/LOCATION _____
LINE 5/TOT _____
LINE 6/REMARKS _____
REMARKS _____

*TRANSMIT AS APPROPRIATE

DD FORM 1972 (REVISED) 15 NOV 1994. Supercedes DD Form 1972, Apr 1975.

Figure C-1. Joint Tactical Air Strike Request Form (continued).

Section I. Mission Request

Line Title and Elements	Explanation
1. UNIT CALLED	Identifies the unit designation/call sign/preassigned number.
THIS IS	Identifies the request originator by unit designation/ call sign/preassigned number.
REQUEST NUMBER	For preplanned missions, indicates the originator's request number in series. For immediate missions, this number is assigned by the air support coordination section (ASCS)/DASC.
SENT	Indicates the time and the individual who transmitted the request.
2. (Mission categories) PREPLANNED:	
A. PRECEDENCE B. PRIORITY	For preplanned requests, enter precedence (block A) or priority (block B). Precedence is stated numerically in descending order of importance, as determined by the requester. Priority is expressed as shown below.
IMMEDIATE:	
C. PRIORITY	For immediate requests, enter priority (block C). A precedence entry is not required for immediate requests because, by definition, all immediate requests have a precedence of 1. Use the numerical designation below to determine priority (e.g., define the tactical situation) for preplanned (block B) or immediate (block C): 1. Emergency: Targets that require immediate action and supersede all other categories of mission priority. 2. Priority: Targets that require immediate action and supersede routine targets. 3. Routine: Targets of opportunity. Targets that do not demand urgency in execution.

Line Title and Elements	Explanation
3. TARGET IS/ NUMBER OF	Describes the type, approximate size, and mobility of the target to be attacked. It is necessary to specify, even if a rough estimate, the number of targets (i.e., 10 tanks) or the size of the target area (i.e., personnel on a 500-meter front). Otherwise planners cannot accurately determine what force is required—aircraft numbers/type and ordnance amount/type.
4. TARGET LOCATION IS	Locates the target by using the military grid reference system (MGRS) prescribed for the area concerned.
A. COORDINATES	Locates a point target or starting point.
B. COORDINATES	When used together with A, provides from ____ to ____ coordinates.
C. COORDINATES	When used together with A and B, provides a route.
D. COORDINATES	When used together with A through C, provides a route or describes a target area.
E. TARGET ELEVATION	Target elevation in feet above sea level.
F. SHEET NUMBER	Self-explanatory.
G. SERIES	Self-explanatory.
H. CHART NUMBER	Self-explanatory.
CHECKED	Indicates with whom target information has been cross-checked.
5. TARGET TIME/ DATE	Indicates the time/date when the air strike is requested.
A. ASAP	As soon as possible.
B. NLT	The target is to be attacked before, but not later than (NLT) the time indicated.
C. AT	Indicates time at which target is to be attacked.
D. TO	Denotes the end of the period of time in which support such as airborne alert or column cover is required. When D is used with C, B is unnecessary.

Line Title and Elements	Explanation
6. DESIRED ORDNANCE/ RESULTS	Indicates the requester's desired results. This is essential information for the planner and must be carefully considered by the requester.
A. ORDNANCE	Desired ordnance.
B. DESTROY	Self-explanatory.
C. NEUTRALIZE	Self-explanatory.
D. HARASS/ INTERDICT	Self-explanatory.
7. FINAL CONTROL	Identifies the final controller (FAC, FAC[A], etc.) who will conduct the briefing and control the release of the ordnance.
A. FAC	Transmits the type of terminal control.
B. CALL SIGN	Call sign of terminal controller.
C. FREQUENCY	Recommended tactical air direction (TAD) frequency that is usable on the forward edge of the battle area (FEBA).
D. FIX/CONTROL POINT	Military grid coordinates and/or navigation aid (NAVAID) fix of a control point that is the furthest limit of the attack aircraft's route of flight before control by the final controller.
8. REMARKS	Allows incorporation of briefing information not included elsewhere in the request. Enter data for the standard CAS brief.

1. IP/BP _____
2. HEADING _____MAG: OFFSET LEFT/RIGHT
3. DISTANCE _____
4. TARGET ELEVATION _____FEET MSL
5. TARGET DESCRIPTION _____
6. Target LOCATION _____
7. MARK TYPE _____CODE _____
8. FRIENDLIES _____
9. EGRESS _____

Section II. Coordination

Line Title and Elements	Explanation
9. NGF	Now known as naval surface fire support (NSFS).
10. Artillery	Artillery coordination.
11. AIO/G-2/G-3	Air Intelligence Officer, G-2, G-3, or other Service equivalent coordination.
12. REQUEST A. APPROVED B. DISAPPROVED	Indicates the approval or disapproval of the request.
13. BY	Indicates the individual who approved or disapproved the request.
14. REASON FOR DISAPPROVAL	Self-explanatory.
15. AIRSPACE COORDINATION AREA A. IS NOT B. NUMBER	The ACA establishes airspace that is reasonably safe from friendly, surface-delivery, nonnuclear fires. The ACA provides a warning to aircraft of the parameters of surface-delivered fire in a specific area. A plan number or code name is issued, as appropriate.
16. IS IN EFFECT A. FROM TIME __ B. TO TIME __	Establishes the time period that the applicable ACA plan will be in effect.
17. LOCATION A. FROM COORDINATES B. TO COORDINATES	Grid coordinates of the start/end points of the ACA's centerline.
18. WIDTH (METERS)	Defines the ACA from either side of the centerline.
19. ALTITUDE/VERTEX A. MAXIMUM/VERTEX B. MINIMUM	ACA altitude given in feet above mean sea level (MSL). (Use A for VERTEX only entry).

Section III. Mission Data

NOTE: Mission data information transmitted to the requesting agency may be limited to those items not included in the request.

Line Title and Elements	Explanation
20. MISSION NUMBER	Indicates mission number.
21. CALL SIGN	Call sign of mission aircraft.
22. NUMBER AND TYPE AIRCRAFT	Self-explanatory.
23. ORDNANCE	Type of ordnance either by code number or actual nomenclature.
24. EST/ACT TAKEOFF	Estimated or actual time the mission aircraft will take off.
25. EST TOT	Estimated TOT.
26. CONTROL POINT/ RENDEZVOUS (COORDINATES/ NAVAID FIX	The furthest limit of the attack aircraft's route of flight before control by the final controller. Same as Line 7, item D, when designated in the request.
27. INITIAL CONTACT	Indicates the initial control agency the flight is to contact.
28. FAC/TAC(A) CALL SIGN FREQUENCY	Call sign and frequency of final control agency.
29. ACA	Refer to lines 15 through 19 for this data.
30. TARGET DESCRIPTION	Self-explanatory.
31. TARGET COORDINATES/ ELEVATION	Self-explanatory.
32. BDA Report	This optional space is used to record BDA for each mission.
LINE 1/ CALL SIGN	Call sign of the reporting aircraft.
LINE 2/ MISSION NUMBER	Mission number of the CAS mission for which results are being reported.

Line Title and Elements	Explanation
LINE 3/REQUEST NUMBER	Requesting unit's request number.
LINE 4/LOCATION	The location of the target when it was attacked.
LINE 5/TOT	The time the aircraft began attack on the target/the time the aircraft completed the mission and departed the target.
LINE 6/RESULTS	The specific results of the mission. (e.g., "10 tanks destroyed, 150 killed in action (KIAs), enemy unit neutralized, mission successful").
REMARKS	Other information appropriate to the tactical situation or as requested.

APPENDIX D. DAMAGE CRITERION

Target Type	Damage Criteria	Pd	Preferred Weapon
Personnel	Harassment Neutralize Destruction	0.1 .3-.4 .5-.7	CBU/GP Bombs CBU/GP Bombs CBU/GP Bombs
Armored Veh.	K-Kill (Single) K-Kill (Area)	.7-.9 .5-.7	PGM/CBU CBU/PGM
Field Artillery	F-Kill	.7-.9	GP/PGM (single)
Rocket/SSM	K-Kill	.7-.9	PGM/CBU
AAA	K-Kill	.7-.9	CBU
Mobile AAA	K-Kill	.5-.7	PGM/CBU/GP
Airfields	MOS/MCL	.7-.8	GP
Aircraft	K-Kill	.7-.8	PGM (single A/C) CBU/GUN/Rocket (Mult A/C)
A/C Bunkers	Breach Bunker & A/C Inside K-Kill	.7-.8	PGM /GP
Harden Targets	Damage inside which causes complete breakdown of position	.7-.9	PGM
C3 Sites	K-Kill	.7-.9	PGM
Bridges	Collapse Span	.7-.8	PGM
Dams	Rupture/Collapse	.7-.9	PGM/GP
Locks	Buckling of gates	.7-.9	PGM/GP
Trains/Trucks	K-Kill	.5-.7	PGM/CBU/GP
Tunnels	Damage to tunnel linings	.7-.8	PGM
Ships	SAM/SSM systems Sea worthiness	.7-.9 .5-.9	ARM PGM/CBU/GP
SAM Systems	K-Kill Suppress	.7-.8 .7-.8	PGM ARM
Buildings	Damage structural	.5-.7	PGM/GP
Comm Vans	None defined	.7-.9	PGM/CBU
Antennas	None defined	.5-.7	PGM/GP
POL	Supplies in open Render unusable	.3-.5 .3-.5	GP GP
POL	Heavy damage to critical components	.7-.9	PGM/GP
Ammo Storage	Catastrophic	.3-5 Open .5 Bldg. .5-.7 Igloos	GP PGM/GP PGM/GP
Ammo Storage	Catastrophic	.3-.5 Open .5 Bldg. .5-.7 Igloos	GP PGM/GP PGM/GP
Ports	Destruction of piers	.5-.7	PGM/GP
Note: The table in this appendix is only a quick reference guide for DAS planners. JMEM/AS should be utilized for detailed DAS operation planning.			

APPENDIX E. GLOSSARY

SECTION I. ACRONYMS AND ABBREVIATIONS

A-6 . . . . . attack aircraft (Intruder)
AAA . . . . . antiaircraft artillery
AADC . . . . . area air defense commander
AAW . . . . . antiair warfare
ABCCC . . . . . airborne battlefield command and control center
ACA . . . . . airspace control authority
ACE . . . . . aviation combat element
ACI . . . . . air combat intelligence
ACO . . . . . airspace control order
ACP . . . . . airspace control plan
AEW . . . . . airborne early warning
AGM . . . . . air-to-ground missile
AH-1W . . . . . attack helicopter (Cobra)
AI . . . . . air interdiction
AO . . . . . area of operations
AOC . . . . . air operations center (Air Force)
AOR . . . . . area of responsibility
APC . . . . . armored personnel carrier
AR . . . . . armed reconnaissance
ARA . . . . . armed reconnaissance area
ARM . . . . . antiradiation missile
ASC(A) . . . . . assault support coordinator (airborne)
ASLT . . . . . air support liaison team
ASOC . . . . . air support operations center
ATARS . . . . . advanced tactical airborne reconnaissance system
ATO . . . . . air tasking order
AV-8B . . . . . V/STOL attack aircraft (Harrier)
AWACS . . . . Airborne Warning and Control System

BDA . . . . . bomb or battle damage assessment
BVR . . . . . beyond visual range

C2 . . . . . command and control
C3 . . . . . command, control, and communications
C4I . . . . . command, control, communications, computers, and intelligence
CA . . . . . combat assessment
CAP . . . . . combat air patrol
CAS . . . . . close air support
CBU . . . . . cluster bomb unit
CCIR . . . . . commander's critical information requirements
CEP . . . . . circular error probable
CINC . . . . . commander in chief
COA . . . . . course of action
COMINT . . . . . communications intelligence
COS . . . . . current operations section
CRC . . . . . control and reporting center
CSSE . . . . . combat service support element
CTAPS . . . . contingency theater automated planning system

D3A . . . . . decide, detect, deliver, and assess
DAS . . . . . deep air support
DASC . . . . . direct air support center
DASC(A) . . . . . direct air support center (airborne)
DOCC . . . deep operations coordination center (Army)
E-2C . . . . . AWACS aircraft (Hawkeye)
EA . . . . . electronic attack
EA-6B . . . . . all-weather electronic attack aircraft (Prowler)
EMW . . . . . expeditionary maneuver warfare
EW . . . . . electronic warfare

F4U . . . . . fighter aircraft (Corsair)
F/A-18 . . . . . fighter/attack aircraft (Hornet)
FAC . . . . . forward air controller
FAC(A) . . . . . forward air controller (airborne)
FARP . . . . . forward arming and refueling point
FEBA . . . . . forward edge of the battle area
FFCC . . . . . force fires coordination center
FLIR . . . . . forward looking infrared
FMF . . . . . Fleet Marine force
FMFM . . . . . Fleet Marine Force manual
FOB . . . . . forward operating base
FOC . . . . . full operational capability
FOS . . . . . future operations section
FRAGO . . . . . fragmentary order
FSCC . . . . . fire support coordination center
FSCL . . . . . fire support coordination line

GAT . . . . . guidance apportionment and targeting
GCE . . . . . ground combat element
GCI . . . . . ground controlled intercept
GGW . . . . . GPS guided weapon
GPS . . . . . global positioning system

HARM . . . . . high-speed antiradiation missile
HELLFIRE . . . helicopterborne fire and forget missile
HIDACZ . . . . . high-density airspace control zone
HPT . . . . . high-payoff target
HPTL . . . . . high-payoff target list
HST . . . . . helicopter support team
HTS . . . . . HARM targeting system

HVT . . . . . high-value target

IFF . . . . . identification, friend or foe
INS. . . . . inertial navigation system
IOC . . . . . initial operational capability
IPB. . . . . intelligence preparation of the battlespace
IR. . . . . infrared radiation

JAOC. . . . . joint air operations center
JDAM . . . . . joint direct attack munition
JFACC. . . . . joint force air component commander
JFC. . . . . joint force commander
JIPTL. . . . . joint integrated prioritized target list
JMEM/AS . . . . joint munitions effectiveness manual/ air to surface
JOA . . . . . joint operations area
JSOW. . . . . joint standoff weapon
JTAR . . . . . joint tactical air strike request
JTCB . . . . . joint targeting coordination board
JTL. . . . . joint target list
JST. . . . . joint strike fighter

KC-130 . . . . . aerial refueling/transport aircraft (Hercules)
KTO. . . . . Kuwaiti theater of operations

LAAD . . . . . low altitude air defense
LANTIRN . . . . . low-altitude navigation and targeting infrared for night
LGB. . . . . laser-guided bomb
LGM . . . . . laser-guided missile
LGW . . . . . laser-guided weapon
LOAC . . . . . law of armed conflict
LOC. . . . . lines of communications
LPD . . . . . amphibious transport dock
LST . . . . . laser spot tracker

MAAP . . . . . master air attack plan
MACCS. . . . Marine air command and control system
MACG. . . . . Marine air control group
MAG . . . . . Marine aircraft group
MAGTF. . . . . Marine air-ground task force
MARFOR . . . . . Marine Corps forces
MARLO. . . . . Marine liaison officer
MCDP . . . . . Marine Corps doctrinal publication
MCPP . . . . . Marine Corps Planning Process
MCRP . . . . . Marine Corps reference publication
MCWP. . . . . Marine Corps warfighting publication
MEA . . . . . munitions effect assessment
MEF. . . . . Marine expeditionary force
METT-T . . . . . mission, enemy, terrain and weather, troops and support available-time available
MISREP. . . . . mission report
MOOTW . . . . . military operations other than war
MOS . . . . . military occupational specialty

MRR . . . . . minimum-risk route
MSC . . . . . major subordinate command

NATO . . . . . North Atlantic Treaty Organization
NFA. . . . . no-fire area
NVD . . . . . night vision device
NVG . . . . . night vision goggle
NWP . . . . . naval warfare publication

OAS. . . . . offensive air support
OIR . . . . . other intelligence requirement
OMFTS . . . . . operational maneuver from the sea
OODA loop . . . . . observe, orient, decide, act; observation, orientation, decision, action
OPLAN . . . . . operation plan
OPORD . . . . . operation order
OPSEC . . . . . operations security
OPT . . . . . operational planning team

PD . . . . . probability of damage
PGM . . . . . precision-guided missile/munition
PGW . . . . . precision-guided weapon
PID . . . . . positive identification
PIR. . . . . priority intelligence requirement
Pk. . . . . probability of kill

RAF . . . . . Royal Air Force (UK)
RAOC . . . . . rear area operations center; regional air operations center
RFI. . . . . request for information; request for intelligence
ROE. . . . . rules of engagement
RR . . . . . reattack recommendation

SAAWC . sector antiair warfare coordinator (USMC)
SAM . . . . . surface-to-air missile
SBD. . . . . attack aircraft (Dauntless)
SCAR . . . . . strike coordination and reconnaissance
SEAD . . . . . suppression of enemy air defenses
SERE. . . . . survival, evasion, resistance, and escape
SLAM . . . . . standoff land attack missile
SPINS . . . . . special instructions
STOM . . . . . ship-to-objective maneuver

TAC(A) . . . . . tactical air coordinator (airborne)
TACAIR . . . . . tactical air
TACC . . . . . tactical air command center (USMC); tactical air control center (USN/USAF)
TACP. . . . . tactical air control party
TADC . . . . . tactical air direction center
TAGS . . . . . theater air ground system
TALD . . . . . tactical air-launched decoy
TAOC . . . . . tactical air operations center
TARPS . . . . . tactical airborne reconnaissance POD system

TBMCS . . . .Theater Battle Management Core System
THS . . . . . target hand-off subsystem
TLDHS . . . . . target location, designation, and hand-off system
TLE . . . . . target location error
TOT . . . . . .time on target
TPFDD . . . . . time-phased force and deployment data
TRAP . . . . tactical recovery of aircraft and personnel
TSS . . . . . target selection standards
TV . . . . . television
TVA . . . . . target value analysis

UAV . . . . . unmanned aerial vehicle
UH1 . . . . . utility helicopter (Huey)
UHF . . . . . ultrahigh frequency
USA . . . . . United States Army
USAF . . . . . United States Air Force
USMC . . . . . United States Marine Corps
USN . . . . . United States Navy

VHF . . . . . .very high frequency
VMFA . . . . . Marine fighter/attack squadron

WGS-84 . . . . . World Geodetic System 1984

SECTION II. DEFINITIONS

air interdiction—Air operations conducted to destroy, neutralize, or delay the enemy's military potential before it can be brought to bear effectively against friendly forces at such distance from friendly forces that detailed integration of each air mission with the fire and movement of friendly forces is not required. (JP 1-02)

air operations center—The principal air operations installation from which aircraft and air warning functions of combat air operations are directed, controlled, and executed. It is the senior agency of the Air Force Component Commander from which command and control of air operations are coordinated with other components and Services. Also called AOC. (JP 1-02)

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

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. Also called ACO. (JP 1-02)

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. Also called ACP. (JP 1-02)

air superiority—That degree of dominance in the air battle of one force over another which permits the conduct of operations by the former and its related land, sea and air forces at a given time and place without prohibitive interference by the opposing force. (JP 1-02)

antiair warfare—A US Navy/US Marine Corps term used to indicate that action required to destroy or reduce to an acceptable level the enemy air and missile threat. It includes such measures as the use of interceptors, bombers, antiaircraft guns, surface-to-air and air-to-air missiles, electronic attack, and destruction of the air or missile threat both before and after it is launched. Other measures which are taken to minimize the effects of hostile air action are cover, concealment, dispersion, deception (including electronic), and mobility. Also called AAW. (JP 1-02) AAW is one of the six functions of Marine aviation.

antiradiation missile—A missile which homes passively on a radiation source. (JP 1-02)

armed reconnaissance—A mission with the primary purpose of locating and attacking targets of opportunity, i.e., enemy materiel, personnel, and facilities, in assigned general areas or along assigned ground communications routes, and not for the purpose of attacking specific briefed targets. Also called AR. (JP 1-02)

aviation combat element—The core element of a Marine air-ground task force that is task-organized to conduct aviation operations. The aviation combat element provides all or a portion of the six functions of Marine aviation necessary to accomplish the Marine air-ground task force's mission. These functions are antiair warfare, offensive air support, assault support, electronic warfare, air reconnaissance, and control of aircraft and missiles. The aviation combat element 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 Marine aircraft wings. The aviation combat element may contain other Service or foreign military forces assigned or attached to the MAGTF. The aviation combat element itself is not a formal command. Also called ACE. (MCRP 5-12C)

battle damage assessment—The timely and accurate estimate of damage resulting from the application of military force, either lethal or non-lethal, against a predetermined objective. Battle damage assessment can be applied to the employment of all types of weapon systems (air, ground, naval, and special forces weapon systems) throughout the range of military operations. Battle damage assessment is primarily an intelligence responsibility with required inputs and coordination from the operators. Battle damage assessment is composed of physical damage assessment, functional damage assessment, and target system assessment. Also called BDA. (JP 1-02)

close air support—Air action by fixed- and rotary-wing aircraft against hostile targets which are in close proximity to friendly forces and which require detailed integration of each air mission with the fire and movement of those forces. Also called CAS. (JP 1-02)

combat service support element—The core element of a Marine air-ground task force that is task-organized to provide the combat service support necessary to accomplish the Marine air-ground task force mission. The combat service support element varies in size from a small detachment to one or more force service support groups. It provides supply, maintenance, transportation, general engineering, health services, and a variety of other services to the Marine air-ground task force. It may also contain other Service or foreign military forces assigned or attached to the MAGTF. The combat service support element itself is not a formal command. Also called CSSE. (MCRP 5-12C)

combined arms—The full integration of combat arms in such a way that to counteract one, the enemy must become more vulnerable to another. (MCRP 5-12C)

command and control—The exercise of authority and direction by a properly designated commander over assigned and attached forces in the accomplishment of the mission. Command and control functions are performed through an arrangement of personnel, equipment, communications, facilities, and procedures employed by a commander in planning, directing, coordinating, and controlling forces and operations in the accomplishment of the mission. Also called C2. (JP 1-02)

command element—The core element of a Marine air-ground task force that is the headquarters. The command element is composed of the commander, general or executive and special staff sections, headquarters section, and requisite communications support, intelligence and reconnaissance forces, necessary to accomplish the MAGTF's mission. The command element provides command and control, intelligence, and other support essential for effective planning and execution of operations by the other elements of the MAGTF. The command element varies in size and composition and may contain other Service or foreign military forces assigned or attached to the MATF. Also called CE. (MCRP 5-12C)

concept of operations—A verbal or graphic statement, in broad outline, of a commander's assumptions or intent in regard to an operation or series of operations. The concept of operations frequently is embodied in campaign plans and operation plans; in the latter case, particularly when the plans cover a series of connected operations to be carried out simultaneously or in succession. The concept is designed to give an overall picture of the operation. It is included primarily for additional clarity of purpose. (JP 1-02)

direct air support center—The principal air control agency of the US 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. Also called DASC. (JP 1-02)

direct support—A mission requiring a force to support another specific force and authorizing it to answer directly to the supported force's request for assistance. See also general support. (JP 1-02)

electronic warfare—Any military action involving the use of electromagnetic and directed energy to control the electromagnetic spectrum or to attack the enemy. Also called EW. The three major subdivisions within electronic warfare are: electronic attack, electronic protection, and electronic warfare support. **a.** electronic attack. That division of electronic warfare involving the use of electromagnetic energy, directed energy, or antiradiation weapons to attack personnel, facilities, or equipment with the intent of degrading, neutralizing, or destroying enemy combat capability and is considered a form of fires. Also called EA. EA includes: **1)** actions taken to prevent or reduce an enemy's effective use of the electromagnetic spectrum, such as jamming and electromagnetic deception, and **2)** employment of weapons that use either electromagnetic or directed energy as their primary destructive mechanism (lasers, radio frequency weapons, particle beams). **b.** electronic protection. That division of electronic warfare involving passive and active means taken to protect personnel, facilities, and equipment from any effects of friendly or enemy employment of

electronic warfare that degrade, neutralize, or destroy friendly combat capability. Also called EP. **c.** electronic warfare support. That division of electronic warfare involving actions tasked by, or under direct control of, an operational commander to search for, intercept, identify, and locate or localize sources of intentional and unintentional radiated electromagnetic energy for the purpose of immediate threat recognition, targeting, planning and conduct of future operations. Thus, electronic warfare support provides information required for decisions involving electronic warfare operations and other tactical actions such as threat avoidance, targeting, and homing. Also called ES. Electronic warfare support data can be used to produce signals intelligence, provide targeting for electronic or destructive attack, and produce measurement and signature intelligence. (JP 1-02)

fire support coordination center—A single location in which are centralized communications facilities and personnel incident to the coordination of all forms of fire support. See also supporting arms coordination center. Also called FSCC. (JP 1-02)

fire support coordination line—A fire support coordinating measure that is established and adjusted by appropriate land or amphibious force commanders within their boundaries in consultation with superior, subordinate, supporting, and affected commanders. Fire support coordination lines (FSCLs) facilitate the expeditious attack of surface targets of opportunity beyond the coordinating measure. An FSCL does not divide an area of operations by defining a boundary between close and deep operations or a zone for close air support. The FSCL applies to all fires of air, land, and sea-based weapon systems using any type of ammunition. Forces attacking targets beyond an FSCL must inform all affected commanders in sufficient time to allow necessary reaction to avoid fratricide. Supporting elements attacking targets beyond the FSCL must ensure that the attack will not produce adverse effects on, or to the rear of, the line. Short of an FSCL all air-to-ground and surface-to surface attack operations are controlled by the appropriate land or amphibious force commander. The FSCL should follow well defined terrain features. Coordination of attacks beyond the FSCL is especially critical to commanders of air, land, and special operations forces. In exceptional circumstances, the inability to conduct this coordination will not preclude the attack of targets beyond the FSCL. However, failure to do so may increase the risk of fratricide and could waste limited resources. Also called FSCL. (JP 1-02)

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. Also called FAC. (JP 1-02)

forward air controller (airborne)—A specifically trained and qualified aviation officer who exercises control from the air of aircraft engaged in close air support of ground troops. The forward air controller (airborne) is normally an airborne extension of the tactical air control party. Also called FAC(A). (JP 1-02)

f**orward arming and refueling point**—A temporary facility, organized, equipped, and deployed by an aviation commander, and normally located in the main battle area closer to the area of operation than the aviation unit's combat service area, to provide fuel and ammunition necessary for the employment of aviation maneuver units in combat. The forward arming and refueling point permits combat aircraft to rapidly refuel and rearm simultaneously. Also called FARP. (JP 1-02)

forward looking infrared—An airborne, electro-optical thermal imaging device that detects far-infrared energy, converts the energy into an electronic signal, and provides a visible image for day or night viewing. Also called FLIR. (JP 1-02) See night vision device.

forward operating base—An airfield used to support tactical operations without establishing full support facilities. The base may be used for an extended time period. Support by a main operating base will be required to provide backup support for a forward operating base. Also called FOB. (JP 1-02)

general support—That support which is given to the supported force as a whole and not to any particular subdivision thereof. (JP 1-02) See also direct support.

ground combat element—The core element of a Marine air-ground task force that is task organized to conduct ground operations. It is usually constructed around an infantry organization but can vary in size from a small ground unit of any type, to one or more

Marine divisions that can be independently maneuvered under the direction of the MAGTF commander. It includes appropriate ground combat and combat support forces and may contain other Service or foreign military forces assigned or attached to the Marine air-ground task force. The ground combat element itself is not a formal command. Also called GCE. (MCRP 5-12C)

immediate air support—Air support to meet specific requests which arise during the course of a battle and which by their nature cannot be planned in advance. (JP 1-02)

intelligence preparation of the battlespace—An analytical methodology employed to reduce uncertainties concerning the enemy, environment, and terrain for all types of operations. Intelligence preparation of the battlespace builds an extensive data base for each potential area in which a unit may be required to operate. The data base is then analyzed in detail to determine the impact of the enemy, environment, and terrain on operations and presents it in graphic form. Intelligence preparation of the battlespace is a continuing process. Also called IPB. (JP 1-02)

joint air operations center—A jointly staffed facility established for planning, directing, and executing joint air operations in support of the joint force commander's operation or campaign objectives. Also called JAOC. (JP 1-02)

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. Also called JFACC. (JP 1-02)

joint force commander—A general term applied to a combatant commander, subunified commander, or joint task force commander authorized to exercise combatant command (command authority) or operational control over a joint force. Also called JFC. (JP 1-02).

list of targets—A tabulation of confirmed or suspect targets maintained by any echelon for informational and fire support planning purposes. (JP 1-02)

maneuver warfare—A warfighting philosophy that seeks to shatter the enemy's cohesion through a variety of rapid, focused, and unexpected actions which create a turbulent and rapidly deteriorating situation with which the enemy cannot cope. (MCRP 5-12C)

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 assigned sector and to coordinate air operations with other Services. It is composed of command and control agencies with communications-electronics equipment that incorporates a capability from manual through semiautomatic control. Also called MACCS. (JP 1-02)

Marine air-ground task force—The Marine Corps principal organization for all missions across the range of military operations, composed of forces task-organized under a single commander capable of responding rapidly to a contingency anywhere in the world. The types of forces in the MAGTF are functionally grouped into four core elements: a command element, an aviation combat element, a ground combat element, and a combat service support element. The four core elements are categories of forces, not formal commands. The basic structure of the MAGTF never varies, though the number, size, and type of Marine Corps units comprising each of its four elements will always be mission dependent. The flexibility of the organizational structure allows for one or more subordinate MAGTFs to be assigned, and other Service and/or foreign military forces, to be assigned or attached to the MAGTF. Also called MAGTF. (MCRP 5-12C)

night vision device—Any electro-optical device that is used to detect visible and infrared energy and provide a visible image. Night vision goggles, forward-looking infrared, thermal sights, and low light level television are night vision devices. Also called NVD. See also night vision goggle(s); forward looking infrared. (JP 1-02)

night vision goggle(s)—An electro-optical image intensifying device that detects visible and near-infrared energy, intensifies the energy, and provides a visible image for night viewing. Night vision goggles can be either hand-held or helmet-mounted. Also called NVG. See also night vision device. (JP 1-02)

offensive air support—Those air operations conducted against enemy installations, facilities, and personnel to directly assist the attainment of MAGTF objectives by the destruction of enemy resources or the isolation of the enemy's military forces. Also called OAS. (MCRP 5-12C) OAS is one of the six functions of Marine aviation.

preplanned air support—Air support in accordance with a program, planned in advance of operations. Also called air support. (JP 1-02)

reasonable assurance—During each close air support mission, an acceptable level of risk under which the supported ground commander allows aircrews to attack targets and release ordnance without positive control. (MCRP 5-12C) See fire support coordination center.

rules of engagement—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. Also called ROE. (JP 1-02)

seabasing—The employment of aircraft from naval platforms, to include carriers and amphibious shipping. Applies only to aircraft organizations.

sortie—In air operations, an operational flight by one aircraft. (JP 1-02)

strike coordination and reconnaissance— A mission flown for the purpose of acquiring and reporting deep air support targets and coordinating armed reconnaissance or air interdiction missions upon those targets. Also called SCAR. (MCRP 5-12C)

supporting arms coordination center—A single location on board an amphibious command ship in which all communication facilities incident to the coordination of fire support of the artillery, air, and naval gunfire are centralized. This is the naval counterpart to the fire support coordination center utilized by the landing force. Also called SACC. (JP 1-02)

suppression of enemy air defenses—That activity which neutralizes, destroys, or temporarily degrades surface-based enemy air defenses by destructive and/or disruptive means. Also called SEAD. (JP 1-02)

tactical air command center—The principal United States 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 US 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 battle staff 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. Also called Marine TACC. (JP 1-02)

tactical air control center—The principal air operations installation (ship-based) from which all aircraft and air warning functions of tactical air operations are controlled. Also called Navy TACC. (JP 1-02)

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. Also called TACP. (JP 1-02)

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. Also called TAC(A). (JP 1-02)

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. Also called TADC. (JP 1-02)

tactical air operations center—The principal air control agency of the US 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. Also called TAOC. (JP 1-02)

tactical recovery of aircraft and personnel—A mission performed by an assigned and briefed aircrew for the specific purpose of the recovery of personnel, equipment, and/or aircraft when the tactical situation precludes search and rescue (SAR) assets from responding and when survivors and their location have been confirmed. Also called TRAP. (MCRP 5-12C)

target list—The listing of targets maintained and promulgated by the senior echelon of command; it contains those targets that are to be engaged by supporting arms, as distinguished from a "list of targets" that may be maintained by any echelon as confirmed, suspected, or possible targets for informational and planning purposes. (JP 1-02)

time on station—The time that an aircraft can actually spend performing its assigned mission. It does not include the time transiting to and from the operating site. Also called TOS. (MCRP 5-12C)

time on target—1. Time at which aircraft are scheduled to attack/photograph the target. **2.** The actual time at which aircraft attack/photograph the target. **3.** The time at which a nuclear detonation is planned at a specified desired ground zero. Also called TOT. (JP 1-02)

weaponeering—The process of determining the quantity of a specific type of lethal or nonlethal weapons required to achieve a specific level of damage to a given target, considering target vulnerability, weapon effect, munitions delivery accuracy, damage criteria, probability of kill, and weapon reliability. (JP 1-02)

APPENDIX F. REFERENCES

Joint Publications (JPs)

0-2	Unified Action Armed Forces (UNAAF)
1-02	DOD Dictionary of Military and Associated Terms
3-0	Doctrine for Joint Operations
3-01.4	JTTP for Joint Suppression of Enemy Air Defenses (J-SEAD)
3-02	Joint Doctrine for Amphibious Operations
3-02.1	Joint Doctrine for Landing Force Operations
3-03	Doctrine for Joint Interdiction Operations
3-09	Doctrine for Joint Fire Support
3-09.3	Joint Tactics, Techniques, and Procedures for Close Air Support (CAS)
3-52	Doctrine for Joint Airspace Control in the Combat Zone
3-56.1	Command and Control for Joint Air Operations
3-60	Joint Doctrine for Targeting

Marine Corps Doctrinal Publications (MCDPs)

1	Warfighting
2	Intelligence
5	Planning
6	Command and Control

Marine Corps Warfighting Publications (MCWPs)

0-1	Marine Corps Operations
3-2	Aviation Operations
3-22.2	Suppression of Enemy Air Defenses
3-23.1	Close Air Support
3-23.2	Deep Air Support
3-25	Control of Aircraft and Missiles
3-25.2	Multi-Service Procedures for Theater Air Ground System (TAGS)
3-25.3	Marine Air Command and Control System Handbook
3-25.4	MarineTactical Air Command Center Handbook
3-25.5	Direct Air Support Center Handbook
5-1	Marine Corps Planning Process

Marine Corps Reference Publications (MCRPs)

3-16A	Tactics, Techniques and Procedures for the Targeting Process (dual designated as FMFRP 6-90-2/FM 90-16)
3-16B	Joint Targeting Process and Procedures for Targeting Time-Critical Targets
5-12C	Marine Corps Supplement to the Department of Defense Dictionary of Military and Associated Terms

Fleet Marine Force Manual (FMFM)

6-18-1	Procedures for the Marine Corps Fire Support System

Naval Warfare Publications (NWP)

3-09.11 Supporting Arms in Amphibious Operations
55 Series Aircraft Tactical Manuals (renumbered as 3-02 series)

Air Force Doctrinal Document

2-1.3 Counterland (draft)

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