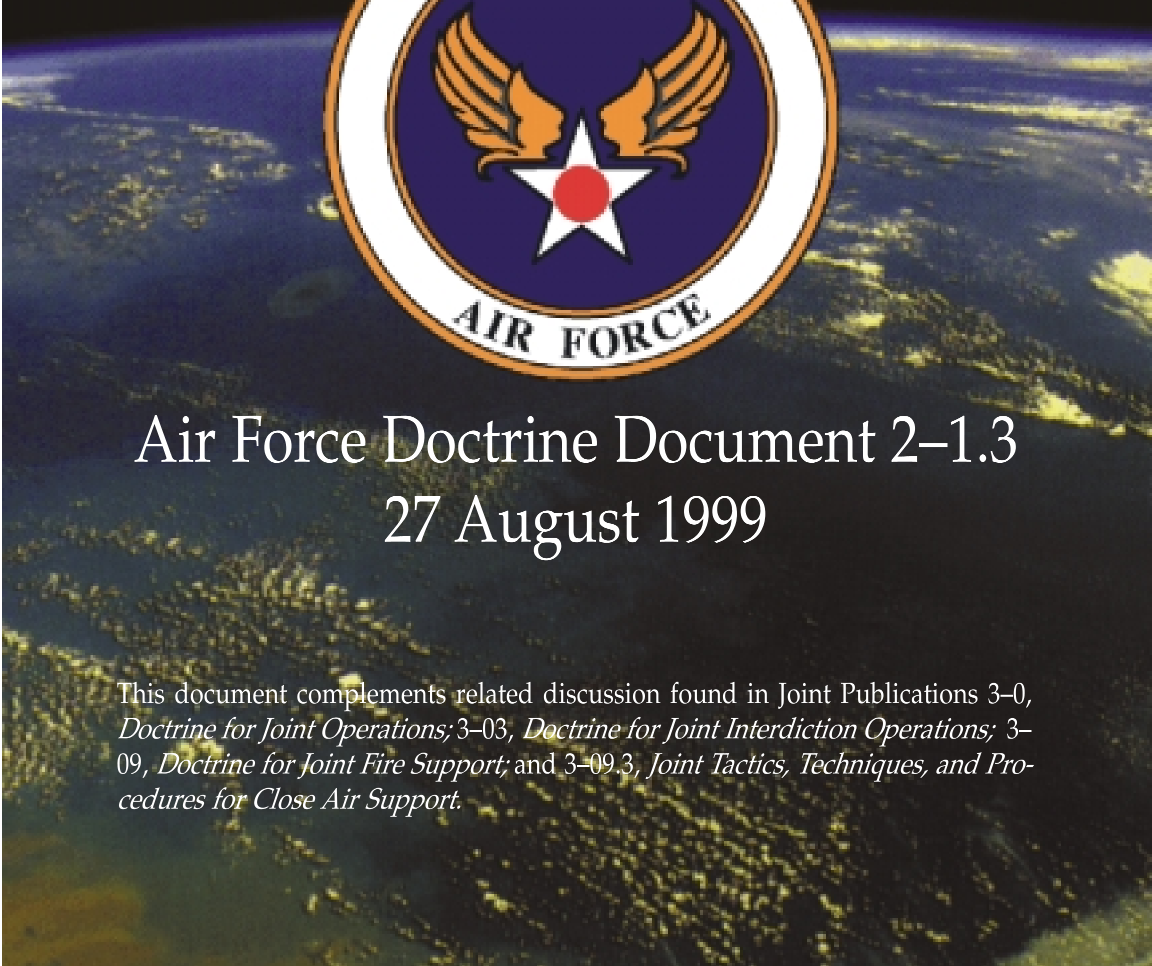
Counterland



Air Force Doctrine Document 2–1.3
27 August 1999

This document complements related discussion found in Joint Publications 3–0, *Doctrine for Joint Operations;* 3–03, *Doctrine for Joint Interdiction Operations;* 3–09, *Doctrine for Joint Fire Support;* and 3–09.3, *Joint Tactics, Techniques, and Procedures for Close Air Support.*

BY ORDER OF THE
SECRETARY OF THE AIR FORCE

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FOREWORD

Air interdiction (AI) and close air support (CAS) can be traced to the earliest days of air-to-ground operations. Airpower in the days of biplanes and open cockpits was often limited to reconnaissance, artillery spotting, and the direct support of surface forces, due to technical limitations on both range and payload as well as the employment doctrine of the day. As air forces matured and the military Services began to realize the capability of well planned and executed air operations, airpower has taken on a much greater role in warfare. Modern aerospace power offers the versatility and capability to deliver combat power on the enemy when and where needed to attain military objectives across the range of military operations. Air interdiction and close air support can be executed effectively with bombers, fighters, helicopters, or special operations forces (SOF), and with virtually all available munitions. **These operations can be employed either in support of surface operations or as the primary element of overall theater strategy.**

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Major General, USAF
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27 August 1999

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INTRODUCTION

> ***Counterland:** Operations conducted to attain and maintain a desired degree of superiority over surface operations by the destruction, disrupting, delaying, diverting, or other neutralization of enemy forces. The main objectives of counterland operations are to dominate the surface environment and prevent the opponent from doing the same.*
>
> **AFDD1**

PURPOSE

This Air Force Doctrine Document (AFDD) implements Air Force Policy Directive (AFPD) 10-13, *Air and Space Doctrine*. **AFDD 2-1.3 *Counterland* is an operational-level view of two traditional missions that airmen have performed since the first air combat sorties—air interdiction and close air support.** *This document establishes United States Air Force operational doctrine for planning and conducting AI and CAS operations, which together form the function of counterland, and supports basic aerospace doctrine.* Although this document is written within the scope of major theater warfare (MTW), the basics of counterland apply equally as well to the application of aerospace power against surface forces in more limited contingency operations.

APPLICATION

Counterland operations have become major contributors to aerospace power's decisiveness in joint warfare by rapidly destroying, or rendering ineffective, significant portions of key enemy surface forces and their supporting infrastructure, thereby enhancing maneuver warfare and avoiding prolonged and costly wars of attrition. Indeed, counterland offers the potential to prevent significant levels of enemy surface forces from engaging friendly forces. Counterland operations can support overall theater strategy by supporting friendly surface operations, or they may directly achieve theater-level objectives as the supported force maneuvering against enemy surface combat power.

This AFDD applies to all Air Force military and civilian personnel (includes AFRC and ANG units and members). The doctrine in this document is authoritative but not directive. Therefore, commanders need to consider not only the contents of this AFDD, but also the particular context in which they find themselves—national military objectives, available forces, enemy capabilities, rules of engagement, etc.—when planning counterland operations. This document is consistent with and complements joint doctrine, with close ties to Joint Pub 3-0, *Doctrine for Joint Operations*; Joint Pub 3-03, *Doctrine for Joint Interdiction Operations;* and JP 3-09.3, *Joint Tactics, Techniques, and Procedures for Close Air Support.* Although AFDD 2-1.3, *Counterland,* is consistent with these documents, its purpose is to promulgate the United States Air Force perspective on the counterland use of aerospace power.

SCOPE

This doctrine guides the Commander, Air Force Forces (COMAFFOR) and the joint force air component commander (JFACC) in developing counterland operations in support of the joint force commander's (JFC) campaign objectives. It articulates fundamental Air Force principles for the application of combat force and provides operational-level guidance on the integration and employment of Air Force resources to achieve desired objectives.

> ***Victory smiles upon those who anticipate the changes in the character of war, not upon those who wait to adapt themselves after the changes occur.***
>
> **Giulio Douhet**
> ***Command of the Air***

CHAPTER ONE

COUNTERLAND BASICS

> ***An army can be defeated by one of two main alternative means—not necessarily mutually exclusive: We can strike at the enemy's troops themselves, either by killing them or preventing them from being in the right place at the right time; or we can ruin their fighting efficiency by depriving them of their supplies of food and war material of all kinds on which they depend for existence as a fighting force***
>
> **Wing Commander J. C. Slessor**
> *Air Power and Armies, 1936*

GENERAL

Aerospace forces, with their responsiveness, flexibility, range, speed, and versatility, can transcend the normal operating limitations imposed on surface forces. Through its ability to strike enemy surface forces across the depth of the theater, aerospace power can reduce or even eliminate the need to engage in potentially costly ground combat. Counterland can be separated from strategic attack, which seeks to influence the enemy directly at the strategic level through the disruption of such target sets as weapons manufacturing, energy production, or national command and control systems. Counterland effects focus at the tactical and operational levels of war, targeting the fielded enemy surface forces and the infrastructure which directly supports them, and will indirectly lead to strategic effects by denying the enemy the ability to execute ground combat strategy. In cases where the enemy places strategic value on a specific portion of their ground combat force, counterland operations can produce more immediate effects at the strategic level. AI and CAS missions may be flown under an overall theater posture of offense or defense and are normally coordinated with any ground scheme of maneuver to maximize the effect on the enemy.

Although the counterland function is normally accomplished through AI and CAS missions, it should be mentioned that not all air interdiction falls under the category of counterland. History has many examples of airpower interdicting the enemy's air or sea lines of communication; these are respectively executed as counterair or countersea missions even though they may have an interdiction effect at the operational level.

The JFACC, who is normally also the COMAFFOR, is the supported commander for the JFC's overall air interdiction effort and a supporting commander when providing CAS or supporting AI to the ground component. CAS, which is the application of aerospace power in close support of the ground or amphibious components, requires a high level of coordination between surface and aerospace maneuver forces. It has the most focused and immediate effects of the two missions described in this document and is often crucial to the success or even survival of surface forces. CAS also tends to be a less efficient use of aerospace power than AI, due to its localized effects, the tactical disposition of enemy targets, and the added restrictions when attacking in close proximity to friendly ground forces. CAS is typically used for the direct destruction of local enemy forces, often one gun or tank at a time, rather than aiming to disrupt or neutralize large enemy formations by targeting critical enemy systems or nodes. Air interdiction, on the other hand, allows aerospace power to focus more directly on key portions of the enemy army and associated support structure, generally producing more widespread and longer-lasting results. AI has historically focused on operational-level effects such as isolating an entire front from access or reinforcement by enemy forces, destroying critical enemy war-fighting capabilities, or facilitating operational maneuver of friendly surface forces. With its inherent flexibility, AI can also focus on more localized effects in closer coordination with specific ground forces.

Each weapon system and munition has unique characteristics which should be considered based on the nature of the specific threat and targets to be attacked. However, it is important to remember when planning for AI and CAS that it is the commander's objective and the proximity to friendly ground forces, not the platform or munition used, which determines whether a mission is classified "air interdiction" or "close air support." Many of the assets that are used to interdict enemy surface forces deep in the enemy

Many multirole weapons such as the F-16 are capable of perfoming counterland missions as well as other functions.

rear can also be used, if needed, to support the Army's close fight, and vice versa.

DEFINITIONS

Joint doctrine currently defines **air interdiction** as: "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) Interestingly, the joint definition for the more general term *"interdiction"* specifically lists the effects as "destroy, disrupt, divert, or delay." This is a more precise definition of the desired effects, and applies to air interdiction as well as surface interdiction. The stated effects themselves can also have different meanings in different contexts, and so should be very precisely defined when used in broad guidance such as the commander's intent statements. For example, the term "delay" should always include a geographic and a chronological effect delineator, such as "delay the enemy XX battalion behind phase line charlie for 48 hours." The term "destroy" has a large number of different meanings to various parts of the military. The joint munition effectiveness manuals (JMEMs), for example, have their own definitions for mobility, firepower, and catastrophic kill of individual targets. At the higher levels of war, one usually associates the word "destroy" with a certain reduction in combat power. Again, this should be specifically stated both in terms of how much combat power needs to be reduced and what the mechanism for destroying that combat power will be. A very specific example of this might be "destroy 50% of the enemy XX battalion's combat power through the destruction of armored vehicles, artillery batteries, and associated tactical munitions stockpiles," while a more flexible example might simply be "reduce the combat power of the enemy XX battalion by 50%." *Flexibility is good, but the desired effects must be adequately defined to properly meet the commander's intent.*

A key portion of the air interdiction definition deals with distance. Air interdiction is employed against enemy surface power beyond the range at which it can effectively engage friendly surface forces. *This minimizes the risk of fratricide against friendly ground forces and reduces the need to deconflict between aerospace maneuver forces and organic surface fires.* AI has the flexibility to operate either in support of surface operations or as the main effort against the enemy ground force. In some cases AI can provide the sole effort against the enemy ground forces, for example, when a joint operation has no friendly land component involved in combat operations.

Close air support is defined as: "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." (JP 1-02)

Although the acronym includes it, the word "support" does not appear in the joint definition of CAS. In fact, most CAS actions do directly support ground forces. Other key portions of the joint definition for CAS are *"close proximity"* and *"detailed integration."* To provide a proper outer boundary to the CAS mission from the US Air Force perspective, these terms require the following amplification:

- ✪ **Close Proximity:** *As used in relation to close air support, close proximity is the distance within which some form of terminal attack control is required for targeting direction and fratricide prevention.*

- ✪ **Detailed Integration:** *As used in relation to close air support, detailed integration refers to the level of coordination required to achieve the desired effects without overly restricting CAS attacks, surface firepower, or the ground scheme of maneuver. It is also necessary to protect aircraft from the unintended effects of friendly surface fire. The maximum range requiring detailed integration is typically bounded by the range at which organic surface firepower provides the preponderance of effect on the enemy.*

The two key factors when employing CAS have always been the need to **provide flexible, real-time targeting guidance** to CAS aircraft and the need to **avoid hitting friendly ground forces** in close proximity to the target. These have shaped the tactics and command and control (C2) methods currently employed for CAS operations. The fluidity of the ground situation that exists within this close proximity distance usually requires real-time direction from the terminal controller to ensure that targets of highest priority to the ground commander are struck. The need to react to a rapidly changing ground battle has led to the CAS C2 system in place today.

Two distinguishing characteristics between CAS and AI are the *timing of when the effects* will be felt (CAS effects are felt almost immediately, while AI effects can take days or even weeks to be perceived) and the *level of coordination* needed for success. When friendly forces are within close proximity, more restrictive control measures are required to integrate CAS with surface maneuver while avoiding fratricide. Planned or anticipated movement of friendly and enemy ground units into close proximity is also a factor. This precludes scheduling AI against targets which will be within close proximity by the time the mission is flown, even if they are outside close proximity at the time the missions are allocated or planned.

World War I pursuits like this SPAD XIII were often used for both "trench strafing" and "ground strafing" missions, which would today be categorized as close air support and air interdiction.

In theory and in practice, air support aircraft in 1918 had two categories of targets: objectives along the enemy's heavily defended frontal positions, which some generals called the "crust," and a whole range of targets extending twenty miles and more behind that crust. By the end of the war, a considerable body of opinion held that the chief contribution of aircraft should be against those objectives behind that crust. Enemy reinforcements moving up in column were much more visible and much more vulnerable than front-line troops in field fortifications, and there was less danger of confusing them with friendly ground forces. Then too, objectives behind the front lines tended to be less fiercely defended—no minor consideration, given the losses suffered by ground attack units. Additionally, excellent targets often lay beyond the effective range of friendly artillery, in a zone where only the airplane could reach them. Toward the end of the war, targets such as dense troop columns and convoys of vehicles appeared in great numbers.

Lee Kennett
Case Studies in the Development of Close Air Support

COUNTERLAND AND THEATER STRATEGY

Counterland operations are only one of a number of functions available to the JFACC for conducting aerospace warfare. In any conflict with an enemy who possesses significant aerospace power, the first step towards victory is usually achieving air superiority through counterair operations. This allows friendly aerospace and surface units to proceed with other operations while preventing enemy air and missile attacks. With the rapidly growing use of space to support military activity on the surface, counterspace operations will also be a consideration. *Aerospace superiority allows communications, navigation, sensor, and reconnaissance assets to accomplish the tasks that are vital to friendly military operations and denies that capability to the enemy.*

Once the way has been cleared to apply aerospace power against the enemy, a variety of attack options is available to the JFACC. For example, the enemy may possess critical centers of gravity (COGs) that can be directly neutralized through strategic attack, thereby disrupting the enemy's overall military strategy. Strategic attack operations are designed to affect the enemy at the national-military or even national-political level, without the requirement of first creating operational-level effects. *Conversely, counterland operations typically create operational effects as a cumulative result of individual tactical operations, although operational effects such as theater isolation or combat force immobility can lead directly to strategic results. Such results depend greatly on the enemy's strategy and the criticality of counterland targets.* Depending on the specific circumstances of the conflict, aerospace power might be employed in an early phase for strategic attack, then shift to counterland operations in a later phase. Another option would be to run parallel strategic attack and counterland operations, shifting the priorities back and forth as theater strategy progresses and the enemy reacts to it. The use of counterland in the opening phases of a conflict will depend greatly on the initial disposition of enemy ground forces, and how immediate a threat they represent. When ground operations are imminent or ongoing, the priority of counterland will increase.

How counterland operations themselves are conducted is also dependent on overall theater strategy. How many CAS missions will be flown and how deep the AI missions will be targeted depend on numerous factors such as: enemy disposition, phase of the operation, whether ground combat is also occurring, and the need to support (or the support provided by) the friendly ground force. If the enemy army is a vulnerable target, the opening phase of the campaign may include a *"decisive halt"* operation to stop the enemy advance while simultaneously inflicting crippling damage. The surviving enemy force would continue to be attacked once it is halted, possibly in concert with strategic attacks, until the enemy either comes to terms or is overcome by a friendly ground counteroffensive or other following operational phase. *The synergy of counterland operations and friendly ground combat forces, operating as an integrated joint force, can often be overwhelming in cases where a single component cannot be decisive by itself.*

COUNTERLAND AS MANEUVER WARFARE

The term maneuver is typically defined as a combination of movement and fire, or fire potential, to achieve a position of advantage over the enemy. Aerospace forces are by far the most inherently maneuverable military assets the US possesses; aircraft can maneuver to any point on the globe in a matter of several hours, while space assets provide global coverage in far less time even than that. Maneuver warfare, in general terms, rests on movement relative to the enemy to create conditions for tactical, operational, and strategic success. Warfare by maneuver stems from a desire to circumvent enemy strengths and attack from a position of advantage, rather than meeting the enemy head on, or even to force the enemy into such a disadvantaged position that continued resistance is futile. *Aerospace forces, with their inherent speed, range, and precision attack capabilities, cannot be defined as anything but maneuver forces.*

Since maneuver warfare often seeks to neutralize enemy combat effectiveness through shock and disruption effects, rather than through direct attrition, aerospace forces are tailor-made for the task. *Where ground forces must seek out weak points in the enemy line to be broken through and exploited, aircraft and missiles can maneuver in three dimensions directly to key points in the enemy rear.* Destruction of these decisive points by air attack, whether lines of communications (LOC) or vital logistics, actual combat forces or other interdiction targets achieves much the same effect as if overrun by a friendly ground advance. Aerospace maneuver may not permanently gain and hold territory, *but the value of terrain is not constant and the persistent application of aerospace power against critical targets usually results in permanent disruptive effects being maintained on the enemy.*

As an aerial maneuver force, it is incorrect to think of counterland operations as "flying artillery." Counterland assets have much greater range and targeting options, can adapt to changing situations while en route to the target area, can retarget based on onboard or offboard information updates, can fight their way through enemy defenses, and can orbit over a given area while reconnoitering for targets of opportunity. Aerospace power's reach enables an entire theater's counterland effects to be focused in a small area, if strategy so dictates, or spread uniformly across the theater at whatever depth is required. The airman's perception of depth differs from that of the soldier, in that aerospace power can reach to almost any depth on the battlefield from the close battle area back to and beyond the enemy's heartland. Close air support represents aerial maneuver in direct support of ground maneuver; air attack of ground-nominated AI targets is aerial maneuver indirectly supporting ground maneuver; and air attack of theater wide AI targets is aerial maneuver that either provides general support to the ground force or directly achieves theater objectives. Indeed, in some circumstances ground maneuver may support aerial maneuver by forcing the enemy into a position that is more vulnerable to air attack, which then delivers a vital blow. In those unusual circumstances in which aerospace forces conduct AI in the absence of friendly surface forces, enemy forces are able to disperse and seek cover in a way that complicates the problem for the airman. However, as was shown in Operation ALLIED FORCE, airpower can still create decisive effects and lead to success for the joint force. *What matters is not whether aerospace or surface forces are the decisive element; the key fact is that in most cases* both *aerospace and surface forces will be required in any successful joint operation.*

JOINT CONSIDERATIONS

When discussing the counterland use of aerospace power, it is important to recognize the contribution of the surface components' aviation arms. US Navy and Marine Corps assets can be used for both AI and CAS, with the Marines viewing support to their own ground forces as the primary task for Marine aviation. US Army scout and attack helicopters, while lacking the speed and range of fixed-wing assets, are also capable platforms for the AI and CAS missions. Air- and surface-launched cruise missiles can also be employed for interdiction, as can the Army tactical missile system (ATACMS). In multinational coalitions, air forces from allied nations will usually be available for counterland employment. Such forces are normally employed under a combined force air component commander (CFACC).

Regardless of which Service the assets come from, the counterland effort is guided by a single air component commander (ACC) and

The effects of air interdiction: the photo sequence on the left shows a strafing attack on a German halftrack; the photo on the right shows German armor destroyed by air attack.

On 7 August 1944, the German Army launched operation Lüttich, a five-division armored counterattack against the rapidly advancing Allied armies in the vicinity of Mortain, France. While friendly ground forces fought a slow withdrawal, rocket-equipped Royal Air Force Typhoons and other fighters flew several hundred sorties against the advancing Panzers. Although the fighting lingered on for a few days, the heavy losses suffered by the German forces at the hands of Allied airpower decided the outcome in the first several hours. The German Seventh Army's war diary stated: "The attack has been brought to a complete standstill by unusually strong fighter-bomber activity. The actual attack has not made any progress since 1300 hours because of the large number of fighter-bombers and the absence of our own Air Force." The reference to the absent *Luftwaffe* was a direct result of Allied air superiority, which allowed our own fighters complete freedom to attack and paralyze German ground maneuver while preventing interference from enemy aircraft. General Eisenhower recognized the contribution of airpower in the Mortain battle with the following dispatch: ". . . The result of this strafing was that the enemy attack was effectively brought to a halt, and a threat was turned into a great victory."

Craven & Cate, *The Army Air Forces in World War II, volume III*

Dwight D. Eisenhower
Report by the Supreme Commander to the Combined Chiefs of Staff on the Operations in Europe of of the Allied Expeditionary Force

directly supports the overall joint campaign. *Centralized command is a fundamental tenet of aerospace power and must be followed to guarantee the concentration of aerospace power where it is needed most.* Theaterwide or joint operations area (JOA)-wide air interdiction is normally carried out by the JFACC, as the supported commander for such operations, and in direct support of the JFC's overall theater objectives. This is a functional responsibility which seeks to engage the enemy across the theater wherever valuable AI targets are found (to include inside a surface area of operations). AI used in this fashion tends to have the greatest overall effect on the enemy, but the results may be delayed in comparison with AI employed closer to the ground battle. If theater objectives dictate, air interdiction may operate in support of a particular portion of the theater where it is more closely integrated with the ground battle. This form of air interdiction may strike targets that are nominated through the joint targeting process by either the air or ground component and often produces results visible to the ground commander more quickly than a theaterwide air interdiction effort. These results also tend to be smaller in scope and shorter in duration. The most detailed integration of air and ground components is found in close air support where the air attack and ground battle are essentially a single cohesive operation. Proper integration of counterland and ground operations is vital to the success of both, and the synergistic effect of integrated operations is often much greater than the sum of individual air and ground operations. *This will especially be true if a single, integrated joint operations plan is employed instead of attempting to synchronize individual plans developed by the various components.*

COUNTERLAND RESOURCES

Aerospace power offers the capability to deliver lethal and nonlethal combat power against the enemy, when and where needed to attain objectives across the range of military operations. *Its flexibility, range, speed, lethality, precision, and ability to mass effects at a desired time and place contribute significantly to the joint campaign.* Predominant weapons systems and forces that aerospace power can contribute to counterland include aircraft with air-launched or air-released munitions or mines, standoff missiles and rockets, electronic warfare (EW) systems, airborne and space-based platforms for detection and navigation, and SOF.

The close air support mission within counterland is conducted by fixed- and rotary-wing aircraft against hostile targets in close proximity to friendly forces. *Employing munitions near friendly forces requires that CAS have certain capabilities to be effective and to preclude fratricide.*

Because CAS normally requires positive control through the terminal phase of the attack, reliable and interoperable communications with the supported force are essential. The variety of targets likely to be encountered (day or night and in adverse weather conditions) makes it important to be able to employ a variety of weapons and delivery systems. Reliability and accuracy are both critical in the CAS environment, due to the close proximity of friendly ground forces. *Aircrews and terminal controllers must train often to retain mission currency, preferably training with the actual units they would be called on to operate with in combat.*

Airpower's ability to employ precision-guided munitions (PGMs) against counterland targets offers some significant advantages over other weapon systems. Guided weapons can correct for many ballistic, release, and targeting errors in flight, yielding much higher probability of a direct hit compared with unguided ordnance. Explosive loads can also be more accurately tailored to the target, since planners can assume most bombs and missiles will strike in the manner and place expected. The increasing availability of precision, penetrating weapons, combined with accurate and timely intelligence and weather information, gives air forces the ability to strike at high-value, hardened, point targets with a high probability of success. The decision to use such precision weapons should balance the need for high accuracy with often limited munitions availability. The use of such weapons places high demands on intelligence capabilities to identify key nodes and provide precise target locations. In many situations the employment of "massive firepower" against area targets, using large numbers of accurate but not precision-guided weapons, can ensure more uniform target coverage and maximize physical and morale effects on the enemy. Standoff precision weapons used in CAS will require special considerations for munitions reliability and targeting accuracy and will not likely be recommended for troops-in-contact situations. No PGM is guaranteed to hit its target 100 percent of the time, and the non-ballistic nature of many PGMs means that *miss distances when they do fail to guide properly can be many times the expected miss distance of unguided munitions*. This increased miss distance may be a consideration in high-risk collateral damage situations or when determining which weapons to employ for CAS, especially in troops-in-contact situations.

Against a mechanized enemy force, which places most of its combat power in various types of vehicles, the widespread use of PGMs may offer advantages not previously available with unguided weapons. However, precision attack of key infrastructure, transportation, and C2 targets can cripple the enemy army's ability to maneuver, and is usually a better use of limited PGM assets than attacking the enemy one vehicle at a time. If the number of PGMs and aircraft available is high enough, counterland operations can inflict devastating losses on a mechanized enemy force through the simple expedient of vehicle-by-vehicle destruction. *Such a strategy must be considered both in terms of number of weapons required and the possible existence of more lucrative target sets and the time required to destroy enough of the enemy force to be operationally effective.*

Whether attacking the enemy's tactical supporting infrastructure, or directly attacking their fielded forces, the widespread use of modern precision weapons has radically increased aerospace power's ability to neutralize enemy ground forces. Since precision-guided bombs and missiles now reliably hit within a few feet of the aimpoint, aerospace warfare has evolved from an era when it took many aircraft to destroy a single target to the point where a single aircraft can destroy multiple targets per sortie. It is now possible to conduct parallel, asymmetric attacks on many parts of the enemy army in a short period of time, perhaps even simultaneously. While attacking enemy ground forces with aerospace power might be considered symmetric warfare since it is still force-on-force, it is certainly asymmetric compared with surface force-on-force combat. Aerospace power's much greater speed and range, coupled with its ability to maneuver in three dimensions, makes enemy ground forces vulnerable to simultaneous attack across the width and depth of the battlespace. *This vulnerability can be exploited to physically destroy key parts of the enemy army and leave the rest so shocked, disrupted, and disconnected as to be operationally useless.*

Although technology has reduced their impact, weather and other environmental conditions can still adversely affect counterland operations. Some forms of severe weather can interfere with the ability of aerospace power assets to reach their targets. Many precision-guided weapons still rely on line-of-sight to the target for employment; conditions such as fog, undercast, or battlefield obscuration can prevent visual contact and disrupt weapons delivery. The adverse effects of weather can be reduced through a combination of weapons that do not require optical guidance, such as global positioning system (GPS)-assisted munitions, and the use of nonvisual sensors such as radar to aid the weapons delivery process. Space-based assets provide critical planning information on forecast weather conditions during the attack window, which allows counterland planners to predict when and where weather will be a factor. *Modern systems have, however, provided a night attack capability that is often equal to daytime in terms of target detectability and precision attack accuracy.*

Night attack capability for counterland has progressed from the flares used in World War II and the Korean War to modern infrared systems such as the low-altitude navigation and targeting infrared for night (LANTIRN) pods on this F-15E Strike Eagle. Improving technology has removed much of the night/adverse weather interdiction sanctuary of formerly exploited by enemy surface forces.

COMPLEMENTARY OPERATIONS

Counterland operations are most effective when planned and conducted in a synergistic manner with other planned and ongoing air, land, sea, space, information, and special operations. Other missions or operations which can significantly contribute to the effectiveness of air interdiction and close air support include the following:

Counterair

Air superiority is essential for the success of all other operations, as it provides both the freedom to attack and freedom from attack. It may range from theaterwide air supremacy to the localized negation of enemy offensive or defensive air and missile systems. Though it is possible to conduct counterland operations without control of the air, such operations would likely be both costly and ineffective. CAS, which takes place in close proximity to enemy units, is particularly vulnerable to enemy air defenses. Even with modern datalink technology, CAS tends to be very intensive and reduces the aircrew's ability to detect and react to threats. The prerequisite of local air superiority is one of the differences between close air support and organic artillery support that air and surface commanders must be aware of. *The risk of conducting* *counterland operations prior to achieving air superiority must be balanced with the threats posed by the enemy air and surface forces; such operations will normally be reserved for those targets that represent immediate and critical danger.*

Stealth technology offers a means of minimizing much of the enemy air threat when air superiority is in dispute and may allow some counterland operations even in the face of heavy enemy air defenses. Modern **multirole fighters** have significant air-to-air capabilities even while carrying a full air-to-ground weapons load and, in effect, carry their own bubble of local air superiority with them. Whether stealth or self-escorted fighter, however, such attack assets are likely to be prioritized against counterair targets until air superiority is achieved, so only the highest priority counterland targets will be attacked during this phase of the campaign.

Strategic Attack

Strategic attack and counterland operations complement one another through their synergistic effects. Strategic attack operations directly target enemy centers of gravity such as command and control, munitions or energy production, weapons of mass destruction, and other war-sustaining capabilities. Strategic attack operations have also been used to directly target the enemy's will to fight, but this has historically proven difficult to accomplish. *Strategic attack disrupts or destroys such targets at the source, while counterland is normally directed against fielded forces and their supporting infrastructure in the field.* Where strategic attack directly achieves theater objectives, it should receive the highest priority for aerospace power after achieving the required level of air superiority. In many cases strategic attack can complement other operations by crippling the enemy's ability to fight without being able to directly force an enemy surrender. Under these circumstances, the enemy war effort will be further strained by losses in their fielded forces through counterland operations; their forces will be made more susceptible to disruption because of the effects of strategic attack; and their losses in both combat and support forces will be more difficult to replace. In some cases, fielded forces by themselves can be considered targets for strategic attack. When a specific portion of the enemy's military is considered an elite force, with special military or political value, its destruction or disruption may lead directly to strategic results.

Space

Space operations enhance counterland operations throughout the theater. Counterspace operations ensure continued friendly space support and deny an adversary support from space. Space systems provide capabilities for C2; sea, land, and space surveillance; intelligence collection; tactical warning and combat assessment; navigation and targeting; global geospatial information and services; and environmental monitoring.

Intelligence, Surveillance, and Reconnaissance (ISR)

ISR serves a vital role in the planning and prosecution of counterland operations. Surveillance information about the enemy's LOCs, tactical dispositions, and capabilities is imperative. Accurate and timely intelligence provides information about the enemy's probable courses of action, identifies interrelated target systems and critical nodes, and enhances the commander's ability to anticipate enemy actions or counteractions and respond accordingly. Accurate intelligence assists commanders in developing achievable objectives, selecting appropriate targets, applying the appropriate weapon and delivery systems, and keeping abreast of the enemy's response. Rapidly changing threat and target environments require responsive ISR systems capable of quickly collecting, processing, and disseminating data. Unlike strategic attack operations, counterland targets often present fleeting opportunities when exceptionally effective results can be obtained through air attack. This makes rapid analysis and dissemination of target intelligence important for success. In the post attack environment, reconnaissance and intelligence elements provide assessment of the level of success in achieving the desired level of damage against the selected targets/systems. Such information is vital in determining the necessity and timing for follow-up strikes against these or other opportune targets.

Information Operations (IO)

Information operations include both information warfare and information-in-warfare. The latter includes the use of information to assess and target enemy vulnerabilities through conventional means, while the former involves directly targeting key enemy information (and protecting our own information from the same). The vulnerability of an enemy army to information attack will depend on a host of variables such as level of technology, redundancy, hardening of information systems, etc., but it should be considered along with conventional attack when developing counterland strategy. Another part of IO is determining if certain targets within the enemy's fielded forces should remain untargeted due to their value to intelligence collection. The intelligence value thus collected must be weighed against the value of such targets to the enemy's forces. When the intended target of information operations is the enemy ground force, then IO becomes a fundamental part of the overall counterland effort.

Special Operations

Special operations forces from the various Services complement and support conventional counterland operations by providing such assistance as intelligence, terminal attack control, terminal guidance for PGMs, and post attack assessment; or SOF may act independently when the use of

Air refueling is a key part of most air component operations and extends the range, payload, and endurance of counterland assets, thereby increasing their effectiveness. In some cases, counterland missions would not be possible at all without air refueling capability. As this DESERT STORM photo of an Air Force KC-135 refueling Marine F-18s demonstrates, air refueling is a key factor in all air component operations, whether US Air Force, other Service, or allied nation forces are involved. Air refueling is a key enabler to initial force deployment as well, since most counterland aircraft lack the range to deploy directly to or from the combat theater on their own.

Air Refueling—A Critical Enabler

conventional forces is inappropriate or unfeasible. SOF may employ such weapon systems as fixed- or rotary-winged gunships for their specialized sensors and weapons effects.

ELEMENTS OF EFFECTIVE COUNTERLAND OPERATIONS

Effective counterland operations depend on the integration of numerous elements, which form the core of any effective aerospace operation. In addition to those complementary functions discussed above, other elements which facilitate the successful conduct of both AI and CAS include seizing the offensive, sustained and concentrated pressure on the enemy, exploitation of the psychological effects of aerospace power, and force structure/weapons capability. The relative importance of each varies with the combat scenario; however, all should be present to allow the operation to achieve its aim.

Counterland operations should be designed to seize the initiative and force the opponent to react. As part of an overall joint strategy, such attacks should be employed in space and time to mass their effects on the enemy. This does not necessarily mean a physical massing of forces, but rather a carefully planned massing of effect against the key nodes or forces within the enemy army. CAS is often directed against strong defensive positions, concentrations of enemy troops, suspected ambush sites, and other centers of resistance. It should therefore be concentrated in sufficient strength to achieve initial objectives and be continued until friendly surface forces are in command of the situation. Massing effects is more efficient than employing assets piecemeal, and physically massing forces to overwhelm enemy defenses can minimize overall losses. *However, the precision and lethality of aerospace power now affords the ability to mass effects rather than platforms and conduct parallel attacks on entire target systems with only one or two platforms per target.*

Two key characteristics of successful counterland operations are sustained and concentrated efforts. AI, especially, demands sustained, persistent action. Persistence is a critical element in ensuring the prolonged effect of both missions. Eventually, even the most prolonged effects of air attack may potentially be circumvented by resourceful enemies. Effective employment of ISR assets provides critical information to the JFACC on the results of the opening attacks and on the effect achieved over time by the aerospace operation as a whole. Such information will be used in reattack decisions and in deciding when to attack follow-on targets while the enemy attempts to recover from the original attacks. Interdiction is often directed against replaceable systems (vehicles; weapons; petroleum, oil, and lubricants (POL); communications systems) and repairable systems such as bridges or railroad lines. Therefore, pressure should be sufficient to impede efforts to replace or repair affected targets and cause stress on the entire enemy operation. This requirement applies particularly to operations of long duration, because time normally allows the enemy to restore losses. Attacks on key repair and replacement assets may be advisable if such targets represent the weak link in the enemy's support infrastructure. *Concentrating the effects of counterland operations against critical targets is essential due to the generally limited numbers of AI- and CAS-capable assets.*

The psychological effects of counterland operations can have a significant role in achieving the overall campaign objectives. The precision, intensity, and persistence of air attack can demoralize governments, populations, and military forces. The ability of aerospace power to achieve its effects through psychological impact will likely remain limited. However, the synergistic effect of the psychological element, along with the destruction of resources, infrastructure, and the impact on enemy forces in the field, combine to give the air component a pivotal role in achieving the overall goals of any joint campaign. *The psychological shock of massed air attack can be overwhelming to the enemy's fielded forces, especially when those forces have already been strained by surface combat.*

The JFACC's ability to successfully conduct counterland operations depends greatly on the available type and quantity of aerospace assets. Precision weapons delivery, stealth characteristics, and destructive power, combined with the inherent capability of the air component to mass effects against a given objective, can provide a substitute for absolute numbers. The principles of mass and economy of force must be followed to ensure that adequate force is available to achieve the desired effects. Numbers and types of munitions available, as well as those in the logistics pipeline, need to support the requirements generated by intense air operations. The munitions mix must correspond to the selected targeting strategy, and vice versa. Precision munitions are uniquely valuable in attacking hardened point targets or for minimizing collateral damage, while weapons with a standoff capability may allow delivery platforms to remain outside the most heavily defended areas. However, weapons loads and fuze settings should be tailored to the desired level of target destruction, neutralization, or suppression. They should be weighed against possible adverse effects on other components, such as the employment of time-delayed munitions against an enemy retreating in front of advancing friendly forces. Though many platforms may be employed in the AI and CAS roles, some are better suited for each mission from both a training and equipment standpoint. Commanders should carefully assess the desired munitions effects in light of the potential for fratricide.

TENETS OF AEROSPACE POWER

In closing this section on general counterland considerations, it is worth examining the tenets of aerospace power with a specific counterland focus:

Centralized Control and Decentralized Execution

Since counterland operations effect the enemy across the entire theater, they must be centrally planned with theater-level priorities involved. The flexible nature of aerospace power allows it to be concentrated wherever counterland effects are needed, and it can shift as needed by air, ground, or overall campaign requirements. Decentralized execution is also essential, so that air support operations centers (ASOCs) and airborne battlefield command and control centers (ABCCCs) as well as individual mission and flight leads have the flexibility to accomplish their tasks. Decentralized coordination between air and ground units for CAS execution, once the centralized apportionment and allocation process has been accomplished, is also required for timeliness. Once CAS missions have been allocated to support the ground force, the ASOC should have the authority to distribute and task allocated CAS missions based on the ground commander's guidance and intent. Battalion-level (and occasionally brigade-level) tactical air control parties (TACPs) communicate directly with CAS aircraft and provide the real-time terminal control needed for mission success.

Flexibility and Versatility

Flexibility allows counterland assets to focus their effects where and when required to achieve optimum results. This may entail continual changes in both the breadth and depth of counterland targeting, and keys on rapid assessment of changing conditions across the theater. In general terms, counterland should stay focused on those portions of the enemy land force that represents the greatest threat to friendly strategy. *Versatility allows the use of counterland assets in many different roles, from CAS to both shallow and deep AI.* This frees the JFACC to continually adjust the weight of effort as required. Flexibility in employment of CAS missions is most effectively exercised through the ASOC or ABCCC. These decentralized C2 organizations are most capable of making the required adjustments to CAS in the fluid ground battle environment.

Flexibility and versatility also offer aerospace power a means of minimizing the **fog and friction** that accompany any military operation. Aerospace power's speed and range of operations give it unique abilities to rapidly adjust as unforeseen circumstances may require. Retargeting and repackaging air assets is usually much easier than moving ground forces to a new part of the battlefield when operational plans change due to friction or the inevitable fog of war.

Synergistic Effects

Counterland operations often produce much greater results when integrated with other efforts. For example, AI produces the traditional *"commander's dilemma"* by making the enemy choose between dispersing their forces or getting them to the front in time to influence the ground battle. The enemy either loses so much combat strength to air attack that the remainder cannot influence the surface outcome, or keeps more of their army intact through dispersal but it arrives too late to affect the ground battle. In close air support, the value of aerospace power lies both in physical destruction and its disruptive shock effects. Properly coordinated ground advances, during or immediately after heavy CAS attacks, will often find the enemy much less able to resist than if CAS had not been used. When airpower is employed in a counterland role in the absence of friendly ground forces, then the enemy has the option of dispersing forces, and digging those forces in. The resulting difficulty in efficiently attacking those forces highlights the desirability of operating synergistically in an integrated joint operation.

Persistence

Persistence must be a fundamental part of all counterland operations. The success of all forms of counterland, especially long term theaterwide interdiction, requires continued attacks that stay ahead of the enemy's efforts at repairing, bypassing, or circumventing the damage.

The contribution of airpower to the successful invasion of Normandy is captured in these photographs, which show a B–26 over the invasion area and a P–38 engaged in air interdiction to isolate the beachhead from reinforcements

There is perhaps no better example of successful military synergy than the Allied landings in Normandy on the 6th of June, 1944. The enabling effects of naval and air superiority were mandatory first steps, allowing the pre-invasion buildup, cross-channel movement, and post-invasion sustainment to proceed unhindered. Allied airpower began an all-out air interdiction effort in April 1944 to both slow the buildup of enemy forces defending the beaches and to isolate those defending forces from their reserves. Due in part to successful Allied deception efforts which masked the true objective of OVERLORD and in part to the lack of sufficient strength to heavily defend every possible landing site, Field Marshall Erwin Rommel was forced to employ armored reserves that would be brought up only after the invasion had begun. On June 6 the German high command was slow to release these forces, which further delayed their movement toward the beachhead. Massive Allied airborne landings behind the beaches, enabled by air superiority over Normandy, caused further damage and disruption to the initial German counterattacks.

Once the true size of the Normandy invasion force was realized, the Germans tried to move much of their available reserves towards the battle. Their movement was slowed to a crawl, however, by both the heavy destruction of transportation infrastructure and by direct attack on the advancing forces themselves. The Allied landing force was so successful that any delay in getting reinforcements to the front was unacceptable even if it meant exposing those reinforcements to withering air attack. In the final outcome, it took until 18 June for the German Army to move five divisions forward to reinforce the beachhead; by then it was too late to seriously threaten the Allied forces. The German mobilization plan, which assumed an intact transportation network and only minimal interference by Allied airpower, calculated that seventeen divisions should have been able to reinforce the beach defenses within a few days of the landings. In the end the heroic efforts of Allied soldiers, sailors, marines, and airmen all combined to overwhelm the German defenses, and provided one of the Allies' greatest victories of the war.

Operation OVERLOAD—A Classic Case of Military Synergy

Concentration

Concentration of counterland effects is possible in both space and time. Failure to concentrate typically occurs when commanders attempt to spread air component assets too thinly, and lose sight of the theater perspective on where the main effort needs to remain focused. Even if there are enough counterland assets for each ground maneuver unit to receive its own distribution, centralized control enables massing of effects where they are most needed and is more effective than "penny-packeting" aerospace power.

> **During the Tunisia campaign of WWII, the Allies initially divided their airpower among corps and division commanders. These ground commanders maintained strict control of their apportioned air forces, thus negating the Allied airmen's ability to mass against German air attacks across the theater. The airmen's protest to such penny-packeting reached a fever pitch when the Allied II Corps commander denied air support to Free French forces in another sector in order to support one of his own, unopposed, operations. Lacking concentration and employment with a theater perspective, Allied commanders diluted the advantages of airpower, producing minimal effects on the battlefield.**
>
> **Syrett, "Tunisia Campaign, 1942-43"**
> ***Case Studies in the Development of Close Air Support***

Priority

Conflicting priorities will exist at all levels of command, as each level naturally focuses on its own particular task at hand. *Counterland operations, however, must primarily respond to theater-level priorities to avoid dilution to the point of ineffectiveness.* Theater priorities may also require aerospace power to be used for other missions than counterland, especially when assets are scarce.

> ***We do not have to be out-and-out disciples of Douhet to be persuaded of the great significance of air forces for a future war, and to go on from there to explore how success in the air could be exploited for ground warfare, which would in turn consolidate the aerial victory.***
>
> **Major General Heinz Guderian**
> ***Achtung—Panzer!***

CHAPTER TWO

AIR INTERDICTION

> ***The disruption of hostile lines of communication (and at times lines of signal communication), the destruction of supply dumps, installations, and the attack on hostile troop concentrations in rear areas will cause the enemy great damage and may decide the battle.***
>
> **US Army FM 100-20, *Command and Employment of Air Power*, 1943**

GENERAL

Air interdiction, to include both lethal and nonlethal systems, is employed to destroy, disrupt, divert, or delay the enemy's surface military potential before it can effectively engage friendly forces, or otherwise achieve its objectives. Interdiction can significantly affect the overall course of a campaign. It contributes by disrupting the enemy's ability to command, mass, maneuver, withdraw, supply, and reinforce available combat power and by weakening the enemy physically and psychologically. It can also create opportunities for friendly commanders to exploit. The effectiveness of AI, however, is largely dependent on a number of variables. Results against an enemy with minimal logistics requirements, a simple force structure, and primitive logistics systems differ from air interdiction conducted against a highly mechanized, modern force possessing intensive logistics requirements. Interdiction conducted against enemy forces and logistics, without regard to the overall theater situation, may be largely ineffective; thus, planning for interdiction should be closely integrated in the JFC's overall planning process. The time required for AI to affect the enemy, and the duration and depth of those effects, depends on several factors such as the distance between interdiction operations and the location of intended effect, the means and rate of enemy movement (ships, trains, aircraft, trucks), the immediate target (forces, supplies, fuel, munitions, infrastructure), the level of enemy activity, and the resilience of the targeted force or system.

Geography and weather are factors when conducting interdiction operations. Weather and terrain influence the rate of enemy movement and the size of the force to be moved, where it can move, and the means required to move the force. Geography can also determine the selection of weapon systems to interdict the enemy. Adverse weather conditions affect friendly air and surface movement, as well as the ability to attack the enemy. The rate and extent of enemy surface maneuver are influenced by weather conditions that can provide increased air interdiction opportunities (for example, when enemy maneuver is restricted to a few major routes by seasonal conditions, it results in concentrated forces which are more easily disrupted or destroyed). Adverse weather may also hinder the friendly AI effort by making both detection and actual attack of the enemy more difficult. *Current developments are working to reduce the negative effects of adverse weather on aerospace power, much as recent technology has eliminated the sanctuary of night from the enemy.*

INTERDICTION OBJECTIVES

The desired effects of interdiction are to destroy, disrupt, divert, or delay enemy surface forces. It is not necessary for an AI operation to focus solely on a single objective; in fact, air interdiction typically inflicts multiple effects on the enemy. The enemy army that is travelling to the front while under air attack will suffer some level of destruction, and the remaining force will almost certainly be delayed in getting to its destination and will suffer some level of physical and psychological disruption.

Destruction of the enemy surface force is the most direct of the effects of air interdiction. Direct attack of enemy fielded forces has traditionally been more limited than the other effects, mainly due to the difficulty of finding and targeting individual guns or vehicles. *Modern sensor and weapons technology is changing this picture, however, and direct destruction of enemy forces is becoming a more viable option for air interdiction.* As available assets will likely remain limited, however, the fact that direct attack is possible does not mean that direct attack is always the most efficient approach. The number and vulnerability of enemy fielded force components, along with the enemy's ability to replace their losses, must be weighed against the expected results of targeting the supporting infrastructure. Direct destruction of enemy forces has an immediate impact on enemy combat power, which is an advantage over infrastructure attack that may produce delayed results, but direct attack usually requires more assets due to the larger number of individual targets. Modern surface weapons, particularly those used by mechanized forces, are very sophisticated and expensive. The enemy may not be able to rapidly replace their losses; and under such circumstances, destroying tanks and artillery

The B-52 Stratofortress was originally designed for intercontinental strategic attack, but it has been successfully employed for both air interdiction and close air support. In DESERT STORM the physical and psychological effects of B-52 attacks were both found to have greatly affected the Iraqi forces that were attacked, with some units surrendering to US forces strictly because they had observed neighboring units being attacked by B-52s.

pieces may produce more payoffs than destroying repairable targets such as bridges. However, targeting critical LOCs may cause the concentration of enemy fielded forces, which in turn makes them more vulnerable to direct attack. *A direct attack strategy tends to produce intense localized results with fewer disruptive effects across the entire enemy army. Psychologically disruptive effects, however, may prove to be an added benefit.*

Disruption of enemy surface forces can be accomplished in a number of ways. A key part of the interdiction planner's task is to analyze the enemy army for key vulnerabilities that, if attacked, will have a disruptive effect across significant portions of the enemy force. *The presence of such targets, and our ability to attack them, will often determine whether disruption or destruction will be the primary effect mechanism planned for the air interdiction effort.* This can include traditional supply targets such as ammunition or POL, LOCs used to transport the enemy force into combat, C2 systems that the enemy army requires to fight effectively, or anything else that the enemy force depends on for success in combat. In analyzing the enemy, considerations include what reserves or workarounds the enemy has available, what time delay can be afforded before the effects must impact the enemy, what doctrine and strategy the enemy is expected to employ, and what the actual battlefield situation is. Another way to neutralize the enemy surface force is to affect the morale of its troops, which has historically been a strongpoint of using airpower. As the same infrastructure that supplies ammunition and fuel usually provides food, water, and contact with home, morale effects are often created when this infrastructure is attacked.

Diversion and delay are often by-products of destruction or disruption. If part of the enemy surface force is destroyed, the enemy's efforts to avoid having the rest of his force suffer the same fate will often result in long delays or an outright halt to their movement to contact. Enemy forces that become disrupted or diverted to a longer line of communication will be delayed in reaching the close combat zone and may become more vulnerable to destruction themselves. The ultimate form of delay is the *halt* in which an advancing enemy force is not just delayed but is completely prevented from advancing to its objective. How effective the delay is in achieving friendly objectives depends on how long the delay lasts and how much delay the enemy can afford. *Of the possible effects of AI, delay is the most dependent on coordination with the ground scheme of maneuver since success or failure rests on winning the ground battle before the enemy forces finally arrive.*

TYPES OF AIR INTERDICTION MISSIONS

There are several types of air interdiction missions that can be flown, each is influenced by a variety of factors. *Unless dynamic targeting requires otherwise, preplanning of the attack should always be accomplished to allow for proper weapon-target combination, target area tactics planning, threat avoidance, weather study, and other variables that maximize the probability of target destruction with minimum losses.* Attacking mobile or short-notice targets may provide a more flexible response on the battlefield, but the chances of each specific attack being successful are reduced and higher friendly losses may be expected. *Modern technology such as real-time datalink and digital imagery in the cockpit may reduce, but not eliminate, this factor.*

Preplanned AI is the normal method of operation. This mode is used to hit specific targets that are known in advance, and detailed intelligence information is available to support strike planning. Preplanned attacks are normally flown against fixed targets or against mobile targets that are not expected to move in the interval between planning and execution (revetted tanks are one example). Target information for preplanned AI can come from sources that vary from overhead reconnaissance to ground-based special operations forces.

There are several types of nonpreplanned, or "flexible," types of AI missions. *Armed reconnaissance, also known as "armed recce" and "road recce," is a form of AI that is planned against a particular area, rather than a particular target.* The area may be defined by a box or grid, or may be defined as a stretch of an LOC such as a railroad, highway, or river. When specific killboxes are used for this purpose, the mission is sometimes known as "killbox AI." *Armed reconnaissance is normally flown into areas where lucrative targets are known or suspected to exist, or where mobile enemy surface units have moved to as a result of ground fighting.* In cases where a specific area to search for enemy AI targets cannot be predetermined, missions may be flown in an *airborne alert* or *on-call* status. The appropriate C2 agency provides guidance to a specific target, a killbox or other type of coordinating measure to perform armed reconnaissance, or clearance to proceed to a backup target if available. All nonpreplanned missions will normally be given a target priority list or other guidance defining which targets to attack for greatest disruption of the enemy. This set of target priorities may be available prior to takeoff, or may be passed in flight by an appropriate C2 agency such as an ASOC or ABCCC. *When flexible AI is flown in direct support of the ground component, the target priorities should reflect those established by the ground component and communicated via the battlefield coordination detachment (BCD) or the theater air-ground system (TAGS).*

Real-time targeting is emerging as a viable means of attacking time-critical targets using AI assets. Often flown from an airborne alert status, this form of AI may rely on an offboard sensor such as the joint surveillance, target attack radar system (JSTARS) to provide initial target detection and attack targeting information. Response time can be as short as a few minutes, depending on the distances and C2 arrangements involved. As with all alert missions, the sortie will be less useful if no lucrative targets appear during the assigned alert period. Real-time targeting can also be used with more conventional AI sorties, where a known target exists but real-time target updates are passed to inbound missions for final refinement. This option may work well for attacking enemy ground forces on the move in the enemy rear area, especially if prelaunch target coordinates/location requires updating. Real-time targeting of AI missions, especially those flown short of the fire support coordination line (FSCL), provides a more responsive use of counterland attack when supporting the ground component and allows airborne assets to quickly exploit enemy vulnerability that may be of limited duration. A downside of all nonpreplanned, dynamic targeting counterland missions is an overall reduction in probability of killing the target. Preplanned missions allow aircrews more time to study the target imagery and to align attack axes to optimize weapons effects. Detailed study can reduce threat exposure and allow mission planners to optimize the weapon's fuzing for maximum effect. Preplanning allows better packaging of strike and support assets when required. *The bottom line for dynamic targeting of airborne assets is that it should be used in those cases when the need for a short reaction time outweighs the reduced effectiveness that is likely to result when compared with preplanned operations.*

ELEMENTS OF EFFECTIVE AI OPERATIONS

In addition to the counterland elements discussed previously, there are particular considerations that are especially applicable to air interdiction operations. These include the elements normally required to successfully prosecute AI operations (integration with surface maneuver and effective C2 systems) and those desired effects of typical interdiction operations (channeled enemy movements, high rates of consumption, logistics constriction, and time-urgent movement). *To what degree each element contributes to the operation varies with the nature of the conflict, geographic location, weather, and characteristics of the enemy.*

An important factor in optimizing air interdiction operations is the integration of aerospace maneuver with surface maneuver. *Planning and conducting AI and surface operations within a coherent framework enhances their synergistic effect, in those operstions involving both aerospace and surface forces.* Proper integration can create a dilemma for the enemy commander as he reacts to the resulting combined and complementary effects. If the enemy counters surface maneuver through rapid movement or massing of forces, losses from air attack (due to reduced concealment, greater detectability, and increased predictability) may become unacceptable. Conversely, measures required to minimize losses from AI leave the enemy more susceptible to defeat by friendly surface forces. Surface combat can place sustained pressure on the enemy, enabling air attack to destroy enemy forces and assets at a faster rate than they can be repaired or replaced. Ground maneuver can also affect target systems to facilitate their acquisition and attack by AI forces. Actual or threatened ground advance can force an enemy to respond by attempting rapid maneuver or resupply. *Close coordination among all components will help maximize enemy vulnerability to air interdiction.*

Mission-type orders allow for the optimum employment of aerospace forces by maximizing effects and increasing employment flexibility. For example, the JFC may direct theater-wide interdiction of all enemy second echelon forces. The JFACC will then conduct a dynamic interdiction effort against advancing second-echelon forces as the operation unfolds, with specific targeting guidance being developed at the component or even tactical level. In another example, the land component commander might indicate to the JFACC that delay or disruption of a particular enemy ground force is the highest priority for air support. The JFACC can then determine the best way to achieve those desired effects of delay or disruption, since he has the best means for determining how to attack the enemy with aerospace power. Surface commanders request-

During World War II, light and medium bombers such as this A-20 HAVOC were often employed against enemy LOCs. These attacks achieved the dual effects of delaying the enemy's advance and channelizing their movement, which in turn made them more concentrated and vulnerable to follow-on attacks. LOC interdiction proved especially valuable during the Normandy campaign, when German reserve forces were effectively kept out of the battle by sustained air interdiction.

ing supporting AI should clearly state how it will enable or enhance their operations, listing both the desired effects and effects to be avoided. The latter might include effects such as destruction of LOCs critical to the ground scheme of maneuver. *Airmen at the tactical and operational levels, especially those in the field advising the ground component on proper use of aerospace power, can facilitate the commander's intent process by ensuring that air support requests clearly state the desired effects.*

Channeled enemy movements generally result from the lack of multiple transportation routes, artificial or natural obstacles, and other geographical constraints. The fewer the routes to handle enemy supplies and reinforcements, the greater the loss or delay caused by severing those routes. Attacks on enemy lateral LOCs can channel movement, impair reinforcement, reduce operational cohesion, and create chokepoints with lucrative, highly concentrated targets.

Heavy ground combat creates demands on enemy fielded forces and speeds consumption of vital war materiel. This in turn increases the effects of air interdiction operations by straining the enemy support system and reducing stockpiles. For surface combat to take place, soldiers and their weapons, ammunition, food, and communications must get to the battle. When the enemy consumes large quantities of supplies because of heavy combat or extensive movement, interdiction operations have an accelerated impact for two reasons. First, when opponents are under heavy pressure, they may be forced to use up stockpiles reserved for ongoing or future operations. Inability to stockpile supplies makes it more difficult for the enemy to initiate large-scale offensive operations. Second, high consumption drives an enemy to use more direct routes, making them more vulnerable to interdiction attacks. The nature of ground combat also determines which supporting elements are most critical at any given time, as which items of supply and infrastructure are critical can vary greatly with the situation. *Historically, an enemy army fighting under static conditions is more affected by the destruction of munitions, while a highly mobile enemy is more disrupted by the loss of fuel and transportation.*

The less surplus capacity the enemy's logistics system has, the less it can compensate for damage to tactical stockpiles of critical materiel. Degrading the mobility of the enemy's distribution system hinders their ability to redistribute assets to effectively counter friendly operations. In many cases, the enemy will use the same transportation system for both forces and supplies. Under such circumstances, destroying or degrading the enemy's LOCs will impact both their force mobility

Airpower assets like this E-8 Joint STARS were key in achieving the results depicted in the lower photograph.

During the evening of 29 January 1991, the Iraqi Army set elements of three divisions in motion out of their static positions in occupied Kuwait. While their ultimate objectives are not known, there is no question that all three advances were aimed at engaging coalition forces, with the largest ground battle developing in the Saudi town of Ra's al Khafji. As news of the initial contacts with Iraqi ground forces flowed into the air control center at Riyadh, additional sorties by E-8 JSTARS surveillance aircraft and fighters armed for air interdiction were ordered.

While JSTARS located, tracked, and provided vectors to the columns of advancing Iraqi vehicles, flights of fighters, bombers, attack aircraft, and attack helicopters from all of the Services closed in for the kill. Close air support was flown in and around Khafji itself in support of engaged coalition ground forces, resulting in heavy losses to the Iraqi 5th Mechanized Division. Further north, the other two lines of Iraqi advance suddenly found themselves very exposed, with their own movement serving only to highlight themselves as targets. Coalition air interdiction missions took full advantage of this, using a variety of night vision devices and precision guided munitions to inflict even greater damage and stop the Iraqi advance. After losing hundreds of vehicles and thousands of casualties, the Iraqis abandoned the attack as a costly failure and resupply capability. When analyzing an enemy transportation network for importance to their overall strategy, all possible uses for such a system must be considered. *Before the decision is made to interdict the enemy's transportation network, it must be analyzed for surplus capacity and reconstitution capability. Failure to do this has sometimes led to large-scale AI efforts that had little real chance of success.*

The enemy transportation system itself must also be broken down into components when analyzing for weaknesses to attack. Most transportation systems consist of the actual conduit for travel (roads, rail, etc.), vehicles used to transport troops or supplies along the conduit, energy required for those vehicles to operate (typically POL or electricity), C2 to run the transportation system, and repair facilities to keep the system operating. The loading and unloading points in the transportation system may prove especially vulnerable, as large concentrations of enemy forces or supplies are often found there. If these forces or supplies are critically needed at the front, the enemy may not have the luxury of dispersing them during loading or unloading, which increases vulnerability to attack.

A thorough assessment of the enemy's ability to reconstitute or work around air interdiction damage is vital to success.

The enemy may attempt time-urgent movement for several reasons. They may need to achieve surprise, to attack before friendly reinforcements or supplies arrive, to rapidly reinforce threatened defensive positions, or to exploit offensive operations. Under these conditions, the enemy has a strong incentive to attain specific objectives within tight time constraints. Such rapid movement of enemy forces and supplies makes them more vulnerable to air attack, as they generally become more concentrated and vulnerable while in transit, often foregoing time-consuming camouflage and concealment efforts. Just the fact that troops or supplies are in motion makes them more vulnerable to modern airborne sensors. For friendly forces to capitalize on such opportunities, the enemy must be denied mobility when they need it most. Friendly forces must take full advantage of all reconnaissance and surveillance assets, from air- and space-borne sensors to SOF teams, to detect when these movements occur. *Coordination is required among all forces to take full advantage of the situation in the time provided; otherwise, the enemy may escape the desired effects of air interdiction.*

C2 systems include both the communications and computer systems required to implement the command and control process and play a critical role in the processing, flow, and quality of data supporting information requirements throughout the joint force. C2 systems complement the planning, execution, and sustainment of successful air interdiction operations. The enemy's combat operations may be disrupted with attacks on their own C2 nodes; the level of C2 disruption must be commensurate with overall objectives. C2 attacks may seek complete isolation of enemy combat forces from higher headquarters, or such attacks may force the enemy to use less capable, less secure backup communication systems that can be more easily exploited by friendly forces. When the enemy employs a rigid, top-down command and control doctrine, they can be particularly vulnerable to the disruptive effects of C2 interdiction. This is especially true when the enemy has not had a long preparation period to exercise their plan, or when the conflict has moved beyond the initial stages. Conversely, an enemy that practices a high degree of C2 autonomy will likely be less affected by attacks on their C2 network. When the ground situation has been static for long periods prior to the campaign, chances are greater that the enemy has planned and trained for either offensive or defensive operations. Under such circumstances, attacks on enemy C2 are less likely to have significant effects as the enemy is still able to react in a scripted manner. Once enough time has elapsed for events to overcome a preplanned enemy response, attacks on command and control will impair their ability to respond and pay larger dividends on the battlefield. In some circumstances, such as when the operations plan includes forcing the enemy to react to friendly maneuver, complete destruction of their command and control architecture would be counterproductive. *The capability to affect the enemy through nonlethal information operations must also be considered, as this approach may lead to better overall results while freeing up conventional attack assets for other forms of air interdiction.*

Persistence is also required for most air interdiction efforts to succeed. Success or failure often comes down to the balance between the enemy's ability to repair the damage versus friendly ability to inflict more damage to the system being interdicted. Sustained pressure can be applied at the source (through strategic attack), at the delivery end (on the battlefield), and through AI against the forces and infrastructure in between.

SUMMARY

Air interdiction represents a flexible and lethal form of aerospace power that can be used in various ways to prosecute the joint battle. However employed, certain principles such as centralized control/decentralized execution must be followed to achieve maximum effectiveness with minimum losses. Whether supporting a ground offensive by attacking ground-nominated targets or decisively halting an enemy advance with theater-wide air interdiction, AI provides a powerful tool for defeating the enemy ground force. To be employed in a fashion appropriate to its capabilities, *air interdiction must be viewed as a form of aerial maneuver, coequal to ground maneuver, in both the planning and execution stages of the joint campaign.*

Experience shows that certain key conditions tend to produce favorable air interdiction results. While not advocating a "checklist" approach, the following can be considered either vital enablers of AI or required conditions for success in most AI operations:

- ✪ Air superiority.
- ✪ Targets exist that are both critical to the enemy and vulnerable to attack.
- ✪ Sustained pressure from ground combat, continued air attack, or both.
- ✪ Logistical constriction (due both to reduced supply and high consumption).
- ✪ Concentration of effect.

CHAPTER THREE

CLOSE AIR SUPPORT

CAS produces the most focused but briefest effects of any counterland mission; by itself, it rarely achieves campaign-level objectives. However, at times it may be the more critical mission by ensuring the success or survival of surface forces.

AFDD 1

CLOSE AIR SUPPORT OBJECTIVES

CAS provides firepower in offensive and defensive operations, day or night, to destroy, suppress, neutralize, disrupt, fix, or delay enemy forces in close proximity to friendly ground forces. For CAS to be employed effectively, it should be applied against targets that present the greatest threat to the supported friendly surface force. Almost any enemy threat in close proximity to friendly forces on the modern battlefield is suitable for CAS targeting. However, indiscriminate CAS application against inappropriate targets decreases mission effectiveness, increases the risk of fratricide, and may increase the attrition of attack aircraft to an unacceptable level. Although there is no single category of targets most suitable for CAS application, mobile targets and their supporting firepower (in general) present the most immediate threat to friendly surface forces and thus are prime candidates for consideration. This is especially true when supporting light forces, such as airborne or amphibious units, since they are not able to bring as much organic heavy firepower into battle as heavier mechanized or armored units. *CAS provides the surface commander with highly mobile, responsive, and concentrated firepower. It enhances the element of surprise, is capable of employing munitions with great precision, and is able to attack targets that are inaccessible or invulnerable to surface fire.*

The success of both offensive and defensive operations depends on massing effects at decisive points, and not diluting them across the entire battlefield. Normally there are many more targets for CAS than can be attacked by the available air assets. As a result, CAS should be focused in those critical areas where friendly surface forces lack the organic firepower to handle the situation themselves. The centralized command and control of CAS employment are essential to allow the massing of its effects where needed most. This may often be beyond the troops-in-contact range, as CAS missions operating there will have reduced risk of fratricide and enemy forces destroyed or delayed there are often kept from engaging friendly surface forces. Surface commanders should properly prioritize and focus the firepower of apportioned and allocated CAS at decisive places and times to achieve their objectives. *Distributing CAS among many competing requesters dilutes the capability of those assets and will result in less rather than more air support to ground forces.*

Effective actions to gain air superiority and to interdict an enemy can limit the flexibility of those forces, deny their reinforcement, and enhance opportunities for friendly commanders to seize the initiative through offensive action. Close air support can enhance the offensive by providing the capability to deliver a wide range of weapons, massed or distributed as necessary, and by creating opportunities to break through enemy lines, protecting the flanks of a penetration, or preventing the counter-maneuver of enemy surface forces. Defensive requirements to blunt an enemy offensive may also dictate the need for close support. CAS can protect the maneuver and withdrawal of surface forces, protect rear area movements, or create avenues of escape. CAS aircraft may also be used to provide escort and suppressive supporting firepower for air mobile and airborne forces, and to conduct surveillance and security for landing forces, patrol, and probing operations. *All of these benefits of CAS must be weighed against the other, potentially more effective, uses for CAS-capable assets such as AI or even strategic attack. The ground commander should use his organic firepower whenever possible before calling in requests for CAS.*

CHARACTERISTICS OF CAS OPERATIONS

Close air support is "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." (JP 1-02) Since close proximity is defined as that distance within which terminal control is required for fratricide avoidance and targeting guidance, *CAS is not defined by a specific region of the theater/JOA*; rather it can be conducted at any place and time friendly surface forces are in close proximity to enemy forces. For example, CAS can be employed in support of special operations forces operating anywhere in the JOA, as long as there are friendly troops within close proximity of the enemy forces being attacked.

CAS is not the only form of aerospace power that can support ground operations, since much of air interdiction also accomplishes that function, as can other aerospace functions. CAS is simply the name applied to air attack of enemy forces that are currently within close proximity and detailed integration distance of friendly ground forces. The distinguishing factor for CAS is the detailed C2 required to integrate air support into the ground close battle area; this also makes CAS effects much more rapid than deeper attacks which may have more overall impact on the enemy. Air operations against enemy surface forces that will engage, or be engaged by, friendly ground units in the near or distant future normally fall under air interdiction rather than close air support. *Whereas AI may provide indirect or general support through integrated planning, CAS provides direct support through integrated planning and integrated execution.*

Successful close air support requires precise teamwork between the air and ground elements.

Since close air support operates in close proximity to friendly surface units, reliable air-ground communications are mandatory. Ground terminal attack controllers normally provide targeting instructions, final attack clearance, and fratricide avoidance instructions to CAS aircraft. Airborne forward air controllers, or FAC(A)s, may also provide this capability and will normally be in contact with ground-based terminal attack controllers to determine targeting and friendly location details. *Since close air support requires the highest level of integration between air and ground maneuver, specific procedures and training are required for air and ground terminal attack controllers and CAS aircrew.*

Air operations in close proximity to friendly forces require particular emphasis on the avoidance of fratricide. CAS requires detailed planning, coordination, and training for effective and safe execution. Though occasionally the result of malfunctioning weapons, fratricide has often been the result of confusion on and over the battlefield.

Causes include misidentification of targets, target location errors, target or friendly locations incorrectly transmitted or received, and loss of situational awareness by terminal controllers, CAS aircrews, or air support request agencies. It is critical for all involved in the CAS process to realize that they can contribute to unintentional or inadvertent friendly fire incidents. *Each participant must make every effort possible to ensure friendly units and enemy forces are correctly identified prior to engagement.*

CAS should be massed to apply concentrated firepower where it is most needed by the ground commander. When applied en masse, CAS has immediate physical and psychological effects on enemy capabilities. Since available assets are usually limited, CAS is applied against targets of immediate concern to surface forces when those forces cannot produce the desired effect with organic weapons alone, when surface forces are committed without heavy organic weapons support, or when the disposition of targets prevents successful attack by surface firepower. CAS often provides more effective support to the ground force when used against enemy targets that are beyond troops-in-contact range, due to the decreased risk of fratricide and the reduced interference of CAS with organic surface fires. The task of CAS is to provide selective and discriminating firepower, when and where needed, in support of surface forces. *It provides the surface commander with highly mobile, responsive, and concentrated firepower, enhances the element of surprise, is capable of employing munitions with great precision, and is able to attack targets which are inaccessible or invulnerable to surface fire.*

CAS missions are integrated with the organic fire of surface units to achieve mutual support, increase the overall destruction of enemy forces, suppress enemy air defenses (SEAD), and to ensure air support is delivered when and where required. This detailed integration is accomplished by parallel air and surface force control systems which extend through all levels of command. These systems integrate air maneuver with surface firepower to fulfill fire support requirements as they occur and deconflict air maneuver units from surface fires. Augmentation of surface firepower by CAS can decisively contribute to surface combat success with air attacks during breakthroughs, counterattacks, defense against enemy assaults, and surprise attacks. SOF teams operating beyond the range of organic surface fires may require emergency CAS if compromised, and many combat search and rescue (CSAR) situations also require CAS. *CAS is particularly important to offset shortages of surface firepower during the critical landing stages of airborne, airmobile, and amphibious operations by friendly forces.*

Thus, close air support should be available, responsive, utilized to mass its effects, and closely integrated with the surface component commander's scheme of maneuver. The mobility and firepower of CAS can make an immediate and direct contribution to the surface battle, *but only when all players adhere to a complicated orchestration process.*

US airpower doctrine matured in North Africa, the first major test of Army Air Force doctrine in joint operations with a major ground offensive.

When the Allies invaded North Africa in 1942, US Army Air Force air support doctrine was not yet mature, and the correct USAAF doctrine that did exist was often improperly employed. The air support system as practiced called for dividing air support assets among the various ground units being supported, resulting in "penny packeting" of airpower into small, uncoordinated, and ineffective formations. The drawbacks of this system were highlighted by the poor performance of air support in the early days of the Tunisian campaign.

Building on ideas that had existed in US airpower thought since World War One and had been proven by the Royal Air Force against the Afrika Korps, the USAAF developed a system for air support that provided centralized control of supporting airpower, commanded by an airman, and decentralized execution through a system of air liaison officers who lived and fought with the US Army units they supported. This air support control system matured through the Allied advance across North Africa and into Italy, and was used to great effect in France following the Normandy landings.

The Allied airmen who perfected this system did so in the heat of battle, where lessons learned were often costly. Their developed concepts, along with other improving circumstances, had dramatic effects in North Africa. They correctly identified the key requirements of successful command and control of air support that survive to this day, which if forgotten will lead to relearning the same costly lessons all over again.

North Africa: Lessons Learned and Relearned

TYPES OF CAS REQUESTS

There are various methods of requesting close air support, depending on how fluid the situation is and how much premission intelligence on the target is available. Unlike other forms of air attack, with CAS it is very rare to know the precise target prior to takeoff. It is important to note the difference between CAS *missions* and CAS *requests*. CAS requests may change right up to the time the CAS flight lead checks in with the terminal controller, due to the changing battlefield situation, while such changes may or may not affect the actual execution timing of CAS missions. *The ground component may have a pre-identified list of CAS targets, but the fluid battlefield situation often delays to the last minute the decision as to which target's destruction or disruption is the highest priority.*

Preplanned CAS means that the aircraft flying the missions are scheduled for a particular time or time period, which normally coincides with the anticipated time when CAS will be needed most by the ground component. Preplanned CAS requests come in two categories: *scheduled* and *on call*.

- ✪ **Scheduled CAS** is the preferred method of employment because it puts the CAS assets over the area of the battlefield where they are needed most, at a preplanned time-on-target (TOT), and where a need for CAS had been established in advance. Scheduled missions will normally have a specific contact point, at a specific time, to expect handoff to a ground- or air-based forward air controller. Scheduled CAS missions are the most likely to have good intelligence on the expected type of target, resulting in a better munitions-target match. Although joint doctrine states that a specific target must be identified when requesting scheduled CAS, the reality of fluid battlefield environments makes identifying a CAS target days in advance very difficult.

- ✪ **On-call CAS** involves putting the aircraft on ground-based or airborne alert (often listed as GCAS or XCAS in the air tasking order) during a preplanned time period when the need for CAS is likely, but not guaranteed. *This is a less efficient use of CAS resources, as the assets involved may or may not actually employ against the enemy unless a backup target is provided.*

Immediate CAS requests usually result from unanticipated needs on the battlefield, often of an emergency nature, that require diverting or rescheduling aircraft from other missions. Immediate requests will result in missions that are likely to be less well planned or executed due to their hasty nature. The best way to fill immediate requests is by diverting aircraft from preplanned CAS missions that are of lower priority. The need for immediate CAS can be reduced by apportioning the proper amount of aerospace power to support the ground scheme of maneuver, based on the overall theater priorities. When immediate requests result in CAS requirements that exceed the CAS apportionment, the JFACC will either deny the lower priority requests or request additional CAS apportionment from the JFC. The decision on whether or not to increase CAS apportionment will be based primarily on the gravity of the ground situation and the contribution to theater strategy being made by the available CAS-capable assets.

Push CAS represents a proactive method of distributing close air support that differs from the standard request-driven or "pull" method. While similar in concept to other preplanned CAS missions, push CAS differs in that it is planned and often flown before the actual request for CAS is made by the supported ground component. *Push CAS missions are scheduled to arrive at a specified contact point at a specified time, normally in a continuous flow, to provide constant CAS assets available to support the ground*

P-47 Thunderbolts en route to a counterland target.

The successful DESERT STORM tactic of "push CAS" can trace its origins at least back to World War II. By 1944, the USAAF and RAF in Italy had perfected a method of flowing fighters into the CAS area on a regular, prescheduled basis. This system, known as "Cabrank" for its similarity to a line of taxicabs waiting for passengers, provided a constant flow of fighters overhead the ground controllers, then known as "Rovers." If not needed for close air support, these missions pressed on to a preplanned backup target, typically a bridge or other interdiction target of known value to the enemy. The Cabrank system was possible because of Allied air superiority and large numbers of counterland assets, and provided the ground force with very responsive air support. Cabrank response time was as little as a few minutes, while traditional CAS missions that were only scheduled in response to specific requests by the ground force might not arrive for several hours.

The Origins of "Push CAS"

unit(s) identified as the main weight-of-effort. The term push refers to the fact that CAS missions are "pushed" forward to the terminal attack controller (TAC) before the formal CAS request is made; those assets not needed for CAS will often be pushed to preplanned backup targets so the sorties are not wasted. Although not required, push CAS works best in an environment where many CAS targets are available, so the assets involved will likely have a lucrative target to employ against.

When a significant number of CAS assets is available, and the tactical situation dictates, a *continuous flow* system providing a constant stream of CAS missions to the contact points may be employed. This method puts CAS flights overhead at regularly scheduled intervals, keeping some flights constantly on station and ready for immediate tasking. Response times are thus reduced, but the number of sorties required is often high and the advantages gained must be weighed against the other potential uses for these assets.

CONDITIONS FOR EFFECTIVE CAS

Close air support is one of the most complex missions performed by the Air Force. The very complexity can limit the overall efficiency of CAS, but it is the only way to get air support on enemy targets in close proximity to friendly positions. Effective CAS requires proper training, equipment, and an understanding of the strengths and limitations of aerospace power. *This is why the tactical air control system (TACS) has been organized so that only airmen directly control aerospace power, even when that power is acting in support of ground combat.*

Air superiority is required for CAS missions to concentrate on the task at hand. CAS is highly demanding of aircrew situational awareness, and proper execution of the CAS mission is not normally possible while searching for, or reacting to, enemy air threats. A strong counterair plan early in the campaign will therefore enable more effective close air support. **Suppression of enemy air defenses** is part of the counterair function and is perhaps the most important aspect of air superiority to the CAS pilot. Most enemy ground forces bring some level of tactical air defense into battle; such defenses consist of antiaircraft artillery (AAA), man-portable or vehicle mounted infrared surface-to-air missiles (IR SAMs), or short-range radar guided SAMs. Depending on the enemy's integrated air defense system (IADS) and the location of the ground battle, their longer range strategic SAMs might also be a factor. This is why indiscriminately pushing CAS missions beyond the range of organic firepower can be very dangerous; such missions will outrange ground-based suppressing fire and may fly into a much higher threat arena. Air interdiction missions are normally packaged with appropriate support assets to handle a greater SAM threat, while close air support missions typically operate in flights of two aircraft with no dedicated support. *The use of organic surface fire support such as artillery to suppress enemy air defenses for CAS aircraft represents a positive integration of air and ground component forces.*

Target marking can be accomplished through various means, including smoke rockets or rounds, laser designation, and flares. Timely and accurate marking can greatly increase the accuracy of CAS attacks and will also reduce the chances of fratricide through target misidentification. With the use of low light and infrared systems becoming more widespread, the use of marking devices in those spectra can be more effective than visible target marking, depending on how the aircrew actually acquires the target and employs ordnance on it.

Favorable weather is important to effective CAS, perhaps more so than other forms of air attack. Since identification of the target through visual or electro-optical means is usually required for target confirmation and fratricide avoidance, an undercast can often prevent CAS missions from hitting their targets. Radar-cued aiming or global positioning system and inertial navigation system (GPS/INS) tactics may allow CAS aircraft to hit stationary targets through the weather, *but questions of target coordinate accuracy and guidance reliability will have to be answered to both the air and ground component's satisfaction before this option is used.* In any case, it is the JFACC who determines what the minimum acceptable weather for CAS will be, and the air liaison officer (ALO) should advise the ground commander on what impact poor weather will have on his expected close air support. Individual controllers and aircrew must make the final call during mission execution if existing weather is above or below their mission minimums. Emerging technologies are being developed to assist in adverse-weather employment, and the partial sanctuary of poor weather may disappear, as has the sanctuary of night. Modern air-to-ground infrared (IR) systems often see better at night than during the day, and night operations can make many tactical air defense systems less effective against CAS aircraft (especially attack helicopters which are typically limited to low altitude operations).

Flexible and responsive command and control permits requests for CAS, coordinated with the appropriate agencies, to be originated at any level of command within the supported surface force or by elements of the Theater Air Control System (TACS), such as ALOs and terminal attack controllers. In MOOTW, additional restrictions may be imposed (such as a requirement to gain approval for CAS operations from foreign/civilian agencies), however, flexibility will be diminished. The interval of time between a unit's request for air support and the delivery of the supporting attack is a critical factor in CAS effectiveness. Prompt response allows a commander to exploit fleeting battlefield opportunities and to survive in a defensive situation. Launch and divert authority of scheduled CAS assets at the air support operations center (ASOC) or ABCCC level provides reduced response time. Diverted airborne aircraft from lower priority missions may also be used, however, a balance is required between the most effective use of resources and their response times. Effective command and control also enhances the ability to integrate CAS with surface operations, coordinate support, and update or warn of threats to CAS assets. The depth at which the ASOC will control operations depends a great deal on the ability to both communicate with forces and maintain situation awareness on targets, threats, and other factors. *The authority to redirect aircraft to or from missions beyond the FSCL should remain centralized at the AOC, while the authority to flow CAS assets to and from shallow AI targets short of the FSCL is often delegated to the ASOC or TACP.*

Aircrew and terminal controller skill is vital to the success of close air support. Commanders should emphasize joint training that routinely exercises CAS tactics, techniques, and procedures to maintain aircrew and controller proficiency. *Combat experience has shown that when CAS is not practiced and proficiency is not maintained a long time is spent at the opening of the next conflict relearning CAS procedures—to the detriment of friendly forces.*

CAS requires **interoperable and dependable communications** between air and surface forces. Mismatched equipment slows coordination of fire support, and lack of secure or frequency-agile radios may lead to compromised, garbled, or noncommunicated mission data. Such simple errors as having the air and ground components deploy with different codes for their communications equipment can delay the proper execution of close air support. *As with the other aspects of CAS, the only way to ensure interoperable communications in war is to conduct fully integrated exercises during peacetime.*

Flexible and responsive command and control are critical for effective employment of close air support. *The tactical employment of CAS is centrally controlled by the Air Support Operations Center (ASOC) and decentrally executed at the tactical level.* Launch and divert authority of scheduled CAS assets at the ASOC or Airborne Battlefield Command and Control Center (ABCCC) level provides reduced response time. Aircraft diverted from lower priority missions may also be used—however, a balance is required between rapid response and efficient use of limited assets. Effective command and control also enhances the ability to integrate CAS with surface operations, coordinate support, and update or warn of threats to CAS assets. The authority to re-role aircraft between mission types should remain centralized at the AOC, whereas the authority to retarget CAS and AI missions short of the FSCL normally rests with the ASOC.

Requests for CAS, coordinated with the appropriate agencies, may be originated at any level of command within the supported surface force. The procedures for CAS requests may take two forms. During low to medium intensity conflicts with a limited requirement for CAS, the ASOC may operate the traditional Air Force Air Request Net (AFARN). TACPs at any level of command may request CAS directly from the ASOC. However, during a high-intensity conflict when there are more requests than available CAS missions, the ASOC may require CAS requests to flow through the TACP at each level of command. This allows intermediate commanders to filter low priority requests (or requesting units), ensuring that only the highest priority CAS requirements are provided to the ASOC. Ground commanders at each level may thus prioritize where they have the greatest need for CAS, and employ their limited resources at the most decisive points in the battlespace. The ASOC may develop abbreviated message/request formats to speed the flow of information between C2 nodes. This also prevents the ASOC from being overwhelmed with unnecessary or low priority information.

Familiarity with the local battlefield situation is also critical to the success of CAS. When extended periods of close air support are expected, typically due to prolonged heavy ground fighting, combat effectiveness is increased when the same squadrons remain tasked to provide CAS over the same portions of the battlefield. This allows the pilots and intelligence personnel to become very familiar with the local terrain and enemy operations, as well as develop closer ties with the friendly ground units being supported. *This liaison should be strengthened through* *close contact between air and surface units whenever possible, a job that can be accomplished by the ground liaison officers (GLOs) attached to the flying units as well as the ALOs operating with the surface forces.*

CHAPTER FOUR

COMMAND AND CONTROL OF COUNTERLAND OPERATIONS

Direct support of ground troops is naturally the method preferred by the immediate commander concerned, but his vision did not extend beyond the local battle. It did not consider the competing demands of individual commanders on a far flung battlefront, each of whom would naturally like to have at his disposal some segment of the Air Force for his own exclusive use.

General Dwight D. Eisenhower

COMMAND RELATIONSHIPS

American military power is normally employed under joint or multinational force commanders. In joint operations, the JFC normally designates a JFACC to ensure the proper application of the joint air effort within the theater of operations. The flexibility and versatility of aerospace power allows it to be employed in multiple roles against varied targets. *Since there will rarely be enough counterland-capable assets to meet all demands, a single air commander can best ensure the unity of effort required for optimum use of those assets; designating a JFACC adheres to the principle of unity of command.* The JFACC should be the Service component commander with the preponderance of air assets and the C2 infrastructure necessary to plan and conduct theater air operations. This is normally the COMAFFOR for any large-scale joint operation; however, there will be some circumstances in which the JFACC should be designated from another Service, or even an allied nation during combined (multinational) force operations. The air component commander for a *combined force* is designated the *CFACC*. The JFACC's authority, guidance, and responsibilities are assigned by the JFC and include, but are not limited to, recommending apportionment to the JFC and planning, coordinating, allocating, and tasking aerospace power based on the JFC's apportionment guidance.

The JFC establishes the specific command authority for the JFACC to fulfill assigned responsibilities. JFACCs typically exercise operational control (OPCON) over assigned and attached forces and tactical control (TACON) over (or establish a support relationship with) other forces made available for air component tasking.

The JFACC is the *supported commander* for the JFC's overall air interdiction effort and will use JFC priorities to plan and execute theater-wide interdiction operations. The JFC sets overall theater priorities, which guide air component objectives and determine the level of support that air and ground maneuver will provide each other. Based on the JFC's guidance, the JFACC will normally establish the specific priorities for theater-wide AI and will apply these priorities to air interdiction targets located both outside of and inside any surface AOs. The surface commander can determine specific targets for air interdiction or, more preferably, provide the air component mission-type instructions that allow more leeway in tactical mission planning. This way the JFACC can best determine how to support the ground commander, without knowing in advance the exact location or timing of the priority targets. *Ultimately, interdiction priorities within the surface AO are considered along with the theater-wide interdiction priorities, that are established by the JFC and guide the overall targeting process.*

The intent of centrally prioritizing aerospace power is to provide the effectiveness against all relevant targets, consistent with the theater commander's strategy. When the number of productive targets exceeds aerospace power's ability to attack them, centralized prioritization ensures that lower-priority targets are not hit first, regardless of whether they were nominated by an air or surface component. *It is important to remember that all components support the JFC's overall strategy, so there should not be great disparities between the various components' priorities for aerospace power as long as the overall task remains in view.*

Nomination of AI targets does not end when the planning cycle begins; rather, the process is flexible enough to allow for targeting inputs even beyond the ATO's execution time. Such inputs may come from any supported or supporting component and will be evaluated against theater counterland priorities and asset availability. Post-nomination target changes are normally possible but must be justified in terms of target priority. Once the ATO has entered final production, proposed changes are normally passed to the AOC's combat operations division for incorporation into tactical planning or mission execution. Further guidance on the relationship of air interdiction and surface maneuver may be found in Joint Pub 3-0, *Doctrine for Joint Operations*, and Joint Pub 3-03, *Doctrine for Joint Interdiction Operations*.

The JFACC is normally a *supporting commander* for CAS. Priorities and intentions for both CAS and surface maneuver operations come from the JFC. The JFC apportions CAS and AI based on his overall strategy and JFACC recommendation. The JFACC then allocates sorties to the various functions, areas, and missions to support that apportionment decision and assigns CAS missions to units via the air tasking order (ATO). Surface commanders request preplanned CAS in advance of operations as part of their overall concept of operations and distribute the CAS apportionment to fill requests from those ground forces who most require air support. This distribution process is best accomplished by the air component's liaison function that accompanies ground units onto the battlefield. While the ground component commander is normally the supported commander for CAS, *direct control of CAS missions rests with the Air Force's Theater Air Control System (TACS).*

The surface commander distributes sorties that have been allocated to CAS where his scheme of maneuver most requires them; this process is a distribution of *targets that can be attacked,* not a distribution of sorties "owned" by the ground commander (the JFACC retains tactical control over CAS through the TACS). The air-to-ground portion of the TACS is responsible for providing an air component liaison to the various echelons of ground command and terminal targeting and control that helps to ensure aerial maneuver is integrated with the ground scheme of maneuver. *The air liaison function should also guide the ground commander in the optimum distribution of CAS among his various units, keeping in mind that aerospace power is most effective when concentrated at the decisive points.*

THEATER AIR CONTROL SYSTEM (TACS)

The TACS performs centralized planning and control, facilitates decentralized execution of all air component operations, and consists of the combined AOC (CAOC) or joint AOC (JAOC) and subordinate control elements. The air-to-ground portion of the TACS, along with the air-ground control mechanisms of the various ground Services, are collectively known as the theater air-ground system (TAGS). A key function of the TAGS is to ensure aerospace maneuver is properly integrated with the ground scheme of maneuver. Figure 4.1 shows the key Air Force and Army components of the TAGS.

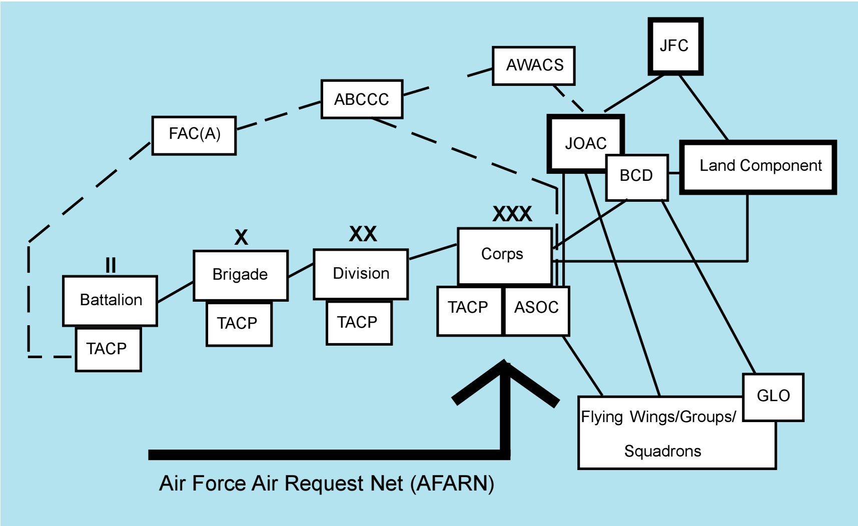

Figure 4.1. Air Force – Army TACS Connectivity

Connectivity for maritime or amphibious air support is similar, but several of the key components use different labels. The senior element in the Marine air command and control system (MACCS) is the tactical air command center (TACC), which performs similar duties at the tactical level for organic Marine aviation that the JAOC performs for the air component at the operational level. The direct air support center (DASC) is roughly equivalent to the US Air Force's ASOC that coordinates and directs aerospace support for land forces at the corps level and below, while at lower echelons of command the Marine system uses the same TACP label for air support liaisons as the TACS.

The Aerospace Operations Center (AOC)

The AOC will normally be designated the joint air operations center (JAOC) during joint operations and will be the operational command center for the JFACC. It is the means by which the JFACC exercises centralized command and control of theater air assets and turns the JFC's guidance into an air operations plan, allocating resources, and tasking forces through ATOs. Although actual theater AOC organizational structures may vary, the four basic functions performed by all large AOC's include strategy development, combat planning, combat operations, and air mobility. The JFACC employs the contingency theater automated planning system (CTAPS), being replaced by the Theater Battle Management Core System (TBMCS), to generate and disseminate the ATO, to pass and display air target information, and to speed the flow and dissemination of other information to users in all components.

The *battlefield coordination detachment (BCD)* is the senior Army liaison element to the TACS and is located in the AOC. The BCD processes the land component's air support requests, to include air interdiction target nominations and requests for preplanned close air support. The BCD processes the ground component's target nominations and acts throughout planning and execution to ensure proper representation of ground component priorities in the overall process. The BCD acts as the primary conduit for real-time and near real-time requests for AI targeting from the ground component. Such requests flow up the Army chain of command to the highest echelon, then flow to the AOC via the BCD. It is also the BCD's responsibility to inform the various ground commanders of which nominated targets were or were not included on the target list for incorporation into the ATO and the approval status of preplanned CAS requests. This feedback loop is critical, as ground commanders must know which requested targets did or did not meet the JFC's priority requirements for air attack. During the execution process, the BCD provides current ground picture information to the AOC on both friendly and enemy ground forces.

The Air Support Operations Center (ASOC)

The ASOC is the primary control agency of the TACS for the execution of aerospace power in direct support of ground operations. *Normally aligned with the senior Army tactical level of command, the ASOC coordinates and directs aerospace support for land forces at corps level and below.* It is directly subordinate to the JAOC, and is responsible for the coordination and control of air component missions within its associated ground component's area of operation (AO). This AO typically extends to the fire support coordination line (FSCL) for actual control of mission execution, and may extend to the corps' forward boundary for planning and advisory purposes. In the latter capacity, the ASOC commander and staff advise the corps commander on CAS employment and target nominations for those AI and SEAD missions that support the ground force and that part of tactical air reconnaissance and airlift that directly supports the Army. If missions are flown beyond the range of ground-based SEAD but still in the ASOC's assigned area, the ASOC will need to coordinate for airborne SEAD from fixed- or rotary-wing assets when a threat exists. Such SEAD will almost always need to be preplanned and must include deconfliction with any friendly ground emitters in the area. As the primary coordinator for SEAD, the ASOC must have visibility of surface-to-air threats that effect its associated component's AO to perform its mission. Air missions that do not directly support the ground component but are flown inside the ASOC's control area will normally be coordinated through the ASOC to deconflict with ground force maneuver and fires and to receive target and threat updates. The ASOC also provides fast reaction to requests for air support and is capable of assisting time-critical targeting and friendly force location information to CAS, AI, SEAD, air mobility, surveillance, and reconnaissance missions. The AOC will normally delegate launch or commit authority for alert CAS missions to the ASOC, providing a faster response time when air support is needed. The decision to delegate re-targeting authority for specific short-of-the-FSCL AI missions to the ASOC will depend on actual circumstances, including the timeliness required for getting desired effects on target. *Unless specifically delegated, however, targeting authority for all AI missions remains with the AOC.*

The ASOC director, normally the corps ALO, exercises operational control of all subordinate TACPs. The ALO is the JFACC's primary representative to the senior tactical ground commanders. Air Force ASOCs do not deploy independently, and rely on their associated ground forces for much of their logistics support. They may be tailored in size depending on the task at hand. *ASOC members must be strongly versed in Air Force doctrine and capabilities across the spectrum to include counterland, counterair, ISR, IO, and CSAR.*

Other TACS Elements

Airborne Battlefield Command and Control Center (ABCCC). The ABCCC is a key link in the C2 network for counterland operations. It is equipped with communications and battle management displays, and can act either as a self-contained airborne command post or as a relay for ground command centers such as the ASOC. *Attack aircraft hitting CAS or shallow AI targets will often communicate with an ABCCC as opposed to talking directly with the ASOC, due to radio and line-of-sight limitations.*

The Tactical Air Control Party (TACP). The TACP is the principal Air Force liaison element aligned with Army maneuver units from battalion through corps. The primary mission of corps- through brigade-level TACPs is to advise their respective ground commanders on the capabilities and limitations of aerospace power; battalion TACPs have the additional task of providing terminal control to CAS missions. The TACP provides the primary terminal attack control of CAS in support of ground forces. In the TACS chain of command, TACPs are directly subordinate to the ASOC.

Terminal Attack Controller (TAC). A TAC is an airman experienced in air-to-ground operations who, from a forward ground or airborne position, controls aircraft in close air support of ground forces. Terminal attack controllers have the authority to direct aircraft that are delivering ordnance to a specific target. Only specially trained and certified individuals are authorized to perform this duty. TAC, a generic term applying to both enlisted and officer controllers, can include ALOs, enlisted terminal attack controllers (ETACs), FAC(A)s, special operations terminal attack controllers (SOTACs), and other trained and certified attack controllers. *Ground commanders must understand that battalion-level ALOs and ETACs are not trained as combat observation and lasing team (COLT) members, and these key C2 personnel must be carefully employed on the battlefield. The decision to send them into high-risk situations must consider the potential loss of both personnel and the capability they represent.*

The terminal attack controller is a vital link in getting close air support where the ground commander needs it the most.

Air Liaison Officer. An ALO is an aeronautically rated officer, aligned with a ground maneuver unit, who functions as the primary advisor to the ground commander on the capabilities and limitations of aerospace power. As the ground commander's expert on aerospace operations, the ALO should be given broad, "commander's intent" type of guidance so he can do the detailed air support planning with his own staff.

Forward Air Controller (Airborne). Operating from a suitable aircraft, the FAC(A) coordinates airstrikes between the TACP and CAS aircraft. The FAC(A) provides terminal control, relays CAS briefings, provides immediate target and threat reconnaissance, and marks targets for the attacking aircraft. Threats and weather permitting, the FAC(A) can see well beyond the normal visual range of ground-based terminal controllers. The FAC(A) can perform tactical battle management by cycling the CAS flights through the target area, while prioritizing the targets in coordination with the friendly ground force. The FAC(A) normally operates as an extension of the TACP.

Airborne forward air controllers have provided increased capability to control close air support in several conflicts, and continue to be a key asset today. The FAC(A) provides increased depth and visibility for controlling CAS, and enables terminal control where it might

Killer Scout. While not a formal part of the TACS, Killer Scouts perform a similar function for AI missions that FAC(A)s provide for CAS aircraft. Killer Scout is a mission performed by some multirole fighters, and involves scouting designated target areas to locate and verify targets for, and provide some control and sequencing for, follow-on air interdiction. Capable of passing very accurate target updates to AI assets, some Killer Scouts are also capable of actually marking targets if required. Killer Scouts are also trained in cycling multiple attacking flights through the target area, and providing prioritized targeting guidance to maximize the effect of each sortie. *Killer Scouts are not trained to provide CAS terminal control, and should never be used to control attacks inside close proximity to friendly ground forces.*

AIR-GROUND COMPONENT CONNECTIVITY

Due to the nature of counterland operations, interconnectivity between the TACS and the other Service C2 networks is critical, especially when providing close air support. While the TACS is an Air Force system, a US Air Force JFACC will normally exercise command and control of his joint air assets through it regardless of the Service that provides them. When supporting the Army, the TACS must interface with the Army air-ground system (AAGS). In those cases where JFACC air supports the Marines, the amphibious tactical air control system (ATACS) provides control through either the Marine air command and control system (MACCS) or the Navy tactical air control system (NTACS). Special operations forces normally rely on organic air support, but they also have a system in place to request CAS if needed from non-SOF forces.

AI Connectivity

All supported surface components and Services have liaisons in the AOC to coordinate nominations for air interdiction and to provide expertise on their components to the AOC for planning and execution. As previously discussed, these teams provide coordination between the air plan and the various ground schemes of maneuver. The liaison elements are instrumental in providing a knowledgeable presentation of target priority from the ground perspective, current and projected ground force positions, desired effects to support ground maneuver, and other factors that govern the integration of air interdiction and ground maneuver. These liaisons are also responsible for keeping their respective ground components informed of the capabilities and limitations of available aerospace power.

Last-minute updates to AI target nominations are normally passed through the surface component's AOC liaison (such as the Army's BCD), unless circumstances dictate that passing the request through the TACP/ASOC channel is more expeditious. AI retargeting for missions short of the FSCL can often be handled directly by the ASOC when the update comes too late to replan the mission (such as target changes after takeoff). This is possible because all missions against targets short of the FSCL normally coordinate with the ASOC or ABCCC. Unless specifically delegated, however, the ASOC cannot make AI retargeting decisions without direction from the AOC. *Establishing cutoff times for when the requested target change will be passed through one channel or the other helps to avoid confusion and leads to increased combat effectiveness.*

An increasingly important part of AI connectivity is real-time **sensor-to-shooter (STS)** information flow. Whether the data comes via voice or data link, from an unmanned aerial vehicle (UAV), a recon team on the ground, or from the E-8 JSTARS, the ability to receive real-time targeting updates is a key element in effectively targeting mobile ground forces. Effective communications between sensors, shooters, and the battle managers are critical to the immediate targeting process. Decisions, such as how much battle management authority to delegate to JSTARS, must be a balance between the commander's intent, communications connectivity, timeliness required to strike the target and achieve the desired effect, and access to the overall air and ground picture. As with all command and control, a clear line of which C2 elements have various levels of decision-making authority must be clearly stated by the commander to avoid confusion. Another key factor in proper STS execution is to provide the right kind of information to the shooter without overwhelming him with data or choking the data pipeline. Digitized radar and electro-optical (EO) images, while costly in terms of data volume, can be very helpful in some cases to assist the shooter in correctly identifying and attacking the target. In other circumstances, however, such as when attacking rapidly moving targets, a picture that is even a few minutes old may be of limited value and unnecessary.

CAS Connectivity

At the TACP level, CAS coordination occurs between the TACP and the Army's **fire support element (FSE), S/G-3 operations staff, and S/G-2 intelligence staff.** TACPs are aligned with the FSE to ensure the proper integration of air support into the ground scheme of maneuver and to work closely with them through the execution of the battle plan. This includes requesting artillery- delivered SEAD, airspace deconfliction, target marking, and other tasks. The actual execution of CAS depends greatly on the *proximity of the target* to the terminal controller, his ability to *observe the attacking aircraft,* and the use of *reliable communications links* between all players. CAS weapons release authority comes in two levels labeled *"positive control"* and *"reasonable assurance."*

Positive control is executed under two forms known as *direct control* and *indirect control*. Direct positive control provides a higher level of targeting guidance for the aircrew and provides the greatest level of fratricide protection. Thus, positive direct control is the only method appropriate for controlling CAS in most troops-in-contact situation. Indirect control provides greater flexibility to attack targets beyond troops-in-contact range, where fratricide avoidance is less of a factor and direct control techniques may not be possible for ground-based controllers. *Where the friendly ground situation is not confirmed, troops-in-contact should always be assumed to exist.*

✪ **Direct control** normally requires the terminal attack controller to observe the attacking aircraft, the desired target or targets, and ensure the aircraft is attacking the correct target and is not a threat to friendly ground forces. There may be times when the controller cannot see the attacking aircraft (due to high altitude, standoff weapons, night, poor visibility, etc.) but is in position to observe the target. In these cases, clearance to drop will be given only if the terminal controller can use other means to confirm the aircraft is attacking the correct target and has friendly positions in sight. These include, but are not limited to, confirming with a verbal description that the aircraft has friendly positions and/or the target in sight, often confirmed by a target mark (as appropriate).

✪ **Indirect control** is used when the TAC cannot observe the attack but a trained observer is in position to observe it and has direct communications with the terminal controller. This method still requires positive clearance to attack from the terminal controller, who may allow the fighters to execute multiple attacks once he is assured the fighters are on the correct target, friendly positions are well clear, and the initial clearance to attack is given. Indirect control is less positive than direct control, but battlefield conditions often require its use due to distance between the TAC and the target. *It must be emphasized that indirect control is not normally appropriate with troops-in-contact, due to the risk of fratricide.*

There is a gap in current joint doctrine regarding the use of CAS in beyond-visual-range (BVR) situations. Both the published definitions of direct and indirect positive control require someone other than the attacking aircrew to physically see the target, while the "reasonable assurance" level of CAS control (described below) is specifically stated not to be used as a primary form of CAS control. This creates a doctrinal sanctuary for those enemy forces that fall within the close proximity/detailed integration distance that requires them to be attacked via CAS but are outside the range where an observer or controller can physically see them and no FAC(A) is available. One method currently being employed, and only with the approval of the ground force commander, is to include as indirect positive control a method where the TAC sends the fighters to an area where targets are known to exist, and relies on the target area description from the fighters as to key terrain features, target marks, etc., to build an awareness of what the fighters are observing. Once the TAC is confident of the fighters being in the correct location they may be cleared "hot" to attack. This method differs from AI in that the TAC retains positive control of the attack throughout, and the fighters are only cleared to attack when proper situation awareness is established for the controller on the ground. *As with other forms of indirect control, this method is not appropriate in most troops-in-contact situations.*

Emerging capabilities such as UAV datalink may allow a variation of indirect control in which the TAC observes the target through the UAV's onboard sensors and gives targeting direction and corrections to attacking aircraft via radio or datalink. This form of control would not likely be appropriate in a troops-in-contact situation, as the risk of fratricide is higher than when the TAC has visual of both the CAS aircraft and the target. Airborne forward air controllers are also increasingly equipped with night-vision systems, GPS, and laser designating equipment for more precise control of CAS in more varied environments. Real-time datalinks may lead to a common operating picture among all airborne and surface CAS players, speeding the target designation process and improving identification of friendly forces. Methods such as these will make indirect control more effective in a wider range of circumstances and may, in fact, blur the line between "direct" and "indirect" control. As with all new systems, however, *reliability and compatibility must be proven* before new sensors or weapons are employed, especially in the CAS environment. Another complication associated with developing technology is the blurring of formerly clear distinctions; for example, the term "visual" must now be specified as to whether it includes various sensors or is restricted to the "mark I eyeball" only. *It now requires more specification than just "direct" or "indirect" when discussing control of CAS; commanders must be specific in their special instructions (SPINS) and rules of engagement (ROE) on exactly which systems, sensors, and forms of CAS control are allowed under which circumstances in their theater/JOA.*

Reasonable assurance is a level of release authority that is used when conditions prevent the use of positive control. It will be used only when circumstances defined by the JFC have been met, and the air and ground component commanders concur with its use after weighing the risks involved. "Reasonable assurance" provides a clear set of guidelines for special circumstances (such as communications jamming, equipment failure, etc.); it is not intended to be used as a primary method of CAS control. Under this level of release authority, the CAS aircrew may execute their attack without positive control after ensuring that clearly specified reasonable assurance criteria have been met. *These conditions should be addressed in ROE or SPINS and must be clear-cut for both CAS aircrew and CAS controllers as to when they apply, and must come from the JFC.*

FIRE SUPPORT COORDINATION MEASURES

Various measures are used for both airspace control and fire support coordination in both **planning and executing** counterland operations. The measures help to integrate air and ground maneuver, ensure deconfliction, and identify which parts of the battlefield require specialized control procedures.

Fire Support Coordination Line (FSCL)

The purpose of the FSCL, as stated in joint doctrine, is to ensure the coordination of fire not under the surface commander's control but which may affect his current tactical situation. The land component commander typically sets the FSCL after coordinating with all affected component commanders. All attacks short of the FSCL must be coordinated with the establishing component, primarily to ensure proper synchronization and prevent fratricide. Because of this, the FSCL is often used as the forward limit of the airspace controlled by the TAGS. This mandates the various ASOCs and other TAGS components have the required connectivity to monitor not only air activity out to the FSCL but also be able to monitor friendly and enemy ground positions, surface-to-air threats, and all other key aspects of situational awareness. Likewise, when the ground component attacks targets beyond the FSCL (such as long-range ATACMS shots against high-value targets) it is required to coordinate with the air component to ensure deconfliction and prevent multiple assets attacking the same target.

Forward Line of Own Troops (FLOT)

While not a true fire support coordination measure, the FLOT is a useful planning tool that delineates the known forward trace of friendly ground forces. Joint doctrine defines the FLOT as: "A line which indicates the most forward positions of friendly forces in any kind of military operation at a specific time. The forward line of own troops normally identifies the forward location of covering and screening forces." The zone between the FLOT and the FSCL is typically the area over which friendly ground forces intend to maneuver in the near future and may also be the area within which ground force organic fires are employed. This zone is typically, though not always, the area where air operations will be executed through the TAGS (see figure 4.2).

It must be emphasized that the FSCL is primarily used to establish command and control procedures for planning and execution

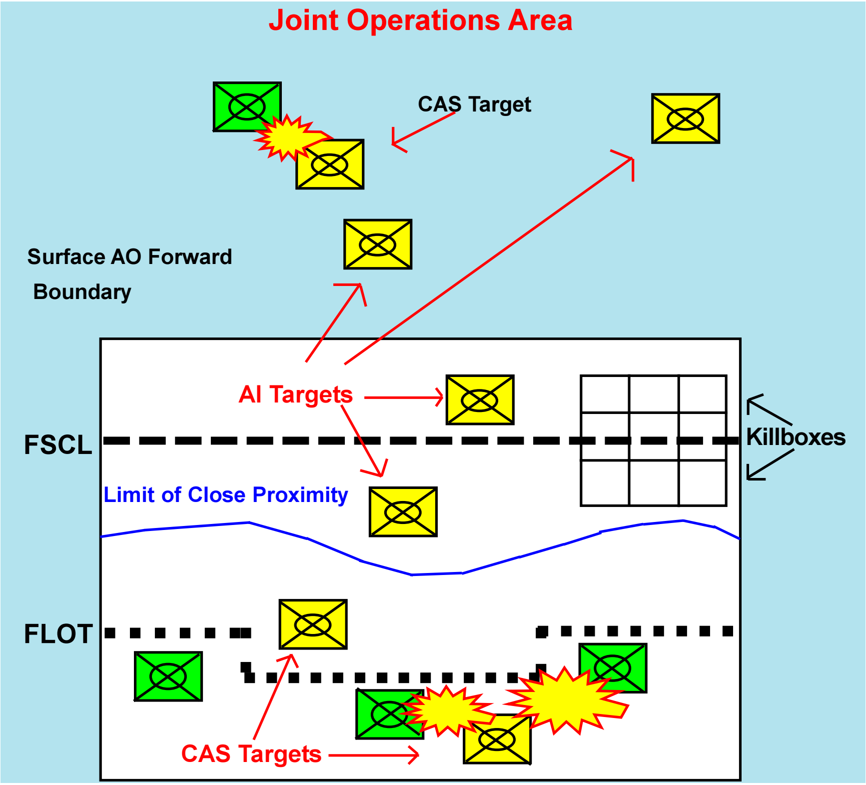

Figure 4.2. Standard FLOT/FSCL/Surface AO Relationship
(denotes troops-in-contact)

purposes; it does not define mission types. Missions flown beyond the FSCL will typically not use the TAGS, as they are beyond the distance where detailed integration is required. However, CAS missions can be flown in the portions of the battlefield beyond the FSCL when friendly troops are operating there and require support. Ground forces such as SOF teams that often operate deep should include the appropriate TAGS element for CAS control and have a liaison element at the JAOC. Short of the FSCL, all missions will typically require check in with the air-to-ground TACS while en route to the target for an update on potential targets, surface-to-air threats, and friendly troop locations. CAS missions will normally be handed off to a TAC or FAC(A) for terminal attack control. Even those short-of-the-FSCL missions that usually do not directly support the ground component, such as counterair or strategic attack, will normally contact the ASOC/ABCCC for situation updates and deconfliction while in the ASOC's airspace.

The optimum placement of the FSCL varies with specific battlefield circumstances, but typically it should be placed where the capability to produce the preponderance of effects on the battlefield shifts from the ground component to the air component. *In this way, the FSCL placement maximizes the overall effectiveness of the joint force, and each component will suffer the minimum reduction in efficiency.* To place the FSCL so deep or shallow that one component is given complete freedom to operate will usually result in the other components being so restricted that overall joint effectiveness suffers. The proper location for the FSCL may also shift from one phase of the war to the next, depending on the scale and scope of each component's contribution during that phase. FSCL placement must also take into account the ground scheme of maneuver and should be based on *anticipated,* not *current,* ground force positions at the time that the FSCL will be active. *History has shown that placing the FSCL too deep is detrimental to overall joint force effectiveness and may even provide the enemy a sanctuary from effective air attack.*

Under all but the most rapid ground maneuvers, the FSCL should normally be near the maximum operating range of organic artillery and rockets, since beyond that point most of the *"expeditious attack of surface targets of opportunity"* is accomplished by aerospace power. To facilitate a rapidly moving battlefield, a common practice is to establish *"on-call FSCLs"* in advance that can be activated as the ground force moves. In the past, establishing the FSCL along an easily identifiable terrain feature has been critical to success. Modern digitization, along with advanced navigation equipment such as GPS, has reduced the importance of this factor. When possible, however, using obvious terrain features for FSCLs can still prevent errors from happening in the heat and confusion of battle.

The FSCL is as important for planning as execution, particularly since the ATO planners must know where they will have to send their strike packages through TAGS control, where detailed integration is required, and where they will have more freedom to operate. Missions planned beyond the FSCL will normally be flown well beyond the furthest possible extent of friendly ground forces, therefore simply locating the target will be sufficient for attack. Missions attacking targets short of the FSCL will often be required to *positively identify* their targets to prevent fratricide, which can be much more difficult and time consuming. Even the use of procedural deconfliction measures short of the FSCL imparts operating restrictions not normally found beyond the FSCL. New technologies that allow for precision attack through adverse weather, or from long standoff ranges will likewise be limited in their application when friendly ground troops are nearby. All of these factors highlight both the greater effectiveness of attacks beyond the FSCL and the need for some logical fire support coordination measures for the aerospace power planner. In those cases where the ground component commander might elect not to establish a FSCL, the air component will conceivably be able to employ "beyond FSCL" procedures right up to the FLOT. In this case, the zone where the TAGS control missions shrinks considerably. Under such conditions the JFACC would likely establish his own coordinating line at the limit of close proximity, which he would employ much like a FSCL for both planning and employment purposes. *The important point is that by not designating a FSCL the ground commander does not gain more control of counterland assets; instead it reduces the ground commander's ability to coordinate aerospace power not under his control.*

Coordination on the Nonlinear Battlefield

An emerging concept for ground warfare is the nonlinear battlefield, in which rapidly advancing ground forces occupy pockets that may have large distances of open terrain between them, occupied only by the enemy. When such advancing forces move in by air, there will likely be helicopter lines of resupply extending into the friendly rear area. Under such circumstances, the classic linear concepts such as the FSCL may need to be adjusted. *One option is to create a new fire support coordination measure, based on a standardized box, circle, or other easily employed shape, to accomplish the same task that the FSCL performs for the linear battlefield.* By drawing lines around the areas occupied by friendly troops, properly padded for both close proximity and intended scheme of maneuver, there would be large areas left available for more unrestricted "beyond the FSCL" type of air attack (see figure 4.3). This discussion presents the concept of nonlinear coordination in very simple terms, as any real example would be very complex and would require great flexibility.

This allows for more efficient air attack on nonengaged enemy ground forces, such as those at center.

A combination of the two concepts is also possible, such as when a single large advance is made from a classic linear battlefield (see figure 4.4). Here the "standard" FSCL could be used for the slower moving forces, and a localized fire support coordination measure would be created around the rapid advance.

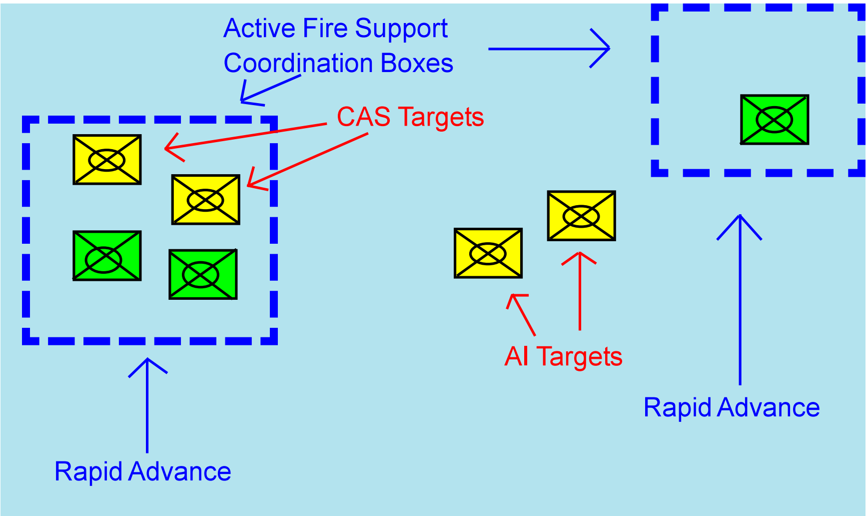

Figure 4.3. Nonlinear Fire Support Coordination Measure

This allows for the greatest freedom of ground and aerial maneuver and enhances combat effectiveness.

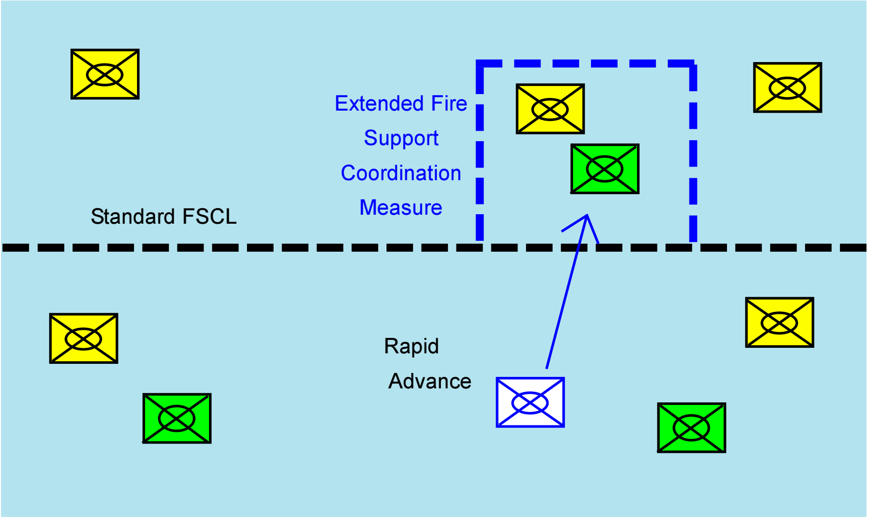

Figure 4.4 Combination of Linear and Nonlinear Fire Support Coordination Measures

AI CONTROL AND COORDINATION MEASURES

The control measures used for AI missions will vary greatly depending on the type of target attacked and whether the target sits beyond or short of the FSCL. For missions flown against preplanned targets beyond the FSCL, which normally comprises the bulk of AI, there are no special requirements for airspace control. Missions will normally check in with a command and control agency such as the airborne warning and control system (AWACS) and monitor a designated strike frequency to and from the target area for threat information and other updates. There may be other forms of AI control that apply under the following circumstances:

✪ **AI Short of the FSCL.** For missions against targets short of the FSCL, the theater airspace control plan (ACP), as implemented in the daily airspace control order (ACO), will normally require contact with the TAGS (typically the ASOC or an ABCCC) for ground situation updates. The plan may also require clearance into specified target areas using procedural control to deconflict with ground maneuver. The TAGS will also provide any available updates to targeting information, which provides flexibility against mobile targets right up to the actual TOT.

✪ **Killbox Operations.** One airspace control measure that has been used successfully in the execution of armed reconnaissance AI missions is the killbox. The killbox is defined as a generic term for airspace control measures used by the theater air control system for controlling air-to-ground operations. Killboxes are complementary to, and do not preclude or conflict with, other fire support control measures, and may be employed on either side of the FSCL. They are often employed through pre-identified map grids that are common to both air and ground components, and can be easily activated and deactivated without confusion. Killboxes provide one way to do counterland targeting in near-real-time against mobile ground forces that defy long range preplanning. The aircrew is normally given a prioritized list of target sets that reflects the desired effects of the mission and may also be provided more detailed target locations if they are available. Killboxes may be combined with sensor-to-shooter targeting data, if available. The authority to activate killboxes, whether inside or beyond the FSCL, rests with the airspace control authority (normally the JFACC); however, concurrence of the ground component is mandatory for activating any box inside the FSCL to ensure that all ground forces are clear of the designated area. Since the ASOC is deployed with the ground force and is normally the TACS element responsible for airspace short of the FSCL, it will typically be the agency which opens and closes killboxes in that zone. An activated killbox is not usually required for missions flown beyond the FSCL, but it is simply one way of providing updated targeting information for those targets whose mobility precludes the normal planning process.

✪ **Airborne Alert AI.** For those circumstances in which a lucrative target has been identified and assets allocated against it, but no precise premission targeting data is available, airborne alert may be justified. This type of AI is flown much like on-call CAS and relies on some type of real- or near-real-time targeting guidance, such as the STS capability provided by JSTARS. Airborne alert can be an inefficient use of assets; if no backup target is provided then the entire mission can be wasted if the primary target fails to appear. Alert AI (often abbreviated XAI in the ATO) might be appropriate when a large enemy push is expected, but the route of advance is not clear ahead of time. It also tends to be used more when there is a lack of lucrative infrastructure targets and direct attack of enemy artillery, armored vehicles, or other ground combat forces is planned. *The use of interdiction assets to patrol for reactive attacks on enemy theater ballistic missiles has been cited as an example of airborne alert AI, although such "Scud CAPs" are correctly categorized as alert offensive counter air (XOCA) missions.*

The key to providing proper control for air interdiction lies in assessing how much flexibility will be required and which C2 assets will be in the best position to provide targeting updates in a timely fashion. For AI against nonmoving targets, very little retargeting will be done and the AOC should retain control of all missions to ensure execution remains focused on theater objectives (except where ASOC control is required for integration with ground maneuver). When the ground situation is fluid, assets such as ASOCs and Killer Scouts may need to be used more for final targeting updates. Furthermore, under such situations, flexible procedures such as armed reconnaissance and killboxes may become more useful. *There is no one best answer to command and control of air interdiction, but a flexible approach that keeps counterland operations focused where needed has proven the most effective approach.*

CHAPTER FIVE

PLANNING AND EXECUTING COUNTERLAND OPERATIONS

> ***We are not preparing the battlefield, we are destroying it***
>
> **Sign posted in the "Black Hole" planning cell during DESERT STORM**

Aerospace power has attributes that allow it to be employed in diverse and multiple combat tasks across the joint operations area. However, there is rarely enough aerospace power available to satisfy all demands. Effective counterland operations call for centralized control and decentralized execution. Centralized control optimizes the use of normally scarce aerospace assets. It also minimizes undue dissipation and fragmentation of effort and ensures coherence and focus on essential JFC objectives. Because no single commander can personally direct all of the detailed actions of a typical complement of assigned and available air forces, decentralized execution of air missions is necessary and is accomplished by delegating appropriate authority for detailed mission planning and execution. *Decentralized execution ensures effective employment of limited assets, allows tactical adaptation, and accommodates the Services' different employment concepts and procedures.*

BASIC PLANNING CONSIDERATIONS

In order to support the JFC's overall theater objectives, the **JFACC integrates all available theater air resources** into a comprehensive joint aerospace operations plan (JAOP) to achieve the designated air component objectives. Typically, air interdiction's main focus is on the operational level and CAS is on the tactical level. Interdiction often overlaps into both the strategic and tactical levels of warfare in that its objectives may be focused on enemy centers of gravity or on immediate support of surface maneuver forces. Interdiction objectives that concentrate at the strategic and operational levels are best expressed as *desired effects* rather than *specific targets*. These desired effects drive targeting decisions by subordinate commanders and aerospace power planners. Examples of operational-level desired effects might be "isolation of the enemy army from its supporting infrastructure" or "battlefield immobility imposed on the enemy ground combat force." *Each of these effects would be achieved through attack of dozens or even hundreds of specific, tactical-level targets.*

In developing the JAOP, planners normally assume that significant resources will be preempted for the **establishment of air and space superiority.** Though counterland operations can be pursued without control of air and space, attrition will likely be much higher with a corresponding drop in operational effectiveness. In most cases, a minimum of local air superiority should be achieved to successfully carry out these operations. Later in the campaign, as theater-wide air superiority is established, multirole aircraft may be shifted from air-to-air operations to provide increased resources for air-to-surface employment. Removing the enemy's weapons-of-mass-destruction (WMD) capability may be a top priority, and once accomplished the forces used for WMD denial may be freed for use against conventional ground force targets. Space control is vital to a host of supporting functions like C2 and ISR, and loss of space superiority through operations in space or at the surface links for controlling space could be devastating to counterland effectiveness.

Basing is also key to counterland planning. Not only will runways and airbase support be required, but also the range to the fight must be considered when assessing the scale of counterland operations to be flown. If threats or base availability drive the operational radius up, increased air refueling will be required. Even if adequate tankers are available, increased mission duration will reduce the total number of sorties that can be flown. The use of dispersed, forward-based assets such as vertical/short takeoff and landing aircraft (V/STOL) fighters and attack aircraft may help in this regard, but dispersed operations then require difficult and time-consuming dispersal of logistics support. Another option is the use of forward operating locations (FOLs) that provide quick turnaround locations for counterland missions increases sortie rates, and reduces the overall strain on the tanker force. *If threats and basing availability allow, FOLs may be employed close enough to the target area to reduce the external fuel tanks requirement and increase the payload/effectiveness per sortie.*

Planning for AI and CAS requires both a concept of operations and a plan for phasing and coordination, normally included as part of the JAOP. How much of the counterland effort will be directed into either AI or CAS depends greatly on the status of friendly surface operations. Early on, if there is little or no ground fighting occurring, the entire effort may fall into theater-wide air interdiction to either destroy the enemy surface force or make it more vulnerable to a follow-on friendly ground offensive. If friendly ground forces are heavily engaged, especially if they are lighter units with limited organic firepower, more CAS may be appropriate to properly support theater strategy. Even when friendly surface forces are heavily engaged with the enemy, proper analysis of enemy vulnerabilities must be accomplished to avoid needless expenditure or diversion of scarce counterland assets. *Tactical immediacy of potential CAS results must be balanced with the greater scope and duration of AI effects. The ground commanders involved must understand that the CAS/AI tradeoff is often a minor disruption of the enemy today versus a major disruption tomorrow.*

Apportionment is the process by which the overall air component effort is divided into various categories, including AI and CAS. The JFACC forwards his apportionment recommendation to the JFC, who is the apportionment authority. The apportionment decision is the fundamental process by which aerospace power is matched against daily theater priorities, including AI and CAS.

Allocation is the process that assigns specific air assets against the apportionment priorities. After allocation, the master air attack plan (MAAP) is created that matches assets against targets. Also occurring after allocation is the distribution process that matches CAS assets against support requests, which should be planned by the ASOC in conjunction with ground force planning. The final step of the process is the actual ATO production, which packages the attacking and supporting assets to achieve optimum effect against the enemy.

The authority to retarget missions that support the overall joint force normally rests with the ACC. For counterland, this typically refers to the bulk of AI that falls under the "theater-wide AI" label. For that portion of AI flown in direct support of a specific ground unit, and for most CAS, the authority to retarget missions is normally delegated to the ASOCs who can best respond to fluid changes in the battlefield situation and the changing needs of the ground component. *When a significant amount of AI is expected to target the enemy short of the FSCL, or otherwise come under the control of the ASOC, it may be best to delegate to the ASOC some authority to rerole missions between CAS and AI short of the FSCL.*

It cannot be overemphasized that proper counterland planning, as with all air component planning, requires a full consideration of the capabilities and limitations of aerospace power during the initial development of overall theater strategy. Historically, theater campaign planners have taken a land-centric view of how the campaign should unfold through its various phases, then examined how airpower would support it. *This approach is no longer valid, and true joint planning requires that all components be equally involved in planning the various stages of a military campaign.* How counterland fits into the larger picture of a *specific* strategy will depend on numerous variables, but there should be no preconceived notions about the decisiveness of any one component. Instead of *individual component decisiveness,* it is better to plan in terms of the *required components of a decisive joint force*. Likewise, friction and the fog of war should never be ruled out. Any plan that assumes perfect knowledge of the enemy is doomed to failure; proper counterland planning must provide some last-minute flexibility for reaction to unanticipated enemy movement.

AIR-GROUND SYNERGY

A quick survey of the various types of ground maneuver reveals some insight as to how counterland operations should be employed when directly supporting the ground battle. The same survey yields some lessons for employing ground forces when aerospace power provides the bulk of battlefield effects on the enemy. The important question is not so much which component is the more decisive but how best to combine the available aerospace and surface combat power for the quickest, cheapest victory.

During the **movement to contact** by ground forces, there is little or no close combat between friendly and enemy ground units. Counterland's main contribution during this phase is air interdiction, to destroy or disrupt the enemy forces that will subsequently be engaged by friendly ground units. Enemy second echelon forces are also valuable targets in this phase, when AI seeks to isolate the enemy front-line units from their support and reinforcements. The Army will make good use of organic rotary-wing assets to screen ahead and to the flanks during movement to contact, a task that can be supplemented by fixed-wing counterland assets when needed.

Meeting engagements occur when friendly and enemy ground forces engage while both on the move. **Hasty attacks** occur with little time for detailed planning, typically within 24 hours of first contact with the enemy. In both of these modes of ground combat, there may not be time for the normal target nomination and air component apportionment processes to occur before missions must be flown. Depending on the amount of air support required, and other theater priorities for aerospace power, missions may be diverted or reroled to fly CAS or AI missions. Since preplanned targets may not be available, counterland assets may be forced into greater use of airborne alert or general grid box target locations for AI missions. Flexibility will be paramount, as enemy vulnerabilities may appear on short notice that aerospace power can capitalize on. *Under these circumstances it is especially important for the ASOCs and TACPs to stay tightly integrated with their ground component counterparts, as confusion over both friendly and enemy troop positions and movements is likely.* A hasty ground engagement may often be the result of a desire to attack quickly to surprise the enemy, so they will likely be suffering from the same short-notice reaction that affects friendly planning and air-ground coordination. When significant friendly counterland assets are not available or when air superiority has not been achieved, the friendly ground force should be cautious about schemes of maneuver that increase the likelihood of meeting engagements or hasty attacks, unless sufficient organic surface firepower exists to deal with the enemy force.

A **deliberate attack** occurs when adequate time for planning and coordination exists; this is the preferred mode of ground advance. Air and ground components will have time for properly detailed coordination, establish on-call FSCLs, nominate appropriate AI targets to achieve desired battlefield results, and ensure air superiority that minimizes the enemy's use of air to support their own army.

Exploitation of breakthroughs into the enemy rear, possibly combined with the use of airborne or air assault forces, achieves maximum disruption when combined with counterland aerial maneuver. Integrated air-ground operations against the enemy, possibly over a multiphased offensive, require the advance planning that only a deliberate attack provides. The need for both flexibility and close coordination between air and ground components grows as friendly ground forces push deeper into enemy territory. The rate of ground advance must continually be balanced with the effectiveness of air attack in achieving theater objectives and with the relative merits of ground versus aerospace maneuver as they come into play. *Proper advancement of the FSCL is one of the key issues during rapid ground advance as the factors of aerospace power effectiveness, potential fratricide, and freedom of ground maneuver are weighed.*

A **spoiling attack** is launched from a defensive position to disrupt a forming enemy offensive and may act to divert enemy attention from the main ground offensive to be launched elsewhere. Since disruption of the enemy is the main objective, the use of counterland can contribute greatly to success. Enemy forces may be particularly vulnerable while marshalling for an attack, and second-echelon forces may be more vulnerable to AI while moving up to reinforce an enemy offensive. Successful interdiction of enemy exploitation forces may persuade the enemy to call off an attack, since they would then have no ground force to consolidate any gains.

Mobile defense is a concept in which friendly ground forces use fire and movement tactics over a given area to slow and disrupt the enemy advance. Aerospace power's greatest contribution to mobile defense may be in shallow AI to slow the enemy's movement through destruction of POL, lines of communication, and other infrastructure targets whose destruction will guarantee that friendly ground forces retain greater mobility than the enemy. *In mobile defense both the friendly and enemy positions can become difficult to accurately track, and the ASOCs and TACPs again become a critical link when heavy CAS is required.* The risk of fratricide will increase during mobile operations, so organic surface firepower should always be used when available.

Area defense is more static, and involves a direct confrontation with the enemy along a defensible line of contact. Under these circumstances counterland missions can be flown in closer proximity to ground forces with reduced chance of fratricide, and the more static nature of the conflict will reduce the impact of attacks on enemy mobility. Enemy ammunition stocks, artillery tubes, and rocket launchers may become higher priority targets for AI and CAS during area defense. *If air superiority is challenged or lost, friendly surface forces in static positions will likely become very vulnerable to enemy air and missile attack, since fixed ground positions are vulnerable to a lower level of aerospace technology than mobile forces.*

TARGETING

Once potential targets are identified, intelligence provides precise location of individual target elements, status of defenses, and other information necessary for the detailed planning of counterland missions. Modern warfare is dynamic and demands that friendly forces adapt their methods to cope with enemy responses. In most interdiction operations, there is a period of delay from the action until an effect is observed. Care should be taken in choosing targets that provide timely payback for the resources and effort expended. The ability to detect, assess, and properly choose targets is a function of several attributes discussed in the following paragraphs.

The suitability of a target set for attack is often decided by a combination of its criticality and vulnerability. For example, fewer conveyances and depots in an enemy transportation system increases the enemy's dependence on that system; therefore, each potential target in that transportation system becomes more critical. Conversely, an enemy possessing a varied, dispersed transportation system is less operationally vulnerable to infrastructure interdiction. Tactical vulnerability refers to the ease of attacking a particular target, based on hardening, defenses, etc., once it has been identified that the attack will produce the desired effects. Tactical vulnerability is important, as the benefit of attacking a target must be balanced against the expected cost. Timing is also key to a particular target's criticality to the enemy. For example, rotary-wing forces typically operate from forward arming and refueling points (FARPs) that are mobile and thus not exceedingly hardened. Catching an enemy helicopter force at such a location could yield high payoffs in terms of both forces and infrastructure destroyed. When marshalling for an attack, or deploying for transport to the forward area, ground combat units may be exceedingly vulnerable for short periods. *The enemy may risk this temporary vulnerability in order to get their forces into combat, but proper friendly intelligence can create opportunities for high payoff attacks by allowing planners to focus on the exact time of maximum enemy vulnerability.*

Mobile targets will normally require a different approach than fixed targets, whether attacking actual enemy combat forces or their fielded support. Modern sensors such as moving target indicators can often locate and compute accurate bombing solutions for any moving vehicle on a battlefield, and the heat generated by operating engines and equipment often makes mobile units easily located by either onboard sensors or precision-guided munitions. In some theaters, the JAOC employs a *mobile target working group* to ensure planning both maximizes the effectiveness

> ***The lesson for the air and theater commander is that a delay always exists between cause and effect. If the commander is sure that the war will be decided before an effect can be felt from a given action, then it is pointless to waste resources on carrying it out.***
>
> **Colonel John A. Warden III, USAF**

of counterland attack on mobile targets and integrates the effort with the ground scheme of maneuver. **Fixed targets** may be harder to identify with onboard sensors and may be more hardened against weapons effects, but their fixed nature makes target location easier and simplifies targeting by weapons such as GPS-aided bombs or missiles.

Target area **environmental conditions** include terrain features, adverse weather, time of day/night, humidity and temperature effects, and active or passive defense measures (such as smoke and camouflage). These may act to conceal targets, reduce visibility, and degrade weapon systems and overall counterland capabilities. Lunar illumination and weather conditions can drastically affect the ability of onboard sensors to both locate and identify targets. Terrain features may restrict target acquisition in some bandwidths, thus requiring specialized weapons, sensors, and tactics. The flexibility of different sensors and munitions that allow use of optical, near and far spectrum IR, radar, and GPS for target acquisition, marking, and weapons guidance gives the counterland planner many options to counter the natural and artificial obstacles to success.

Weapons effects are always a critical part of targeting for counterland. Some munitions and fuzes are designed for very specific applications and are very effective against certain targets with little or no capability against others. Good intelligence data on target specifics is vital to the proper matching of munition to target. Likewise, the flexibility of some munitions and fuzes to provide multiple effects allows planners options for maximum effect against preplanned targets, and in many cases allows inflight selection of weapons/fuze effects for nonpreplanned targets. *The latter capability is especially important for CAS and flexible AI, when the specific target type is not normally known prior to takeoff.*

Rules-of-engagement (ROE) may dictate the use of certain procedures, tactics, or munitions that can or cannot be used in a given situation. Collateral damage should always be minimized, and under some circumstances it becomes the primary planning factor. The Law of Armed Conflict (LOAC), US law, DOD directives, US policy, and Service regulations guide the procedures, tactics, or munitions that can be used in given situations. Planners apply this direction (sometimes given in the form of ROE) and the principles of discrimination, military necessity, unnecessary suffering, and proportionality when making decisions concerning targets. Commanders and planners must always remain aware of the risk to aircrews that may flow from decisions that restrict munitions and tactics. Weapons accuracy, reliability, damage radius, and other factors come into play; under some circumstances operations will only be executed under conditions that allow visual identification of the aim point. *Collateral damage is very difficult to reduce beyond a certain level, especially in cases where the enemy uses the same infrastructure to support both their fielded army and civilian populace.*

This P-47 THUNDERBOLT demonstrates mission flexibility with its mixed load of bombs, rockets, and .50 caliber machine guns. The ability to provide a variety of weapons effects, when and where needed, was a major part of counterland success in World War II.

Special Instructions (SPINS) are another method the JFACC uses to provide guidance to his tactical units. SPINS will be based on various requirements that impact mission execution, such as routing restrictions, procedures, tactics, or other guidance that affects how counterland aircrews accomplish their missions. SPINS are commonly used to provide execution details to individual missions that are not found in the normal air tasking or airspace control order data. SPINS also affect how the TAGS controls aerospace power and provide the ground component with an understanding of why the ASOCs and TACPs might employ in certain ways.

Conducting **urban counterland operations** adds additional difficulties peculiar to that environment. Collateral damage in cities or towns that have not been evacuated will represent a great risk that must be considered and minimized. CAS will be difficult when supporting house-to-house ground fighting, where the task of locating and identifying friendly positions may prove highly demanding. Locating the proper enemy targets will also be more difficult, and the obstructions due to multistory structures will hamper both sensor and weapon line-of-sight. Techniques such as overlaying tactical charts and local street maps may prove useful in identifying enemy and friendly positions. Urban CAS requires increased reliance on friendly ground forces to locate and mark targets, since enemy combat units will often be concealed inside buildings. Aircrew will

In addition to performing the standard air interdiction and close air support roles, attack helicopters can be valuable SEAD platforms (as demonstrated on the first night of DESERT STORM, when they opened a hole in the Iraqi air defenses).

have to pay extra attention to detail on attack and designation axes; the problem may be similar to attacking enemy forces in steep mountainous terrain. Munitions effects will vary greatly depending on whether the enemy can be attacked in the open versus inside buildings, requiring both patience and flexibility for mission success. *The AC-130 gunship has proven particularly effective in many urban operations, with its combination of endurance, precision accuracy, and wide range of onboard sensors.*

Target defenses may distract aircrews and hamper their ability to identify and attack targets. Detection assets like JSTARS, or intelligence sources such as human intelligence (HUMINT) and imagery intelligence (IMINT) will often enhance target acquisition capability. However, enemy air defenses may still hamper the aircrews' ability to visually acquire their targets, due to required high speeds, low or very high altitudes, or restricted ingress routing necessary to minimize the risk of engagement. Effective force packaging can negate the impact of enemy air defenses and achieve temporary local air superiority. A longer-lasting effect is achieved by first eliminating or negating enemy surface-to-air defenses as part of an overall air superiority operation. Many current SEAD assets are multirole, and once the bulk of the enemy surface-to-air defense has been eliminated these forces can be reroled into the main counterland effort. Missions against CAS targets can often use ground force artillery, rockets, and attack helicopters to suppress enemy air defenses, which also frees fixed-wing assets to directly attack the primary targets. The ground component also possesses a limited capability to suppress enemy air defenses at longer ranges through the use of ATACMS and attack helicopter assets.

PLANNING FLEXIBILITY

When planning to directly attack mobile combat forces, flexibility is critically important. Ground combat forces are usually mobile, and even the best intelligence may not be able to predict where the enemy unit will be two or three days in the future. The enemy army may not maneuver as predicted, resulting in different target priorities and locations than planned. A large enemy ground formation of battalion or brigade size does not lend itself to a single set of target coordinates and may be more easily attacked if its location is identified by an area designator such as a grid box. Designating target areas allows the use of killboxes for armed reconnaissance AI, within which the attacking aircraft may have additional targeting data from premission intelligence, Killer Scouts, UAVs, or other offboard sources. Ground-nominated requests must be based on *validated targets;* it is an extreme waste of valuable aerospace assets to request attacks based on non-updated templated information.

Ground-nominated air interdiction targets are not often presented in the standardized "basic encyclopedia" (BE) number designation, which is another reason to retain flexibility in counterland planning. If the ground component needs a particular enemy unit attacked, and that unit meets the requisite priority criteria, planners must ensure that *particular* enemy unit is affected to the level required. This requires the AOC planners to maintain awareness of that enemy unit's position as it moves a task that may involve the BCD. Instead of concern over a particular enemy unit, the friendly ground component may have a certain geographic area of concern to its scheme of maneuver. In this case, the friendly ground force requires an attack on *any* enemy forces that happen to be there. Planning methods must therefore allow for either an area or unit-specific focus for AI targeting, especially for ground-nominated targets. Attacks against large ground forces are most effective when prioritized targeting guidance is included in the nomination, such as artillery first, armor second, etc. When possible, however, air support can be most effective when the ground component specifies broad effects desired on an enemy unit, such as "delay enemy XX Brigade 72 hours from achieving contact" or "fix enemy YY Division in place for 48 hours." *The air-ground system works best when the ground component requests overall battlefield effects, rather than* *specific targets, due to the greater ability of the air component to analyze the enemy force for proper aerospace power targeting.*

During the initial planning process, before the actual ATO is put into production, **justified changes to targets and targeting priority can be incorporated.** Once the ATO is put into final production, approved changes are typically passed on to the combat operations division for incorporation either at tactical unit level planning or during actual mission execution. If the enemy ground force does move to an unexpected location, it is not likely to have moved far enough to require much repackaging of counterland missions. This allows for a relatively simple retargeting of a given flight or strike package to the new target location. *Any changes must account for differing air defenses, proximity to friendly ground forces, and other factors before final approval.*

For those missions where lucrative targets are highly likely, but preplanned locations are not available, **airborne or ground alert** may be appropriate. This is the most common method employed for CAS, where there is typically not a preidentified target prior to mission execution. Airborne alert AI can be used to provide up-to-the-last-minute flexibility, where final targeting guidance comes from offboard sources such as JSTARS. Airborne alert missions should only be planned when lucrative targets are likely to exist, otherwise the missions will be wasted. The "push" system of providing preplanned backup targets for both CAS and AI alleviates this problem to some extent; this procedure gives each mission a fixed target of some military value in case the primary target fails to materialize.

COUNTERLAND ASSESSMENT

Once planning and execution have taken place, assessment of the effectiveness of counterland operations occurs to measure effectiveness and recommend future action. Assessment occurs at the tactical, operational, and strategic levels and is accomplished in some form or another by almost every part of the counterland force.

Combat Assessment

According to joint doctrine, combat assessment consists of **battle damage assessment (BDA)**, **munitions effectiveness assessment (MEA),** and a **reattack recommendation.** In general terms, combat assessment measures how effective a particular attack was in achieving a specific result on a specific target. It may measure, for example, numbers of tanks destroyed or damaged, and to what level they were damaged. The reattack recommendation that grows out of combat assessment is typically based on whether the weapons employed hit the target or not and whether the damage achieved was as great as planned or not.

BDA starts with **inflight** and **postflight aircrew reports,** whether the mission is AI or CAS. FAC(A) inflight BDA of CAS results is often more accurate than that reported by CAS pilots, due to the fact that the FAC(A) will usually have had the target area under observation for a longer time and may have had the benefit of observing the results of several CAS flights in succession. Ground observation of mission results is often available for CAS BDA, and in some cases deep observation teams can provide BDA for AI missions.

Emerging technology may greatly impact the scale and timeliness of BDA. The growing use of UAVs may result in real-time video assessment of target destruction, and new weapons may include self-contained sensors that provide BDA to the attacking aircraft or other collection assets. Improvements in BDA must keep pace with improved weapons technology. For example, the new generation of GPS-assisted weapons will allow precision attack of nonmoving targets (and moving targets with proper moving target indicator (MTI) radar) through the weather. However, aircraft attacking through the undercast will *not* be able to provide the kind of immediate BDA feedback that has come to be expected when employing laser-guided bombs. Overhead imagery may also be available for mission BDA but is usually restricted to a limited number of targets and should therefore be focused where BDA is needed most. *Being able to destroy targets is only half of the equation; unless that destruction is confirmed through BDA the question of reattack requirements will remain open.*

Operational Assessment

Although not yet a standardized joint term, *operational assessment* is often referred to as the operational-level assessment of friendly operations against the enemy. It occupies a higher level than combat assessment and includes the overall analysis of enemy operations, their reaction to friendly operations, and recommendations for changes or adjustments to friendly strategy based on overall observations. Operational assessment builds on the daily observations and recommendations of combat assessment and identifies such things as when phase objectives have been met and when friendly operations should proceed to the next phase of the campaign.

As an example, in a halting operation against an advancing enemy ground force, combat assessment would yield individual mission results and recommendations for the next ATO cycle. Operational assessment would determine if and when the enemy force as a whole has been stopped, which would likely allow friendly operations to proceed to a new phase. Operational assessment would also monitor suspected enemy intentions and what changes to their operational plan might result from a successful decisive halt. *In general terms, combat assessment measures the effectiveness of the counterland operation, while operational assessment measures how the effects of counterland operations relate to the overall theater strategy.*

Another key part of operational assessment is to maintain a **long-term evaluation of the enemy's efforts to repair or circumvent the damage and disruption caused by friendly counterland operations.** It is not realistic to expect, for example, the battlefield isolation effects of a theater-wide AI campaign to stand for long without a certain "maintenance level" of continued AI attacks. Planning for subsequent phases of the campaign must include those assets required to sustain the effects from earlier phases for the required duration.

SUPPORTING COUNTERLAND OPERATIONS

Both air interdiction and close air support operations require the **full spectrum of support,** from logistics to force protection to administrative services. Logistics and other combat support is a key enabler to counterland operations. Key factors affecting logistics supportability include force beddown and base support planning, deployment and sustainment of munitions and fuel, and maintenance support for critical spares. A robust air mobility capability, especially for intratheater movement, is critical for getting this logistical support to the bases that require it. *As the Air Force moves to increasingly expeditionary operations, these key support issues assume even greater importance.* This section highlights some of the support aspects that are particularly important to the counterland function.

Munitions Requirements

As the arsenal of precision-guided munitions that can be employed in counterland continues to grow, maintaining proper stocks

at operating locations becomes increasingly important. There will usually be tradeoffs involved in deciding which weapons to employ against specific targets, and availability will often be a factor. Proper knowledge of the munitions available at each air base, carrier battle group, etc., along with their weapons resupply capability, is mandatory. Those munitions with the greatest potential for accuracy, destructiveness, or standoff range are often in the shortest supply. *Targeteers and weaponeers should keep in mind factors such as anticipated length of the campaign, munitions needs of the various campaign phases, and tradeoffs of each weapons type when making munitions recommendations.*

Air Refueling

US Air Force air refueling aircraft have evolved from their traditional role of supporting long range strategic attack to become an essential, integrated part of counterland force packaging. Tanker aircraft are a force multiplier that enhances, or in some cases enables, counterland operations by allowing access to a wider range of targets and payloads. Station times will be increased for airborne alert AI and CAS missions, providing decreased response times and increasing the counterland effect on the enemy. One of the key tasks for ATO production teams is to optimize use of the available tankers; *availability of refueling booms and drogues is often the limiting factor that determines how many counterland targets can be attacked in a given cycle.*

While technically a "support" asset, air refueling has become such an integrated part of counterland force packaging that it would be difficult to imagine operating without the enhanced capabilities it provides. For example, enemy antiship defenses may force an aircraft carrier to standoff from the counterland area, requiring Air Force refueling support to get carrier aviation to the fight. When air superiority is in dispute, and enemy aircraft and missiles threaten air bases close to the ground fighting, *air refueling may be the only way to get counterland missions to the fight from protected bases further to the rear.*

CHAPTER SIX

TRAINING AND EDUCATION

Interservice operations inescapably pose grave difficulties in execution. In no area of interservice operations is this phenomenon been more pronounced than in the matter of close air support. . . Surprisingly, the processes and procedures by which success was achieved, usually belatedly, in each war in which the United States had been engaged for more than two generations, were largely forgotten by the armed forces by the time they again became actively involved in fighting. This strongly indicates defects in the way the military establishment has provided itself with an institutional memory.

Major General I. B. Holley, Jr,
Case Studies in the Development of Close Air Support

"Train like you fight" is the prevailing training philosophy in the United States Air Force. This strongly applies to counterland, as the various interconnected parts that comprise this capability must be trained and thoroughly exercised by all parties if success in combat is to be achieved. The orchestration required by the air and ground components in the CAS environment make it possibly the most difficult mission performed by the US Air Force.

The US Air Force has a checkered history when it comes to preserving counterland expertise between periods of open conflict. While the end of World War II, the Korean War, and the war in Vietnam each saw AI and CAS procedures honed to a fine art, the period after each of those conflicts saw a marked decline due to other priorities. CAS expertise, with its complicated requirements on both the air and ground component sides, tended to decay especially rapidly when continued training was not there. *Fortunately, as the extremely successful application of both AI and CAS in DESERT STORM illustrates, this trend appears to have been reversed.*

TRAINING

The main reason for the success of counterland operations is the dedication to realistic training in both the air and ground components. While there is always room for improvement, the forces that went into battle in Kuwait and Iraq had considerable training in multinational employment of aerial and ground maneuver. Exercises such as Red Flag and Air Warrior allow AI and CAS missions to be practiced in realistic environments, with realistic threats. In addition, adequate AOC representation at the higher level Army Warfighter exercises is critical to ensure air component operations are accurately portrayed and integrated with the ground scheme of maneuver. This prevents aerial maneuver from being just a "scripted" portion of the exercise. Army combat training at locations such as the National Training Center (NTC), Joint Readiness Training Center (JRTC), and other field exercises almost always includes CAS operations and provides opportunities to practice and refine the planning and request procedures for air support.

As air and ground warfare becomes more digitized, and datalinks become a preferred method of passing information between forces, continued training becomes even more critical. *The only way to ensure proper connectivity between systems, in a true tactical environment, is to practice with them under operational conditions.* Digital connectivity between TACP and CAS aircraft is a definite improvement and speeds information flow with reduced risk of error, but it must be practiced to ensure the connectivity will be there when needed. Since no system is 100 per cent reliable or unjammable, backup procedures must be exercised. *Digital and other connectivity links for counterland missions must be practiced, among all of the potential sensors, battle managers, and shooters, if they are to succeed in combat.*

Counterland training is often difficult to fully accomplish in peacetime, since it requires both an attacking air component and ground forces on both sides of the FLOT. Typically, both air and ground components do most of their training in a "part-task" environment that replicates only certain tasks within the overall mission. As long as the shortcomings of daily training are recognized, and full-scale exercises held often enough to expose all counterland players to near-actual battlefield conditions, proficiency can be maintained. *The cost, in both personnel and money required, will always limit the opportunities for true large-scale counterland exercises.*

Computer simulations can help to fill the gap, especially where planning staffs are concerned. While not a valid wholesale replacement for actual field training exercises, computer replication can and does lead to authentic replication of large forces on and over the battlefield, often down to the individual tank, bridge, and aircraft. The key for counterland planners in such exercises is to accurately model the nodal and cascading effects of air attack against enemy infrastructure and not focus solely on aircraft-against-tank warfare. Many ground-centric exercises do exactly this, and treat all counterland as simple flying artillery (some ignore even the possibility of interdiction, limiting all effects from aerospace power to the "close proximity" environment). Likewise, adequate ground representation, including *human* input in the command roles, is critical to ensure that ground maneuver is more than just a scripted set of enemy targets to bomb and friendly forces to avoid. Blue Flag, one of the key Air Force planning-level exercises, is moving in this direction to provide AOC staff members a realistic training environment.

Training at both the planning and execution levels is greatly enhanced when the units that will fight together are able to train together. In counterland operations, this often means that forces from different components that comprise a joint task force (JTF) should seek opportunities to train together before actual operations commence. *When time and conditions permit this training, a common level of trust and expertise is achieved that is not possible otherwise.*

EDUCATION

All players in the counterland environment, from the ground commander nominating targets to the planning cell members to the pilots flying the sorties, need to understand the various factors at play in AI and CAS. Not all ground forces are the same; light units such as airborne or amphibious units physically cannot bring as much organic firepower to the battle as other forces, therefore they need more close support on the battlefield. US Army rotary-wing aviation is treated much as a ground maneuver unit and is often more vulnerable to CAS-environment threats than fixed-wing aircraft. Ground commanders must be educated on the inherent flexibility of the aerospace planning and execution process and must understand that air support comes in many forms other than just CAS. Perhaps most important for the ground commander to understand is that CAS is not something to be directed anywhere on the battlefield, *but that both US Air Force and joint doctrine call for it to be used strictly in "close proximity" to ground forces.*

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Glossary

Abbreviations and Acronyms

AAA	antiaircraft artillery
AAGS	Army air-ground system
ABCCC	airborne battlefield command and control center
ACC	air component commander
ACO	airspace control order
ACP	airspace control plan
AFARN	Air Force air request net
AI	air interdiction
ALO	air liaison officer
AO	area of operations
AOC	aerospace operations center
ASOC	air support operations center
ATACMS	Army tactical missile system
ATACS	amphibious tactical air control system
ATO	air tasking order
AWACS	airborne warning and control system
BCD	battlefield coordination detachment
BDA	battle damage assessment
BE	basic encyclopedia
BVR	beyond-visual-range
C2	command and control
CAOC	combat air operations center
CAP	combat air patrols
CAS	close air support
CFACC	combined force air component commander
COG	center of gravity
COMAFFOR	Commander, Air Force Forces
CSAR	combat search and rescue
CTAPS	contingency theater automated planning system
DASC	direct air support center
EO	electro-optical
EW	electronic warfare
FAC(A)	airborne forward air controller
FARPS	forward arming and refueling points
FOL	forward operating locations
FSCL	fire support coordination line

FSE	fire support element
GLO	ground liaison officer
GPS	global positioning system
HUMINT	human intelligence
IADS	integrated air defense system
IMINT	imagery intelligence
INS	inertial navigation system
IO	information operations
IR	infrared
ISR	intelligence, surveillance, and reconnaissance
JAOC	joint air operations center
JAOP	joint air operations plan
JDAM	joint direct attack munition
JFACC	joint force air component commander
JFC	joint force commander
JMEM	joint munitions effectiveness manual
JOA	joint operations area
JRTC	joint readiness training center
JSTARS	joint surveillance, target attack radar system
JTF	joint task force
LANTIRN	low-altitude navigation and targeting infrared for night
LOAC	law of armed conflict
LOC	lines of communications
MAAP	master air attack plan
MACCS	Marine air command and control system
MEA	munitions effectiveness assessment
MOOTW	military operations other than war
MTI	moving target indicator
MTW	major theater warfare
NTACS	Navy tactical air control system
NTC	national training center
OPCON	operational control
PGM	precision-guided munition
POL	petroleum, oils, and lubricants
ROE	rules of engagement

SAM	surface-to-air missile
SEAD	suppression of enemy air defense
SOF	special operations forces
SOTAC	special operations terminal attack controller
SPINS	special instructions
STS	sensor-to-shooter
TAC	terminal attack controller
TACON	tactical control
TACP	tactical air control parties
TACS	theater air control system
TAGS	theater air-ground system
TBMCS	theater battle management core system
TOT	time-on-target
UAV	unmanned aerial vehicle
V/STOL	vertical/short takeoff and landing aircraft
WMD	weapons of mass destruction

Definitions

air interdiction. Air operations conducted to delay, divert, disrupt, or destroy 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. (Proposed update to the current definition in Joint Pub 1-02)

air liaison officer. An officer (aviator/pilot) attached to a ground unit who functions as the primary advisor to the ground commander on air operation matters. (Joint Pub 1-02)

boundary. A line which delineates surface areas for the purpose of facilitating coordination and deconfliction of operations between adjacent units, formations, or areas. (Joint Pub 1-02)

campaign. A series of related military operations aimed at accomplishing a strategic or operational objective within a given time and space. (Joint Pub 1-02)

campaign plan. A plan for a series of related military operations aimed at accomplishing a strategic or operational objective within a given time and space. (Joint Pub 1-02)

centers of gravity. Those characteristics, capabilities, or localities from which a military force derives its freedom of action, physical strength, or will to fight. (Joint Pub 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.** (Joint Pub 1-02)

close proximity. As used in relation to close air support, close proximity refers to the distance within which some form of terminal attack control is required for targeting direction and fratricide prevention. (Proposed for inclusion in Joint Pub 1-02)

counterland. Operations conducted to attain and maintain a desired degree of superiority over surface operations by the destruction, disrupting, delaying, diverting, or other neutralization of enemy forces. The main objectives of counterland operations are to dominate the surface environment and prevent the opponent from doing the same. (AFDD 1)

detailed integration. As used in relation to close air support (CAS), detailed integration refers to the level of coordination required to achieve the desired effects without overly restricting CAS attacks, surface firepower, or the ground scheme of maneuver. It is also necessary to protect aircraft from the unintended effects of friendly surface fire. The maximum range requiring detailed integration is typically bounded by the range at which organic surface firepower provides the preponderance of effect on the enemy. (Proposed for inclusion in Joint Pub 1-02)

direct control. A form of positive control, direct control will be used whenever possible. It occurs when the terminal controller is able to observe and control the attack. (Joint Pub 3-09.3)

enlisted terminal attack controller (ETAC). ETACs are members of the tactical air control party (TACP), provide flexibility for the air liaison officer (ALO) by also being qualified to perform terminal control and assist in liaison functions. (Joint Pub 3-09.3)

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. (Joint Pub 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).** (Joint Pub 1-02)

indirect control. Indirect control is not the preferred method of positive control. It is used when a terminal controller cannot observe the attack but is in contact with someone who is in an observation position. The terminal controller can issue clearance or abort the attack based on information from the observer. This form of control must be authorized by the surface force commander. (Joint Pub 3-09.3)

interdiction. An action to divert, disrupt, delay, or destroy the enemy's surface military potential before it can be used effectively against friendly forces. See also air interdiction. (Joint Pub 1-02)

joint. Connotes activities, operations, organizations, etc., in which elements of two or more Military Departments participate. (Joint Pub 1-02)

joint doctrine. Fundamental principles that guide the employment of forces of two or more Services in coordinated action toward a common objective. It will be promulgated by the Chairman of the Joint Chiefs of Staff, in coordination with the combatant commands, Services, and Joint Staff. (Joint Pub 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.** (Joint Pub 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.** (Joint Pub 1-02)

Killbox. A generic term for airspace control measures used by the theater air control system for controlling air-to-ground operations. An active killbox signifies: 1) airspace potentially occupied by attack aircraft, 2) underlying surface zone that contains known or suspected enemy targets, 3) underlying surface zone known to be clear of friendly forces. Killboxes are complementary to, and do not preclude or conflict with, other airspace control measures. (proposed for inclusion in JP 1-02)

Killer Scout. Armed fighters or attack aircraft used for air interdiction, typically in an armed reconnaissance role, to validate and mark targets for dedicated attack missions against lucrative targets in a specified geographic zone. Killer Scouts are normally used as part of the C2 interface to coordinate multiple flights, identify or neutralize targets and enemy air defenses, and provide battle damage assessment (BDA).

maneuver. 1. A movement to place ships or aircraft in a position of advantage over the enemy. 2. A tactical exercise carried out at sea, in the air, on the ground, or on a map in imitation of war. 3. The operation of a ship, aircraft, or vehicle, to cause it to perform desired movements. 4. Employment of forces in the battlespace* through movement in combination with fire, or fire potential, to achieve a position of advantage in respect to the enemy in order to accomplish the mission. (Joint Pub 1-02)

** The USAF has proposed changing the word "battlefield" to "battlespace," as it more accurately reflects maneuver warfare in all mediums. Otherwise this reflects the JP 1-02 definition.*

military operations other than war. Operations that encompass the use of military capabilities across the range of military operations short of war. These military actions can be applied to complement any other combination of the other instruments of national power and occur before, during, and after war. Also called **MOOTW.** (Joint Pub 1-02)

mission type order. 1. Order issued to a lower unit that includes the accomplishment of the total mission assigned to the higher headquarters. 2. Order to a unit to perform a mission without specifying how it is to be accomplished. (Joint Pub 1-02)

operational art. The employment of military forces to attain strategic and/or operational objectives through the design, organization, integration, and conduct of strategies, campaigns, major operations, and battles. Operational art translates the joint force commander's strategy into operational design, and, ultimately, tactical action, by integrating the key activities at all levels of war. (Joint Pub 1-02)

operational control. Transferable command authority that may be exercised by commanders at any echelon at or below the level of combatant command. Operational control is inherent in combatant command (command authority). Operational control may be delegated and is the authority to perform those functions of command over subordinate forces involving organizing and employing commands and forces, assigning tasks, designating objectives, and giving authoritative direction necessary to accomplish the mission. Operational control includes authoritative direction over all aspects of military operations and joint training necessary to accomplish missions assigned to the command. Operational control should be exercised through the commanders of subordinate organizations. Normally this authority is exercised through subordinate joint force commanders and Service and/or functional component commanders. Operational control normally provides full authority to organize commands and forces and to employ those forces as the commander in operational control considers necessary to accomplish assigned missions. Operational control does not, in and of itself, include authoritative direction for logistics or matters of administration, discipline, internal organization, or unit training. Also called **OPCON.** (Joint Pub 1-02)

operational level of war. The level of war at which campaigns and major operations are planned, conducted, and sustained to accomplish strategic objectives within theaters or areas of operations. Activities at this level link tactics and strategy by establishing operational objectives needed to accomplish the strategic objectives, sequencing events to achieve the operational objectives, initiating actions, and applying resources to bring about and sustain these events. These activities imply a broader dimension of time or space than do tactics; they ensure the logistic and administrative support of tactical forces, and provide the means by which tactical successes are exploited to achieve strategic objectives. See also **strategic level of war**; **tactical level of war.** (Joint Pub 1-02)

positive control. A form of terminal close air support control in which the terminal controller (or an observer in contact with the terminal controller) is in a position to visually observe the attacking aircraft and target, and receive verbal confirmation that the objective/mark is in sight from the attacking pilot/aircrew prior to commanding "cleared hot." (Joint Pub 3-09.3)

psychological operations. Planned operations to convey selected information and indicators to foreign audiences to influence their emotions, motives, objective reasoning, and ultimately the behavior of foreign governments, organizations, groups, and individuals. The purpose of psychological operations is to induce or reinforce foreign attitudes and behavior favorable to the originator's objectives. Also called **PSYOP.** (Joint Pub 1-02)

pull CAS. Alternative distribution technique that requires formal requests from TACPs for CAS support,used when the decisive point on the battlefield cannot readily be determined. CAS missions may be scheduled to the ASOC contact point or placed in on-call status. The ASOC "holds" the missions, and sends them forward to an approved target following TACP request and coordination at each Army echelon.

push CAS. A proactive distribution technique designed to concentrate CAS effects at the decisive point on the battlefield without a formal request. After CAS missions are allocated and flown as either scheduled or on-call sorties, the ASOC "pushes" the aircraft forward to the TACP based on the corps commander's weight of effort decision before receiving a formal CAS request.

reasonable assurance. A level of close air support release authority, reasonable assurance is a risk assessment by the joint force commander with concurrence from subordinate joint or component commanders who are either receiving or providing CAS. The JFC establishes the conditions for reasonable assurance and when they will be in effect. When reasonable assurance is in effect, attacks can continue if the surface force commander, terminal controller, and aircrew are confident the attack will achieve objectives without harming friendly forces. This applies only if the CAS aircrew has already received initial targeting information. Careful consideration must be given to using reasonable assurance because of the increased possibility of fratricide. (Joint Pub 3-09.3)

special operations. Operations conducted by specially organized, trained, and equipped military and paramilitary forces to achieve military, political, economic, or informational objectives by unconventional military means in hostile, denied, or politically sensitive areas. These operations are conducted across the full range of military operations, independently or in coordination with operations of conventional, non-special operations forces. Political-military considerations frequently shape special operations, requiring clandestine, covert, or low visibility techniques and oversight at the national level. Special operations differ from conventional operations in degree of physical and political risk, operational techniques, mode of employment, independence from friendly support, and dependence on detailed operational intelligence and indigenous assets. Also called **SO.** (Joint Pub 1-02)

strategic level of war. The level of war at which a nation, often as a member of a group of nations, determines national or multinational (alliance or coalition) security objectives and guidance, and develops and uses national resources to accomplish these objectives. Activities at this level establish national and multinational military objectives; sequence initiatives; define limits and assess risks for the use of military and other instruments of national power; develop global plans or theater war plans to achieve these objectives; and provide military forces and other capabilities in accordance with strategic plans. See also **operational level of war; tactical level of war.** (Joint Pub 1-02)

support. 1. The action of a force which aids, protects, complements, or sustains another force in accordance with a directive requiring such action. 2. A unit which helps another unit in battle. Aviation, artillery, or naval gunfire may be used as a support for infantry. 3. A part of any unit held back at the beginning of an attack as a reserve. 4. An element of a command which assists, protects, or supplies other forces in combat. (Joint Pub 1-02)

supported commander. The commander having primary responsibility for all aspects of a task assigned by the Joint Strategic Capabilities Plan or other joint operation planning authority. In the context of joint operation planning, this term refers to the commander who prepares operation plans or operation orders in response to requirements of the Chairman of the Joint Chiefs of Staff. (Joint Pub 1-02)

supporting commander. A commander who provides augmentation forces or other support to a supported commander or who develops a supporting plan. Includes the designated combatant commands and Defense agencies as appropriate. See also **supported commander.** (Joint Pub 1-02)

synchronization. 1. The arrangement of military actions in time, space, and purpose to produce maximum relative combat power at a decisive place and time. 2. In the intelligence context, application of intelligence sources and methods in concert with the operational plan. (Joint Pub 1-02)

tactical control. Command authority over assigned or attached forces or commands, or military capability or forces made available for tasking, that is limited to the detailed and, usually, local direction and control of movements or maneuvers necessary to accomplish missions or tasks assigned. Tactical control is inherent in operational control. Tactical control may be delegated to, and exercised at any level at or below the level of combatant command. Also called **TACON.** (Joint Pub 1-02)

tactical level of war. The level of war at which battles and engagements are planned and executed to accomplish military objectives assigned to tactical units or task forces. Activities at this level focus on the ordered arrangement and maneuver of combat elements in relation to each other and to the enemy to achieve combat objectives. See also **operational level of war; strategic level of war.** (Joint Pub 1-02)

terminal attack controller. A qualified officer or enlisted member who, from a forward ground or airborne position, provides terminal control to aircraft performing close air support to ground forces. While terminal attack controllers operate with the ground forces they support, their personnel normally remain under the command of the component providing the close air support. Also called **TAC.** (Proposed for inclusion in Joint Pub 1-02)

terminal control. 1. The authority to direct the maneuver of aircraft which are delivering ordnance, passengers, or cargo to a specific location or target. Terminal control is a type of air control. 2. Any electronic, mechanical, or visual control given to aircraft to facilitate target acquisition and resolution. (Joint Pub 1-02)