

TRANSITIONS AND ROMAN GATES UNBARRED:
THE JOINT INTEGRATION OF AIR AND GROUND POWER IN PAST, PRESENT,
AND FUTURE OPERATIONS

BY

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ABSTRACT

This study examines the interaction between the land component and the air component during the conduct of rapid maneuver operations executed by smaller warfighting units. In the conduct of rapid ground operations, certain conflicts have arisen that have both doctrinal and operational origins. What has resulted from these conflicts is that the transition from shaping operations, conducted and controlled by the air component commander, to close operations waged almost exclusively by the ground component, does not happen as effectively as it could. The author evaluated four cases of rapid ground offensives in past conflicts and derived transcendent characteristics in the solutions employed when these past campaigns experienced similar problems. Next, the author compared those characteristics to some of the solutions used primarily by the Marine Corps in recent operations in order to examine whether or not there is a strong correlation between the characteristics of past and present solutions. Based upon the findings of these comparisons, the author recommends changes to particular roles, missions, and coordination procedures to strengthen the dynamic effectiveness of highly integrated campaigns of fires and maneuver.

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Chapter 1

Introduction

*My gate, unbarred, stands wide open, that when the people
hath gone forth to war, the road for their return may be
open too. I bar the doors in time of peace, lest peace
departs, and under Caesar's star I shall be long shut up.
He spoke, and lifting up his eyes that saw in opposite
directions, he surveyed all that the whole world held.*

— Janus speaks to Germanicus in Roman mythology

Roman legend states that a daughter of a Roman city guardsman betrayed her fellow citizens by opening a gate into Rome and then leading the invading Sabines to that gate. Before the invaders could enter and commence their attack, Janus commanded a hot spring to erupt and this stopped the Sabines from entering and sacking the city.¹ Since that event, the Romans kept Janus' temple gates open in times of war as a way of calling for his protection during the transition period from peace to war. This ancient deity and savior of Rome had a head that consisted of two faces looking in opposite directions to signify looking forward into the future and looking back into the past. Homage was often paid to Janus during the harvest season, planting season, marriages, birth, or any other important event considered both a beginning and an end. His gaze toward both directions exemplified times of transition away from the practices of the past to the prospects of the future.

Because Janus was a warrior deity, it is likely he would recognize a period of transition in the form of integrated air-land warfare during the late 1970s when the United States Army drew important lessons from the 1973 Arab-Israeli War. The Army concluded that their operational warfighting doctrine would not be able to defeat a possible Warsaw Pact armored juggernaut assaulting Western Europe. Generals Meyer

¹ Mischa F. Lindemans, "Janus," 03 Mar 1997, On-Line. Internet. 24 Jan 2005. Available at <http://www.pantheon.org/articles/j/janus.html>. pg 1.

and Starry became instrumental in the development of the Active Defense doctrine and eventually the comprehensive AirLand Battle doctrine. AirLand Battle marked a fundamental shift in the thinking and methodology for conducting operational-level warfare. General Starry in particular developed an effective process by which the Army could assess contextual factors, develop a concept statement for the development of new doctrine, develop an operational concept, and accordingly adopt the changes necessary for both issues of readiness and preparedness. This period from 1973 to 1982 serves as an example to the current discussions now being conducted on how warfighting forms may change again.

Within the AirLand Battle construct, airpower assumed a larger role in terms of fighting a larger opponent across the depth of his forces. This role was necessary in order to fight the enemy ground forces engaged with friendly ground *and* the larger enemy forces moving to that same fight. Airpower's speed, flexibility, and lethality make it ideally suited to attacking across the breadth and depth of the battlefield, but those attributes may soon no longer be solely claimed by airpower. The Army and the Marine Corps see speed, flexibility, and lethality as a means to empower smaller ground units capable of rapidly defeating an enemy. The proposed research topic will address the effective employment of air interdiction and battlefield air interdiction within the context of the growing emphasis on smaller, lighter, and more mobile ground forces.

Airpower's advantages have allowed it to play a key role in ground operations, even when its use was not deliberately planned by the ground element. For example, consider the siege of Ras al-Khafji in Operation DESERT STORM. As Iraqi armored columns moved south across the Kuwait-Saudi Arabia border, E-8C JSTARS detected and transmitted their movements. The Coalition command and control system immediately diverted A-10, F-16, B-52, AC-130, AV-8, and F/A-18 aircraft and tasked them to engage the Iraqi tanks, armored personnel carriers, and trucks traveling south on the coastal highways around Khafji.² The E-8C pictures led to the diversion of B-52s and A-10s to an area known as the Kuwaiti National Forest. As the B-52 payloads detonated

² Tom Clancy and General Charles Horner, Every Man a Tiger, (New York, N. Y.: G. P. Putnam's Sons, 1999), pg 425.

near the forest, Iraqi vehicles retreated and were summarily destroyed by the A-10s.³ The small contingent of Coalition forces trapped in Khafji actually directed airpower on to enemy locations within the town. Airpower demonstrated the capability to aid a small, isolated Coalition ground combat unit repel an Iraqi armored division and prevail. The residual effect of this integrated defense was that Iraq never attempted another armored raid into Saudi Arabia.

Ground power's traditional strengths have been the use of massed forces, fires, and maneuver to close with and destroy those forces. However, massing forces and coordinating large elements of supporting arms makes rapid, agile ground operations extremely difficult to accomplish. Thus, there has been a concerted effort on the part of American land forces to make smaller ground units the fundamental warfighter. Indeed, a smaller warfighting unit has become the rule rather than the exception recently as ground power attempts to find new balances between lethality and agility.

In Operation ENDURING FREEDOM, Special Forces units supported indigenous Afghan fighters. Later in the conflict, 'light' forces such as the 101st Airborne Brigade and the 15th Marine Expeditionary Unit (Special Operations Capable) deployed, fought, and stabilized a territory roughly the size of Texas within one month. In Operation IRAQI FREEDOM, one of the two corps of coalition ground forces fought from Kuwait to Tikrit in units no larger than a regiment or battalion. In order to compensate for the relatively smaller size of units, ground forces incorporated the advantage of greater speed and fluidity into their operations. Speed and dispersion became both a force multiplier and a form of security for these ground forces. They were able to engage larger ground combat units and still prevail.

American ground power was able to incorporate speed and agility into its operations by fighting as smaller, semi-independent units and reducing the more cumbersome indirect fire support systems such as long range artillery, rocket, and missile forces. They generally came to rely more upon airpower to compensate for the reductions in fire support and mass in order to enhance mobility. In the development of AirLand Battle, airpower compensated for the significant numerical advantage of the Warsaw Pact

³ Tom Clancy and General Charles Horner, Every Man a Tiger, (New York, N. Y.: G. P. Putnam's Sons, 1999), pg 426.

forces. Today, the power of that idea and operational concept from the past may shed light on how airpower can integrate with and provide solutions for the developing requirements of smaller and faster ground forces in rapid maneuver warfare.

Thus, the question addressed in this study is how can air and ground commanders better integrate the strengths of airpower with the developing strengths created when ground power fights as smaller units in rapid maneuver warfare?

The significance of this research project will be the identification and proffering of potential ways to integrate airpower in a joint campaign. Although the tenet of centralized airpower under the control of an airman has profoundly influenced the way an air interdiction campaign is conducted in support of ground operations, the effective transition of requirements from the joint forces commander to the land component commander has often eluded our efforts. Thus, the findings may have implications for joint operational doctrine regarding fire and air support coordination and the Theater Air-to-Ground System (TAGS).

Chapter Two will introduce the necessary doctrinal background regarding the major actors, their delineated areas of responsibility, and the major functions they perform within those areas in order to identify key areas of doctrinal conflict

Chapter Three will assess the nature of the current problems with regard to fire support coordination procedures, trends in ground operations, and the difficulties encountered by air support centers.

Chapter Four will examine historical case studies in order to reveal how air-to-ground coordination led to solutions during periods of rapid ground operations. The case studies selected span from World War II to Operation DESERT STORM. The characteristics of the solutions shall form the foundation to extrapolate remedies for likely problems brought by evolutions in rapid maneuver warfare.

Chapter Five will examine current remedies to the problems defined in Chapter Three. Problems associated with rapid ground operations may become worse without changes to the current system. I will finalize my arguments and submit recommendations compliant with the timeless characteristics distilled in Chapter Four.

Joint and Coalition warfare has changed significantly within the fourteen years since Operation DESERT STORM. As the services continue to explore new concepts of

warfare, there must be an accompanying dialogue on the implications for the air component commander so that the most powerful results from these new concepts can be achieved. In order to realize newer forms of ground warfare, joint air and land component commanders must coordinate and control the fight at the proper time, place, and with the proper forces. Although we have never resorted to leaving temple gates ajar in order to beckon inspiration from Roman deities, we can certainly employ the discipline to look objectively both into the past and towards the future to map an effective transition to newer forms of warfare. If such a study is indeed extensively conducted, completed, and implemented, then perhaps in future those same temple doors may remain closed for longer periods of time, as peace becomes a more prevalent condition.

Chapter 2

Doctrinal Background

The JFC ultimately approves the integration of joint interdiction operations with execution of other joint force operations. To ensure unity of command and effort throughout a theater and/or JOA, the JFC normally delegates the planning and execution of theater and/or JOA wide interdiction operations to the component commander with the preponderance of interdiction assets within range and with the ability to control them.

— MCRP 3-25F

This chapter will discuss some of the sources of conflict associated with synchronization and coordination of the air-ground battle. Much of this conflict arises from the doctrinal responsibilities and functions of the air component commander and the land component commander. The discussion will highlight difficulties associated with the transfer of responsibility of the deep battle between these component commanders as well as the problems that manifest when this transition is not conducted effectively.

Major Actors

The Joint Forces Commander (JFC) is the supreme commander of a unified combatant command. His authority as commander is codified by law and he exercises that authority over all forces assigned to him for the purpose of achieving those objectives and directives given to him by the Commander-in-Chief and Secretary of Defense as communicated by the Chairman of the Joint Chiefs of Staff (CJCS). The JFC can operate his forces either by service, through the commanders of the service components assigned to him, or the JFC can operate his forces by functional components such as subordinate commanders of the air, land, sea, special operations, and other functions that may cut across service lines. Two of the functions germane to this discussion are the air component commander and the land component commander. Specifically, the air commander is defined as the Joint Forces Air Component

Commander (JFACC) and the land commander is defined as the Joint Forces Land Component Commander (JFLCC).⁴

The JFACC is designated and assigned responsibilities by the JFC.⁵ JFACC authority and command relationships with higher, adjacent, and subordinate commands are all established by the JFC. The JFC may establish supporting/ supported relationships between the other components within the JFC's control. Generally, the JFACC is tasked to support the JFLCC and that support is specifically defined by the JFC in terms of aid, protection, complementary action, or sustainment of the supported force.⁶ However, for example, the JFACC may be supported by the JFLCC when the JFLCC employs long range rocket artillery on targets that the JFACC cannot or should not strike with his own assets. The JFACC is selected on the basis of which service has the preponderance of air assets in theater and also has the means to command and control those assets. The JFACC may be the senior aviator from the Air Force, Navy, or Marine Corps because these services all have the ability to perform the command and control function of the JFACC. The JFACC may be given Operational Command (OPCON) over air forces that are assigned or attached to his command.⁷ He also exercises Tactical Command (TACON) over other air forces that are made available to him by their parent service.⁸

⁴ In later chapters, both Joint and Coalition military operations will be examined. In discussions of these campaigns, the author will use the term JFC, JFACC, and JFLCC when referring to strictly Joint operations. The term "Combined forces" refers to the military forces of an international coalition. The terms Combined Forces Commander (CFC), Combined Forces Air Component Commander (CFACC), and Combined Forces Land Component Commander (CFLCC) will be used when discussing Coalition operations. For purposes of this thesis, the author will use the Coalition terms when arguing theoretical and doctrinal cases. Additionally, for purposes of this thesis, the terms should be thought of as interchangeable in meaning throughout the remaining chapters.

⁵ Joint Publication 3-52, Joint Doctrine for Airspace Control in the Combat Zone, 30 August 2004. pg. II-2, 3.

⁶ Joint Publication 0-2, Unified Action Armed Forces (UNAAF), 10 July 2001, pg. xii.

⁷ Joint Publication 0-2, Unified Action Armed Forces (UNAAF), 10 July 2001, pg. xii. OPCON 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. OPCON includes authoritative direction over all aspects of military operations and joint training necessary to accomplish missions assigned to the command. Joint Publication 0-2, Unified Action Armed Forces (UNAAF), 10 July 2001, pg. xii.

⁸ Joint Publication 0-2, Unified Action Armed Forces (UNAAF), 10 July 2001, pg. xii. TACON is the command authority over assigned or attached forces or commands or military capability made available for tasking that is limited to the detailed and usually local direction and control of movements or maneuvers necessary to accomplish assigned missions or tasks. TACON may be delegated to and exercised by commanders at any echelon at or below the level of combatant command. TACON is inherent in OPCON.

The theory behind the designation of a JFACC is that the control of airpower should be centralized and the execution of airpower decentralized. This tenet originally derived from Field Manual (FM) 100-20, which was issued in 1943 as a response to the disastrous fragmented control of airpower experienced in North Africa. The tenet is currently codified in Air Force Doctrinal Directive 1 (AFDD 1) which viewed the fragmented command of air assets as a central factor in the operational ineffectiveness of the air operations in both North Vietnam and South Vietnam.⁹ The lesson learned from these North African experiences was that centralized control of airpower by an airman is the best method for effectively employing airpower at the strategic, operational, and tactical levels of war. If we compare the successes enjoyed in Operation DESERT STORM vice the Vietnam or Korean Wars, one could argue that centralized control enabled the U. S. military to focus upon priorities of air support that accomplished the objectives of the JFC or supported the accomplishment of objectives by another component. This centralization of control contributed to victory because one commander could concentrate or disperse airpower's strengths in time and space as necessary.

The other important half of the tenet is decentralized execution, which Air Force doctrine considers essential to achieve a span of control while facilitating initiative, situational awareness, responsiveness, and tactical flexibility by all subordinate units. This tenet appeared in Air Force doctrine after Vietnam in response to the control of the bombing campaign being directed from the White House. Well-defined commander's intent messages are given to flight leads and this gives those flight leads the freedom to act with initiative. The single intent issued to flight leads means a continuous application of force can be executed against an entire range of separately engaging, reacting, and thinking enemies.¹⁰ Through use of the tenet of centralized control and decentralized execution, the JFACC acts as the JFC's principal coordinator of airpower and executes several key functions intrinsic to airpower in order to meet the overall objectives determined by the JFC.

⁹ Air Force Doctrinal Directive (AFDD) 1, Air Force Basic Doctrine, 17 November 2003. pg. 23.

¹⁰ Air Force Doctrinal Directive (AFDD) 1, Air Force Basic Doctrine, 17 November 2003. pg. 23.

The JFLCC, too, is designated by the Joint Forces Commander (JFC).¹¹ His authority and command relationships with higher, adjacent, and subordinate commands are also established by the JFC and are similar to those of the JFACC. The JFLCC is generally the service component commander with a majority of ground forces and with the requisite command and control infrastructure.¹² Historically, the JFLCC has come from the Army. The JFLCC exercises control of all assigned and attached forces using the same levels of command such as OPCON and TACON as discussed with regard to the JFACC. The JFC will determine the type of ‘supporting versus supported’ relationships between the JFLCC and other components such as the JFACC. Those relationships between components can be general support, mutual support, close support, or direct support.¹³ In essence, the JFLCC is assigned to orchestrate the efforts of the various land combat forces into a single coherent and focused operational mission.

The primary consideration for designation of the JFLCC and establishment of the command relationships are the principles of unity of command and unity of effort. These principles of unity make the JFLCC the central point for the planning and execution of the land operations portion of the JFC’s overall campaign plan.¹⁴ The JFLCC acts as the JFC’s principal coordinator of ground operations and is typically the primary component for the decisive battle phase of a joint campaign plan. Often, he ultimately seizes terrain, controls key terrain, or destroys enemy forces in order to accomplish the overall objectives determined and assigned by the JFC.

Having defined the JFC, JFACC, and JFLCC, how they are appointed, how they are empowered, and their central tenets of operation, we can now examine their major areas of responsibility in terms of battlespace and how they execute duties. Examining

¹¹ Field Manual (FM) 3-31, Joint Force Land Component Commander Handbook (JFLCC), December 2001. pg. I-3.

¹² Field Manual (FM) 3-31, Joint Force Land Component Commander Handbook (JFLCC), December 2001. pg I-4.

¹³ Joint Publication (JP) 0-2, Unified Action Armed Forces (UNAAF), 10 July 2001, pg. xii. General support is action that is given to the supported force as a whole rather than to a particular subdivision. Mutual support is action that units render each other because of their assigned tasks, their position relative to each other, and their inherent capabilities. Close support is action of the supporting force against targets or objectives that are sufficiently near the supported force as to require detailed integration or coordination of the supporting action with fire, movement, or other actions of the supported force. Direct support is a mission where one force supports another specific force and authorizes it to answer directly any supported force’s request.

¹⁴ Field Manual (FM) 3-31, Joint Force Land Component Commander Handbook (JFLCC), December 2001. pg II-4.

these delineations of space and responsibility will shed more light upon the areas where conflict arises between the JFACC and the JFLCC. Understanding what each actor considers to be his domain, and what he is free to accomplish within that domain, reveals points where conflict has, and may continue, to arise.

Major delineations of areas of responsibility

Major land and air delineations will be discussed in terms of their respective definitions, functions, and controlling authorities. Additionally, we will discuss how each actor interprets his role in these domains. One of the first prerequisites for the land component and the JFC is a defined area of operation. A Joint Operations Area (JOA) is defined as an area of land, sea, and airspace in which a JFC conducts military operations to accomplish a specific mission. The area is created by the geographic combatant commander, such as CENTCOM or PACOM, and is assigned to the JFC.¹⁵ Within this JOA, the JFC will assign an Area of Operations (AO) for his land and naval forces. An AO is of sufficient size for the component commander to accomplish their missions and protect their forces.¹⁶ Once assigned, a component commander can employ control measures and fire support control measures to delineate responsibilities, to deconflict operations, and promote unity of the warfighting effort among his subordinate units.¹⁷ The JFACC is uniquely capable of acting throughout the JFC's area of operation; the JFLCC, in a majority of cases, does not have that same capability. For a graphic depiction of the areas of operation, see Figure 1.

¹⁵ Joint Publication (JP) 3-0, Doctrine for Joint Operations, 10 September 2001, pg II-17.

¹⁶ Joint Publication (JP) 3-0, Doctrine for Joint Operations, 10 September 2001, pg II-19.

¹⁷ Joint Publication (JP) 3-0, Doctrine for Joint Operations, 10 September 2001, pg II-19.

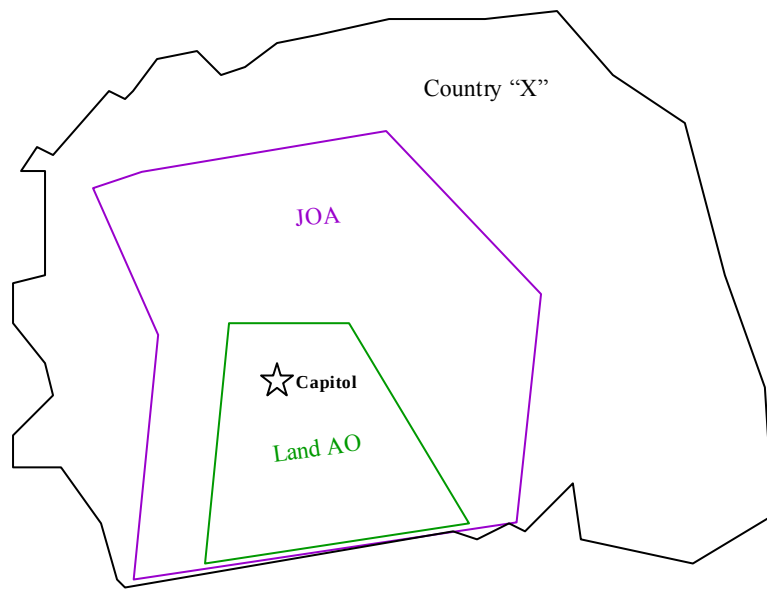


Figure 1. Areas of Responsibility.

In Figure 1, a mission has been assigned to the regional combatant commander to conduct joint military operations in Country “X”. The JFC assigned the mission delineates his operating area in appropriate depth and width in order to accomplish all objectives assigned to him by the military chain of command. Within the JOA, the JFC has delineated a land area of operations encompassing the capitol of Country “X” and all adjacent terrain in order to fulfill all objectives assigned to the JFLCC.

Once assigned an area of operations by the JFC, the JFLCC, in turn, typically *further* delineates the JFLCC AO between his subordinate components through use of a boundary.¹⁸ Basically, a boundary defines the area of responsibility for the JFLCC subordinate commands. Boundaries can be defined as lateral, rear, and adjacent in order to define where land force commanders will accomplish their missions. These commanders can array their subordinate forces as necessary within the confines of the boundary. Boundaries can be subject to adjustments and modifications as the operational and tactical situations unfold.

¹⁸ Joint Publication (JP) 3-0, Doctrine for Joint Operations, 10 September 2001, pg III-33.

Another important delineation for this discussion is known as the Forward Line of Troops (FLOT). The FLOT is not a boundary but a delineation of where the leading edges of friendly forces are currently located relative to the enemy forces. It is a delineation often used to safeguard friendly land forces through greater integration and coordination of fire support as their effects approach the line of delineation. At the highest level, the JFLCC defines a Forward Line of Troops (FLOT) in order to delineate an edge where his forces are and to facilitate rapid fire and air support beyond the line while preventing fratricide from happening short of the line.

These two delineations, the boundary and the FLOT, determine the areas responsibility for ground combat forces and determine the arrangement of those forces within the confines of the boundaries. Through knowledge of these delineations, air support and indirect fire support units coordinate in more detail to support and protect the ground combat units as the effects of air and indirect fire come closer. One particular fire support coordination measure within the JFLCC area of operation is highly relevant to this study.

The Fire Support Coordination Line (FSCL) is a measure that facilitates both the rapid engagement of enemy forces and the protection of friendly forces. Unfortunately, the FSCL has also become a key point of contention between the air component commander and the land component commander. Emplaced by the JFLCC, it is a line beyond which land and air forces may expeditiously attack targets without conducting additional coordination to ensure the safety of friendly ground forces.¹⁹ Joint and Army doctrine defines it as a permissive measure which allows targets beyond the line to be engaged by ground forces *without prior coordination amongst themselves*.

However, joint doctrine also states as a caveat that any force attacking beyond the line must *inform* all affected commanders in sufficient time to allow necessary reaction to avoid fratricide, both in the air and on the ground.²⁰ In reality, the JFACC requires knowledge of the fires the JFLCC would execute past the FSCL because the JFACC must be concerned with artillery or rocket trajectories and helicopter attacks that could affect, or be affected by, his operations. Since the JFACC has a high interest in the fires and

¹⁹ Joint Publication (JP) 3-0, Doctrine for Joint Operations, 10 September 2001, pg III-34.

²⁰ Joint Publication (JP) 3-0, Doctrine for Joint Operations, 10 September 2001, pg III-34.

trajectories that will happen beyond the FSCL, he would ideally prefer that all activity beyond the FSCL be done in close *coordination* with his command and control center. Placement of the FSCL is determined by factors such as operational tempo, enemy location, rates of ground advance, and weapons capabilities. According to joint doctrine, coordination and synchronization of operations on either side of the FSCL are the responsibility of the JFLCC out to the limits of his AO.²¹ This means the JFLCC has responsibility to *coordinate* out to the forward limit of the land AO.

The Army definition of the FSCL is quite similar. The FSCL, as described in Army Field Manual 101-5-1, is a permissive measure established by the appropriate ground commander, *coordinated* with the appropriate air component commander and other supporting commanders, to facilitate the attack of targets beyond the line while ensuring proper coordination of fires not under the ground commander's control inside the line.²²

One additional control measure overlays the airspace above all of these other measures. This airspace control measure is known as the killbox system.²³ A killbox is a delineation of airspace along lines of latitude, longitude, and altitude over the Joint AO. It can be assigned to a particular component, and that component can coordinate and approve what aircraft may occupy or deliver ordnance within its confines. That controlling authority can either be from the air or ground component depending upon events on the battlefield. The 'killbox system' has been useful as a means for components to speak of airspace and battlespace in a common language among the various functional and service components. Some theaters use the reference system as a means for coordination and control of joint forces. Boundaries, the FLOT, the FSCL, and the killbox grid system are all illustrated in Figure 2.

²¹ Joint Publication (JP) 3-0, Doctrine for Joint Operations, 10 September 2001, pg III-34.

²² Field Manual (FM) 101-5-1, Operational Terms and Graphics, 30 September 1997, Chapter 1, F. O-line. Internet. Available at http://www.pubs.armystudyguide.com/FM/FM_101-5-1.htm.

²³ The killbox system is an adaptation of the Common Grid Reference System (CGRS, recently renamed Common Geographic Reference System) used to delineate the JAO and subordinate AOs. The airspace above the Joint AO, the land AO, and all boundaries, permissive and restrictive areas of supporting fires are all overlaid with this reference system.

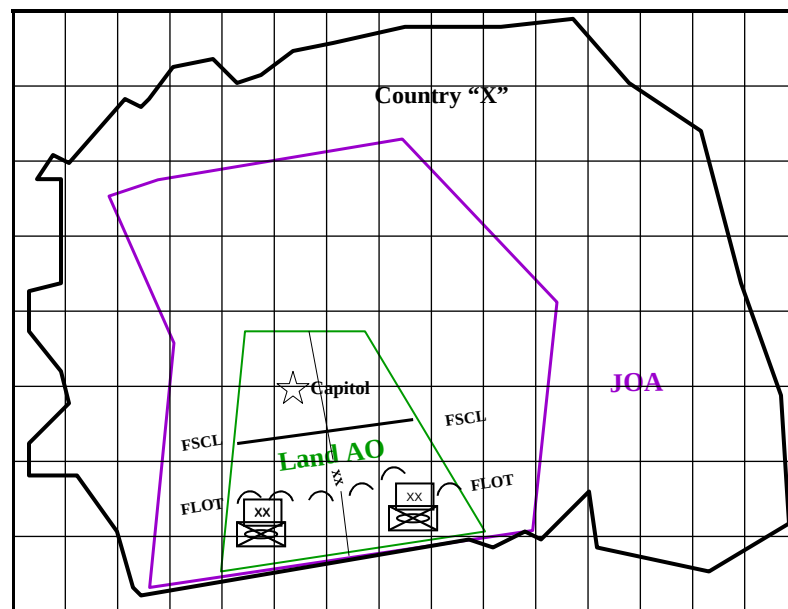


Figure 2. Joint battlespace depiction.

In the example illustrated in Figure 2, two ground divisions have their respective areas of operation. A boundary divides the AO between the divisions. Both a FLOT and FSC are shown to delineate the areas where coordination of air and fire support requires the requisite levels of detail. The land AO and Joint AO are shown to delineate where the JFC, JFLCC, and JFACC must conduct operations. The common reference grid system overlays the entire JOA, and that system may be used to some degree for the planning and coordination of air support, airspace control, and fire support.

In review, the JFC declares the confines of his JOA so he can conduct air, land, sea, space, information, and special operations within that space in order to achieve the theater objectives tasked to him by the Commander-in-Chief as directed and relayed by the Secretary of Defense and the Chairman of the Joint Chiefs of Staff. Within that JOA, the JFC will delineate subordinate AOs as necessary to the land, sea, and special operations components so that they may exercise command and control in order to fulfill those objectives assigned by the JFC. These subordinate areas may become the land AO, the maritime AO, and the special operations AO as dictated by the requirements of the mission assigned.

Major functions that occur within those areas of responsibility.

Given these major delineations of the battlefield and airspace, we can now turn to an examination of their interaction with air-to-ground operations. As was stated earlier, the JFACC is capable of conducting operations throughout the JOA. The JFACC can either be the supported component or the supporting component for operations in the JOA or in one of the component AOs. The level of coordination required between the JFACC and the JFLCC is largely determined by the JFLCC operational scheme of maneuver and the proximity of air operations to the friendly forces.

We have discussed the major actors, their various areas of responsibility, and the functions they perform within and across those areas of responsibility. While this system is very comprehensive, there are some ambiguities that have led to conflicts. These conflicts have historically developed in the synchronization of the various requirements of the JFACC and of the JFLCC. One of the duties of the JFACC is to recommend an appropriate division of effort of his air forces to the JFC during each phase of a joint campaign. This step is called 'apportionment' and is the method by which the JFACC decides how much effort he will give to such functions as counter-air, interdiction, strategic attack, and close air support. Once apportionment is approved by the JFC, the JFACC then becomes responsible for the direction of these functions through his command and control network. If we recall the supporting/ supported relationship between components that the JFC can prescribe, the JFACC is generally the supported effort during strategic attack and *air interdiction* within the joint area of operations. He focuses upon the operational and tactical priorities established by the JFC. In his role as the supporting effort, the JFACC will support other component commanders in areas such as close air support and *air interdiction within the land or maritime component areas of operation*. What is immediately evident is air interdiction can be a function that the JFACC will execute as either the supported effort as the primary executor of theater-wide interdiction operation or as the supporting effort for the JFLCC land AO interdiction operation.

Three areas of conflict can arise from different interpretations by the services regarding deep versus close operations, and permissive versus restrictive air and land

warfare delineations. The first concerns deep versus close operations. *Depth* is defined as the extension of operations in time, space, resources, and purpose allowing commanders to attack and fight enemy forces and capabilities simultaneously throughout the battlefield.²⁴ Closely related to depth is the concept of *battlespace*. It is defined as the maximum area within which the capabilities of a unit can acquire and dominate the enemy. It includes area beyond the area of operations and it varies over time according to how the commander positions his assets.²⁵ In order to fight across the depth of a battlespace, components often define their fights in terms of deep, close, and rear fights. The components conduct deep operations to limit the enemy's freedom of action and alter his tempo to their advantage within the abilities of that component commander's weapons systems and intelligence systems.

The Marine Corps defines deep operations as “military actions conducted against enemy capabilities which pose a *potential* threat to friendly forces.”²⁶ Deep operations shape and prepare the battlespace in order to influence the conduct of future operations. They create a window of opportunity for decisive action, restrict the enemy's freedom of action, and disrupt the enemy's operational tempo.²⁷ Conversely, close operations involve immediate contact and include corps/division current battles.²⁸ The battlespace associated with close operations lies proximate to the forward line of troops. The Marine Corps specifically defines it as “military actions conducted to project power decisively against enemy forces which pose an immediate or near term threat to the success of current battles or engagements.”²⁹

Within the land AO in particular, the JFLCC usually subdivides his AO for three particular purposes. First, he will identify the regions where he will conduct a deep, close, and rear battle to ensure application of military operations across his entire AO. What assists the JFLCC in specifically delineating the deep and close fight are the FLOT and

²⁴ MAGTF Staff Training Program Pamphlet (MSTP) 3-0.5, Fighting the MEF, May 2001, pg. 36.

²⁵ MAGTF Staff Training Program Pamphlet (MSTP) 3-0.5, Fighting the MEF, May 2001, pg. 7.

²⁶ Marine Corps Reference Publication (MCRP) 5-12C, Marine Corps Supplement to the Department of Defense Dictionary of Military and Associated Terms, July 1998, pg 49. Emphasis added by the author.

²⁷ MAGTF Staff Training Program (MSTP) Pamphlet 3-0.5, Fighting the MEF, May 2001, pg 37.

²⁸ MAGTF Staff Training Program (MSTP) Pamphlet 3-0.5, Fighting the MEF, May 2001, pg 38.

²⁹ Marine Corps Reference Publication (MCRP) 5-12C, Marine Corps Supplement to the Department of Defense Dictionary of Military and Associated Terms, July 1998, pg 42.

the FSCL. The FLOT moves as major subordinate units move, and the FSCL is placed at an appropriate distance from the FLOT in order to attack both deep and close targets with simultaneity and rapidity. Overlaid upon appropriate areas of the Joint AO and subordinate AOs is a killbox grid system so that the appropriate component commander can exercise control and coordination of kinetic and non-kinetic fires onto the terrain within the confines of the killbox.

By conducting deep operations, the respective level of command creates favorable conditions for his subordinate components at the Joint level or the subordinate combat units of those respective components to fight. Conversely, close operations concentrate overwhelming combat power upon the enemy at a critical time and place where a decisive battlefield victory may occur.³⁰ Close operations are largely considered to be the focus of both air and ground combat power as a combined arms blow that proves devastating to enemy forces.

Deep and close operations mean different things to the JFC and JFACC, as opposed to the JFLCC. Figure 3 shows the concepts of deep and close operations. JFC deep operations occur beyond and around the JFLCC Land AO. The JFLCC deep fight is shown from the forward boundary of his subordinate divisions to his forward boundary. The JFLCC close fight is from his subordinate division's deep fight to the rear boundary of his subordinate divisions. The JFACC air operations serve to support the JFLCC deep and close fights, and the JFACC is the supported component for the JFCs deep fight.

³⁰ MAGTF Staff Training Program (MSTP) Pamphlet 3-0.5, Fighting the MEF, May 2001, pg 38.

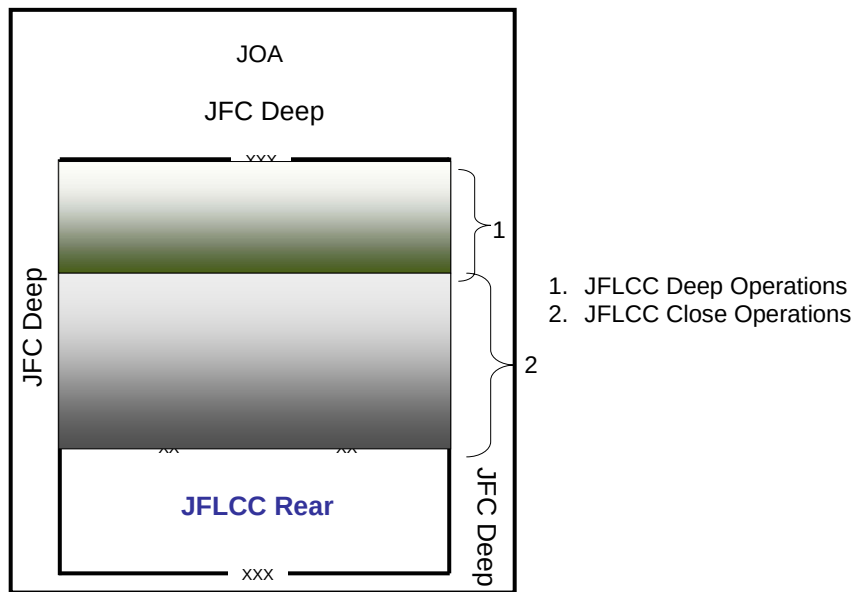


Figure 3. Deep, close, and rear battlespace depictions

The JFC, JFACC, and JFLCC apply joint combat power in their respective deep and close fights through use of joint fires. These joint fires are produced during the employment of forces from two or more components in coordinated action toward a common objective.³¹ The JFACC contributes to joint fires through three variants of what is termed ‘Offensive Air Support’ (OAS) by the Marine Corps or ‘Counterland’ by the Air Force. These variants are ordered from near to far relative to the FLOT. Refer to Figure 4 for a visual depiction of the variants.

³¹ Joint Publication (JP) 3-09, Doctrine for Joint Fire Support, 10 April 1997, pg. GL-7.

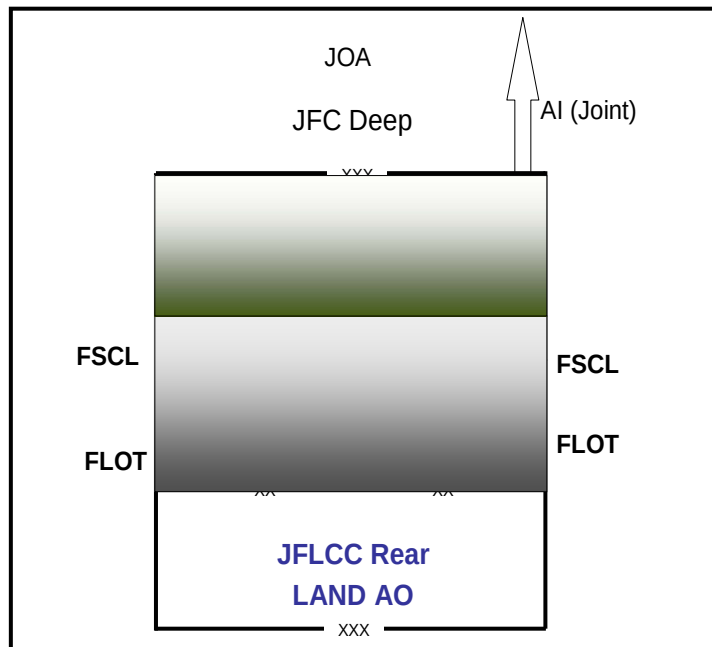


Figure 4. Offensive Air Support/ Counterland missions

First, the variant of offensive air support that is closest in proximity to friendly forces is Close Air Support (CAS). The purpose of CAS is to destroy those enemy forces that are in close proximity or in contact with friendly forces. This requires detailed integration of airpower with the fire and movement of those friendly forces.³² That detailed integration is accomplished through positive control of the CAS aircraft's attack. What this means is that the terminal controllers can dictate what ordnance to release, what the direction of attack will be, and, most importantly, where the ordnance must impact. The objective of CAS is to achieve or support the achievement of decisive tactical objectives. The JFACC is the supporting component of the JFLCC subordinate ground forces' close fight.

Next in order of proximity to friendly forces is Battlefield Air Interdiction (BAI). BAI is a subcategory of offensive air support that has been codified in NATO publications. The purpose of BAI is to bring airpower to bear on those enemy forces not

³² Marine Corps Warfighting Publication (MCWP) 3-23, Offensive Air Support, 30 May 2001, pg. 2-2.

yet engaged but positioned to directly affect the land battle.³³ The objective of BAI is to engage enemy second echelon regiments and divisions that are moving toward the line of contact between enemy forces and the friendly forces in order to prevent that second echelon from exploiting any gaps created in friendly defenses.³⁴ What is significant about BAI is that it the concept of AirLand Battle recognized the requirement to simultaneously fight an additional armored force simultaneously as a deep fight for the purpose of stopping the enemy from massing to overwhelm friendly defenses.³⁵ The air forces had to assume the land force commander's deep fight and a portion of the close fight if acceptable force ratios for a viable defense against a numerically larger enemy were to be maintained. While the air component was responsible for this partially deep and partially close fight, the JFACC would generally remain a supporting component because BAI is conducted in both the JFLCC deep and close battlespace.

Last, Air Interdiction (AI) is designed to isolate the enemy ground forces from their supplies and lines of communication. The purpose of air interdiction is to attack the ability to fight primarily by targeting the enemy's tactical and operational infrastructure as well as to divert, disrupt, delay, and destroy enemy potential ground power before they can be effectively used against friendly forces.³⁶ Air interdiction, specifically, attempts to achieve this objective at such distances from friendly forces that detailed coordination of missions with the fire and movement of those forces is not required.³⁷ Air interdiction is considered predominantly as a deep operation by the JFLCC and by the JFACC.

While joint interdiction operations can occur anywhere in the JOA, land component interdiction operations specifically occur in the land AO. Generally, the JFACC is the supported component in the joint interdiction effort while the JFLCC is the supporting component in the land AO interdiction operation. In this case, the JFACC is a supporting effort in order to influence the operational objectives of the JFLCC. While

³³ John L. Romjue, *From Active Defense to AirLand Battle*, (Fort Monroe, VA.: U.S. Army Training and Doctrine Command, 1984), pg. 62.

³⁴ Colonel Bruce L. Brown, USAF, Lieutenant Colonel Thomas A. Cardwell III, USAF, and Major D. J. Alberts, USAF, "Battlefield Air Interdiction." *Doctrine Information Publication*, No. 7 (HQ USAF/XOXLD), 1979, pg 1.

³⁵ John L. Romjue, *From Active Defense to AirLand Battle*, (Fort Monroe, VA.: U.S. Army Training and Doctrine Command, 1984), pg. 63.

³⁶ Joint Publication (JP) 3-03, *Doctrine for Joint Integration Operations*, 10 April 1997, pg GL-4.

³⁷ Joint Publication (JP) 3-03, *Doctrine for Joint Integration Operations*, 10 April 1997, pg GL-2.

both operations typically happen in parallel, it is the ability to quickly adapt one or the other to the conditions of the battlefield that becomes significant. Ultimately, conflict between the JFACC and the JFLCC is possible because air interdiction occurring in the land AO can serve the joint interdiction operation or the land interdiction operation and thus either commander could make claim to be the 'supported' commander and thus have the other take responsibility for coordinating his actions.

Areas of Doctrinal Conflict

Two conflicts stand out. First, JFACC and the JFLCC have doctrinally conflicting interests from the FSCL out to the forward edge of the land AO. The JFLCC's targets lie within the confines of his land AO, and the JFC's targets lie anywhere within the JOA, which also includes the land AO. The JFACC is often the sole component able to engage targets within the entire JOA and for this reason he is the supported component for executing the JFC's joint interdiction operations throughout the JOA. Yet the JFACC must also target, as part of his 'supporting component' role, those forces in the land AO beyond the FSCL according to the requirements of the JFLCC. What this means is the JFACC must simultaneously interdict targets that meet either JFC or JFLCC targeting requirements. Thus, for the JFACC, the question becomes which targeting priorities receive priority, the JFC's or the JFLCC's. The second conflict is that the JFLCC views the FSCL as a permissive measure where he has freedom to conduct fire support beyond the line with minimum coordination if necessary. The JFACC sees that same line as a de facto boundary. He expects weapons effects beyond the FSCL be coordinated with him based upon his role as a supported component for joint air interdiction within the land AO and as a supporting component to the JFLCC. Thus, the question here becomes who must coordinate with whom, and through which coordination mechanism, when striking beyond the FSCL to the forward edge of the land AO.

Based upon the tenet of unity of effort, the JFLCC wishes to conduct deep operations out to the forward edge of his AO. While the JFACC, guided by the tenet of centralized control, wishes to conduct operations throughout the expanse of the JOA where his forces are primary means of conducting the joint and land deep fights. Both components can execute slightly different variants of interdiction within the same

battlespace. JP 3-03 states that the JFC may have high priority targets for his joint campaign inside the land AO that might not be of immediate interest to the land component.³⁸ What joint doctrine defines is a battlespace where two components, acting both as a supported and supporting effort, by doctrine attempt to perform deep and close operations within the confines of that same battlespace.

Second, Joint Publication 3-03 also states that interdiction can also occur on both sides of the FSCL. The JFACC does conduct detailed integration with the JFLCC for all fires short of the FSCL-where friendly troops are a factor. This type of air support was called CAS. However, as was illustrated in Figure 4, not all air support short of the FSCL is necessarily CAS if there are no friendly forces in the vicinity; it could be interdiction. The JFACC, however, is still required to conduct coordination to ensure land AO interdiction and BAI will not inadvertently put friendly forces in jeopardy. While these are technically two JFLCC close battle missions, they often are not in close proximity to friendly troops. This requirement to clear all air support, regardless of whether or not proximity to friendly forces is not a factor, affects the freedom to conduct land AO interdiction and BAI with requisite speed, flexibility, and sufficiency. Air interdiction operations tempo could be slowed significantly because of the requirement for more detailed communications, rules of engagement procedures, and the detailed integration of several weapons systems employed upon targets identified short of the FSCL.³⁹ Thus, when it comes to interdiction missions short of the FSCL, the JFACC would prefer greater freedom in this battlespace.

Therefore, placement of the FSCL can have a dramatic effect on the time allotted for conducting a deep battle or close battle at the JFC or component level. If placement of the line is inappropriate for the kind of operation to be fought, either the operations of the JFACC or JFLCC may be limited significantly by an extremely deep or close placement of the line. Recall the FSCL is placed by the JFLCC with a requirement for careful consideration. JP 3-03 warns that placement of the line too far away can limit the

³⁸ Joint Publication (JP) 3-03, Doctrine for Joint Interdiction Operations, 10 April 1997, pg. II-7.

³⁹ Joint Publication (JP) 3-03, Doctrine for Joint Interdiction Operations, 10 April 1997, pg. II-15. The issue of coordination through which of two mechanisms, either the JFACC's Air Operations Center (AOC) or the Air Support Operations Center (ASOC) working in concert with the JFLCC senior fire support coordination centers, becomes a central issue for effective integration of air interdiction with ground maneuver.

responsiveness of air interdiction sorties.⁴⁰ Conversely, a line placed too close to the forward line of troops can be passed by rapidly moving ground forces if not updated and disseminated to all components quickly. The risk to friendly ground forces that are beyond the FSCL can increase dramatically, because the coordination requirements beyond it are not as restrictive. There have been noticeable conflicts in execution because these doctrinal inconsistencies--although personal agreements have often mitigated this conflict.

There is evidence that air interdiction operations have been adversely affected by improper placement of the FSCL and by the ability of modern American land forces to move rapidly. This has led to problems in the sufficiency and effectiveness of air interdiction operations in portions of the JFLCC area of operations. *Therefore, tactical air control systems have had difficulties directing the conduct of air interdiction operations because of the combination of improper FSCL placement and rapid ground forces movements.* This lag in the responsiveness of air interdiction, created by rapid land warfare, has led to difficulties in conducting effective land AO air interdiction operations throughout the span of the JFLCC battlespace.

⁴⁰ Joint Publication (JP) 3-03, Doctrine for Joint Interdiction Operations, 10 April 1997, pg. II-15.

Chapter 3

Current Challenges in Air-to-Ground Operations

He who only sees the obvious, wins his battles with difficulty; he who looks below the surface of things, wins with ease.

— Mei Yao-chen

This chapter will address the empirical record of instances where doctrinal conflicts have led to significant problems of coordination, control, and execution of air-to-ground support of maneuver warfare. Three arguments will be made. First, there is a tendency for air interdiction to be slow and inefficient when supporting the JFLCC from the Fire Support Coordination Line (FSCL) to his forward boundary. Second, the air-to-ground system has difficulty redirecting unused sorties quickly within the air interdiction (AI) and battlefield air interdiction (BAI) domain. Third, this results in significant increases in immediate CAS requests as maneuver forces advance and the air-to-ground system has difficulty effectively keeping pace with the battle. The net result of these fundamental problems is that the battlefield is incompletely shaped for the ground maneuver forces by the major functional components. If the maneuver forces must increasingly achieve their close battle objectives through immediate CAS, then perhaps a more efficient and effective method of meeting their deep battle requirements and shaping their battlefield can be implemented. Ground maneuver forces can then more readily commit to decisive battle at times and places of their choosing.

Overcoming clashing air interdiction priorities

There is a long history of conflict over the placement of both permissive and restrictive fire support coordination measures. The distance between the

locations of measures relative to friendly ground forces directly impacts operational tempo and the effectiveness of airpower in meeting operational and tactical objectives. In particular, improper placement of the Fire Support Coordination Line (FSCL) can hamper interdiction operations, because this placement reduces the ability of airpower to effectively influence areas of the battlespace considered important to the land and air component commanders and their operations. This problem may arise if the line is either too far or too close to the friendly ground forces. In terms of the doctrinal cause, a MAGTF Battle Staff Program Information Paper summarizes the problem well:

The point of contention has always centered on the area between the FSCL and the ground commander's forward boundary. The Air Force has historically demanded that the Army "coordinate" strikes forward of the FSCL with the CFACC prior to execution. The Army doesn't like the idea of having to coordinate (thus delay operations) with another component inside its own assigned area of operation, so to avoid the problem, they push the FSCL out to a point beyond their area of influence, ATACMS soliloquies notwithstanding. In effect, the FSCL became a de facto forward boundary.⁴¹

Several examples from exercises and wartime operations reveal the adverse effects upon air interdiction in a joint campaign. First, I will examine the effects of an FSCL beyond the CFLCC area of influence.⁴²

Consider evidence from the Exercise ULCHI FOCUS LENS (UFL) in South Korea. During these exercises, heated debates ensued between the CFACC and the CFLCC over the placement of the FSCL. The CFLCC placed an aggressively distant FSCL--as is his prerogative according to joint doctrine. The CFLCC decision for the distant FSCL placement limited the CFACC freedom of

⁴¹ MAGTF Staff Training Program (MSTP) Information Paper, at <http://www.mstp.quantico.usmc.mil/publications/pointPapers/BCL%20Information%20Pape.pdf>.

ATACMS is the acronym for Army Tactical Missile Systems. This guided missile system is capable of providing the JFC, JFLCC, and corps commanders with a precision engagement capability at ranges well beyond the current capabilities of artillery and surface-to-surface rockets.

⁴² Marine Corps Doctrinal Publication (MCDP) 1-0, Marine Corps Operations, 27 September 2001, pg. F-4. An 'area of influence' as the geographical area wherein a commander is directly capable of influencing operations by maneuver or fire support systems normally under the commander's own command and control. In this instance, the battlespace beyond the maximum ranges of the CFLCC's artillery, rocket, and attack helicopter capabilities would be 'beyond the CFLCC area of influence.'

action in the CFLCC deep operations area.⁴³ The CFACC countered this act by ordering that only flights apportioned specifically to the CAS mission would be permitted to fly short of the FSCL. In essence, the CFACC argued that his ability to fight the joint air interdiction and land area of operations (AO) air interdiction campaign was going to be delayed significantly by a requirement to clear all air delivered fires with the CFLCC air-to-ground operations centers. In retribution, the CFACC would not allow those very sorties that would have to coordinate with the air-to-ground centers to fly in that battlespace. As a result, a large volume of interdiction targets between the FSCL and the FLOT did not receive the proper weight of effort during the exercise because both components demanded the ability to influence this battlespace with little to no coordination.

Figure 5 depicts this situation. The left diagram shows an ideally placed FSCL. We see that joint air interdiction, land AO air interdiction, and battlefield air interdiction can all be conducted by the CFACC as both a supporting and supported effort in the land component deep battle area. The right diagram graphically shows the effects of a ‘distant’ placement of the FSCL; the dashed line shows the ideal FSCL location. What is significant in the comparison between the two diagrams is that while the CFLCC deep battle area requirements and JFC requirements for air interdiction have not changed, the component and the command and control systems best capable of executing those requirements has.⁴⁴ That battlespace beyond the FSCL may not receive the necessary volume or duration of operational fires to shape the deep battle area. Greater portions of CFLCC air interdiction and battlefield air interdiction must conduct further coordination and deconfliction with the air-to-ground system. Additionally, the CFACC’s joint air interdiction campaign is delayed unnecessarily by the requirements to ensure deconfliction with friendly forces. While the CFACC and the command and control capabilities of his Air Operations Center (AOC) are

⁴³ MAGTF Staff Training Program (MSTP) Information Paper, at <http://www.mstp.quantico.usmc.mil/publications/pointPapers/BCL%20/Information%20Pape.pdf>

⁴⁴ There is a change from the CFACC conducting the air interdiction campaign through his Air Operations Center to one where he must gain approval to conduct the air interdiction campaign via the Theater Air-to-Ground System (TAGS) that supports the CFLCC.

supporting component the CFLCC, the CFACC is denied the necessary freedom of action within the CFLCC deep battle area.

Figure 5. FSCL placements

In Operation DESERT STORM, the problems associated with a ‘deep’ FSCl arose during decisive land operations. On 25 February, both the VII and XVIII Corps received intelligence reports that a full general retreat of Iraqi forces from Kuwait was underway.⁴⁵ Air interdiction proceeded to focus upon the pursuit and destruction of the retreating army. Three distinct terrain ‘chokepoints’

acted to concentrate the fleeing Iraqis and created an opportunity for air interdiction to deliver a violent, decisive blow to any Iraqi defenses emplaced to protect the general withdrawal. The first chokepoint was in the VII Corps zone of advance. This corps had the opportunity to destroy Iraqi Republican Guard divisions in the zone between Basra and the Kuwaiti border. These forces were limited in the north by the Euphrates River and on the east by the Shaat al Arab. The withdrawal through Basra would permit decisive engagement for the air and land forces as the Guard moved across the Shaat al Arab. The VII Corps commander placed the FSCL either on or past the Euphrates River and Shaat al Arab in order to have greater influence over the targeting in that battlespace.⁴⁶ While he had obvious concerns about nearby urban environment and the proximity of Basra to Iran, the formation of retreating forces was approximately 20 miles long.⁴⁷

Meanwhile, in the vicinity of the Euphrates River to the north, the Hawr al Hammar Causeway over the southern marshes became a second ‘chokepoint.’ This causeway was the only escape to the north of the Euphrates and into the interior of Iraq. The XVIII Corps commander extended the FSCL north of the Hawr al Hammar causeway and the Euphrates River in order to directly shape the deep battle of his subordinate commands. However, the commander had no intention of crossing the river in pursuit. He intended to use the attack helicopters of the 101st Airborne Division as a way to fight a deep battle with organic systems.⁴⁸ The air component protested that the XVIII Corps commander had placed the line far beyond the range where the ground forces could directly influence deep operations. The CFACC believed the land component emplaced the FSCL without thinking of the impact upon the freedom to engage targets for the air component.⁴⁹ After the FSCL was readjusted by the CFC back towards the FLOT some 15 hours later, air interdiction and battlefield air interdiction could

⁴⁶ Lt. Col. R. Kent Laughbaum, USAF, Synchronizing Airpower and Firepower in the Deep Battle, (Maxwell Air Force Base, AL.: Air University Press, 1999.), pg 37.

⁴⁷ Thomas A. Keaney and Eliot A. Cohen, Gulf War Air Power Survey, Summary Report, 1993, pg 156.

⁴⁸ Lt. Col. R. Kent Laughbaum, USAF, Synchronizing Airpower and Firepower in the Deep Battle, (Maxwell Air Force Base, AL.: Air University Press, 1999.), pg 39.

⁴⁹ Lt. Col. R. Kent Laughbaum, USAF, Synchronizing Airpower and Firepower in the Deep Battle, (Maxwell Air Force Base, AL.: Air University Press, 1999.), pg 39.

not freely engage the approaches to the causeway, the causeway, and the Iraqi forces retreating on those avenues because there were no ground forward air controllers (FAC) in the vicinity. There simply were no armored units that had advanced anywhere nearby, so having an available FAC with the armored unit was not possible. The air-to-ground system could not coordinate and approve strikes inside the FSCL without FACs to deconflict and direct the strikes. According to the Gulf War Air Power Survey (GWAPS), the distant FSCL placement produced a zone of diminished effectiveness during which Iraqi forces were able to escape destruction in great numbers.⁵⁰ Estimates show that the Republican Guard suffered significantly less attrition than regular army units during the ground war. A contributing factor to that difference was the inability to freely conduct the land component air interdiction operation without land component strike approval. The result was that the Coalition's specified enemy center of gravity, the Republican Guard divisions, was not fully destroyed and was permitted to withdraw across the Euphrates River and Shaat al Arab.

Operation IRAQI FREEDOM also reveals an example of a distant placement of the FSCL. In one instance, the FSCL was approximately 150 nautical miles from one Marine regiment in the eastern region. For a graphic depiction, see Figure 6. From where the Marines were located relative to the FSCL, that distance would take the Marines approximately 18 hours to traverse at a reasonable rate of 15-20 kilometers per hour. While the Marines organize differently and use an organic fixed-wing and rotary wing air element to compensate for the dearth of long range fires with the ground forces, it remains a fact that much of the battlespace forward of the MEF BCL line shown in the figure would have to be coordinated through the land component air-to-ground system instead of the air component AOC.⁵¹ Eventually, the FSCL was placed far in advance of the Army as well due to the slow rate of dissemination of the

⁵⁰ Thomas A. Keaney and Eliot A. Cohen, Gulf War Air Power Survey, Volume 1, Part 1, 1993, pg 257.

⁵¹ MEF and BCL are acronyms for Marine Expeditionary Force and Battlefield Coordination Line respectively. The MEF is roughly equivalent to an Army corps and is composed of a command element, a mechanized division, an aircraft wing, and a force service support group. The MEF can fight for 60 days without replenishment. A BCL is a non-doctrinal coordination measure created by the Marine Corps as a 'division of labor' measure between the MEF and the Marine division within the MEF. The BCL will be discussed in greater detail in Chapter 5.

changes throughout the ground forces chain of command. The effect was similar to the DESERT STORM examples: joint air interdiction, land AO air interdiction, and battlefield air interdiction operations serving deep battle requirements were forced to go through a time consuming process. Confirmation that there were no fratricide issues or need to integrate indirect fires from the land component affected the volume and duration of the CFACC air interdiction effort.⁵² It quite simply limited the responsiveness of air interdiction and hindered the freedom of expeditious attacks in the CFLCC deep battlespace because of the control requirements short of the FSCL that were unnecessary.⁵³

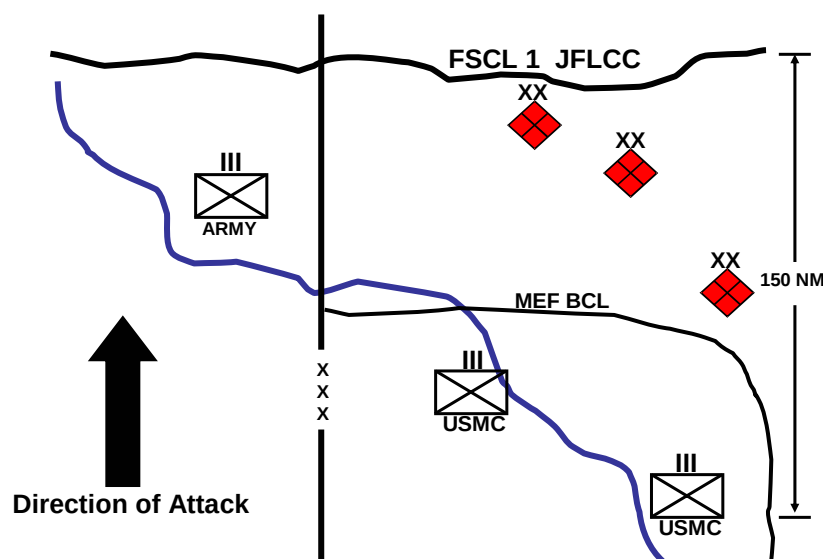


Figure 6. FSCL placement in Operation IRAQI FREEDOM

Source: Colonel Lee Elder, USMC, MAGTF Staff Training Program (MSTP), "MAGTF Aviation, Aviation Combat Element (ACE)." On-Line. Internet. Available from <http://www.mstp.usmc.mil/spts/MAGTFBranch/ace/default.aspx>.

Conversely, there were instances where the Army ground combat units outran the established FSCL quickly--which then led to overcompensation. When

⁵² Bruce R. Pirnie, Alan Vick, Adam Grissom, Karl P. Mueller, David T. Orletsky, *Beyond Close Air Support: Forging a New Air-Ground Partnership*, (Santa Monica, CA.: the RAND Corporation, 2005), pg. 68.

⁵³ Joint Publication (JP) 3-0, Doctrine for Joint Operations, July 10, 2001, pg. III-44.

this occurred, there was a dramatic risk of fratricide to the ground combat forces. One report highlighted the problems associated with overrunning the FSCL during Operation IRAQI FREEDOM:

In OIF, the management of fire support coordination lines (FSCLs) proved particularly noteworthy in this regard. The advance to Baghdad was so fast that the Army overran an established FSCL within an hour after it was established. Because the process of “moving” the line took 8 to 10 hours, air strike operations forward of the line had been impeded until it was “moved.” After finding that this same situation occurred several days in a row, they moved the line far to the north. As a result, planned air strikes were precluded over an extensive region.⁵⁴

There was an extensive amount of time needed to account for all units that had overrun the line in order to alert both the land and air components until the FSCL could be adjusted to fit the battlespace. The threat of fratricide became a consideration too costly to accept after the air-to-ground fratricide incidents in An Nasiriyah. While it would appear there is a tendency over the two wars to err on the side of an excessively distant placement, the possibility that the FSCL may be placed too close to the FLOT remains significant.

The effect of an overly distant or close FSCL had an impact upon the conduct of the CFACC’s air interdiction operations. CFACC freedom to expeditiously engage targets out to the forward edge of the land AO was hindered by the placement of an overly distant FSCL. An FSCL that was placed too close to the land forces was overrun and a significant reduction in air interdiction was ordered until the FSCL could be moved. Both instances had a direct impact upon the volume and duration of air interdiction and battlefield air interdiction operations. If there is too little time to coordinate as units outrun the FSCL, or so much time that air support gets redirected elsewhere, then the CFACC may have difficulties in providing effective support to the land component and his subordinates.

⁵⁴ Report of the Defense Science Board Task Force on Integrated Fire Support in the Battlespace, (Washington, D.C.: Office of the Under Secretary of Defense For Acquisition, Technology, and Logistics), October 2004, pg 62.

The impact of improper placement may lead to the second and third sources of conflict in joint operations.

Overcoming ineffective air interdiction due to a deep FSCL placement

While the coordination of fires and air may be effective in the CLFCC deep fight area (or other delineations between corps and division), these same command and communications mechanisms appear to have difficulty in the transition to immediate, decisive fires for the division and lower echelons. An overly distant FSCL artificially creates an admixture of deep and close battlespace, and the land component air-to-ground system has had difficulty managing and redirecting unused air interdiction (AI) and battlefield air interdiction (BAI) sorties quickly within the domain. Ideally, the land component air-to-ground system concentrates upon the close battle of the various echelons of the land component. While management at the corps level historically has been sufficient, the ability of the air-to-ground system to communicate sufficiently or appropriately with the forward subordinate ground echelons is being progressively taxed. The land component fire and air coordination centers currently exist at levels of command that are becoming too senior to react appropriately to the battlefield. The primary ground combat unit has become smaller, has become faster, and has operated more independently of the corps level where the AI and BAI operations are partially executed. The problem for the air component is more significant than simply assuring that the ground forces are provided with sufficient AI and BAI allotments. In order to understand the nature of the second problem better, some necessary background on the trends in ground combat are in order.

Several post-war reports on Operation IRAQI FREEDOM highlight that Marine Corps ground combat units operated as smaller combat units and at greater ranges from one another than indicated in doctrine. Prior to the war, the division commander, Major General James Mattis, wanted to ensure that his regimental commanders were conversant in the division ground scheme of maneuver. Once the war began, the regimental and battalion commanders largely

operated independently during the offensive to Baghdad.⁵⁵ General Mattis modified the division scheme of maneuver based upon the actions of his regiments and battalions. Spacing and dispersion between the regiments and battalions widened due to poor Iraqi road networks, distances between objectives, and a largely static enemy. At times, distances between the Marine regiments were often as much as 50 miles apart.⁵⁶ What is significant is that the Marines fought a ‘reconnaissance pull’ style of warfare where the commanding general would adjust missions and fires as he received reports from his field commanders.

What becomes significant from this style of warfare was the reduced ability of the Marine Expeditionary Force (MEF) and Coalition fire and air support coordination agencies to keep pace with these battalions and regiments in terms of providing timely and effective AI and BAI support. The number of independently operating units and the distances between them made coordination of AI and BAI more difficult. While fire and air support beyond the FSCL in the JFLCC deep fight was quite effective because of the digital connectivity between Coalition and MEF level centers, relevant guidance and support within the 1st Marine Division area of operations wasn’t of great value.⁵⁷ Ground forces were simply operating faster than the ability of the support agencies to keep pace. The effect was an inability to properly shape the division’s deep fight. While the Marine Direct Air Support Center (DASC) fared somewhat better than the Army’s equivalent air support center for division-level operations, there was great difficulty in predicting what the regiments and battalions would require in terms of interdiction support.⁵⁸ The DASC remained largely tied into division operations out to approximately 18 miles in front of the FLOT, so it had relatively better success than the Air Support Operations Center (ASOC) located with the

⁵⁵ B. F. Bing West, “Maneuver Warfare: It Worked in Iraq,” *Naval Institute Proceedings*, 02 Feb, 2004. On-line. Internet. Available from <http://www.usni.org/Proceedings/Articles04/PRO02west.html>.

⁵⁶ Sue A. Lackey, Initial Look at Distributed Operations Reveals Potential and Problems, Navy League of the United States, Dec 200. On-Line. Internet. at http://www.navyleague.org/sea_power/dec_04_34.php, 1 of 2.

⁵⁷ B. F. Bing West, “Maneuver Warfare: It Worked in Iraq,” *Naval Institute Proceedings*, 02 Feb, 2004. On-line. Internet. Available from <http://www.usni.org/Proceedings/Articles04/PRO02west.html>.

⁵⁸ Rebecca Grant, “Marine Air in the Mainstream,” *Air Force Magazine*, June 2004, Volume 87, No. 6. On-line. Internet. Available from <http://www.afa.org/magazine/June2004/0604marine.asp>, pg. 5 of 10.

Army in attempting to effect a coordinated transition from shaping operations to close operations.⁵⁹ However, there was no way for these units to know whether or not the interdiction targets they had requested had been engaged or not.⁶⁰ The ASOC had frequent difficulty redirecting AI and BAI missions to killboxes within the FSCL because of their inability know what the targeting priorities of the lead regiments.⁶¹

What is significant is that while the coordination of fires and air may be both efficient and effective in the JLFCC deep fight (or other delineations between corps and division), and may provide effective shaping fires, these same echelons do not provide immediate, decisive fires as effectively for the division and lower echelons. However, the fundamental ground warfighting unit has migrated to lower echelons such as regiments and battalions because of their ability to fire and maneuver rapidly. Air and fire support coordination agencies have not made an accompanying migration of means to effectively coordinate and support these fundamental warfighting echelons. The result is that the smooth transition of air and fire support priorities from the corps, through division, to regiment and battalion may not occur effectively. In deep operations from a land-centric, interdiction focused perspective, there was a performance lag between the JFLCC Deep Operations Coordination Center and the JFACC Synchronization Cell. This poor transition can lead to increases in immediate CAS for those ground units.

Reducing the amount of immediate CAS through effective transition

⁵⁹ Rebecca Grant, "Marine Air in the Mainstream," *Air Force Magazine*, June 2004, Volume 87, No. 6. On-line. Internet. Available from <http://www.afa.org/magazine/June2004/0604marine.asp>, pg. 6 of 10.

⁶⁰ 1st Marine Division, *Operation IRAQI FREEDOM (OIF): Lessons Learned*, 30 May 2005. On-Line. Internet. Available from <http://www.globalsecurity.org/military/ops/oif-lessons-learned.htm>, pg. 21-22. The document states that there was no reliable and responsive process or means to determine whether Air Interdiction (AI) targets on the target list were serviced and successfully attacked during and after ATO execution. The impact was that targeting personnel could not consistently and reliably provide the necessary feedback to commanders that their AI target nominations were being serviced or not.

⁶¹ Report of the Defense Science Board Task Force on Integrated Fire Support in the Battlespace, (Washington, D.C.: Office of the Under Secretary of Defense For Acquisition, Technology, and Logistics), October 2004, pg 67.

The preceding two sources of conflict result in an inability to synchronize and transition operations effectively from JFLCC close fight to the deep fights of the division's subordinate units. Recent operations show that battalions and regiments require more battlespace to conduct their deep and close operations, but they do not have the immediate ability to influence and direct deep air support efforts effectively.⁶² In earlier planning, these battalions and regiments submitted pre-planned air support requests, but the highly dynamic nature of the battlefield soon rendered those pre-planned missions unnecessary. Often, MEF and CFLCC could not keep pace with the battlefield requirements surfacing from inside the division area of operations.⁶³ A 1st Marine Division after-action report also discussed how the planning-to-execution cycle was not reactive enough to changes in the scheme of maneuver. What they concluded was the land AO interdiction shaping effort often did not focus enough upon forces that I MEF would actually fight in 48 hours.⁶⁴

In Operation IRAQI FREEDOM, only 234 of the 12,893 preplanned targets submitted by the CFLCC were actually engaged due to the dynamic nature of the battlefield and the Air Tasking Order (ATO) lag.⁶⁵ High volumes of immediate CAS requests submitted by several independently operating ground combat units attempted to recover an effort lost earlier because interdiction targets either moved or the original purpose for their assignment as interdiction targets was no longer valid.⁶⁶ Eventually during Operation IRAQI FREEDOM, immediate CAS requests outnumbered those pre-planned targets by nearly an order of magnitude: some 15,592 immediate air support targets in the CFLCC

⁶² West, F. J. Bing, "Maneuver Warfare: It Worked in Iraq," *Naval Institute Proceedings*, 02 Feb, 2004. On-line. Internet. Available from <http://www.usni.org/Proceedings/Articles04/PRO02west.htm>, pg 1 of 2.

⁶³ West, F. J. Bing, "Maneuver Warfare: It Worked in Iraq," *Naval Institute Proceedings*, 02 Feb, 2004. On-line. Internet. Available from <http://www.usni.org/Proceedings/Articles04/PRO02west.htm>, pg 2 of 2.

⁶⁴ 1st Marine Division, Operation IRAQI FREEDOM (OIF): Lessons Learned, 30 May 2005. On-Line. Internet. Available from <http://www.globalsecurity.org/military/ops/oif-lessons-learned.htm>, pg. 21.

⁶⁵ Report of the Defense Science Board Task Force on Integrated Fire Support in the Battlespace, (Washington, D.C.: Office of the Under Secretary of Defense For Acquisition, Technology, and Logistics), October 2004, pg. 59-60.

⁶⁶ Report of the Defense Science Board Task Force on Integrated Fire Support in the Battlespace, (Washington, D.C.: Office of the Under Secretary of Defense For Acquisition, Technology, and Logistics), October 2004, pg. 59-60.

close battle area were eventually engaged.⁶⁷ This fact reveals that effective interdiction was not occurring in the battlespace where it could have the greatest utility. What resulted was an inability to keep pace with the subordinate warfighting ground forces and an inability to interdict the enemy forces these warfighting units would face in the near term. Their requirements had to eventually be met through increased numbers of immediate CAS missions.

In addition to this increase in immediate CAS requests, there is evidence that there were difficulties in the management and routing of CAS sorties to the ground forces. The ASOC in particular had trouble maintaining communications with ground tactical air control parties because of the ASOC location next to the corps. The ASOC was seen as simply lacking in the equipment, resources, and communications to effectively overcome the vast distances of the Euphrates River region.⁶⁸ There were also communications difficulties between the warfighting units and the CAS aircraft because the CAS aircraft could not establish effective communications with the ground FAC.⁶⁹ These difficulties managing and routing CAS translated into diminished responsiveness even though CAS was in abundance.

Preliminary Conclusion

The difficulties found in today's air-to-ground system have characteristics similar to the difficulties faced in past conflicts. Lieutenant General Wallace, the commanding general of the U. S. Army V Corps, made a comment that would certainly be recognized by commanders of the past when he stated that every fight in Operation IRAQI FREEDOM was a movement to contact at the platoon

⁶⁷ Lieutenant General Michael T Moseley, USAF, Operation IRAQI FREEDOM – By The Numbers, (Assessment and Analysis Division, 30 April 2003), pg. 5.

⁶⁸ Bruce R. Pirnie, Alan Vick, Adam Grissom, Karl P. Mueller, David T. Orletsky, Beyond Close Air Support: Forging a New Air-Ground Partnership, (Santa Monica, CA.: the RAND Corporation, 2005), pg. 68.

⁶⁹ 1st Marine Division, "Operation IRAQI FREEDOM (OIF): Lessons Learned," 30 May 2005. On-Line. Internet. Available from <http://www.globalsecurity.org/military/ops/oif-lessons-learned.htm> , pg. 22.

through battalion level.⁷⁰ He commented that the traditional shaping operations that we typically perform against traditional enemies did not work against Iraqi forces. Based upon some of the after-action reports that came out of Operation IRAQI FREEDOM, it is fair to suggest that shaping operations did not work for Coalition forces either.

In review, this examination of the current challenges to air-to-ground operations reveals three significant conflicts to effective integration of air and rapid maneuver warfare. First, a poorly located FSCL has a distinct effect upon the ability of airpower to rapidly conduct a significant portion of the land component commander and the theater commander's air interdiction operations. Placement either too far or too close has an adverse impact upon the tempo of air operations and, in some cases, can place friendly ground forces at risk of fratricide by CFACC air. Second, the air-to-ground centers are having difficulty keeping pace with events on the battlefield because the fundamental warfighting unit is increasingly unable to effectively communicate and coordinate with these centers. This reality becomes even more significant when the air-to-ground system must attempt to conduct battlefield management over an unusually large battlespace due to a distant FSCL placement. Third, these conflicts translate into an inability to rapidly and effectively transition the CFLCC deep fight to the deep and close fights of his subordinate units. Had airpower and ground maneuver been integrated better in the CFLCC deep fight, the volume of immediate CAS may not have been so large and the ability to satisfy those requests may have been conducted more effectively.

While past commanders may not have fought a purely 'maneuver warfare' style campaign in the past, and their enemies may not have been as ephemeral and difficult to describe, there is value in examining how past campaigns solved the problems associated with integration of airpower and rapid ground operations. By completing such an examination, similarities and differences in the way problems were identified, the way solutions were crafted, and the way the solutions were

⁷⁰ Patrecia Slayden Hollis, "Trained, Adaptable, Flexible Forces=Victory in Iraq: Interview with Lieutenant General W. Scott Wallace, USA, Commanding General, V Corps," *Field Artillery Magazine*, Sept-Oct 2003. On-line Internet. Available from <http://sill-www.army.mil/FAMAG/>, pg. 5.

evaluated for effectiveness may provide lessons for future solutions for integrated air-to-ground operations.

Chapter 4

The Historical Case Studies

"The psychological effect on the fighting forces, especially the infantry, of such a mass of bombs raining down on them with all the force of elemental nature, is a factor which must be given serious consideration. It is not in the least important whether such a carpet of bombs is dropped on good or bad troops..."

— Field Marshal von Kluge's report to Adolph Hitler, July 21, 1944

Although many of the difficulties that arise today from the shift towards smaller, more widely dispersed ground units capable of rapid movement on the battlefield are significant, they are also not necessarily new. History is replete with examples of similar problems facing armies and air forces. If we can gain insight regarding how airpower was coordinated with rapid ground operations from historical case studies, we may be able to analyze the commonalities, difficulties, and characteristics embodied in the solutions that were attempted. Afterwards, we may be able to examine solutions being considered today for those same commonalities. If such characteristics exist across past and present solutions, we may be able to construct solutions that emphasize these 'best practices' in order to address coordinating airpower with future land warfare operational concepts.

These case studies highlight the characteristics of airpower necessary for any concept concerning rapid ground warfare. The operations that I have selected are the German armored advance from the Ardennes to the English Channel in 1940, the Third Army armored advance through northern France in 1940, the American airmobile operations in South Vietnam during the Vietnam War, and the VII and XVIII Corps' western offensives during Operation DESERT STORM.

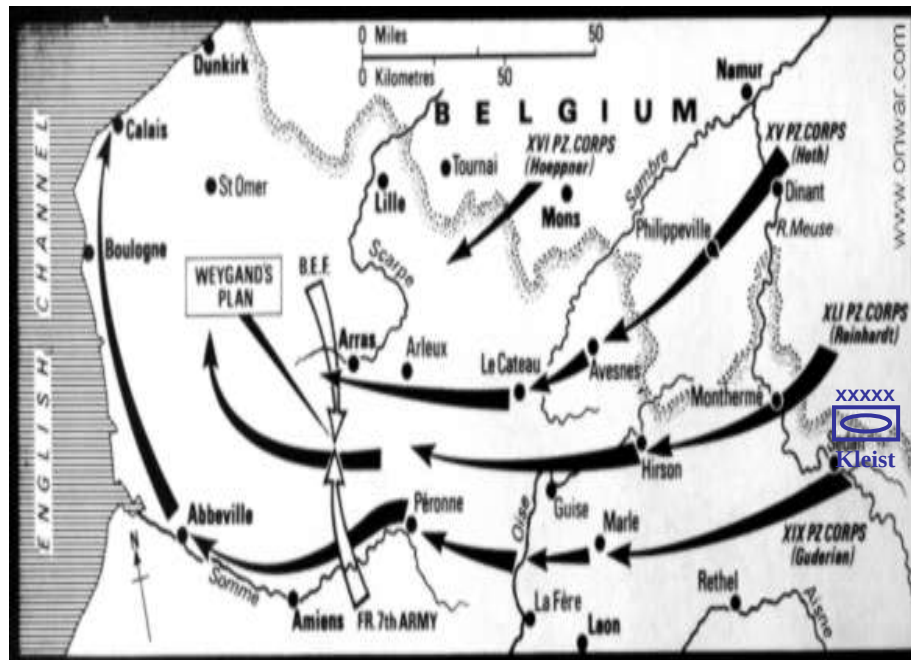
First, I will review what happened in these four operations. Second, I will address the fundamental role of airpower in these respective operations. Third, I will examine the effect of airpower upon these operations. Fourth, I will examine the command and control arrangements within each of the campaigns and how they supported the particular role of airpower and influenced the effectiveness of airpower. Fifth, I will address the problems for the air-to-ground system created by rapid ground operations. Sixth, I will examine how these challenges were addressed. Finally, I will assess the effectiveness of those changes. What this chapter will ultimately do is identify the challenges raised by the operational tempo, how airpower facilitates the speed of these ground operations, and the characteristics of the means by which air-to-ground coordination was accomplished.

Ardennes/ Meuse Operation of the Battle of France 1940

Overview

In the spring of 1940, Germany invaded France in an attempt to trap the Allied forces arrayed in Belgium against the English Channel. A northern deception by Germany created an opportunity for an armored offensive to attack through Belgium and northern France and prevent the Allied army from moving south into the French interior. Panzer Group Kliest would lead the armored spearhead. See Figure 7.

Figure 7
The Battle of France 1940



Source: Adapted from: OnWar.com. Maps of World War II, Blitzkrieg Campaigns 1939-1941. Battle of France: May 14-24, 1940 On-Line Internet. Available from <http://www.onwar.com/maps/wwii/blitz/>.

From the commencement of the offensive on 10 May to 13 May 1940, Panzer Group Kleist moved through Luxembourg and Belgium's Ardennes Forest to the banks of the Meuse River near Sedan. The Luftwaffe's initial weight of effort on the northern end of the front convinced the Allies that the corresponding weight of the ground offensive would also be in the north. On 13 May, Guderian's Panzer Corps crossed the Meuse and exploited the weakly defended boundary between the French Second and Ninth Armies. Using the Aisne River and the Ardennes Canal for security of the armored unit's flanks, the two panzer corps of Kleist's Panzer Group penetrated some 50 miles. From 16 May to 18 May, the two corps penetrated behind the French Ninth Army by covering another 50 miles. Three days later Kleist's Panzer Group attacked along the north shore of the Somme River, reached the English Channel, and completed the envelopment of four allied armies against the French and Belgian coast. What this operation accomplished was dramatic for its time. Four armies of the Allied forces were cut off from their ability to retreat and defend Paris or the French interior. The French government experienced utter shock at the defeat and soon after sued for peace.

Role of Airpower in the Operation

Based upon the plan developed by Erich von Manstein, the chief of staff of Germany's Army Group A, the Luftwaffe would accomplish three tasks in their support of Army Group A's breakthrough. Close air support (CAS) would be focused upon the armored force's crossing of the Meuse and upon the support of airborne infantry operations to seize key Dutch and Belgian terrain for the armored forces. More effort was to be given to winning air superiority and the interdiction of Dutch ground forces.⁷¹ However, when required, the Luftwaffe would divert and concentrate airpower from other missions to support the offensive upon the two decisive points on the Meuse at Dinant in Belgium and Sedan in France. After the crossings had been reasonably secured, the Luftwaffe would then resume their efforts of interdiction and air superiority operations throughout Holland, Belgium, and northern France.

Effectiveness of the Operation.

The final attack towards the English Channel covered 70 miles in three days. The Ardennes/Meuse attack covered over twenty miles per day and was instrumental in enveloping two French armies and the British Expeditionary Force. Additionally, the penetration was successful in fixing the French Sixth, Seventh, and Tenth Armies south of the Somme and Aisne Rivers as the German armored spearhead attacked to the coast. In essence, Panzer Group Kliest had penetrated 170 miles of enemy territory in eight days. This feat caused the allied defenses to collapse rapidly and decisively.

Command and Control Arrangements

Coordination with the ground movement. Luftwaffe air-to-ground coordination followed the 1936 conceptualization entitled "Conduct of the Air

⁷¹ Williamson Murray, *The Luftwaffe Experience*, in *Case Studies in the Development of Close Air Support*, Edited by Benjamin Franklin Cooling, (Washington, D. C.: United States Air Force, Office of Air Force History, 1990), pg. 91.

War” that made CAS an important mission--but not as important as interdiction, air superiority, and strategic bombing.⁷² According to German tactical thought and writing, CAS should be conducted only when battlefield events required air action upon a significant decisive point.⁷³ The preferred method of the Germans was an interdiction campaign that did not require a great deal of coordination with the ground forces when a mission was to occupy key objectives far behind the front.⁷⁴ While it did make use of *Kolufits* at the corps and army level to direct the airborne reconnaissance units of the Luftwaffe and the *Flivos* at corps and army level to relay army air support requests, Goering alone largely directed the ultimate control of the air support.⁷⁵ The Luftwaffe executed interdiction operations behind the French Second Army while Panzer Group Kliest executed a drive from the Ardennes Forest along the north bank of the Meuse River to the environs of Dunkirk and Calais within 13 days. By conducting interdiction of the enemy rear echelons while panzer spearheads penetrated deep into the gaps between Allied defenses, the Luftwaffe contributed to the rapid collapse of the French army through shock. Additionally, the German offensive made use of airborne forces to capture key bridges and Allied positions within relative proximity to the armored spearhead in order for the ground offensive to rapidly move through those positions without undue delay.⁷⁶ The manner in which the Luftwaffe offensive supported this spearhead was to launch continuous ‘rolling attacks’ to paralyze the French defenses, disrupt and isolate its communications,

⁷² Williamson Murray, The Luftwaffe Experience, in *Case Studies in the Development of Close Air Support*, Edited by Benjamin Franklin Cooling, (Washington, D. C.: United States Air Force, Office of Air Force History, 1990), pg. 74.

⁷³ Williamson Murray, The Luftwaffe Experience, in *Case Studies in the Development of Close Air Support*, Edited by Benjamin Franklin Cooling, (Washington, D. C.: United States Air Force, Office of Air Force History, 1990), pg. 19.

⁷⁴ Martin van Creveld, Stephen L. Canby, and Kenneth S. Brower, Air Power and Maneuver Warfare, (Maxwell Air Force Base, AL.: Air University Press, 5th Ed 2003), pg. 48.

⁷⁵ A *Kommandeure Der Luftwaffe*, or *Kolufit*, was a Luftwaffe officer subordinate to the Luftwaffe representative on the General Staff and was in charge of the air reconnaissance. However, he had neither authority over nor direct communications with support aircraft. A *Fliegersoffizieren*, or *Flivo*, was a close air support assistant who traveled the battlefield in an armored car and reported on the ground operations to a close combat officer at the Luftwaffe headquarters. He too had no authority over nor direct communications with the close air support aircraft operating in the close or deep battle.

⁷⁶ Martin van Creveld, Stephen L. Canby, and Kenneth S. Brower, Air Power and Maneuver Warfare, (Maxwell Air Force Base, AL.: Air University Press, 5th Ed 2003), pg. 45.

and lastly fix many of the larger Allied forces in place so the spearhead could proceed at best speed to the English Channel and encircle the Allied defenses.

Command and control of the elements. One of the major contributors to the relative advantage enjoyed by the *Wermacht* and *Luftwaffe* was a fairly unified command and control structure that enabled information to be disseminated quickly and that enabled resources for the offensive to be switched from one unit to another in order to maintain high momentum relative to the enemy.⁷⁷ As armored columns exploited the gaps in the Allied defensive lines, the Luftwaffe attacked the lines of communications leading into the rear of the French defensive line, thereby isolating it from the reinforcements and preventing those Allied reinforcements from being brought forward to counterattack.⁷⁸ The bulk of the Luftwaffe's effort was devoted to what we today would call 'behind the front interdiction' that included considerably more than merely attacks on the lines of communications. The Luftwaffe would attack the stationary defenses ahead of the armored spearhead in order to paralyze the Allied ability to fight in the defenses and stop any Allied attempt to retreat or counterattack from the defenses.⁷⁹ The great advantage of this Luftwaffe theater-level interdiction operation was it did not require close cooperation with ground forces.⁸⁰ The enemy was overwhelmed not so much by firepower as by rapid movements that carved up the theater and left him unable to react until it was too late.⁸¹

Effect of Speed upon the Command and Control System

The operational tempo reached an important point with Guderian's crossing of the Meuse near Sedan. His plan called for a Panzer division to cross north of Sedan while another crossed simultaneously to the south. His request for a day's rest to allow a third division and artillery to catch up was denied by von

⁷⁷ Martin van Creveld, Stephen L. Canby, and Kenneth S. Brower, Air Power and Maneuver Warfare, (Maxwell Air Force Base, AL.: Air University Press, 5th Ed 2003), pg. 43.

⁷⁸ Martin van Creveld, Stephen L. Canby, and Kenneth S. Brower, Air Power and Maneuver Warfare, (Maxwell Air Force Base, AL.: Air University Press, 5th Ed 2003), pg. 49.

⁷⁹ Martin van Creveld, Stephen L. Canby, and Kenneth S. Brower, Air Power and Maneuver Warfare, (Maxwell Air Force Base, AL.: Air University Press, 5th Ed 2003), pg. 50.

⁸⁰ Martin van Creveld, Stephen L. Canby, and Kenneth S. Brower, Air Power and Maneuver Warfare, (Maxwell Air Force Base, AL.: Air University Press, 5th Ed 2003), pg. 53.

⁸¹ Martin van Creveld, Stephen L. Canby, and Kenneth S. Brower, Air Power and Maneuver Warfare, (Maxwell Air Force Base, AL.: Air University Press, 5th Ed 2003), pg. 55.

Kliest, his superior officer. The German ruse of a northern main effort had been accepted as reality by the French and von Kliest did not want to yield the high operational pace and lose the element of surprise. Because of the dearth of artillery available to Guderian for the crossing, General Loerzer, commander of the Luftwaffe's II Air Corps, formulated a rapid air support plan to concentrate 850 attack aircraft within 24 hours upon the French defensive positions on the western side of the Meuse.⁸² Guderian, Loerzer, and the staffs conducted face-to-face meetings and generated a rapid air support plan with the little remaining time they had. The net result was devastating for the French defenses as the Luftwaffe air support and small artillery support began a rout that led to a wide collapse of the French defenses in northern France.⁸³

Solutions Employed to Remedy Challenges Encountered

The most critical challenge encountered by the Luftwaffe concerned airborne discrimination between friend and foe. The larger challenges to the Wehrmacht involved the inability to effectively communicate with aircraft or more rapidly direct their missions. Indeed, direct communications between panzer units and aircraft was a failure.⁸⁴ To deal with this situation, the Wehrmacht devised a series of 'bomblines' that were drawn across terrain features at intervals corresponding with rates of German movement.⁸⁵ Pre-designated targets in the likely path of the panzer divisions were targeted by air support only after air superiority strikes were performed.⁸⁶ How the Wehrmacht and Luftwaffe handled the rapid armored penetrations to the English Channel was to largely separate the air effort and ground offensive enough to eliminate fratricide as much as possible,

⁸² Ernest R. May, *Strange Victory: Hitler's Conquest of France*, (New York, N.Y.: Hill and Wang, 2000), pg. 428.

⁸³ Williamson Murray, *The Luftwaffe Experience*, in *Case Studies in the Development of Close Air Support*, Edited by Benjamin Franklin Cooling, (Washington, D. C.: United States Air Force, Office of Air Force History, 1990), pg. 91.

⁸⁴ Williamson Murray, *The Luftwaffe Experience*, in *Case Studies in the Development of Close Air Support*, Edited by Benjamin Franklin Cooling, (Washington, D. C.: United States Air Force, Office of Air Force History, 1990), pg. 89.

⁸⁵ The bomblines were a deconfliction line where aircraft could engage targets beyond the line with a reasonable assurance that friendly forces were behind the line. Plotting of the bomblines was usually along easily recognizable ground features.

⁸⁶ Williamson Murray, *The Luftwaffe Experience*, in *Case Studies in the Development of Close Air Support*, Edited by Benjamin Franklin Cooling, (Washington, D. C.: United States Air Force, Office of Air Force History, 1990), pg. 89.

yet still have them in enough proximity for the armored offensive to exploit the effects of the “security cloud” created by the Luftwaffe.⁸⁷ When detailed, integrated air-to-ground operations were absolutely essential, as at Sedan, and small amounts of time were available, the Luftwaffe and Wehrmacht excelled at flexible, real-time orchestration of air-to-ground operations at their staff meetings.⁸⁸ High-ranking officers who modified flexible standard operating procedures within a detailed operational plan accomplished the integration and deconfliction of air support at decisive points. What could not be accomplished in real-time was quickly modified from a strong base of German training and education. At Sedan and Dinant in particular, the ‘audible’ created by the Wehrmacht and Luftwaffe was successful because the German ‘playbook’ was thorough and understood by the airpower decision makers. Air-to-ground coordination had been conducted at those decisive points through detailed, timeline-oriented integrated air support.

Effectiveness of the Solutions

The German prescriptions to their command and control problems were effective for a number of reasons. Of greatest significance were the foundations laid in terms of operational readiness and preparedness for rapid land warfare. German air-to-ground coordination was simply more responsive and flexible than their British and French opponents. To begin, Luftwaffe officers were expected to have good knowledge of army tactics and doctrine, and they often had the advantage of extensive joint training prior to 1940.⁸⁹ The solution implemented at Sedan and during the penetration and envelopment to the English Channel enabled airpower to concentrate quickly at one key location while being sufficiently synchronized with friendly ground advances. The Luftwaffe could then quickly re-deploy back to the deeper, theater-wide interdiction and air superiority missions ahead of the armored columns. While the stationary French

⁸⁷ Martin van Creveld, Stephen L. Canby, and Kenneth S. Brower, Air Power and Maneuver Warfare, (Maxwell Air Force Base, AL.: Air University Press, 5th Ed 2003), pg. 55.

⁸⁸ Williamson Murray, The Luftwaffe Experience, in *Case Studies in the Development of Close Air Support*, Edited by Benjamin Franklin Cooling, (Washington, D. C.: United States Air Force, Office of Air Force History, 1990), pg. 93.

⁸⁹ James S. Corum, The Luftwaffe: Creating the Operational Air War, 1918-1940, (Lawrence, KS.: University of Kansas Press, 1997), pg. 245.

defensive network made the Germans' solution simpler to implement, German command and control made sufficient use of reconnaissance flights to find and engage targets in the path of the panzer columns.⁹⁰ The Luftwaffe surveyed division-level targets through organic reconnaissance planes and stayed informed about the friendly ground scheme of maneuver through the *flivros* located at the divisions. Additionally, the static defense system allowed the high concentration on interdiction to mask column movements, bypass the French defenses, and complete the envelopment. In sum, German operational doctrine accounted for the need for aircraft to transition from interdiction to CAS at decisive points in the battlespace, and then quickly resume interdiction; indeed, they had planned and practiced such flexible air-to-ground support in Spain and in exercises. The conflicts between CAS and interdiction were mitigated by sound doctrine that accounted for the necessity of both missions within their comprehensive approach to operational warfare.⁹¹

Patton's Southern Flank Offensive in the Battle of France, 1944.

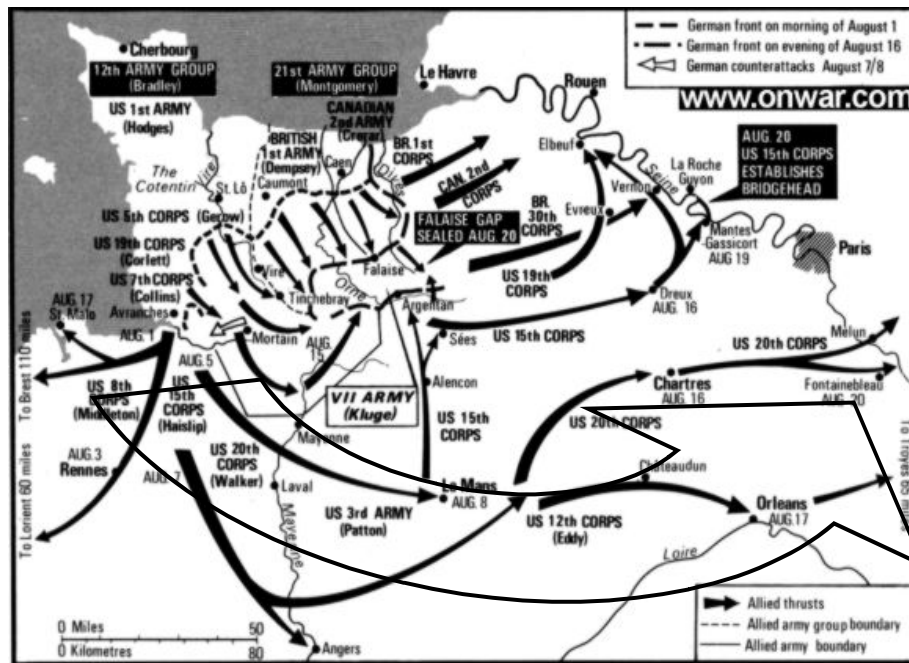
Overview

In the July of 1944, US forces executed breakthrough operations off the Normandy beachhead and began the liberation of France. The objective of the breakthrough was to continue to defeat the German forces throughout Normandy, the Cotentin Peninsula, and Brittany. The Allied forces would also redirect their offensive towards the east, liberate Paris, and prepare for the follow-on invasion of Nazi Germany. General George S. Patton was selected to lead the US Third Army as the southernmost force of the invasion. He was responsible for protection of the southern flank of the Allied Force, and he was also responsible for the liberation of Brittany and all French territory north of the Loire River. See Figure 8.

⁹⁰ James S. Corum, The Luftwaffe: Creating the Operational Air War, 1918-1940, (Lawrence, KS.: University of Kansas Press, 1997), pg. 246-247.

⁹¹ James S. Corum, The Luftwaffe: Creating the Operational Air War, 1918-1940, (Lawrence, KS.: University of Kansas Press, 1997), pg. 248.

Figure 8
Patton's Southern Flank Offensive in the Battle of France, 1944



Source: Adapted from: OnWar.com. Maps of World War II, Western Front Jul-Aug 1944. Allied Drive to the Seine: August 1-16, 1944. On-Line Internet. Available from <http://www.onwar.com/maps/wwii/westfront/index.htm>.

On 3 August 1944, General Patton was given authorization to reorient the Third Army's direction of attack east toward the German border. By the second week of August, the Third Army's rate of advance began to average 20 miles per day. During that time, Patton's forces covered 90 miles, captured Le Mans, and created a southern 'pincher' upon the German Seventh and Fifth Panzer army forces. Patton's operational level tempo relative to the Germans was rapid enough to envelop and crush a German counterattack at the 'Argentan Trap.' Only General Bradley's ill-advised order for the Third Army to halt and assume the 'anvil' to the Canadian First Army's 'hammer' to the north of the gap saved the remnants of the German army.⁹²

⁹² David N. Spires, *Air Power For Patton's Army: The XIX Tactical Air Command in the Second World War*, (Washington, D. C.: Air Force History and Museums Program, 2002), pg 90.

From 13 August to 25 August, the XX Corps and XII Corps of Patton's Third Army penetrated into the French interior towards Troyes and the Seine River some 160 miles. This rapid penetration contributed to a decision to withdraw German Army Group B to the western banks of the Seine River where they gave up contesting Paris to the Allied invasion. Upon arrival at the Meuse River on 5 September, the Third Army had effectively secured a line extending from the mouth of the Loire River at the Bay of Biscay to the source of the Moselle River. German Army Group G was in essence pinned against the Rhine River in Alsace-Lorraine.

Role of Airpower in the Operation

Initially in the Third Army offensive eastward, General Otto P. Weyland, commanding general of XIX TAC, undertook armed reconnaissance and armored column cover as the primary missions to enable Patton's rapid armored offensive. During the second week of August, XIX TAC flew additional missions along with armored column cover--such as direct support and flank security missions in the Third Army rear areas of Brittany and southern Normandy. These missions isolated and reduced any threat to the American rear lines of communications posed by pockets of German resistance. Additionally, XIX TAC also flew advanced interdiction operations in Third Army's deep area of operation (AO) along the Loire River to Orleans and along the Seine and Eure Rivers to Paris in order to stop any Luftwaffe and Wehrmacht efforts at reinforcement of their crumbling defenses.⁹³

During Patton's offensive, Weyland decided that the ground situation required more CAS than interdiction: the increased speed of the ground offensive required it and since Luftwaffe resistance had all but disappeared from the skies it was possible to redirect sorties.⁹⁴ What the interaction between interdiction and CAS accomplished was to first engage armored columns of the German mobile defenses as they committed toward the Americans. Next, as the American

⁹³ David N. Spires, *Air Power For Patton's Army: The XIX Tactical Air Command in the Second World War*, (Washington, D. C.: Air Force History and Museums Program, 2002), pg 89.

⁹⁴ David N. Spires, *Patton and Weyland, A Model For Air-Ground Cooperation*, in *Airpower and Ground Armies: Essays on the Evolution of Anglo-American Air Doctrine 1940-1943*, Edited by Daniel R Mortensen (Maxwell Air Force Base, AL.: Air University Press, 1998), pg. 150.

columns approached, the column cover and air alerts responded as events unfolded in the close battle. Patton's and Weyland's preference was to keep target selection centralized at the Army level and appropriately gave significant weight to the interdiction portion of the fight.⁹⁵ However, as the offensive became increasingly faster, use of forward air controller aircraft, armored column cover, and high volume airstrip alerts became significant in order to provide armored divisions with effective short notice air support.⁹⁶

Effectiveness of the Operation.

By the end of August, the XX Corps had captured Verdun, completing a nearly 500 mile advance that was limited only by an army supply system that could not keep pace with the offensive. Through close, persistent cover of armored columns and an aggressive interdiction operation, XIX TAC enabled the Third Army to concentrate its speed and direction towards the German border. Airpower ensured a secure southern and western flank and airpower engaged enemy forces across the expanse of the battlefield. Most American commanders praised the air support arrangement. Interdiction exacted significant tolls on German freedom of movement and the armored column cover was lauded for its predictability, interoperability with the ground battle, and its responsiveness.⁹⁷ A final assessment by the XX Corps commander, General Walker, suggests that tactical air support greatly enhanced the speed of the American offensive to the German border. His evidence was not based on statistics but on a firsthand view of forces as they achieved their objectives.⁹⁸ Assessment of the effectiveness of this campaign comes from German sources as well. German commanders very quickly concluded that detection by US air reconnaissance planes translated into

⁹⁵ W. A. Jacobs, The Battle For France, 1944, in *Case Studies in the Development of Close Air Support*, Edited by Benjamin Franklin Cooling, (Washington, D. C.: United States Air Force, Office of Air Force History, 1990), pg. 284.

⁹⁶ W. A. Jacobs, The Battle For France, 1944, in *Case Studies in the Development of Close Air Support*, Edited by Benjamin Franklin Cooling, (Washington, D. C.: United States Air Force, Office of Air Force History, 1990), pg. 274.

⁹⁷ W. A. Jacobs, The Battle For France, 1944, in *Case Studies in the Development of Close Air Support*, Edited by Benjamin Franklin Cooling, (Washington, D. C.: United States Air Force, Office of Air Force History, 1990), pg. 281.

⁹⁸ David N. Spires, Air Power For Patton's Army: The XIX Tactical Air Command in the Second World War, (Washington, D. C.: Air Force History and Museums Program, 2002), pg 296.

devastating US air attacks upon their forces.⁹⁹ In addition, German commanders were forced to move units and materials by night, and could only offer disorganized, piecemeal resistance to the American juggernaut.¹⁰⁰

Command and Control Arrangements

Coordination with the ground movement. The XIX TAC operations section maintained knowledge of the Army's movements during the drives east to the Seine River and west to the port of Brest. Additionally, the Army staff made tremendous use of the Air section within Third Army Operations section. XIX TAC Standard Operating Procedures (SOP) called for an Action Officer for fighter-bomber support and a Duty Officer for medium and heavy bomber support to work closely with the Combat Operations Officer in order to approve and direct requests for air support. His 'point of view' was tasked to be oriented towards the ground operation. When air missions were approved for fighter-bomber, medium bomber, or heavy bomber support, mission information was relayed from these officers to the supported unit. After each mission, they would relay results of air support missions to the ground units as well as any scheduled additional air support to those same ground units.¹⁰¹ The Action and Duty Officers were expected to send a minimum of four Situation Reports per day to ground and air headquarters in order to keep ground and air commanders abreast of the current ground situation. This coordination enabled the determination of bomblines and weights of effort so that situation briefs could be given to pilots first thing in the morning.¹⁰² The air-to-ground support system remained rapidly deployable to forward positions in order to eliminate communications difficulties. Lastly, General Weyland held frequent meetings with General Patton and his staff. These enabled timely, informed decisions to be made as the battle situation changed.

⁹⁹ W. A. Jacobs, The Battle For France, 1944, in *Case Studies in the Development of Close Air Support*, Edited by Benjamin Franklin Cooling, (Washington, D. C.: United States Air Force, Office of Air Force History, 1990), pg. 283.

¹⁰⁰ W. A. Jacobs, The Battle For France, 1944, in *Case Studies in the Development of Close Air Support*, Edited by Benjamin Franklin Cooling, (Washington, D. C.: United States Air Force, Office of Air Force History, 1990), pg. 283.

¹⁰¹ XIX TAC Standard Operation Procedures, dtd Jun 45. pg 16.

¹⁰² XIX TAC Standard Operation Procedures, dtd Jun 45. pg 18. Bomblines were used in a manner largely similar to the German example in the Meuse/ Ardennes Operation.

Spires concludes that the informal decision making arrangements enabled the capabilities and flexibility that was essential to air operations that supported ground forces.¹⁰³

Command and control of the elements. Spires states that the ability “of XIX TAC to respond rapidly to the Third Army’s changing combat situations during the exploitation phase overcame tendencies by army officers to extend their authority into the air arena. From the beginning, the battle for France emerged as a joint operations campaign that required and received a high measure of cooperation and personal involvement.”¹⁰⁴ The fast pace of the offensive called for planning and decision making to become more fluid, unstructured, and highly personalized.¹⁰⁵ Communications and coordination between the air and ground units was enabled through daily meetings between Weyland and Patton, Major General Hugh J. Gaffney, the Third Army chief of staff, and Major General H. R. Gay, the assistant chief of staff, over the rapidly changing battle situation and what would be required of air. Weyland would suggest a course of action and once it was approved it would move rapidly back to his combat operations officer for action.¹⁰⁶ Weyland’s solution to the rapid advance along the left bank of the Loire to the Meuse River was extremely decentralized operations along an expansive front aided by a natural barrier. What the XIX TAC provided for the Third Army was extra firepower and a shield for the ground forces.¹⁰⁷ Although Weyland agreed with the requirements of Army Field Manual (FM) 100-20 that the usual order of priority in air operations is air superiority, then isolation of the battlefield, then close air support of ground units in combat, he recognized that

¹⁰³ David N. Spires, Air Power For Patton’s Army: The XIX Tactical Air Command in the Second World War, (Washington, D. C.: Air Force History and Museums Program, 2002), pg 81.

¹⁰⁴ David N. Spires, Air Power For Patton’s Army: The XIX Tactical Air Command in the Second World War, (Washington, D. C.: Air Force History and Museums Program, 2002), pg 119.

¹⁰⁵ David N. Spires, Air Power For Patton’s Army: The XIX Tactical Air Command in the Second World War, (Washington, D. C.: Air Force History and Museums Program, 2002), pg 120.

¹⁰⁶ David N. Spires, Air Power For Patton’s Army: The XIX Tactical Air Command in the Second World War, (Washington, D. C.: Air Force History and Museums Program, 2002), pg 119.

¹⁰⁷ David N. Spires, Air Power For Patton’s Army: The XIX Tactical Air Command in the Second World War, (Washington, D. C.: Air Force History and Museums Program, 2002), pg 297.

things were different in northern France.¹⁰⁸ Weyland deliberately chose close support with the ground forces and close reconnaissance as the priority over isolation of the battlefield.¹⁰⁹ During the Third Army's mobile operations phase, the top priority of air-to-ground planners was close support in the forms of armored column cover, attacks on defended towns and strong points, and armed reconnaissance along likely German counterattack routes. Patton's rapid offensive was an innovation in ground operations that required a corresponding innovation in air support operations.

Effect of Speed upon the Command and Control System

General Weyland faced an operation that was outrunning his ability to maintain communications between the army commanders and his airfields and aircraft groups. The expanding southern front from the Breton Peninsula to the Paris-Orleans gap was roughly 300 miles in length and increasingly hampered his ability to concentrate air where and when it was needed at the operational level. Patton's high operational tempo in August created several difficulties for XIX TAC airfield engineers, communications measures, aircraft maintenance, and logistical capabilities for his 400 craft armada.¹¹⁰ Centralized command as a doctrinal precept became increasingly at odds with the realities and necessities of the conflict.

Solutions Employed to Remedy Challenges

Weyland readily accepted and implemented innovations to his command and control system in order to meet the needs of the rapid ground war. First, Weyland began to create and move forward communications units called X-Ray with the Third Army's forward headquarters. His forward headquarters would handle operational control of XIX TAC while the rear headquarters handled

¹⁰⁸ War Department Field Manual (FM) 100-20, Command and Employment of Airpower, 21 July 1943, Chtp. 2, Sect. 8. a.-f.

¹⁰⁹ David N. Spires, Air Power For Patton's Army: The XIX Tactical Air Command in the Second World War, (Washington, D. C.: Air Force History and Museums Program, 2002), pg 298.

¹¹⁰ David N. Spires, Patton and Weyland, A Model For Air-Ground Cooperation, in *Airpower and Ground Armies: Essays on the Evolution of Anglo-American Air Doctrine 1940-1943*, Edited by Daniel R Mortensen (Maxwell Air Force Base, AL.: Air University Press, 1998),pg. 151.

administrative, maintenance, and logistical matters.¹¹¹ At one point he had four working headquarters elements performing duties in separate regions of Patton's vast area of operations (AO).¹¹² In the eastern AO, Weyland decentralized operational control and dispersed forces as necessary to appropriately weigh missions like armored column cover, airstrip alert, and interdiction. While he eventually paid penalties in not being able to fully support other portions of the AO, Weyland's personal movement from the front to the rear to ensure adequate and responsive support was substantial.

Effectiveness of the Solutions

The bottom line is that the command and control solutions attempted to ensure that interdiction, armed reconnaissance, and armored column cover were tailored to the particular needs of ground forces security within Patton's widely expanding AO. An example of the effectiveness of Weyland's solutions happened near Mortain as the American Third Army drove towards Paris. On 7 August, a German counterattack at Mortain was planned to exploit the cover of thick fog in order to hide from the armored column cover. When the fog prematurely burned off, IX TAC and XIX TAC aircraft detected and savaged the German armored attack and their Luftwaffe cover. Mortain was deemed a colossal German blunder, and a successful example of the flexibility of Weyland's plan to support Patton's high operational tempo.¹¹³ The result was the Wehrmacht could not employ an armored, mobile defense strategy because of the combination of close escort of the American forces and armed reconnaissance that preempted attempts at realignment by German forces.

As the Third Army came to rely on XIX TAC for extra firepower and force protection during high rates of armored advance, General Weyland departed

¹¹¹ W. A. Jacobs, *The Battle For France, 1944*, in *Case Studies in the Development of Close Air Support*, Edited by Benjamin Franklin Cooling, (Washington, D. C.: United States Air Force, Office of Air Force History, 1990), pg. 275.

¹¹² David N. Spires, *Patton and Weyland, A Model For Air-Ground Cooperation*, in *Airpower and Ground Armies: Essays on the Evolution of Anglo-American Air Doctrine 1940-1943*, Edited by Daniel R. Mortensen, (Maxwell Air Force Base, AL.: Air University Press, 1998),pg. 152.

¹¹³ Geoffrey Perret, *Winged Victory, The Army Air Forces in World War II*, (New York, N. Y.: Random House, Inc., 1993), pg. 314.

from the lessons of North Africa that emphasized centralized control of airpower.

Spires quotes an excellent summary of Weyland's ultimate goal:

The determining factor for close support allocation became the rate of advance.... For mobile operations, on the other hand, close support requirements received top priority in the form of armored column cover and attacks on defended towns and strong points, with remaining aerial forces assigned armed reconnaissance routes after minimum air superiority requirements had been met. Again Weyland's air planners adjusted the aerial effort to meet the requirements of Patton's ground offensive, not to satisfy doctrinal pronouncements or some other formal planning arrangement.¹¹⁴

Weyland personally supervised the development of the decentralized command network by flying between the various airfields and field command posts in order to explain his intent, explain the ground scheme of maneuver, and decide what airpower would do to support the Third Army offensive. The decentralized command structure, augmented by Weyland's actively shuttling between Patton's headquarters and his own forward and rear headquarters, contributed to the successful application of airpower that supported the liberation of France.

American Air Mobile Operations in the Vietnam War

Overview

In Central and South Vietnam a different type of war was being engaged using unique capabilities. The Army began to create ground units that were re-organized and equipped for 'airmobile operations.' These units were an admixture of airmobile infantry and elite paratroopers whose missions included search-and-destroy and long range reconnaissance patrols designed to push Viet Cong guerillas from South and Central Vietnam.

One of the key operations making extensive use of airmobile forces was Operation HARRISON in which the 101st Division's airmobile brigade was assigned to clear the coastal mountains of Viet Cong and drive them into the

¹¹⁴ David N. Spires, Air Power For Patton's Army: The XIX Tactical Air Command in the Second World War, (Washington, D. C.: Air Force History and Museums Program, 2002), pg 302.

Central Highlands of Vietnam.¹¹⁵ During Operation HARRISON, speed of the ground operation was determined by ability to rapidly move around the area of operation through numerous insertions, battles, and extractions of the airmobile units. During the battles within this and other airmobile offensives, the Viet Cong often would break contact with American forces and attempt to melt back into the jungle. The 101st would insert other units behind the Viet Cong lines of retreat and either ambush or re-engage the enemy.¹¹⁶ Air support of these operations relied on principles such as responsiveness and concentration in order to achieve effects within the 20-minute lifespan of most of the engagements.

Airmobile units were also used in Operation CEDAR FALLS-JUNCTION CITY. This operation involved four Army divisions conducting a search and destroy mission in order to eliminate the regional Viet Cong command and forces. The mission of the airmobile units in this operation was to insert and close off the likely Viet Cong withdrawal routes into Cambodia. During the operation, airmobile assaults were used to block the northern salient of the region so Viet Cong forces, when driven north by the conventional forces, would encounter these airmobile units and face destruction from air and ground forces.¹¹⁷ Again, air support became crucial in the conduct of these operations that exploited the assault helicopter's inherent advantages of speed and mobility.

Role of Airpower in the Operation

Airpower had two roles in these operations. First, it provided large volumes of close air support in order to replace the dearth of organic firepower the airmobile units could bring themselves. Second, it provided an airborne coordination and control capability that worked in support of the ground

¹¹⁵ John F. Flanagan, *Vietnam Above the Treetops, A Forward Air Controller Reports*, (New York, N. Y.: Praeger Publishers, 1992), pg. 91.

¹¹⁶ John F. Flanagan, *Vietnam Above the Treetops, A Forward Air Controller Reports*, (New York, N. Y.: Praeger Publishers, 1992), pg. 95.

¹¹⁷ Lieutenant General Bernard William Rogers, "Operation CEDAR FALLS-JUNCTION CITY, A Turning Point" in *Vietnam Studies*, 1989. On-line. Internet. 13 May 2005. Available at <http://www.army.mil/cmh-pg/books/Vietnam/907/cont.htm> , Chpt X, pg. 100.

commanders. That capability was the significant requirement for a forward air controller airborne [FAC(A)] who worked closely with the airmobile brigades.¹¹⁸

During both operations, there were no easily discernable forward lines of troops (FLOT) as the enemy had the ability to infiltrate anywhere within the jungles and grasslands of Vietnam. As a result, the insurgents could give battle anywhere because the combat zone was non-linear; the concepts of deep, close, and rearward battlespace did not clearly apply. In many places dense foliage and undulating terrain made use of a ground FAC of limited utility. The FAC(A) was a measure to ensure exacting target identification and air strike control to deal with this problem.¹¹⁹ During the airmobile assaults the FAC(A) would provide for coordination of air strikes and provide information as forces inserted into a zone. Once airmobile forces landed and made contact with the enemy, the FAC(A) would then use preplanned and airstrip alert air support to destroy large portions of the enemy forces that attempted to counterattack or escape. The airmobile units would then engage remnant forces or escaping forces in order to finish off the enemy.¹²⁰ During this decisive phase and during the extraction by helicopter, the FAC(A) would then coordinate air strikes in the surrounding regions where the enemy might attempt to counterattack or disengage from the battle.

Effectiveness of the Operations.

The employment of airmobile tactics was deemed successful in preventing Central Vietnam from being cut in half by the guerrillas.¹²¹ In certain instances, the brigade displayed captured weapons, supplies, and equipment.¹²² While there were obvious debates upon what ultimately defined success for the campaign, the

¹¹⁸ The author chose to use the Navy-Marine Corps version of this term. The Air Force version of the term is an Airborne Forward Air Controller (AFAC). The terms are purely interchangeable.

¹¹⁹ Gary Robert Lester, Mosquitoes to Wolves: The Evolution of the Forward Air Controller, (Maxwell Air Force Base, AL.: Air University Press, 1997) pg. 126.

¹²⁰ Gary Robert Lester, Mosquitoes to Wolves: The Evolution of the Forward Air Controller, (Maxwell Air Force Base, AL.: Air University Press, 1997) pg. 130.

¹²¹ John F. Flanagan, Vietnam Above the Treetops, A Forward Air Controller Reports, (New York, N. Y.: Praeger Publishers, 1992), pg. 111-112.

¹²² John F. Flanagan, Vietnam Above the Treetops, A Forward Air Controller Reports, (New York, N. Y.: Praeger Publishers, 1992), pg. 112.

fact remains that airmobile operations had a significant effect upon the ability of the enemy to physically occupy and control the villages and terrain in the highlands.

Command and Control Arrangements

Coordination with the ground movement. Many of the forward air controllers who flew 0-1 light observer aircraft planned their missions side by side with the Army elements, flew the controller missions, and debriefed the Army staffs after conclusion of the mission. During Operation HARRISON, this close and detailed coordination was possible because the 0-1 needed very little in terms of runway, munitions, and fuel--and thus could be deployed forward. Therefore, the FAC(A)s who flew the support missions could locate themselves along side the 101st Airborne Brigade. Often the planning for an airmobile assault mission was likened by the FAC(A)s to a stock exchange session where the staff sections would 'barter' a plan, and then the FAC(A)s would determine air support requirements after the plan was formed.¹²³ Coordination was then made for the close air support sorties. After the mission, the FAC(A) would return to the Army command post and debrief the 101st Airborne's operations and intelligence sections on all activities and results. During operations, the FAC(A)s were often the first to sight, monitor, and report changes in enemy activity because of their superior advantage for observation of the battlefield and for simultaneous communication with forces in combat and with the various command posts and fire support centers.¹²⁴ Again, there is an element of the rapid pace of an offensive where planning and decision making became fluid, unstructured, immediate, and highly personalized. That form of coordination with the FAC(A) enabled the airmobile operations to adjust rapidly and effectively to the dynamics of the battlefield through superior situational awareness by the Army airmobile brigade.

Command and control of the elements. The Air Force believed that the FAC(A) and the ground force commander must have a strong relationship since

¹²³ John F. Flanagan, Vietnam Above the Treetops, A Forward Air Controller Reports, (New York, N. Y.: Praeger Publishers, 1992), pg. 92.

¹²⁴ John F. Flanagan, Vietnam Above the Treetops, A Forward Air Controller Reports, (New York, N. Y.: Praeger Publishers, 1992), pg. 93.

the FAC(A) was a direct representative of the tactical air force commander. The FAC(A) was considered the local air commander in the conduct of air operations within his region, and he was often the deciding vote regarding whether or not air delivered ordnance was approved.¹²⁵ In this case the FAC(A) was delegated wide authority to meet the targeting desires of the ground commander and he acted with the de facto approval of the tactical air forces commander.

Effect of Speed upon the Command and Control System

The battles of the 101st Airborne brigade (Airmobile) in the Central Highlands were characterized as fluid and opportunistic.¹²⁶ Often the average duration of a skirmish or battle was 20 minutes. Airpower had to be brought to bear quickly and massively. Additionally, on several occasions, a fight could switch from going well to critical when helicopters became heavily engaged in landings or takeoffs. A downed helicopter required a heavy amount of support in order to rescue the surviving or stranded soldiers.

This meant that airpower was challenged to respond quickly with the necessary volume and type of air-delivered ordnance to support ground forces that could quickly become vulnerable to Viet Cong counterattacks. Airpower had to fly significant distances to arrive on station near the battle, become quickly apprised of the ground situation, and deliver ordnance on enemy forces--in some cases as close as 30 meters from friendly ground forces.¹²⁷ This all needed to happen within the decision cycle of an enemy that preferred to fight briefly and quickly disappear into the harsh Vietnamese environment.

Solutions Employed to Remedy Challenges

One measure employed to correctly assess the status of the battlespace was to tie FAC(A)s to a region. This Air Force plan, based upon a RAND study, recommended assigning a FAC(A) to each of the 44 provinces of South Vietnam. The reasoning was that the FAC(A)s would become highly familiar with the

¹²⁵ General William W. Momyer, Airpower in Three Wars (WWII, Korea, Vietnam), (Maxwell Air Force Base, AL.: Air University, Reprint Edition 2003), pg. 304.

¹²⁶ John F. Flanagan, Vietnam Above the Treetops, A Forward Air Controller Reports, (New York, N. Y.: Praeger Publishers, 1992), pg. 110.

¹²⁷ Donald J. Mrozek, Air Power and the Ground War in Vietnam: Ideas and Actions, (Maxwell Air Force Base, AL.: Air University Press, 1988), pg. 118.

terrain and activity within their assigned region.¹²⁸ As their familiarity with the terrain and the activities taking place in the region continued to mature and become more refined, the FAC(A) could better make the necessary judgments pertaining to the enemy activities and plan and execute accordingly to defeat the Viet Cong.

Additionally, FAC(A)s in Operation HARRISON were physically located with the command and staff element of the 101st brigade. FAC(A) crews could brief the operation and debrief the results in person. This personal interaction between the air and ground units forged important bonds and nuanced understandings of one another. FAC(A)s and air-to-ground coordinators developed comprehensions of the ground command element and became more attuned to both their stated and implied needs. The opportunity for face-to-face interaction during planning and debriefing of operations often translated quite positively during operations.

FAC(A)s began to take on greater responsibilities beyond air strike coordination and CAS, including visual reconnaissance, strike aircraft procurement, and terminal control of air strikes. Airpower assumed a firepower role for the relatively lightly armed airmobile brigades. In addition, the FAC(A) developed into a monitor of ground activity, a primary means of target identification, and a procurer of air strikes and CAS. Ultimately, he gave the air-to-ground system greater flexibility and the accuracy necessary for rapid, airmobile operations.¹²⁹

Effectiveness of the Solutions

The effectiveness of FAC(A) assignments to support the 101st in the highlands can be measured by how the brigades took advantage of FAC(A) capabilities. General Bernard Rogers had eight airmobile battalions during Operation JUNCTION CITY and made extensive use of the FAC(A) for high

¹²⁸ General William W. Momyer, Airpower in Three Wars (WWII, Korea, Vietnam), (Maxwell Air Force Base, AL.: Air University, Reprint Edition 2003), pg. 301.

¹²⁹ Gary Robert Lester, Mosquitoes to Wolves: The Evolution of the Forward Air Controller, (Maxwell Air Force Base, AL.: Air University Press, 1997) pg. 194.

volumes of accurate fire.¹³⁰ He lauded the FAC(A) for their ability to reduce the reaction times necessary to get large volumes of air support ordnance for the ground forces.¹³¹ The capabilities of airpower, when tied closely to ground battlefield requirements, led to more daring operations that were only made possible through the ability to reinforce isolated units with timely and precise support.¹³²

The presence of the FAC(A) and on-call air support contributed to the success of these airmobile missions. FAC(A)s came to be seen as the focal point for coordination of many of the airmobile battles in both operations. Many times the FAC(A) was the first to know of enemy activity because he monitored several radios, observed forces on the ground, and identified new information important to the Army commanders.¹³³ What is significant is that the FAC(A) made timely use of the air and fire support he had planned for or had been able to access as a battle unfolded.

The final result was that many times, the lowest level unit leader had readily available access to artillery support, extensive air support, surveillance reports, and rapid medical evacuation of casualties because of the FAC(A)'s presence.¹³⁴ Lester argues that the successful FAC(A) became many things to the land forces: he was a politician, administrative officer, radio operator, and an effective weapons controller capable of supporting or even directing an operation.¹³⁵ The nexus of FAC(A) ability and smaller ground units gave those same units capabilities beyond their size and location.

¹³⁰ Lieutenant General Bernard William Rogers, "Operation CEDAR FALLS-JUNCTION CITY, A Turning Point" in *Vietnam Studies*, 1989. On-line. Internet. 13 May 2005. Available at <http://www.army.mil/cmh-pg/books/Vietnam/907/cont.htm>, Chpt X, pg. 101.

¹³¹ Donald J. Mrozek, *Air Power and the Ground War in Vietnam: Ideas and Actions*, (Maxwell Air Force Base, AL.: Air University Press, 1988), pg. 118.

¹³² Donald J. Mrozek, *Air Power and the Ground War in Vietnam: Ideas and Actions*, (Maxwell Air Force Base, AL.: Air University Press, 1988), pg. 118.

¹³³ John F. Flanagan, *Vietnam Above the Treetops, A Forward Air Controller Reports*, (New York, N. Y.: Praeger Publishers, 1992), pg. 93.

¹³⁴ John F. Flanagan, *Vietnam Above the Treetops, A Forward Air Controller Reports*, (New York, N. Y.: Praeger Publishers, 1992), pg. 111.

¹³⁵ Gary Robert Lester, *Mosquitoes to Wolves: The Evolution of the Forward Air Controller*, (Maxwell Air Force Base, AL.: Air University Press, 1997) pg. 131.

In the central and southern regions of Vietnam, airmobile assault operations brought about greater reliance upon airpower for fire support. Airpower became an extension of the ground commander's fire support system. Through greater familiarity with enemy behavior, with the battlespace, and with the friendly objectives and tactics, airpower was able to provide a 'troubleshooter' who could react to and drive events on the battlefield. His ability to keep the command and control system advised of events contributed to the ability of that same system to keep pace and adapt during the operation.

The Western Axis of Advance in Operation DESERT STORM, 1991.

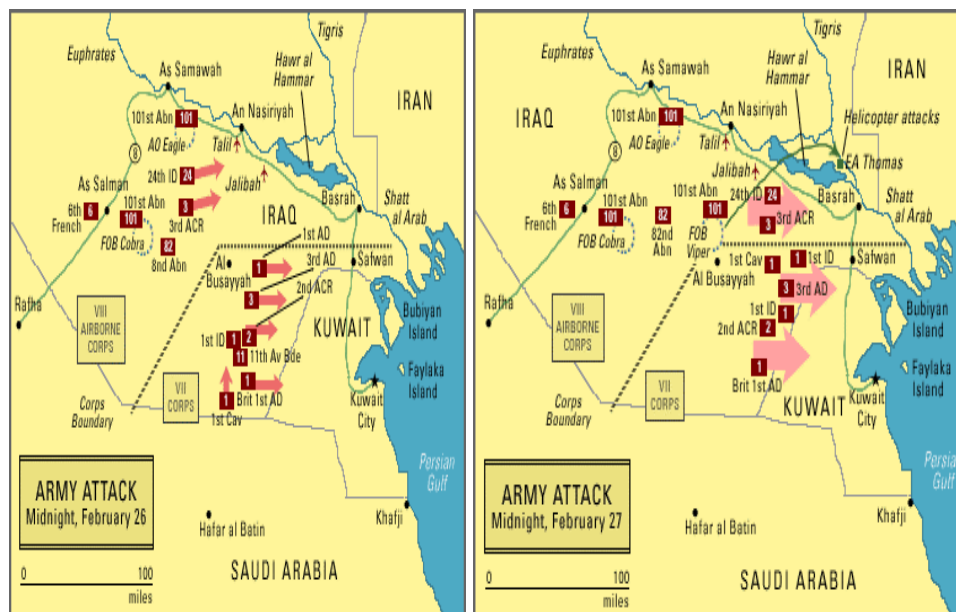
Overview

On August 2, 1990, Iraqi forces invaded neighboring Kuwait. On January 16, 1991, a United States-led coalition of armed forces began an air campaign against Iraqi targets in order to enforce United Nations resolutions calling for the immediate and unconditional withdrawal of Iraqi forces from Kuwait. At 0400 on February 24, 1991, the coalition ground offensive commenced operations in order to destroy the Iraqi ground forces remaining in Kuwait.

The western axis of advance was one of a two pronged ground offensive designed to remove Iraqi forces from Kuwait and envelop the Republican Guard flanks in southern Iraq in order to destroy this important source of Saddam Hussein's power. The western axis was the U.S. Army offensive. Two Army corps were quietly shifted to the west of the main Iraqi defensive line where they could gain direct access to the southern banks of the Euphrates River and the Hawr al Hammar marshes. As the Marine attack hit the main Iraqi defenses, it was expected that the Republican Guards would move south to reinforce the defensive line. The VII Corps, the main effort in the west, would move rapidly from the west and smash into the flanks of the Republican Guards and pin them against Basra and the Shaat al Arab waterway. The XVIII Corps would cover

western and rear areas of the VII Corps, and seal off any Iraqi attempts to escape to the west or the north. The western axis would ideally be an operational surprise to the Iraqis as they became engaged on three sides of their forces. See Figure 9.

Figure 9
VII Corps and XVIII Corps
Western Axis of Advance in Operation DESERT STORM, 1991.



Source: Frontline: The Gulf War, Maps, Army Attacks. On-Line. Internet. Available from <http://www.pbs.org/wgbh/pages/frontline/gulf/maps/7.html>.

Role of Airpower in the Operation

When planning for the ground offensive, General Horner, the CFACC, was tasked to assure adequate air support for the ground commanders. Specifically, the ground offensive would not even commence until the major Iraqi ground forces had suffered a 50% reduction in armored and mechanized units at the hand of air interdiction operations.¹³⁶ In order for General Horner meet that objective--and the myriad of other requirements for the land offensive--he devised a concept of 'ready-fire-aim.' Deployment and sustainment of airpower constituted the 'ready,' the launching of airpower on a predetermined schedule was the 'fire,' and the command and control of airpower to the target was the 'aim.'¹³⁷ Through this construct, he could achieve the primary goal of the air operation: provision of constant firepower for ground forces.¹³⁸

In order to provide that constant firepower during the land campaign, the support for the ground offensive called for 830 day and night CAS sorties, 465 night interdiction sorties, and 735 day interdiction sorties.¹³⁹ The 'push-CAS' concept provided sorties to the ground units at regular intervals throughout an execution cycle. If the aircraft were not needed, they were returned to the air-to-ground system and sent either to another ground unit or forward to conduct interdiction missions in the division or corps deep battle area.¹⁴⁰ Conversely, Horner's 'ready-fire-aim' construct allowed for interdiction to be diverted to immediate CAS if requested by the ground commanders. The air component command and control system could divert and redirect sorties from the deep battle to the ground component's air-to-ground system so immediate CAS could fulfill

¹³⁶ Diane T. Putney, Airpower Advantage: Planning the Gulf War Air Campaign 1989-1991, (Washington, D.C.: Air Force History and Museums Program, 2004), pg. 354.

¹³⁷ Tom Clancy, General Chuck Horner, USAF (Ret.), Every Man a Tiger, (New York, N. Y.: G. P. Putnam's Sons, 1999), pg. 251.

¹³⁸ Diane T. Putney, Airpower Advantage: Planning the Gulf War Air Campaign 1989-1991, (Washington, D.C.: Air Force History and Museums Program, 2004), pg. 308.

¹³⁹ Diane T. Putney, Airpower Advantage: Planning the Gulf War Air Campaign 1989-1991, (Washington, D.C.: Air Force History and Museums Program, 2004), pg. 308.

¹⁴⁰ Tom Clancy, General Chuck Horner, USAF (Ret.), Every Man a Tiger, (New York, N. Y.: G. P. Putnam's Sons, 1999), pg. 247.

the 'aim' portion of the construct. Tensions between interdiction and CAS priorities were minimized through sufficient sorties and the presence of a flexible system to redirect air sorties as required.

Effectiveness of the Operation.

Within the span of 100 hours, Coalition forces had seized and captured over 73,700 square kilometers of Iraqi territory.¹⁴¹ The Coalition 'left hook'-- composed of two corps of armored, mechanized infantry, airborne forces, attack helicopter battalions, and artillery battalions--attacked into Iraqi lands south of the Euphrates River and then east towards Basra at a devastating pace. The only negative assessment of the Coalition offensive was one of timing. If the attack along the Kuwaiti-Saudi Arabian border, otherwise known as 'the Saddam Line,' had been slowed perhaps a little by a semi-coherent Iraqi defense, Iraqi forces would have been fixed in place and would have been more decisively enveloped by the two corps main effort from the west.¹⁴² By retreating *en masse* due to the relative ease of the Marine Corps-led penetration of the Saddam Line in the east, a large portion of the Iraqi forces escaped envelopment because they did not remain in place long enough for the Coalition western offensive to attack the entire width of the Iraqi defenses.

Command and Control Arrangements

Coordination with the ground movement. General Horner had designed an effective 'push CAS' system to ensure each ground combat unit had sufficient and responsive close air support at all times of the ground operation. General Schwarzkopf chose to rely exclusively on the Battlefield Coordination Element (BCE) resident at the joint level and the air component command level to coordinate between the CFACC and the Army, Marine, and Coalition corps commanders.¹⁴³ While 'push CAS' appeared to offer a predictable, frequent supply of air support, problems of coordination with the ground offensive arose in

¹⁴¹ Lawrence Freedman, and Efraim Karsh, The Gulf Conflict 1990-1991: Diplomacy and War in the New World Order, (Princeton, N. J.: Princeton University Press, 1993), pg 408.

¹⁴² Lawrence Freedman, and Efraim Karsh, The Gulf Conflict 1990-1991: Diplomacy and War in the New World Order, (Princeton, N. J.: Princeton University Press, 1993), pg 409.

¹⁴³ Lieutenant Colonel R. Kent Laughbaum, USAF, Synchronizing Airpower and Firepower in the Deep Battle, (Maxwell Air Force Base, AL.: Air University Press, 1999), pg. 33.

air interdiction operations supporting the CFLCC deep battle. While the corps commanders made full use of the BCE, there was Army criticism of the BCE relationship with the CFACC's Tactical Air Control Center (TACC) and an assessed lack of communication on issues concerning deep battle targeting. VII and XVIII Corps did not believe that their deep battle requirements were being sufficiently met.¹⁴⁴

Command and control of the elements. General Horner was adamant that airpower would remain centralized under his control, although not necessarily under his ownership. The tenet of centralized command/ decentralized control of Coalition airpower could not be clearer in Operation DESERT STORM. All aircraft clearly belonged to the CFC and were tasked by the CFACC to meet Coalition objectives.¹⁴⁵ On one occasion the CFACC told Marine Lieutenant General Walter Boomer, the Marine Forces Central Commander, "...we are not going to fragment airpower. So your planes are going to come under me, and you will get everything you need."¹⁴⁶ General Boomer was content with the arrangement.

Effect of Speed upon the Command and Control System

As the western offensive began to encounter light resistance, many of the 'push-CAS' sorties went unused. Many Iraqi forces retreated or simply surrendered *en masse*. The air-to-ground system began to return many of the 'push-CAS' sorties back over to the TACC because the subordinate ground units of the VII and XVIII Corps did not require their ordnance as they rapidly advanced into what remained of the Iraqi ground forces. The challenge became how to quickly task these sorties either short or long of the FSCL in anticipation of the quickly moving battlefield. Certain air assets could only direct targeting on

¹⁴⁴ Richard M. Swain, Lucky War: Third Army in Desert Storm, (U.S. Army Command and General Staff College Press, Fort Leavenworth, KS.: 1991) 30 May 2005. On-Line. Internet. Available from <http://www-cgsc.army.mil/carl/resources/csi/Swain/swain.asp#175>

¹⁴⁵ General Schwarzkopf once admonished his corps commanders by screaming, "You people don't understand. It's *all my air* (original emphasis), and I'll use it any way I please." From Diane T. Putney, Airpower Advantage: Planning the Gulf War Air Campaign 1989-1991, (Washington, D.C.: Air Force History and Museums Program, 2004), pg. 347.

¹⁴⁶ Tom Clancy, General Chuck Horner, USAF (Ret.), Every Man a Tiger, (New York, N. Y.: G. P. Putnam's Sons, 1999), pg. 216.

one side of the FSCL so they could not remain over the same battlespace as the FSCL moved and ground forces continued east.

Solutions Employed to Remedy Challenges

Past the FSCL, the CFACC made use of a killbox system where a killer scout would direct the former 'push-CAS' sorties to targets as they were discovered.¹⁴⁷ These killbox missions were executed in the CFLCC deep battle area by the CFACC as the supporting commander. However, as the FSCL was placed progressively further from the leading edge of the VII corps armor, the battlespace short of the FSCL could not be shaped properly for the division commanders. This reduction of shaping occurred for two reasons. First, the battlespace expanse from the forward line of troops (FLOT) to the FSCL was too far from the ground FACs to be able to satisfy close coordination and terminal control requirements. Second, there was no comprehensive plan for employment of FAC(A)s that could have easily coordinated with the air-to-ground system and cleared air support sorties to engage targets that were short of the FSCL but too far from the ground forces to be of prohibitive concern.¹⁴⁸ Push-CAS sorties could have made a significant impact in this portion of the battlespace because the Corps commanders could have taken advantage of airpower's ability to delay the Iraqi mass withdrawal long enough to be able to close with them.

Effectiveness of the Solutions

Push-CAS system provided ready close air support when needed. How quickly the air-to-ground system could route these air support sorties back to the CFACC or to the division deep battle became somewhat effective when there was an ability to make use of the FAC(A) in the regions short of the FSCL. It was a different story where the FAC(A) or the ground FAC was not present. Significant numbers of Iraqi ground forces short of the FSCL were spared from the full might of these push-CAS sorties because the aircraft could not procedurally engage

¹⁴⁷ Lieutenant Colonel R. Kent Laughbaum, USAF, Synchronizing Airpower and Firepower in the Deep Battle, (Maxwell Air Force Base, AL.: Air University Press, 1999), pg. 37.

¹⁴⁸ Lieutenant Colonel William F. Andrews, USAF, Airpower Against an Army: Challenge and Response in CENTAF's Duel with the Republican Guard, (Maxwell Air Force Base, AL.: Air University Press, 1998), pg. 86.

them due to the improperly placed fire support coordination measure and the dearth of air-to-ground controllers who could employ the sorties. Beyond the FSCL, the CFACC directed unused push-CAS to airborne battlefield managers who could direct the sorties against enemy ground forces--but these battlefield managers could not operate short of the FSCL. The readily available supply of air support sorties through a flexible air-to-ground system was an effective solution for rapidly supplying ground forces with airpower. Ensuring effective alternatives exist for unused close air support where it was truly needed remained a challenge.

Synthesis of Commonalities and Differences

These cases illustrate certain commonalities in the command and control of airpower: an increasing presence of key decision makers placed forward to the battlefield leading edges, a predictable and readily available supply of airpower near the decision makers, and lastly, a willingness to adapt or ignore doctrinal precepts due to battlefield conditions. These decentralized air operations developments led to great effectiveness in rapid land operations. While the methods of control were primarily accomplished in the earlier cases through demarcations such as bomblines or time schedules, the requirements of close coordination with the fires and maneuver of the ground forces is quite evident.

The gradient for command and control traveled from the ground to the air, as well as from the close fight to the deep fight, at increasingly higher echelons as the clarity of the battlefield situation improved. While command of air remained centralized in most cases, the control became partially decentralized in XIX TAC and Vietnam. In Operation DESERT STORM, the high level of battlefield awareness possessed by an air component properly emplaced over the battlefield beyond the FSCL resulted in the effective shaping and crumbling of the Iraqi forces.

Challenges posed by Operational Tempo

Operational tempo served a distinct purpose in the four case studies. The speed of the offensive caused a disruption of the enemy force's coherence and

plans. In France during the spring of 1940, the opponent was a cumbersome French defensive system. Subsequently, four years later, an uncoordinated, isolated series of German fixed and mobile defenses faced Patton's Third Army. Additionally, an amorphous and footmobile enemy hid amongst the jungles and grasslands in Vietnam. Lastly, in Southwest Asia, an entrenched, armored defensive network faced the Coalition forces. The enemy could not react at a comparable tempo and quickly became overwhelmed. Table 1 summarizes the speed of land operations and the role of airpower in the ground campaign.

TABLE 1
Comparison of Speed of the Offensives,
And the Role of Airpower in the Offensives

Speed of Operation	Ardennes/ Meuse 1940	Battle of France 1944	Vietnam U.S. Army Airmobile Operations	Operation DESERT STORM
-Rate per day	-20-25 miles per day	-20 miles per day	-20 to 50 km, as well as frequent inserts and extracts	-40 miles per day
-Role of air in rapid assault	-Close air support used at key 'decisive points' -Primarily air superiority, Interdiction oriented, but CAS seen as justifiable for decisive effect	-Air used as security, reconnaissance -Both Interdiction and CAS oriented	-Air used as coordinator, reconnaissance, communications relay towards annihilation of guerrilla forces - Both Interdiction and CAS oriented	-Air used for strike coordination, reconnaissance -Interdiction oriented when not required for CAS

Three of the cases reveal how operational exploitation of a breach or flank was made possible by rapid maneuver. The major challenges in these cases became how airpower could integrate fires with the maneuver elements to modulate the speed of maneuver. They also show what airpower must do quickly when ground power could not accept battle, or had surprise encounters with the enemy. Particularly in the Vietnam example, the challenge of concentrating

weapons for an effect had to be done in less than 20 minutes.¹⁴⁹ While the cases varied between forms of execution, the challenge remained the same: how to best strengthen the linkage between airpower's effects and the land forces that needed to exploit those operational level effects.

Tactical airpower appeared to have a pronounced effect disrupting enemy defensive plans when it created the opportunities for shock and isolation of enemy forces. Rapid ground maneuver could then quickly exploit that shock for additional tactical purposes. Air delivered fires accomplished many effects in the cases studied. Air delivered fires isolated the battlefield writ large from enemy attempts to reinforce or re-supply their own forces. It suppressed the areas near an airmobile landing zone. Finally, it fixed enemy mobile and stationary defenses in order for friendly maneuver units to rapidly bypass the fixed enemy in order to pursue a more lucrative objective. In all of these examples, it was the close nexus of the aggressive, opportunistic maneuver by ground forces in timing with the air delivered fires that made rapid maneuver so pronounced.

Requirements for Meeting Operational Tempo Challenges

The ability to disrupt enemy defensive plans through shock and isolation had requirements that were fulfilled by the roles of airpower. Across the cases, airpower played four distinct roles: it established and maintained air superiority, it concealed the ground forces' main effort, it prevented large-scale like-force battles, and it provided consistent, predictable volumes of close air support of ground forces.

First and foremost, the case studies all corroborate the importance of air superiority. The Luftwaffe first obtained air superiority over their area of operations in France.¹⁵⁰ The Luftwaffe was in turn chased from the skies during the Third Army offensive in 1944. In Vietnam and in Operation DESERT STORM, rapid ground operations ensued under a sky free of enemy presence. The

¹⁴⁹ John Slight, "The War in South Vietnam, The Years of the Offensive 1965-1968," (Washington, D.C.: Office of Air Force History, 1988), in *SAASS 628 Reader II*, pg. 115.

¹⁵⁰ Williamson Murray, *Strategy for Defeat: The Luftwaffe 1933-1945*, (Maxwell Air Force Base, AL.: Air University Press, 1983), pg 37.

investment of air resources was clearly paid to obtaining and maintaining a battlefield free of enemy air forces as a necessary condition for integrated air-ground operations.

In the two offensives through France, air superiority was won and maintained quite rapidly. While the Luftwaffe invested greater percentages of sorties to the maintenance of air superiority than XIX TAC, there was little contest of the skies as the penetration commenced. In southwest Asia and Vietnam, there was absolutely no enemy air activity to oppose the operations. This permitted a freedom to position air power according to operational requirements for effective ground operations. Air superiority allowed for greater focus and detailed integration with the land operation. For instance, with regards to airmobile operations:

The employment of such forces requires almost complete air superiority and the ability to maintain a stream of fighters overhead throughout the initial phases and until such forces can linkup with an advancing column on the ground. For airborne troops to survive such an assault, airpower must provide the heavy firepower until the soldier again has his own organic support.¹⁵¹

There is a clearly a substantial absence of enemy aircraft or prohibitive enemy air defenses in these cases. The close integration of air delivered fires and maneuver could only occur if both air and ground forces could act somewhat free of enemy air and surface-to-air threats. All of these cases factors describe a fairly permissive environment; therefore air supremacy continues to be a necessary condition for effective air support of rapid ground maneuver.

In the German example of 1940 and the American examples of 1944 and 1991, airpower successfully prevented enemy forces from discovering the actual main effort of the ground offensive until it was entirely too late. Airpower's ability to feign large-scale activity and draw enemy attention away from the main effort permitted significant movements of forces to a weakness in the enemy defenses. Additionally, airpower affected the enemy's ground reconnaissance capabilities--thus preventing them from concentrating sufficient combat power to defend against the main effort. The objective of Guderian, Patton, and

¹⁵¹ General William W. Momyer, Airpower in Three Wars (WWII, Korea, Vietnam), (Maxwell Air Force Base, AL.: Air University, Reprint Edition 2003), pg. 361-362.

Schwarzkopf was to penetrate deeply into enemy territory and trap or destroy larger enemy forces at a strategically significant location. In order to do so, it was important to exploit weaknesses in the enemy's defensive lines and preserve combat power for the penetration to Dunkirk and Dieppe for Guderian, the Rhine for Patton, and the Hawr al Hammar and Shaat al Arab for Schwarzkopf. Only in the Vietnam example do we see the airmobile units functioning as the trap--airpower simply assisted the ground unit's role in setting the trap. Airpower was critical to concealing the actual friendly scheme of maneuver.

In all four cases, airpower was used to protect the ground force by continuously engaging enemy ground forces and preventing battles between like forces.¹⁵² During high rates of movement with the Third Army and the VI and XVIII Corps, airpower was first and foremost to prevent large-scale, armored fights. Airpower allowed exploitations of successful breakthroughs or envelopments of the enemy by isolating enemy forces and preventing their mobility across a deeper, more expansive area. Airpower struck enemy defenses and interdicted his distant enemy reserve forces. In all four cases the preservation of the ground force's fighting capacity was a primary consideration, and airpower applied its inherent advantages of speed and firepower against the enemy land defenses. Armored column cover had a requirement for dawn to dusk overhead protection by fighter-bombers executing close support, armed reconnaissance, and target of opportunity strafing missions.¹⁵³ Whether performing a vulnerable operation such as a major river crossing, or a helicopter insertion or extraction, airpower provided the effects necessary to cover the vulnerable areas of the operation.

Lastly, when combat power was required in locations where the ground forces did give battle, airpower was prepared and ready with sufficient CAS sorties. Aircraft were available in sufficient numbers to permit P-47s and P-51s to fly armored column cover in 1944, to permit forward air controllers to be assigned

¹⁵² Martin van Creveld, Stephen L. Canby, and Kenneth S. Brower, Air Power and Maneuver Warfare, (Maxwell Air Force Base, AL.: Air University Press, 5th Ed 2003), pg. 146.

¹⁵³ Geoffrey Perret, Winged Victory, The Army Air Forces in World War II, (New York, N. Y.: Random House, Inc., 1993), pg 313.

fixed regions and sufficient preplanned CAS in Vietnam, and for the Coalition aircraft to fly killbox interdiction in Operation DESERT STORM when not required as CAS. This abundance also allowed multiple tasks to be assigned to the same aircraft during their time on station. XIX TAC aircraft would fly interdiction missions against German reinforcements and then fly armed reconnaissance missions to engage any German targets of opportunity during their return to the airfield. The Luftwaffe methodology was more in line with the ‘rolling barrage’ that moved far enough ahead of the Panzer Group to prevent fratricide. However, it was close enough for them to take advantage of the shock and suppression effects on the enemy that had been honed and rehearsed down to precise intervals. German airpower served German ground forces well if *those ground forces kept pace*. Where Germany wanted the greater distance between air and ground forces as a way of coordination, the American forces wanted greater coordination via forward headquarters and radio contact and greater proximity between air and ground forces.

This belief in greater integration and proximity significantly emerges in the airmobile operations in Vietnam. In one after action report of the 101st Airborne Brigade, tactical aviation was called essential to the success of airmobile operations.¹⁵⁴ One recommendation to enhance the effectiveness of the tactical air fighter-bombers was more robust ordnance loads and methods to lengthen their on-station times.¹⁵⁵ Other recommendations focused upon higher amounts of airpower in order to ensure a favorable combat environment for the airmobile forces.¹⁵⁶

The ‘push-CAS’ method in Southwest Asia was a logical extension of the Vietnam method of preplanned air support intervals; what worked in airmobile operations in Vietnam had applicability to division and corps level deep fights in Operation DESERT STORM. The air-to-ground system would send scheduled but

¹⁵⁴ CORONA HARVERST, Combat After Action Report on Airmobile Operations In Support Of Operation LAMSON 719, Feb 1971-Apr 71, pg. I-51.

¹⁵⁵ CORONA HARVERST, Combat After Action Report on Airmobile Operations In Support Of Operation LAMSON 719, Feb 1971-Apr 71, pg. I-51.

¹⁵⁶ General William W. Momyer, Airpower in Three Wars (WWII, Korea, Vietnam), (Maxwell Air Force Base, AL.: Air University, Reprint Edition 2003), pg. 363.

unused CAS into the deep battle area for use with killer scouts. Air sorties would report to a killer scout who was familiar with the deep battle requirements and familiar with the terrain. This scout would use procedures similar to those of the FAC(A) and coordinate where air interdiction engaged targets. A constant and predictable supply of air sorties capable of performing multiple missions empowered decision makers with even greater ability to react to changing requirements on the battlefield.

Across the cases, it becomes largely evident that a permissive air environment meant and a predictable, heavily armed supply of air support gave senior commanders the ability to conduct large-scale, operational deceptions, to preserve decisive combat power by largely preventing like-force ground battles, prepare large volumes of close air support when needed by the ground forces. These requirements for meeting the challenges of high operational tempo were facilitated by other capabilities and requirements that airpower was largely able to provide in the cases studied.

Facilitators for Meeting Operational Tempo Challenges

It is evident in these cases airpower was able to facilitate rapid ground operations in other ways as well. First, airpower was often effective in augmenting the flank and rear security of the ground force, particularly when the flank and rear was tied to restrictive terrain features such as a major European or Middle Eastern river, or an open desert as in Iraq. What airpower could provide in the way of security freed maneuver forces to effectively concentrate more combat power to the leading edge of the ground offensive. When a ground campaign can operate with fewer units tasked for defense of the flanks and rear areas, it can augment forces to focus upon the assault. In most of the cases, the speed of the operation worked best when there was an accompanying natural terrain barrier that air could use as a demarcation between 'us and them.' Additionally, airpower had the ability to detect enemy forces crossing that line of the demarcation. The natural barrier, plus the air cover, allowed the ground spearhead to move rapidly in the penetration and not have to concern itself with flank protection. The Seine

River, Loire River, and the western Iraqi desert all permitted airpower to defend ground flanks and rear areas with greater efficiency.

Second, close escort enabled the penetration's main effort to maintain high rates of advance towards the operationally significant terrain feature of the English Channel, the Rhine River, and the Shaat al Arab and Euphrates River. Tactical airpower's effects appear to enable focus upon an enemy *schwerpunkt*, or use of an economy of force, to attack that point of the enemy.¹⁵⁷ This means maneuver forces could delegate chance tactical battles more effectively with air support or simply task airpower to engage the enemy force as maneuver forces continue the penetration. Weyland and Patton coordinated the assignment of approximately 500 miles of flank and rear responsibility to the XIX TAC, and they were able to assure that French territory north of the Loire and Seine remained secure from a German offensive. That ability to concentrate combat power in the lead armored spearheads was significant for the Germans and Americans in France, and for the Coalition flanking attack in Iraq.

Lastly, close escort of the armored spearheads enabled them to retain speed toward a distant objective rather than engage threats to the column and slow the rate of advance. In all the cases both positional and mobile defenses were engaged and defeated by a close proximity of readily available air support. Often, these defensive positions were eliminated by a combination of the armored column cover, interdiction, and armed reconnaissance. None of the enemy forces were able to locate friendly ground formations through use of their own reconnaissance. This further enabled the ability of friendly ground forces to achieve surprise by using unexpected avenues of approach: Patton had a propensity to use less obvious routes through northern France, the western offensive in Operation DESERT STORM came from a featureless desert, and air mobile operations could occur anywhere a flight of helicopters could touchdown. The effect of refusing decisive battle until that reaching these locations had significant strategic level shock on the enemy: France later sued for peace in

¹⁵⁷ *Schwerpunkt* is a decisive point; or, more precisely, a concept of using principles such as mass and concentration to defeat the enemy at a critical point of vulnerability.

1940, all German forces south of the Loire and west of the Rhone surrendered to the Allies, and the Iraqi army began a full scale, uncoordinated flight from Kuwait and Southern Iraq. Therefore our third facilitator can be described as an airborne security coordinator.

Characteristics of Solutions Employed

Examination of these cases reveals that the challenges of integrating air power and maneuver were met with solutions that shared a number of elements. Frequent liaison, increased battlefield awareness, and the physical proximity of a ‘trusted air representative’ near the edge of battle all constituted key elements for airpower’s successful integration with rapid ground offenses in these cases.¹⁵⁸

Frequent liaison between the ground forces commanders, air support assets, and air commanders led to responsive air operations in the cases studied. In both of the World War II examples, frequent upper level meetings between air and land forces commanders created an ability to quickly alter maneuver or air support requirements to better suit the operational situation as perceived by the ground commanders. In the Vietnam and DESERT STORM cases, when a FAC or ‘killer scout’ was tasked to find and engage targets according to the desires of the airborne or ground commander, the engagements enabled maneuver to bypass or move through an enemy force. Particularly in Vietnam and DESERT STORM, we begin to see authority to execute a targeting game plan directly delegated to a FAC(A) or a ‘killer scout’ based upon his immediate perceptions of the situation within the confines of his geographically determined area.

Key decision makers increasingly had a presence at the leading edge of the battle. In the German case, when integrated air support was required in greater proximity to the Panzers, as in Dinant and Sedan, Luftwaffe and Wermacht decision makers were present and quickly altered the intensity, proximity, and duration of the barrage to suit the requirements of a river crossing. In the American World War II case, Weyland’s ‘shuttle coordination’ between his X-

¹⁵⁸ The term ‘trusted air representative’ is an adaptation of a term coined by Lieutenant Colonel L. Ross Roberts, USMC, when he referred to this individual as a ‘trusted agent’ in many of his correspondences with the commanding officers of Marine Aircraft Groups 11 and 31 during Operation IRAQI FREEDOM.

Ray units, Patton's headquarters, and the advanced airfields consistently displayed his requirements for updates on the battlefield situation. This allowed him to make decisions, communicate those decisions, and then obtain more inputs on battlefield requirements.

In the Vietnam and DESERT STORM cases, the 'trusted decision maker' was airborne at the leading edge of battle. As a 'trusted decision maker,' as in the other cases, he was given broad and flexible guidance from the air component that allowed development of schedules of support and procedures best suited for the battlefield.¹⁵⁹ During Army air mobile operations in Vietnam, the FAC(A) came to prominence as a means to coordinate for air support and control air strikes for the preservation of air mobile combat power until needed to close with the enemy. The FAC(A) was considered a direct representative of the tactical air force commander and made decisions on the conduct of tactical air operations.¹⁶⁰ In Operation DESERT STORM, the 'killer scout' was used to coordinate the destruction of targets beyond the FSCL as a director of the unused push-CAS sorties. The 'killer-scout' quickly found and designated targets for the unused sorties and effectively managed the land AO. These 'trusted decision makers' required proximity to the battlefield in order to decide on the ground force's airpower requirements. Certain elements become central for the capabilities vested in the 'trusted air representative' before, during, and after combat operations. They are comprehensive knowledge of the ground scheme of maneuver, high degrees of situational awareness, a clear willingness to adapt or ignore doctrinal precepts, control over the interdiction zone, access to high volumes of air support, and an ability to synthesize intelligence and 'pull' ground maneuver forces towards their successful operations. These representatives exhibited these characteristics across the cases.

Comprehensive Knowledge of the Ground Commander's Scheme of Maneuver.

¹⁵⁹ John Slight, "The War in South Vietnam, The Years of the Offensive 1965-1968," (Washington, D.C.: Office of Air Force History, 1988), in *SAASS 628 Reader II*, pg. 107.

¹⁶⁰ General William W. Momyer, Airpower in Three Wars (WWII, Korea, Vietnam), (Maxwell Air Force Base, AL.: Air University, Reprint Edition 2003), pg. 301.

As the ground forces moved faster, the change from the targeting priorities of the higher echelon joint force commanders down to those small unit ground forces happened substantially more quickly on the battlefield. Rates of movement ranged from 12 to 40 miles per day in the four cases. As forces move toward an objective, higher command elements transition from shaping the battle to give the ground forces certain requisite conditions for their eventual movement into the objective. Effective management and transition of targeting priorities from shaping to close priorities can be conducted simultaneously if there are sufficient aviation assets. In some of the cases, those changes were discussed and disseminated through face-to-face meetings. In the more recent cases, these changes were transmitted to, or even originated from, an on-site 'trusted air representative' who could have an appropriate sense of the ground scheme of maneuver, the magnitude of any changes to it, and who would be affected by those changes. Equally important, these 'trusted air representatives' generally appreciated what those changes to the situation and the ground scheme of maneuver meant for the associated targeting requirements. They appreciated the priorities of targeting that would best prepare the battlespace for the arrival of the ground maneuver forces. Therefore, comprehensive knowledge of the ground scheme of maneuver is a characteristic of the means for effective air-to-ground integration in rapid ground operations.

High degrees of situational awareness.

The armored column escort, FAC(A), or 'killer scout' contributed to the ground commander's decision of when to give battle and when to refuse battle in order to achieve a larger objective. When battle was given by the ground force commander, the convoy escort and FAC(A) were often instrumental in assisting friendly ground forces converge upon an enemy force with a corresponding high awareness of all friendly unit locations. Fratricide incidents were particularly low when there was an airborne escort, controller, or coordinator on station over the battlefield. A high level of situational awareness possessed by the trusted air representative was a significant contributor assisting a ground commander's control of the battle.

Flexibility in application of doctrinal precepts.

In order to permit greater flexibility in the command and control of airpower's reactions to battlefield conditions, sometimes it was necessary to change or ignore standard operating procedures. The Luftwaffe and Wehrmacht adapted a detailed air-ground doctrine because of a need to cross the Meuse quickly. General Weyland's assessment of Patton's offensive operation led him to forsake the prescription of FM 100-20 for centralized control and decentralize his command. In both Vietnam and Operation DESERT STORM, an airborne representative of the air component command was given increasing responsibility to coordinate and direct the execution of a close and deep battle respectively, which largely runs counter to ground force doctrine.

Airpower had control over the relative 'interdiction zones'

Across the cases, the more airpower controlled the interdiction effort, the more effective interdiction operations tended to be. From the two World War II and Vietnam examples, the ground forces did not have large amounts of long-range indirect fire support. Because of this paucity of artillery capabilities, the ground forces appeared to be quite accepting of airpower decision makers directing the interdiction operation. Detailed guidance and commander's intent was given to airpower decision makers like Loerzer, Weyland, and the FAC(A) crews of Vietnam. In turn, these empowered and trusted representatives of airpower made tactical and operational decisions while effectively close to the battlefield. These trusted representatives of airpower had an ability to weigh the ground force's scheme of maneuver, the ground commander's intent, and the relatively recent events near the edge of the battlefield. This gave them an ability to make decisions on where to place airpower in order to affect areas of the battlefield where land forces would soon give battle or refuse battle for a larger objective. The evidence from the case studies suggests that airpower was historically well suited for directing land AO interdiction operations.

Access to Multi-Mission, Flexible Air Sorties.

Airpower had a great deal of flexibility in the cases studied, by which I mean the ability and authority to fly multiple missions often within the same sortie. These air forces were as comfortable flying deep support missions as they were with armed reconnaissance and close air support missions. The flexibility to execute as either a targeting director for other air forces or for ground forces reveals an airborne adaptability that greatly helped the ground force commander.

When airpower had the capability to conduct more than one mission during their time aloft, or when airpower could readily change missions in flight to a more immediate task, there is also evidence that the ground operations maintained higher tempos in the completion of their mission. One may see this in the use of the readily available ‘packages’ in XIX TAC and DESERT STORM. While the readily available ‘packages’ of close air support had to adapt in type by Operation DESERT STORM, the inherent flexibility to accept another mission in a different portion of the battlespace reveals how airpower could employ unused sorties in the CFLCC deep or close battle areas. The increase in immediate air support requests may have arisen because ground forces wished to continue the momentum and preferred to bypass enemy positional defenses. There is evidence of this from the American campaigns in France and in Iraq. On the other hand, the increase in immediate CAS requests during airmobile operations in Vietnam was primarily due to an uncertain enemy situation given the dense, jungle terrain of Central Vietnam and Laos.

Still, in these cases, there is a relationship between the flexibility of airpower already aloft to change missions and their ability to support ground forces effectively at that moment in the battle. There is an *interaction* between the ability of air to execute several tasks within the same sortie and the maintenance of higher tempos in ground operations. The armed reconnaissance in 1944 France, the FAC in Vietnam, and the killer scout in Operation DESERT STORM all had the ability to adapt to the real time needs of the ground forces while in flight.

‘Reconnaissance-Pull’ Relationship between ‘Trusted Air Representatives’ and High Level Ground and Air Decision Makers.

Detailed coordination translated new requirements for the ground forces as campaigns unfolded. Weyland and Patton met frequently during the drive eastward. FACs planned and debriefed in facilities co-located with the ground forces' headquarters. Horner and Schwarzkopf coordinated frequently during the course of the ground offensive in Southwest Asia. There is evidence of detailed coordination that was then rapidly disseminated to the flying units so they could make the appropriate changes either while airborne or in the near-term planning stages. During execution, access to those changes in the requirements of the ground forces proved significant to the ability of airpower to support the changing battlefield. Therefore, accessibility to high-level decision makers is an important characteristic for effective air support in rapid ground maneuver.

Effective Cueing from Intelligence/ Surveillance/ Reconnaissance Sources.

Across the cases, when enemy forces attempted to move as large coherent units, airpower had the ability to detect and engage them. The FAC(A)s in Vietnam were highly effective precisely because they intimately understood the enemy situation and the terrain where any fight would likely occur. When they combined and processed the sights unfolding in the battle and the transmissions of their communications suite, they were able to dramatically affect the conduct of a fight. Inclement weather had a noticeable impact upon the effectiveness of XIX TAC air operations in World War II and upon killbox interdiction in Operation DESERT STORM. When armed reconnaissance, FAC(A) patrols, and E-8 JSTARS aircraft were on station to detect enemy forces on the move or in the open, the ability of airpower to effectively shape the battlespace in depth and time was greatly improved. When this shaping could take place, ground forces were not likely to have chance encounters with substantially large enemy forces. Potentially decisive but undesired battles at places such as Sedan, Mortain, and Khafji were avoided because a sufficient and coherent means of detecting enemy forces was in place. Aircraft capable of staying over a battle or armored column remained on station to fuse other information cues into refined and detailed post-mission reports. That information, too, was easily relayed by voice to the air

officers at a headquarters element or traveling with the ground forces themselves. The ability to collect and transmit information greatly enhanced the ability of the ground forces to make quick battlefield decisions.

Conclusion: A Battlespace and Fires Troubleshooter.

All of the above characteristics combine here to make the trusted air representative significant in the cases studied. The placement of fire support coordination measures had an impact upon the type of support, and the effectiveness of the support, airpower provided to the ground forces. These measures historically have been slow to change and have caused degradations in airpower capability because of the approval process inherent in the air-to-ground coordination networks are relatively slower. This fact has been particularly true in predominantly linear operations such as the German and American offensives of World War II and Operation DESERT STORM. In the one example of non-linear operations considered here--Vietnam--the aid of a FAC in activating and deactivating fire support coordination measures was a significant contribution to the success of airmobile operations. This proficiency and ability to activate, modify, and deactivate fire support measures for the ground commander was a vital characteristic of the FAC in Vietnam. Because of the dynamic yet opaque conditions often encountered in the airmobile operations in Vietnam, the FAC had to be empowered with the ability to make decisions regarding air support and indirect fire support for the airmobile force commanders when they were unable to make those decisions from the ground.

As airpower's ability to survey and assess the situation on the battlefield and communicate it to ground forces improved, restrictive fire support coordination measures appeared to become less necessary. Bomblines could adjust and move more rapidly in the World War II examples as the difficulties in radio communications between the aircraft and the lead vehicles of the armored forces were mitigated. In Vietnam, many fire support coordination measures

were predicated on the knowledge obtained by the FAC(A). He could activate and deactivate measures as airmobile forces inserted and extracted from objectives. It is only in DESERT STORM where airpower had limited ability to influence where fire support control measures were activated or deactivated. Arguably, as the battlefield awareness of the trusted air representative increased, fire support coordination measures could be withdrawn or set closer to ground forces--thus permitting airpower's speed, mass, and lethality to engage enemy forces. It should be no surprise that the main counter-tactic of the Viet Cong was to close with friendly forces as quickly as possible in order to negate the precision and discrimination of airpower. When airpower could increase the clarity of the battlefield situation, the fire support coordination measures designed to protect friendly forces and permit rapid engagement of the enemy could be refined in size and location. The trusted representatives of airpower could then concentrate on the permissive engagement areas. Therefore, a trusted representative skilled in air support, fire support, and airspace control is perhaps the best way to characterize the aspects of command and control that increased the likelihood of tactical success in these cases.

The requirements and facilitators to the challenges of operational tempo and the characteristics of the solutions to these challenges are depicted below from the synthesis of the case studies. These requirements, facilitators, and characteristics of the solutions employed over the approximately fifty year timeline appear to be the glue that, when employed properly, led to successful rapid ground operations. See Table 2.

Table 2
Summarization of Requirements, Facilitators, and Characteristics
Of Effective Solutions in Rapid Ground Operations

Requirements for Meeting Operational Tempo Challenges
1. Air Superiority
2. High Volumes of Airpower Tasked to Specifically Support Ground Operations
3. Concealment of the Ground Force Main Effort
4. Prevention of Like-Force Battles
5. Predictable Supply of Close Air Support
Facilitators for Meeting Operational Tempo Challenges
1. Security Underwritten By Airpower and Terrain
2. Close Escort By Airpower For Chance Encounters With Enemy Ground Forces
3. Designated Aircraft Serving As Security Coordinators
Characteristics of Solutions Employed for Meeting Operational Tempo Challenges
1. Frequent Liaison of High Level Decision Makers Near The Battle
2. Trusted Air Representative Acting As A Dynamic Battlespace Manager
a. Comprehensive Knowledge of the Ground Commander's Scheme of Maneuver
b. High degrees of situational awareness.
c. Clear willingness to either adapt or ignore doctrinal precepts.
d. Airpower had control over the relative 'interdiction zones'
e. Access to Multi-Mission, Flexible Air Sorties.

f. 'Reconnaissance-Pull' Relationship between 'Trusted Air Representatives' and High Level Ground and Air Decision Makers.
g. Effective Cueing from Intelligence/ Surveillance/ Reconnaissance Sources.
3. Battlespace and Fires Troubleshooter.

These characteristics and conditions provide the materials we can use to analyze solutions designed to meet the current problems addressed in Chapter Three. If these display many of the same characteristics as the solutions considered in the cases studied, it would then be fair to conclude that they are likely to effectively support rapid maneuver warfare. In the next chapter I will evaluate some of the solutions along these same lines.

Chapter 5

Solutions

We are not holding a goddamned thing. Let the Germans do that. We are advancing constantly, and we are not interested in holding onto anything.... Our basic plan of operation is to advance and to keep on advancing regardless of whether we have to go over, under, or through the enemy.

— General George S. Patton, Jr.

Many significant factors have hampered recent air-to-ground operations. These include, first, a tendency for slow and/or insufficient air interdiction efforts for the CFLCC from the FSCL to his forward boundary. Second, the air-to-ground system has had difficulties redirecting unused sorties within the air interdiction and battlefield air interdiction domain. Third, this insufficient effort has led to significant increases in immediate CAS requests as maneuver forces advance, and the air-to-ground system may not effectively keep pace with the battle. These challenges are magnified when air-to-ground operations must properly integrate at a pace commensurate with rapid ground operations such as the Meuse/Ardennes Offensive of 1940, the Third Army Offensive of 1944, American Airmobile Operations in the Vietnam War, and the Western Offensive of Operation DESERT STORM.

In these operations, air-to-ground coordination overcame similar challenges. Today, a number of options have been discussed to address these challenges. What I shall examine in this chapter is the manner in which military commanders handled air-to-ground coordination during recent exercises and campaigns in order to assess the degree to which their methods shared the requirements, facilitators, and characteristics of the solutions depicted in the previous chapter. This chapter will evaluate the solutions by ascertaining the degree to which they resemble these earlier solutions along the dimensions discussed in Chapter Four.

Overcoming clashing air interdiction priorities

As demonstrated in Chapter Three, there is a propensity for the transition from theater air interdiction to Combined Forces Land Component Commander (CFLCC) air interdiction in support of his deep operations plan to be ineffective. Recall that in Joint Publications the Combined Forces Commander (CFC) defines the CFLCC area of operations (AO) in terms of depth and width. The CFLCC determines the location of the Fire Support Coordination Line (FSCL) based upon factors such as operational tempo, array of enemy forces, and operational objectives. What is significant is that the CFLCC still has priority air support needs beyond the FSCL out to his forward boundary. Therefore, from the FSCL out to that forward boundary, targeting interests between the CFLCC and the CFC overlap and compete intensely.¹⁶¹ The CFC must execute a theater interdiction operation in order to closely integrate air delivered fires and maneuver, while the CFLCC would like to directly control any shaping operations that take place in his area of operations. The CFC must shape the entire Coalition/ Joint area of operations (JOA) through his CFACC, but the CFACC is also the primary component for executing CFLCC shaping operations--yet doctrine states that it is the CFLCC who is the supported component within his AO out to his forward boundary. This conflict between the component relationships within the CFLCC and Combined/ Joint deep battlespace and the air support requirements within these AOs defines a portion of the challenge for the effective air-ground integration.

One proposed solution to that challenge came from the Combined Forces Command in Korea. What the command devised was the Deep Battle Synchronization Line (DBSL). This line corresponded to the CFLCC forward boundary. Beyond the DBSL, joint fires consist of air and surface interdiction missions that affect operational maneuvers of the CFLCC, as well as support for special operations, strategic attack, counter air, and direct support missions. Coordination must be made with the CFACC in order to fire or strike within this realm. Short of the DBSL, the CFLCC remained the supported commander for shaping of his deep battle.¹⁶² However, between the FSCL and

¹⁶¹ Lieutenant Colonel Robert J. D'Amico, USAF, Joint Fires Coordination: Service Competencies and Boundary Challenges, *Joint Forces Quarterly*, Spring 1999, pg. 73.

¹⁶² Lieutenant Colonel Robert J. D'Amico, USAF, Joint Fires Coordination: Service Competencies and Boundary Challenges, *Joint Forces Quarterly*, Spring 1999, pg. 72.

the DBSL, the coordinating authority for operational level fires and air support remained the JFACC.¹⁶³ In this agreement, the litmus test was the level of effect the CFLCC needed for the operational maneuver of forces. The CFACC would reprioritize air support to achieve the effects necessary for CFLCC operational maneuver. The coordination of this effort took place between the CFLCC Deep Operations Coordination Cell (DOCC) and the JFACC Synchronization Cell.¹⁶⁴

This arrangement acknowledges of the need for the CFLCC to receive greater priority for his deep battle, but specifies that the component best suited to command and control of the land component's deep fight is the CFACC. See Figure 10.

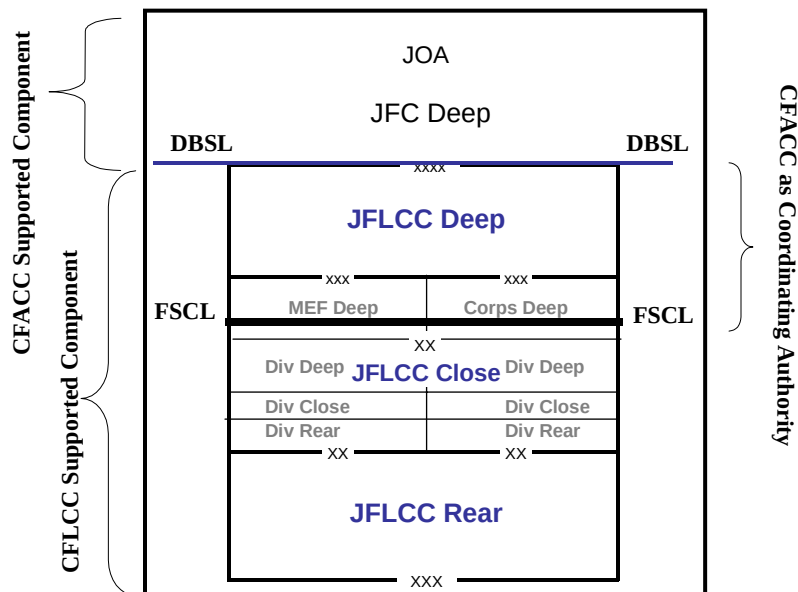


Figure 10. Component relationships in the battlespace.

¹⁶³ Joint Publication (JP) 0-2, Unified Action Armed Forces (UNAAF), 10 July 2001, pg. III-11, III-12. Coordinating Authority is a consultation relationship between commanders for the purpose of planning or executing specific functions delineated in an agreement. While it is not an agreement where one component has the authority to compel agreement, it can be created based upon the missions and capabilities of the command or component designated. Joint Publication (JP) 0-2, Unified Action Armed Forces (UNAAF), 10 July 2001, pg. III-11, III-12.

Operational fires are the operational level commander's application of lethal and non-lethal weapons effects to accomplish objectives during the conduct of a campaign or major operation. They achieve an operational level objective. Operational Maneuver involves placing forces and resources at the critical place in time to achieve an operational advantage over the enemy. In Field Manual (FM) 3-0, Operations, June 2001, pg. 4-6.

¹⁶⁴ Lieutenant Colonel Robert J. D'Amico, USAF, Joint Fires Coordination: Service Competencies and Boundary Challenges, *Joint Forces Quarterly*, Spring 1999, pg. 76.

What is significant about this solution is that a level of trust was agreed upon and institutionalized in practice where the CFACC would assume greater responsibility for the conduct of the CFLCC deep battle from the DBSL/ land forward boundary to the FSCL. The doctrinal relationship was modified to take advantage of the air component's capabilities, and the remedy empowered the air component to use his command and control system, not the land component's air-to-ground system, as the deep battle management system.

Overall, the acknowledgement that the CFACC is best suited to coordinate the fight beyond the FSCL is a key first step in the recognition of air as a trusted authority that will adequately fight both the CFC and CFLCC deep battles. The extensive liaison with the Army's Battlefield Coordination Element (BCE) and the CFLCC DOCC means that the CFACC should understand the ground scheme of maneuver and be able to effectively create areas conducive for rapid maneuver and 'pull' those forces towards those areas through an effective interdiction operation in the CFLCC deep battle area.

This present day solution has certain similarities and differences with past solutions. It shares intensive liaison between the decision makers of both the air and ground forces. In the World War II and Vietnam examples, the air component directed interdiction operations because the ground combat forces did not have the systems or weaponry to adequately direct that fight. It is only recently that ground forces have acquired weapons systems such as long-range artillery, missiles, and attack helicopters that can operate well beyond the CFLCC's means to command and control. However, the air component remains best suited to act as the battlespace and fires troubleshooter in the CFLCC and corps deep battle area, poorly located FSCLs notwithstanding. This is because the CFACC can effectively prepare and exploit 'gaps' into the enemy defenses through the constant observation and coordination efforts of his battlespace and fires troubleshooters in preparation for ground force exploitation. In essence, the air component could prepare and 'pull' maneuver through any breaches created by fires--as was seen in the majority of the case studies.

Overcoming ineffective air interdiction due to deep FSCL placement

Chapter Three demonstrated that the land component's air-to-ground system has had difficulties managing the sorties within the air interdiction and battlefield air interdiction regions that corresponded with the corps and division deep battles. The primary source of this problem has been the deep placement of the FSCL because it significantly hindered the free exercise of air interdiction and battlefield air interdiction in the CFLCC deep battle area. The Marine Corps attacked this problem by using a Battlefield Coordination Line (BCL) that has given the Marine Expeditionary Force (MEF) the ability to more effectively conduct deep operations within the corps and division deep battle areas.¹⁶⁵ The corps in essence created room to shape and handoff the battlefield effectively to the division and subordinate commands--thereby affecting a smoother transition from the MEF's deep fight to the subordinate division. As shown as a red line in Figure 11, the BCL was set at a requisite distance short of the FSCL within the division deep battle area and updated frequently. See Figure 11.

¹⁶⁵ The MEF is equivalent to a corps level command and consists of four major elements: a command element, a ground combat element consisting of at least one division, an aviation combat element consisting of at least one Marine aircraft wing, and a combat service support element consisting of a force service support group. The MEF is commanded by a Lieutenant General. The three subordinate elements are all commanded by Major Generals.

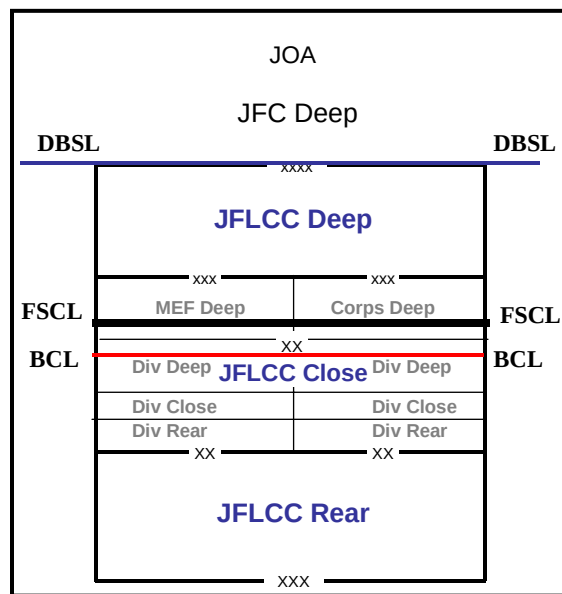


Figure 11. DBSL in the battlespace

As discussed in Chapter Three, when the FSCL eventually came to be placed at problematic distances from the ground forces, the Marine Corps used a BCL to delineate where the Marine division and the Marine Expeditionary Force would divide their labor.¹⁶⁶ Short of the BCL, the MEF senior fires and air coordination center would monitor and support the division deep fire support and targeting, while beyond the BCL, the MEF would fight its deep operations with the MEF organic fixed-wing interdiction. This arrangement was quite similar to the CFACC controlling the fight beyond the FSCL to the forward edge of the land AO, and the CFLCC controlling the fight short of the FSCL.

In Operation IRAQI FREEDOM, corps level fires from the BCL out to the FSCL were executed by Marine air and joint air in a 'pre-coordinated' domain where the requirements for detailed integration with the land forces were already completed. This pre-coordination was simple acknowledgement that there were no friendly ground forces that would operate beyond the delineation within a reasonable time interval, and that there was no necessity for the normally close, detailed coordination required short of the

¹⁶⁶ MAGTF Staff Training Program (MSTP) Information Paper, On-Line. Internet. Available from <http://www.mstp.quantico.usmc.mil/publications/pointPapers/BCL%20/Information%20Papre.pdf>. pg 1.

FSCL. This measure appeared to solve the problems encountered by the deep placement of the FSCL in past conflicts as indicated by the gray shaded areas in Figure 12. Aircraft were free to prosecute land AO air interdiction and battlefield air interdiction as if they were on the other side of the FSCL. Additionally, the MEF could focus on fixing and isolating Iraqi ground forces in order to protect the flanks of the Marine division. The BCL enabled killbox interdiction because coordination of the line occurred every two hours in order to keep pace with the battlefield. See Figure 12.

Figure 12. BCL in the battlespace

security underwritten by airpower and terrain, and a designated aircraft serving as the security coordinators.

In addition to the frequent BCL updates, the MEF commanding general tasked Marines fixed-wing aircraft as ‘killbox managers.’ They frequently returned to the same regions for several days and coordinated the destruction of the enemy forces threatening Marine ground forces. Aircraft conducted targeting within the killboxes to either reduce enemy forces to acceptable ratios compared to Marine ground forces or to fix enemy forces to their defensive positions so they could not threaten the Marine flanks and rear areas. These managers studied the ground situation in depth, studied their mission, and comprehended the commanding general’s intent and the ground scheme of maneuver. The author’s personal experience during Operation IRAQI FREEDOM has led him to the conclusion that the combination of the BCL and the ‘killbox manager’ appeared to have improved the responsiveness of on-call air support for air interdiction operations. A RAND Corporation post-operations critique highlights the difference between the Army zone, where the BCL was not used, and the Marine zone where the BCL/ killbox manager system was used. The study generally praised the Marine system.¹⁶⁷ Often interdiction sorties not used by the Army crossed into the Marine zone, contacted the Marine air-to-ground system, and were quickly routed to killbox managers for mission tasking.¹⁶⁸

During operations, the killbox managers maintained frequent contact with the air-to-ground system in order to keep pace with the fire and maneuver requirements of the MEF and division. In essence, the Marine Corps used the BCL as both a restrictive fire support measure and a handoff zone between the MEF and the division. They made use of dedicated fixed wing aircraft sorties as coordinators within the killboxes in order to make that handoff more effective. The killbox managers performed security operations for the ground component in what is doctrinally defined as screen, guard, or cover missions.¹⁶⁹ The MEF commanding general used aviation as a guarding force along the

¹⁶⁷ Bruce R. Pirnie, Alan Vick, Adam Grissom, Karl P. Mueller, David T. Orletsky, Beyond Close Air Support: Forging a New Air-Ground Partnership, (Santa Monica, CA.: the RAND Corporation, 2005), pg. 68.

¹⁶⁸ The author’s personal experience as an airborne killbox manager during Operation IRAQI FREEDOM.

¹⁶⁹ Marine Corps Warfighting Publication (MCWP) 3-2, Aviation Operations, 09 May 2000, pg 3-13. Screen missions basically provide information, reaction time, and maneuver space to the main body ground

Tigris River, where Iraqi armored and mechanized divisions were basically left to aviation during the war so that the 1st Marine Division could concentrate on attacking Baghdad.¹⁷⁰ In defending the MEF eastern flank, reconnaissance and killbox managers found new, hidden targets along the MEF flank in large numbers. Killbox interdiction destroyed these armored units in accordance with the ground component commander's scheme of maneuver. The operational effect of these interdiction missions was to secure the flanks of the Marine divisions in central Iraq and to secure the rear area of the British division in Basra. Four Iraqi divisions could not counterattack the flanks of one stationary division and one offensive division, and they devolved completely to self-defense.

This solution shares many common characteristics with previous solutions. There is deference again to the air component as best suited to direct the interdiction and battlefield air interdiction operations. The BCL permitted killbox managers to execute the ground scheme of maneuver with the same freedom as seen in the air reconnaissance flights protecting the Third Army in France and in the FAC(A) missions in Vietnam. Battlespace was put directly under the control of a trusted air representative who could direct fires, relay information, act as a security element, and determine how the battlespace under his charge should be used in the near future. Often, the managers fulfilled visual information requests (VIR) submitted by the ground component, then recorded and relayed their information. The multi-mission capability within the killboxes made for greater flexibility in the preparation of the battlespace for the corps and division. Additionally, as was also seen along the Meuse, Loire, and Euphrates Rivers in the cases studied, the killbox managers exploited the advantages of the Tigris River and effectively held several Iraqi divisions at bay from friendly ground forces. The BCL and killbox manager combination performed a 'reconnaissance-pull' of Marine forces away from enemy forces in order to attack Baghdad. This second solution further committed the interdiction and battlefield air interdiction operation to the air component.

force. It enables the harassment and impediment of the enemy within capabilities. It basically can prevent an enemy deliberate attack by causing him a less offensive movement to contact. A guard mission does all a screen does but additionally prevents the enemy observation and direct fire upon the main body while gaining time and reporting information. A cover mission operates independently of the main force in order to intercept, engage, delay, disorganize and deceive the enemy before it can attack the main body.

¹⁷⁰ F. J. Bing West, "Maneuver Warfare: It Worked in Iraq," *Naval Institute Proceedings*, 02 Feb, 2004. On-line. Internet. Available from <http://www.usni.org/Proceedings/Articles04/PRO02west.htm>, pg 2.

Reducing the amount of immediate CAS through effective transition

As discussed Chapter Three, the third problem has two parts. First, the high percentages of immediate CAS requests occur due to the dynamic ground situation. This fact reveals that these targets were not engaged in sufficient levels when they were corps and division deep targets. Second, the inability for some of the battalions and regiments to quickly obtain close air support suggests that the air-to-ground system command and control centers are not represented 'forward' enough to mitigate problems of communications, intelligence, and coordination. One solution used during Operation IRAQI FREEDOM had positive results.

If the deep battles at the JFLCC and corps levels are not transitioned effectively to their subordinates, there is a greater potential reliance upon close air support (CAS). The development of a readily available, constant supply of CAS aircraft similar to General Horner's 'push-CAS' system remains a good solution to this problem. Based upon data from Operation IRAQI FREEDOM, approximately 80% of the targets struck were killbox interdiction and CAS targets.¹⁷¹ This fact means these strikes were happening because interdiction had not properly affected these targets when they were considered in the division deep battle zone. In order to address an adaptive targeting environment, the CFACC devised a 'stack' system where aircraft would arrive and wait for an on-call mission. The aircraft would takeoff knowing most things except the target and the target location, much like the aircraft stacks of Vietnam and Operation DESERT STORM.¹⁷²

While the supply of CAS in Operation IRAQI FREEDOM may have been unrelenting, the 'reach' down to the regiments and battalions proved more difficult because of their remoteness from the Army and Marine air-to-ground systems.¹⁷³ In the battlespace short of the FSCL, greater use of the forward air controller (airborne) [FAC(A)] in the Marine zone again helped mitigate the problems associated with providing ground warfighting units with sufficient close air support. The FAC(A) is an

¹⁷¹ General Michael Moseley, USAF, *Operation IRAQI FREEDOM by the Numbers*, 30 April, 2003. pg. 5.

¹⁷² Michael Knights, *Air Power Over Iraq*, *Jane's Intelligence Review*, 01 March 2003. On-line. Internet. 10 Jan, 2004. Available from <http://www4.janes.com/K2/docprint.jsp?K2DocKey=/content1/janesdata/mags/jir/history/j.html>

¹⁷³ Bruce R. Pirnie, Alan Vick, Adam Grissom, Karl P. Mueller, David T. Orletsky, *Beyond Close Air Support: Forging a New Air-Ground Partnership*, (Santa Monica, CA.: the RAND Corporation, 2005), pg. 67.

aircraft assigned by the air component to serve as an extension of the tactical air control parties assigned to the ground forces and acts within the air-to-ground system guidance.¹⁷⁴ The ability of the FAC(A) to see, communicate, coordinate, and control air support in close proximity to maneuver forces increased the effective use of the CAS stacks. Often, the FAC(A) would orbit in a manner reminiscent of Weyland's armored column cover in order to relay information, coordinate CAS support for the ground FAC, or simply provide a hasty communications relay for the battalions and regiments back to the divisions in order to overcome the effects of terrain or distance upon transmissions. Often, the FAC(A) would survey the road networks the columns would cross within the hour in order to site defenses, ambush sites, or large refugee convoys that might be of concern to the ground commander.

When the ground FACs had difficulty communicating and coordinating with the Marine Direct Air Support Center (DASC), the FAC(A) capabilities solved the two parts of the problem. They could coordinate CAS sorties and route them to the ground FACs, or the FAC(A) could engage targets at ranges of 5 to 25 kilometers in front of the lead vehicles of the ground forces. A limited ability to target enemy forces at ranges beyond the ground unit capability was always available to the FAC(A). His ability to engage targets out to several kilometers in front of the maneuver forces gave them options to either close and fight or bypass. Since a FAC(A) is fully trained to control CAS or indirect fires on targets as an extension of the ground force, flexibility to conduct interdiction somewhat closer to maneuver forces without undue delay was made possible. Use of the FAC(A) became a measure to provide ground forces the ability to effectively use the constant access of 'push-CAS' and reintroduce some depth of targeting to the battlespace short of the FSCL.

Greater use of the FAC(A) had many similarities to the solutions in the case studies. The parallels are strongest with the Vietnam case study where those FAC(A)s also worked to make airpower available down to the lowest echelons possible. They were empowered to make decisions on the conduct of smaller ground unit operations and were capable of reestablishing links to the senior air-to-ground support centers as greater

¹⁷⁴ Joint Publication (JP) 3-09.3, Joint Tactics, Techniques, and Procedures for Close Air Support, 3 September 2003.

distances made radio communications prohibitive. In World War II, XIX TAC had armored column cover over every significant road that Patton intended to use in order to provide a similar ability for airpower to find enemy forces and concentrate firepower on those forces within proximity to the columns. In Operation DESERT STORM, there was FAC(A) presence--although not in large numbers, nor was a plan for their use considered at an operational level. Generally speaking, though, the use of the trusted air representative at the smallest ground echelons increased the ability to make use of the steady flow of air support, and kept those ground units tied into the air-to-ground system.

Final Analysis

In sum, the approach to these problems of air-to-ground coordination has focused on several factors. In the first solution, the CFACC was recognized as a leading component for conducting interdiction within the deep battlespace of the CFLCC area of operations. In the second solution, a portion of the CFLCC deep and close battlespace was freed of the detailed coordination requirements expected behind the FSCL where friendly ground forces would not be. Additionally, an airborne trusted air representative was charged with conducting interdiction in this portion of the battlespace in order to conduct a higher tempo of interdiction, or to conduct interdiction at levels capable of enabling friendly ground units to maneuver and bypass areas of enemy activity. In the third solution, use of the FAC(A) as a means of making effective employment of the 'push-CAS' supply of air support sorties helped to bridge the gap between the highly detailed, networked corps and MEF level with the rapid battlefield requirements of the battalion and regimental forces who had difficulties making use of the integrated, networked battlefield. In each solution across the conflicts, the air component provided a capability to manage and direct air sorties through use of a trusted representative, often forward deployed primarily in the air, who was empowered to make battlespace and firepower decisions in order to create, maintain, or enhance opportunities for ground forces to drive rapidly into the heart of the enemy's territory.

The Marine Corps approaches to recent operations examined in some of these solutions display characteristics similar to those derived from the air-to-ground operations discussed in Chapter Four, although the correlations are not perfect. Still, the

degree of commonality is significant enough to recommend their consideration in meeting future challenges. There were examples of operational level security that was underwritten by killbox managers making good use of terrain and air support in order to provide effective protection to the Marine division. Additionally, FAC(A) presence managed the chance encounters with enemy ground forces to prevent lengthy, time consuming engagements when the main objective was to seize Baghdad. Lastly, the frequent coordination with the Marine air command and control system empowered killbox managers to effectively protect the flank and rear areas for two ground divisions thus freeing those forces to concentrate mass and firepower where they required it. These solutions may have utility in reintroducing flexibility into the deep battlespace of the CFC and CFLCC, as well as that of the subordinate ground forces.

Recommendations

1. Modify the Killbox System. The first recommendation is to adopt the killbox system as both an airspace coordination and fire support coordination measure. USCENTAF recommended the adoption of the killbox system as a means to deconflict fires both short and long of the FSCL.¹⁷⁵ The killboxes would be owned and operated by either the land or the air component commander and the coordinating authority or ‘supporting/ supported’ relationship would guide the conduct of controlling or coordinating air and fire support.¹⁷⁶

These joint fire support coordination measures could change the killbox system to a series of three forms of killboxes: the JOA Interdiction (JINT), Land AO Interdiction (LINT), and CAS killboxes.¹⁷⁷ The grids could be considered JINT when operations are conducted by the JFACC as the supported commander for the theater-wide air

¹⁷⁵ United States Central Command Air Forces, Kuwait CFLCC Air Component Coordination Element (K-ACCE) Operation Iraqi Freedom After Action Report, 28 April 2003. pg. 21 of 24.

¹⁷⁶ Bruce R. Pirnie, Alan Vick, Adam Grissom, Karl P. Mueller, David T. Orletsky, Beyond Close Air Support: Forging a New Air-Ground Partnership, (Santa Monica, CA.: AND Corporation, 2005), pg. 83.

¹⁷⁷ This recommendation is merely an affirmation of the original proposal discussed in Pirnie, Vick et al. on pages 83-85. The authors state that a future digital battlefield would allow for killboxes to be ‘opened’ or ‘closed’ based upon the presence or requirements of friendly forces on the ground. ‘Open’ killboxes would be where airpower could operate without the requirement for terminal control due to the close proximity of ground forces. Pirnie, Vick et al. label the regions the ‘maneuver zone’ and the ‘close combat zone’. The conceptual argument belongs to Pirnie, Vick, et. al., the JINT, LINT and CAS zone names are this author’s creation.

interdiction operation. Isolation of the enemy land forces from their lines of communication, logistics, and reserve forces would be some of the objectives in this region.

The LINT killbox grids would signify that the JFACC has assumed coordinating authority of interdiction and battlefield air interdiction in order to reduce enemy forces or isolate enemy forces in the CFLCC area of operations in order to create operational level gaps in their defenses. In the LINT boxes, the lack of proximity to friendly ground forces precludes the necessity of CAS, yet the targeting priorities of the CFLCC would be supported. A dynamic target process to shape the CFLCC, corps, and division echelon fight would be conducted to create opportunities for rapid ground maneuver through 'reconnaissance pull' methods. The CFLCC and his subordinate units may then conduct operational maneuvers in order to decide where to fight battles and where to avoid them. Additionally, the increased requirements of the ground forces for flank security could be prepared in the LINT killboxes by the requisite command level so the ground units could choose where to move rapidly and preserve combat power for their decisive attack. Lastly, a CAS grid would signify that the tactical air control parties of the ground forces or the FAC(A)s have accepted responsibility for the control of close air support within the grids. These grids can be broken down into smaller requisite 'keypads' as required for the situation. Keypads would be subdivided killboxes when more exacting delineations of battlespace are required.

This system may create is a more flexible method to direct the correct form and amount of air and fire support into the respective boxes. Ideally, the conduct air support within the killboxes is performed with appropriate coordination and without undue interference by another functional component. See Figure 13 for the delineations and keypads.

This killbox system would make the Fire Support Coordination Line (FSCL), Battlefield Coordination Line (BCL), or Deep Battle Support Line (DBSL) obsolete because it would distinguish between these different forms of interdiction in ways that these static means of coordinating air-to-ground fires do not. This construct is built upon the lessons of the cases studied. Ground forces are predominant in the close fight--they are the supported effort and should dictate the conduct of the fight within the CAS killboxes out to the distance of their abilities to significantly influence the battle in the short term. In the deep battles, it has become evident that the air component commander is best equipped and best capable for this region. He should be the supported component and dictate what occurs in the LINT killboxes and some JINT killboxes.

This fusion of fire support and airspace coordination measures could make the integration of ground scheme of maneuver and the fires that support it more effective. As with the solutions viewed in the cases studied, certain delineations served certain purposes whether they were bomblines, BCLs, or DBSLs. The killbox system allows for a more detailed ability to troubleshoot and modify air support as was seen in the battlespaces occupied by FAC(A) in Vietnam and the killer-scout in DESERT STORM. Additionally, since the killboxes can be designated as a situation unfolds, 'gaps' in the enemy's defenses can be created and exploited, and by changing the killboxes to a different type, opportunities to 'pull' ground forces through those gaps could be better orchestrated under this system.

2. Augment the Deep Battle Management System with Tactical Aircraft as Deep Battle Managers. The second recommendation is for the CFACC to make greater use of the Tactical Air Coordinator (Airborne) [TAC(A)] missions in the selected killboxes. According to joint doctrine, a TAC(A) can coordinate the actions of other aircraft engaged in air support of ground forces.¹⁸⁰ Marine Corps doctrine states as a representative of the Marine air command element, the TAC(A) will perform ad hoc duties as an airborne extension of the Direct Air Support Center (DASC).¹⁸¹ Currently, only the Marine Corps F/A-18D performs this mission; the Navy F/A-18F and the Air

¹⁸⁰ Joint Publication 3-09.3, Joint Tactics, Techniques, and Procedures for Close Air Support, 3 September 2003, pg. GL-14.

¹⁸¹ Marine Corps Warfighting Publication (MCWP) 3-2, Aviation Operations, 09 May 2000, pg. 4-9.

Force F-15E should assume this capability as well.¹⁸² These aircraft possess the requisite additional crewmember, sensors, and communications, and their crews could readily complete the training. This mission is the best example of an airborne ‘trusted air representative’ who, when sent in sufficient numbers throughout the LINT zone and select areas of the JINT zone, can execute the CFACC’s role as the coordinating authority for interdiction.

This high-level troubleshooter role used to reside in the now-retired Airborne Battlefield Command and Control Center (ABCCC) EC-130. After assuming the duties of the ABCCC following its decommissioning, the E-8 JSTARS and the E-3C AWACS aircraft have had documented difficulties in assuming the EC-130’s former duties in the effective management of the interdiction fight.¹⁸³ The TAC(A) could augment the capabilities of the E-8 JSTARS and the E-3C AWACS command and control aircraft to further direct and coordinate the transition from theater interdiction to the CFLCC air interdiction operation in the JINT zone. The TAC(A) could cover any areas not under the surveillance of the E-8 and remain in control of a killbox as it changes from JINT to LINT.

Additionally, if the future battlefield is to have smaller, semi-autonomous combat units, it makes sense for the CFACC to have more deep battle managers (DBM) in the LINT zone directing their deep battle.¹⁸⁴ As in the cases examined in Chapter Four, DBMs would have the ability and power to act as the representative of the air component commander as required within the LINT zone. He would then coordinate the necessary intelligence, air support, fire support, and security for ground forces so they could execute their operations within a shorter timeframe because of his detailed familiarity with the ground scheme of maneuver.

The TAC(A) DBM should be assigned responsibilities as an airborne extension of the land component’s senior fire support coordination center as necessary for the CFLCC

¹⁸² Assumption of another mission is never an easy task for any aircraft type. There are increased demands in time devoted to training, external support, and maintaining aircrew currency. However, this investment in the TAC(A) mission may have rewards that significantly compensate for the investment of the few sorties deemed necessary to coordinate increased targeting effectiveness and efficiency for the ground forces and the air component commander.

¹⁸³ Airborne Battlefield Command and Control Center (ABCCC) Migration CONOPS, HQ/ACC/DOY Battle Management Operations Division (A-36), 21 May 2002, pg. 19.

¹⁸⁴ I will use DBM in reference to the E-8 JSTARS, E-3C AWACS, and the F/A-18D, F/A-18F, and the F-15E. TAC(A) DBM will refer to the tactical aircraft.

deep battle. He would work closely with the CFLCC Deep Operation Coordination Center (DOCC) and the CFACC Synchronization Cell to conduct shaping fires in the LINT zone, and provide the necessary on-site assessments that proved so important in the Vietnam case study. The TAC(A) DBM could conduct the ‘reconnaissance pull’ of forces, support, or surveillance when needed in order to assist the commanders to make timely, effective decisions.

The E-8 JSTARS and the E-3C AWACS could assume a supporting role in the LINT zone because the TAC(A) DBM will have certain on-scene advantages of location, communications, and sensors--as well as the ability to synthesize all of these inputs and execute missions according to the needs of the land component commander. If lighter and faster ground forces must receive greater air and fire support from non-organic assets, it makes sense to empower an air and fires ‘troubleshooter’ that remains to coordinate the necessary airspace, air support, and fires coordination--as in Vietnam and Operation DESERT STORM.

Air interdiction in the JINT killboxes is meant to destroy, neutralize, or delay enemy military potential before it can be brought to bear effectively against friendly forces in an area where detailed integration with fires and movement is not required.¹⁸⁵ Ideally, the E-8 would be the primary DBM with the TAC(A) augmenting where required and where air superiority is achieved. When the decision is made to transition a JINT zone to a LINT zone, the TAC(A) DBM can quickly assume key air support and fire support functions within the LINT zone. Figure 14 lays out the areas of responsibility of these command and control aircraft.

¹⁸⁵ Joint Publication (JP) 1-02, Department of Defense Dictionary of Military and Associated Terms, 05 June 2003, pg. 266.

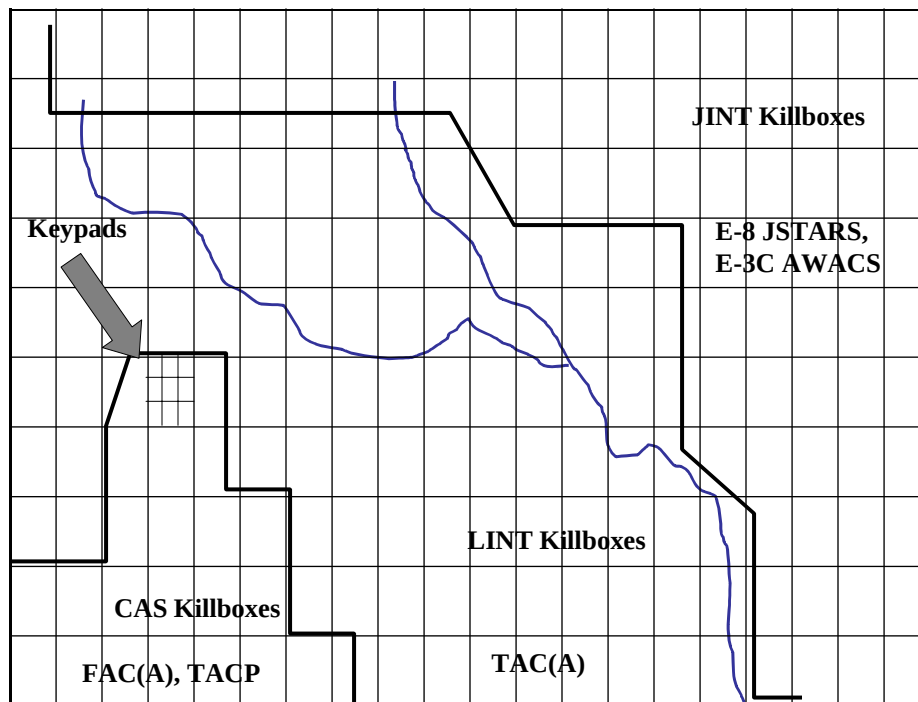


Figure 14. Killbox grid system and DBM areas

What implementation of the TAC(A) empowered as a DBM means is that he assumes the responsibility to provide means by which responsive and effective air support can be provided in the interdiction region for ground forces. The DBM will be a direct representative of the JFACC empowered to troubleshoot the JFC's theater wide interdiction effort where permissive threat environments allow. In the LINT zone, he can serve in a supporting role to the JFLCC by preparing the land AO for the eventual arrival of the ground forces. Within that time, the DBM is serving as a trusted representative while forward deployed in the battlespace. Within the same killbox the DBM can simultaneously or sequentially meet the targeting objectives of the JFC or the JFLCC as tasked by the JFACC. What is needed is an airborne decision maker of the air component who is conversant in the targeting priorities of the various components and can rapidly organize and route air support.

During the conduct of these operations, the DBM would display many of the characteristics discussed in Chapter Four. First, the DBM would be given the requisite authority by the JFACC. Second, enhanced knowledge of the theater air operations plan and the land component commander's scheme of maneuver and concept of fires plans would enable the DBM to execute his missions effectively and rapidly. This requirement

is a tall order and places a great deal of pressure upon the crew. In sum, the TAC(A) DBM could be an effective platform throughout the killbox system because he can absorb the many peripheral cues that would enable greater appreciation of the situation-- Clausewitz' *coup d'oeil*--so as to execute timely and accurate fires.¹⁸⁶

3. Augment the Close Battle with a Comprehensive Forward Air Controller (Airborne) [FAC(A)] Gameplan. When the battle transitions from LINT to CAS, Forward Air Controllers (Airborne) [FAC(A)] could assume the role of battle manager as the ground units maneuver and fight. The FAC(A) could conduct flank security at ranges within the CAS zone in order to protect the flanks and rear areas of the ground forces. In addition, when the ground units decide to give battle, the FAC(A)s could cover the ground units as they conduct attacks in order to protect the forces as in Vietnam. Currently, the Marine Corps F/A-18D, Navy F-14D and F/A-18F, and the Air Force OA-10 and F-16 are the aircraft that have FAC(A) as a mission. The Air Force F-15E should assume the mission as well. These aircraft could augment the capabilities and reach of the tactical air control parties located with the ground maneuver units. The air control parties would direct air support for their close battles while the FAC(A) would augment their abilities for protection and maneuverability in the CAS zone through flank security, battlespace troubleshooting, close reconnaissance and surveillance, and terminal control of air support.

As the Vietnam case portrayed, the FAC(A) significantly augmented the range of protection and awareness around a ground force. As the assessment of recent operations in Chapter Three showed, the lower echelons of ground forces did not receive much of the battlefield situational awareness that was readily accessible to the corps and divisions. A FAC(A) could provide that accessibility through his communications, knowledge of the ground scheme of maneuver, and his commanding position for situational awareness over the immediate battlefield. In those areas where the air control parties cannot see or act, the FAC(A) can act for them. The FAC(A) can impart his understanding and awareness of the situation to the battalion and regimental level maneuver units and serve as a conduit back to the division. This ability to increase awareness and clarity on the

¹⁸⁶ Lieutenant Colonel David Wilkinson, USMC, "TAC(A)," Electronic mail correspondence, 18 March, 2003, pg 2.

battlefield was an important part of the FAC(A) role in Vietnam and of the killer-scout in Operation DESERT STORM and it is a capability that should be augmented and integrated into air operations planning and joint integration of fires and maneuver.

4. The Air Support Operations Center (ASOC) and Direct Air Support Center (DASC) Must Have the Capability to Locate with Lower Levels of Command

Within the current Joint Theater Air to Ground System (TAGS), the ASOC is currently located at the Army's Corps level. In Operation IRAQI FREEDOM an inability to move forward and retain effective communications created difficulties for the Army maneuver units as they advanced towards Baghdad. The result was the inability to coordinate and execute air support at the great distances up to the FSCL. As a consequence, the Army had difficulties maintaining communications with forward ground forces as they penetrated deep into Iraq.

Quite simply, the ASOC and the Marine Corps DASC must be prepared to forward deploy to an appropriate range in order to meet several requirements.¹⁸⁷ First, there is still intrinsic value in being able to conduct real-time planning and face-to-face meetings with maneuver units. While the ASOC and DASC need not do the job of the air control parties located with the ground forces, there needs to be an element of the 'shuttle coordination' along the lines displayed by Guderian and Loerzer, Weyland and Patton, and the FACs with the 101st. These two air-to-ground agencies must be able to communicate with the maneuver units throughout the CAS zones, and selected LINT zones. Forward deployment may keep them better apprised of changes to the ground battle.

The necessity to forward deploy is due to the rapidity at which the battlefield changes. In Operation IRAQI FREEDOM, Major General Mattis, the commanding general of the 1st Marine Division, was disciplined in his use of broad guidance. He would issue mission type orders and then 'catch up' with his regiments a few days later to appraise the situation. Because regiments were executing so quickly, staffs at the Marine Expeditionary Force (MEF) and CFLCC levels were often sending guidance via

¹⁸⁷ Direct Air Support Center (DASC) is the equivalent to an ASOC. The DASC serves as a mechanism for the Aviation Combat Element (ACE) commanding general supports the ground combat element of the MAGTF.

electronic means that was no longer germane to the situation.¹⁸⁸ General Mattis appreciated this deficiency and remained closer to the executing units. For the ASOC and the DASC, an ability to forward deploy at a viable distance from the maneuver units-and an ability to redeploy quickly-will retain their ability to communicate, coordinate, and execute changes for the ground maneuver forces as trusted representatives of the air component. They can maintain communications in the CAS and LINT zones, conduct persistent face-to-face coordination, retain comprehensive knowledge of the ground situation, and conduct the requisite 'reconnaissance pull' of support, forces, and information in concert with the DBM. In sum, a trusted representative of the air component that is forward-deployed and on-the-ground may have a better capability to conduct the effective transition from the LINT to the CAS zone and assist in the effective transition of the fight from the deep, shaping fight to the close, decisive fight.

¹⁸⁸ F. J. Bing West, "Maneuver Warfare: It Worked in Iraq," *Naval Institute Proceedings*, 02 Feb, 2004. On-line. Internet. Available from [http:// www.usni.org/Proceedings/Articles04/PRO02west.htm](http://www.usni.org/Proceedings/Articles04/PRO02west.htm).

Chapter 6

Conclusion

Airpower is becoming the decisive factor in warfare. We must, therefore, get organized accordingly. What we must do now is organize the command and control of our air forces so as to retain the greatest degree of flexibility....

— Field Marshal Sir Bernard Law Montgomery

The reality of ground warfare is that it is being fought by smaller, more mobile, more lethal ground forces. The concept of multiple semi-autonomous maneuver units moving rapidly through the battlespace creates an interesting challenge for airpower. Historically, when ground forces have operated as smaller units at incredibly fast paces, airpower assumed several roles. It rapidly concentrated at key times and locations to assist in breakthroughs of enemy defenses. More often, airpower aided the ability of ground power to bypass intermediate defenses in order to move rapidly to a key location or objective. Airpower often replaced the fire support that ground forces couldn't generate due to factors of speed, logistics, range, and time. Airpower's flexibility and responsiveness was generated, coordinated, and directed in operations to support the ground commander's decision to give or refuse combat. During decisive combat operations, airpower concentrated effects rapidly. During rapid armored or air mobile operations, airpower informed and defended the vulnerabilities of the ground forces.

Airpower faced significant problems in supporting rapid ground operations. The senior ground commander often could not shape his deep fight to set the conditions necessary for the introduction of his forward ground units. There were difficulties with the ability of the respective air-to-ground systems to effectively redirect air interdiction in the deep fight. Last, insufficient shaping of the deep fight sometimes led to significant increases in immediate CAS requests

by maneuver forces, and the air-to-ground system could not sufficiently keep pace with the battle. Limitations of communications, airfield availability, difficult terrain, sortie availability, personalities, and fire support coordination issues all had roles in these problems.

The solutions to these problems had commonalities that transcended over 70 years of warfighting. Extensive air supremacy freed aircraft and capabilities to invest ground forces with higher levels of support for their rapid ground offensive. Significant protection of the ground forces permitted the maneuver units to retain combat power in offensive operations: airpower covering and augmenting flank and rear protection underwrote ground operational speed. When combat power was concentrated for decisive battle, airpower assisted in the destruction of the enemy and provided security from counterattack. Multi-mission flexibility of airpower enhanced the responsiveness to the requirements on the battlefield. Aircraft flew often knowing they could fly either interdiction or CAS missions or interdiction into enemy territory and armed reconnaissance to protect armored column flanks during the return to the airfield. FAC(A)s could act as a communications relay, call for artillery fire support, control air support, and provide information to ground forces and command elements. Trusted representatives were frequently deployed with the ground forces--both in air-to-ground organizations and in the air. This forward presence permitted rapid, decisive actions that could maintain pace with the requirements of the battlefield. All of these representatives had extensive knowledge of the ground scheme of maneuver and the overall ground objectives. These representatives could make decisions in concert with the ground plan. Lastly, higher levels of command increasingly answered the requests of the forward representatives rather than pushing decisions that were no longer relevant to the forward battlefield. In essence, airpower could coordinate and influence the dynamic between air delivered fires and ground maneuver and mitigate the ground tactical-level problems to acceptable thresholds. This influence over the dynamic could largely operate on a continuous basis. Thus, smaller ground forces were able to freely decide where and when to give battle to the enemy--an economy of decisive

combat force became a significantly prevalent feature of air-to-ground coordination.

Implications for the Future

The importance of a trusted air representative to coordinate air-to-ground operations extends beyond traditional, if rapid, ground maneuver warfare. The US armed forces may encounter difficulties in conducting both deep and close air support operations as the United States Army and United States Marine Corps incorporate rapid ground operations conducted by smaller, networked ground forces in their respective visions of future land warfare. The operational statements of the Army and the Marine Corps appear to be derived from the concept “swarming.” As these visions are made operational, many of the problems we experience today could become even worse as the maneuver units get smaller, their dependence upon air support grows larger, and the tempo of their operations increases.

The concept of swarming envisions smaller ground forces as the central warfighting unit in ground warfare operations. Arquilla and Ronfeldt define swarming as follows:

Swarming is seemingly amorphous, but it is a deliberately structured, coordinated, strategic way to strike from all directions, by means of a sustainable pulsing of force and/or fire, close-in as well as from stand-off positions. It will work best—perhaps it will only work—if it is designed mainly around the deployment of myriad, small, dispersed, networked maneuver units (what we call “pods” organized in “clusters”).¹⁸⁹

In essence, swarming is a logical evolution of maneuver warfare. Maneuver warfare uses combinations of firepower, positioning of forces, and speed to place an enemy force into a situation where its defeat is a *fait accompli*. By using combinations of ‘zapping’ and ‘swarming,’ it is claimed that networked ‘clusters’ of ground combat units can defeat larger armies.¹⁹⁰ Swarming differs very little from maneuver warfare--it differs only in the size of the basic combat unit, in the

¹⁸⁹ John Arquilla and David Ronfeldt, Swarming and the Future of Conflict, (Santa Monica, CA.: the RAND Corporation, 2003), pg. vii.

¹⁹⁰ ‘Zapping’ refers to a quick strike by air or indirect fire support where the created effect is a freedom for the ‘clusters’ to quickly bypass or envelop the target.

command and control methods, and in logistics.¹⁹¹ In Table 3 the basic characteristics of swarming and maneuver warfare are shown for comparison. If the units are to be smaller and more rapidly deployable to locations, then the light combat units within the Army or Marine Corps would likely enjoy these fundamental advantages in the future.¹⁹²

Table 3
Comparison between Basic Characteristics of
Maneuver Warfare and Swarming

Basic characteristics (Maneuver Warfare)	Basic characteristics (Swarming)
Complex, synchronized, fast-tempo, multi-linear operations to surprise, penetrate, envelop, or outflank	Autonomous or semi-autonomous units engaging in convergent assault on a common target
Application of mobile mass at “decisive points” in order to gain decisive results	Amorphous but coordinated way to strike from all directions. Attacks designed to disrupt cohesion of adversary
Pre-planned or immediate “massing” of fires	“Sustainable pulsing” of force or fire
Battalion through Brigade sized units	Many small, dispersed, networked maneuver units
Integration of C4I at higher echelons of command (typically Corps or Division)	Integrated surveillance, sensors, C4I for “topsight”
Stand-off and close-in capabilities	Stand-off and close-in capabilities.

¹⁹¹ John Arquilla and David Rondfeldt, Swarming and the Future of Conflict, (Santa Monica, CA.: the RAND Corporation, 2003), pg. vii.

¹⁹² Sean J. A. Edwards, Swarming on the Battlefield, Past, Present, and Future, (Santa Monica, CA.: the RAND Corporation, 2003). Pg 67.

Source: Adapted from: Brigadier General Robert E. Schmidle, USMC, Distributed Operations: From the Sea, *Marine Corps Gazette*, July 2004, pg 37-38.

Distributed Operations (DO) takes the concept of swarming and attempts to elucidate an operational concept that describes combat, combat support, and combat service support in terms of doctrine (the preparedness realm), and training, organizations, and materials (the readiness realm). The envisioned characteristics of DO are quite similar to those of swarming. In DO, small, networked units are dispersed widely over a battlespace extended in breadth and depth. Units of battalion-to-squad size would conduct coordinated movements and attacks in a non-linear, simultaneous, and unpredictable format to quickly shock and defeat the enemy.¹⁹³ Some of the means used by DO are decentralized command and control, a comprehensive commander's intent, precision targeting, rapid maneuver, and follow-on actions based upon 'reconnaissance pull.' Table 4 lists the basic characteristics of Swarming and DO.

Table 4
Comparison between Basic Characteristics of
Maneuver Warfare and Swarming

¹⁹³ Brigadier General Robert E. Schmidle, USMC, Distributed Operations: From the Sea, In *Marine Corps Gazette*, July 2004, pg 37.

Basic characteristics (Swarming)	Basic characteristics (Distributed Operations)
Autonomous or semi-autonomous units engaging in convergent assault on a common target.	Autonomous or semi-autonomous of battalion to squad sized units engaging in convergent assault on a common target
Stand-off and close-in capabilities. Attacks designed to disrupt cohesion of adversary	Mobility of units is greater than the enemy in both speed and distance. Dispersion between units is greater
Integrated surveillance, sensors, C4I for “topsight”	Intelligence “pulls” combat power to the gaps or weaknesses of the enemy
“Sustainable pulsing” of force or fire	Fires are all-weather, responsive, and immediate
Amorphous but coordinated way to strike from all directions by networked forces	C2 network connects all commanders to units, emphasis on decentralized decision making
Sustainment is agile and responsive over larger battlespace	Sustainment is agile and responsive over larger battlespace

Source: Adapted from: Brigadier General Robert E. Schmidle, USMC, Distributed Operations: From the Sea, In *Marine Corps Gazette*, July 2004, pg 37-38.

What key considerations does Distributed Operations bring to the battlefield? In the first place, it means that smaller ground combat units will operate independently until the units are brought together on an objective or decisive target through ‘reconnaissance pull’ methods. Second, these ground combat units will operate more quickly from movement to an objective to the decisive attack to the movement back to a dispersed formation. Third, the dispersion these forces use provides both security and risk to the units. The final decisive action is a simultaneous, non-linear ‘pulse’ using both kinetic and non-kinetic fires.

What does Distributed Operations mean for the battlespace? Ground combat units will be more reliant on supporting fires, more reliant on mutually supporting maneuver and fire (convergence), and more reliant on airpower for security of their flanks and rear areas. Fire support coordination measures will need to become temporally and spatially more dynamic. Offensive air support will need to become temporally and spatially more dynamic. Therefore, it would seem fair to conclude that greater coordination will be required between ground combat

units as well as between ground and air units. The transition from joint targeting priorities through a land component commander's targeting priorities finally to the close fight executed by these ground combat units will occur more rapidly. The challenges of air-to-ground coordination and the transition of airpower's application to these targeting priorities witnessed in past and current operations will likely be encountered in Distributed Operations. Therefore, solutions must attempt to provide a seamless transition of the fight from the air component to the primary ground combat unit. The proposals discussed in the previous chapter incorporate many of the characteristics that have addressed air-to-ground coordination in rapid maneuver warfare, and since DO is merely an evolution of maneuver warfare, these proposals should continue to be applicable. These potential changes in readiness and preparedness may lead to a more effective use of airpower through the air-to-ground and fire support systems.

Concluding Remarks: Fighting in the Future

The motto of the United States Air Force School of Advance Air and Space Studies (SAASS) is, "From the past, the future." This discipline of looking both to the past as well as the future provides insight and judgment to the warfighter. Following Operation DESERT STORM, the Soviet General Staff Academy conducted an analysis of the campaign and came to several conclusions--foremost was the conclusion that the war was the first concrete example of 'intellectualized warfare.'¹⁹⁴ This style of warfare grew from the concepts and operational statements of AirLand Battle. The AirLand Battle concept came to fruition because of the need for a ground combat force to leverage airpower's characteristics against a significantly larger and well-armed enemy. The theme of transition continues as the armed forces explore methods for airpower integration in rapid land operations. The decisions on the role of airpower vis-à-vis rapid land warfare ideally will encapsulate many of the characteristics covered in this thesis. The recommendations proposed may have

¹⁹⁴ Fitzgerald, Mary C., "The Soviet Military and the New Air War in the Persian Gulf" *Airpower Journal*, Winter 1991. On-line. Internet. 12 Jan 2004. Available at <http://www.airpower.maxwell.af.mil/airchronicles/apj/fitz.html>. pg.1

some utility to airpower decision makers as they decide upon issues of readiness and preparedness concerning future land warfare. If ancient Roman temple gates can serve as a metaphor for debate about the role of airpower, may Janus continue to inspire by reminding airpower advocates of the utility of looking for future solutions by not forgetting to look to the past.

Bibliography

- 1st Marine Division, Operation IRAQI FREEDOM (OIF): Lessons Learned, 30 May 2005. On-Line. Internet. Available from <http://www.globalsecurity.org/military/ops/oif-lessons-learned.htm>.
- Airborne Battlefield Command and Control Center (ABCCC) Migration CONOPS, HQ/ACC/DOY Battle Management Operations Division (A-36), 21 May 2002.
- Air Force Doctrine Center, Doctrine WATCH #10, *Air Interdiction and Interdiction*.
- Air Force Doctrine Document (AFDD) 1. *Air Force Basic Doctrine*, 17 November 2003.
- Air Land Sea Application Center (ALSA), *TAGS Multiservice Procedures for the Theater Air-Ground System*, July 1998.
- Arquilla, John; and David Rondfeldt, *Swarming and the Future of Conflict*, Santa Monica, CA.: The RAND Corporation, 2003.
- Arquilla, John, and David Rondfeldt, "Swarming-The Next Face of Battle." In *Aviation Week & Space Technology*, 29 Sept, 2003. On-line. Internet. 07 Jan 2004. Available from <http://www.rand.org/commentary/100703AWST.html>
- Brown, Colonel Bruce L., USAF, Lieutenant Colonel Thomas A. Cardwell III, USAF, and Major D. J. Alberts, USAF, "Battlefield Air Interdiction," in *Doctrine Information Publication*, No. 7 (HQ USAF/XOXLD), 1979.
- Clancy, Tom, and General Charles Horner (Ret.), *Every Man a Tiger*, New York, N. Y.: G. P. Putnam's Sons, 1999.
- Cohen, Dr. Eliot A., et al., *Gulf War Air Power Survey Summary Report*. Washington, D.C.: United States Air Force, 1993.
- CORONA HARVEST, Combat After Action Report on Airmobile Operations In Support Of Operation LAMSON 719, Feb 1971-Apr 71.
- Corum, James S., *The Luftwaffe: Creating the Operational Air War, 1918-1940*, Lawrence, KS.: University of Kansas Press, 1997.

- van Creveld, Martin; Stephen L. Canby; and Kenneth S. Brower, *Air Power and Maneuver Warfare*, Maxwell Air Force Base, AL.: Air University Press, 5th Ed. 2003.
- D'Amico, Lieutenant Colonel Robert, USAF, "Joint Fires Coordination: Service Competencies and Boundary Challenges." *Joint Forces Quarterly*, (Spring 1999), e.g., 70-77.
- Defense Science Board Task Force. Report of the Defense Science Board Task Force on Integrated Fire Support in the Battlespace, (Washington, D.C.: Office of the Under Secretary of Defense For Acquisition, Technology, and Logistics), October 2004.
- Deptula, Maj Gen David A; Col Gary L. Crowder; and Maj George L. Stamper. "Direct Attack Enhancing Counterland Doctrine & Joint Air-Ground Operations." *Air & Space Power Journal*, Winter 2003. On-line. Internet, 12 Jan 2004. Available from <http://www.airpower.maxwell.af.mil/airchronicles/apj/apj03/win03/deptula.html>.
- Edwards, Sean J. A., *Swarming on the Battlefield, Past, Present, and Future*. Santa Monica, CA.: The RAND Corporation, 2003.
- Emerson, Colonel Harry M; Major Michael T. Edwards, *DEEP OPERATIONS: A LOOK FROM BCTP AT THE PROCESS*,
- Field Manual (FM) 3-0. *Operations*, 14 June 2001.
- Field Manual (FM) 3-31, *Joint Force Land Component Commander Handbook (JFLCC)*, December 2001.
- Field Manual (FM) 100-20, *Command and Employment of Air Power*, 21 July 1943.
- Field Manual (FM) 100-61. *Armored and Mechanized Based Opposing Force Operational Art*. 26 Jan 1998. On-line. Internet. Available at <http://www.adtdl.army.mil/cgi-bin/atdl.dll/fm/100-61/toc.htm>.
- Field Manual (FM) 101-5-1, *Operational Terms and Graphics*, 30 September 1997. On-line. Internet. Available at http://www.pubs.armystudyguide.com/FM/FM_101-5-1.htm.
- Fitzgerald, Mary C., "The Soviet Military and the New Air War in the Persian Gulf" in *Airpower Journal*, Winter 1991. On-line. Internet. 12 Jan 2004. Available at <http://www.airpower.maxwell.af.mil/airchronicles/apj/fitz.html>.
- Flanagan, John F., *Vietnam Above the Treetops, A Forward Air Controller Reports*, New York, N. Y.: Praeger Publishers, 1992.

Freedman, Lawrence; and Efraim Karsh, *The Gulf Conflict 1990-1991: Diplomacy and War in the New World Order*, Princeton, N. J.: Princeton University Press, 1993.

Grant Rebecca, "Marine Air in the Mainstream," *Air Force Magazine*, June 2004, Volume 87, No. 6. On-line. Internet. Available from <http://www.afa.org/magazine/June2004/0604marine.asp>,

Hollis, Patricia Slayden, "Trained, Adaptable, Flexible Forces=Victory in Iraq: Interview with Lieutenant General W. Scott Wallace, USA, Commanding General, V Corps," *Field Artillery Magazine*, Sept-Oct 2003. On-line Internet. Available from <http://sill-www.army.mil/FAMAG/>.

Jacobs, W. A., "The Battle For France, 1944," In *Case Studies in the Development of Close Air Support*, Edited by Benjamin Franklin Cooling, Washington, D. C.: United States Air Force, Office of Air Force History, 1990.

Joint Publication (JP) 1-02, *Department of Defense Dictionary of Military and Associated Terms*, 05 June 2003.

Joint Publication (JP) 0-2, *Unified Action Armed Forces (UNAAF)*, 10 July 2001.

Joint Publication (JP) 3-0, *Doctrine for Joint Operations*, 10 September 2001.

Joint Publication (JP) 3-03, *Doctrine for Joint Interdiction Operations*, 10 April 1997.

Joint Publication (JP) 3-09.3, *Joint Tactics, Techniques, and Procedures for Close Air Support*, 3 September 2003.

Joint Publication (JP) 3-52, *Joint Doctrine for Airspace Control in the Combat Zone*, 30 August 2004.

Keaney, Thomas A; and Eliot A. Cohen, *Gulf War Air Power Survey (GWAPS) Summary Report*, Washington, D.C.: Government Printing Office, 1993.

Knights, Michael. "Air Power Over Iraq" *Jane's Intelligence Review*, 01 March 2003. On-line. Internet. 10 Jan, 2004. Available from <http://www4.janes.com/K2/docprint.jsp?K2DocKey=/content1/janesdata/mags/jir/history/j.html>

Lackey, Sue A., "Initial Look at Distributed Operations Reveals Potential and Problems," Navy League of the United States, Dec 200. On-Line. Internet. at http://www.navyleague.org/sea_power/dec_04_34.php, 1 of2.

Laughbaum, Lieutenant Colonel R. Kent, USAF, *Synchronizing Airpower and Firepower in the Deep Battle*, Maxwell Air Force Base, AL.: Air University Press, 1999.

Lester, Gary Robert, *Mosquitoes to Wolves: The Evolution of the Forward Air Controller*, Maxwell Air Force Base, AL.: Air University Press, 1997.

Lindemans, Mischa F., "Janus," 03 Mar 1997, On-Line. Internet. 24 Jan 2005. Available from <http://www.pantheon.org/articles/j/janus.html>.

MAGTF Staff Training Program (MSTP) Pamphlet 3-0.5, *Fighting the MEF*, May 2001.

Marine Corps Doctrinal Publication (MCDP) 1-0, *Marine Corps Operations*, 27 September 2001.

Marine Corps Reference Publication (MCRP) 3-25F, *TAGS, Multi-Service Tactics, Techniques, and Procedures for the Theater Air-Ground System*, December 2003.

Marine Corps Reference Publication (MCRP) 5-12C, *Marine Corps Supplement to the Department of Defense Dictionary of Military and Associated Terms*, July 1998.

Marine Corps Warfighting Laboratory, Information Paper, *Battlefield Coordination Line*. On-line. Internet. 15 January 2005. Available from <http://www.mstp.quantico.usmc.mil/publications/pointPapers/BCL%20Information%20Paper.pdf>

Marine Corps Warfighting Publication (MCWP) 3-2, *Aviation Operations*, 09 May 2000.

Marine Corps Warfighting Publication (MCWP) 3-23, *Offensive Air Support*, 30 May 2001.

Marine Corps Warfighting Publication (MCWP) 3-23.2, *Deep Air Support*, 04 Jan 2001.

May, Ernest R., *Strange Victory: Hitler's Conquest of France*, New York, N.Y.: Hill and Wang, 2000.

Murray, Williamson, "The Luftwaffe Experience." In *Case Studies in the Development of Close Air Support*, Edited by Benjamin Franklin Cooling, (Washington, D. C.: United States Air Force, Office of Air Force History, 1990.

_____. *Strategy for Defeat*, Maxwell Air Force Base, AL.: Air University Press, 1983.

McPeak, General Merrill A. "TACAIR Missions and the Fire Support Coordination Line." *Air & Space Power Chronicles*, 1985, On-line. Internet, 23 Mar 2004. Available from <http://www.airpower.maxwell.af.mil/airchronicles/aureview/1985/sep-oct/mcpeak.html>.

- Momyer, General William W., *Airpower in Three Wars (WWII, Korea, Vietnam)*, Maxwell Air Force Base, AL.: Air University, Reprint Edition 2003.
- Moseley, General Michael, *Operation IRAQI FREEDOM by the Numbers*, 30 April, 2003.
- Mrozek, Donald J., *Air Power and the Ground War in Vietnam: Ideas and Actions*, Maxwell Air Force Base, AL.: Air University Press, 1988.
- Putney, Diane T., *Airpower Advantage: Planning the Gulf War Air Campaign 1989-1991*, Washington, D.C.: Air Force History and Museums Program, 2004.
- Perret, Geoffrey, *Winged Victory, The Army Air Forces in World War II*, New York, N. Y.: Random House, Inc., 1993.
- Pirnie, Bruce R., et al. *Beyond Close Air Support: Forging a New Air-Ground Partnership*, Santa Monica, CA.: The RAND Corporation, 2005.
- Report of the Defense Science Board Task Force on Integrated Fire Support in the Battlespace.
- Rogers, Lieutenant General Bernard William, USA, "Operation CEDAR FALLS-JUNCTION CITY, A Turning Point" in *Vietnam Studies*, 1989. On-line. Internet. 13 May 2005. Available at <http://www.army.mil/cmhp/books/Vietnam/907/cont.htm>.
- Slight, John, "The War in South Vietnam, The Years of the Offensive 1965-1968," Washington, D.C.: Office of Air Force History, 1988., In *SAASS 628 Reader II*, 2005.
- Schmidle, Brigadier General Robert E., "Distributed Operations: From the Sea." In *Marine Corps Gazette*, (July 2004), e.g. 37-41.
- Spires, David N., *Air Power For Patton's Army: The XIX Tactical Air Command in the Second World War*, Washington, D. C.: Air Force History and Museums Program, 2002.
- United States Central Command, *Concept of Operations for Joint Fires*, 10 Nov 1999. On-line. Internet, 18 Feb 2004. Available from <http://fas.org/man/dod-101/ops/docs/jfconops.htm>
- United States Central Command Air Forces, Kuwait CFLCC Air Component Coordination Element (K-ACCE) Operation Iraqi Freedom After Action Report, 28 April 2003.

West, F. J. Bing, "Maneuver Warfare: It Worked in Iraq," *Naval Institute Proceedings*, 02 Feb, 2004. On-line. Internet. Available from [http:// www.usni.org/Proceedings/Articles04/PRO02west.htm](http://www.usni.org/Proceedings/Articles04/PRO02west.htm).

Wilkinson, Lieutenant Colonel David, USMC, "TAC(A)", Electronic mail correspondence, 18 March 2003.

XIX TAC Standard Operation Procedures, dtd Jun 45. Air Force Historical Research Agency.