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OPERATION DESERT STORM AND A NEW PARADIGM:
GROUND FORCES IN SUPPORT OF AIR OPERATIONS

A thesis presented to the Faculty of the U.S. Army
Command and General Staff College in partial
fulfillment of the requirements for the
degree

MASTER OF MILITARY ART AND SCIENCE

by

ROBERT K. SIMM, JR., MAJ, USAF
Northern Arizona University, Flagstaff, Arizona, 1980

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Fort Leavenworth, Kansas
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REPORT DOCUMENTATION PAGE			Form Approved OMB No. 0704-0188	
Public reporting burden for this collection of information is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Washington Headquarters Services, Directorate for Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington, VA 22202-4302, and to the Office of Management and Budget, Paperwork Reduction Project (0704-0188), Washington, DC 20503.				
1. AGENCY USE ONLY (Leave blank)	2. REPORT DATE 4 June 1993	3. REPORT TYPE AND DATES COVERED Master's Thesis 1 Aug 92 - 4 Jun 93		
4. TITLE AND SUBTITLE Operation Desert Storm and a New Paradigm: Ground Forces in Support of Air Operations			5. FUNDING NUMBERS	
6. AUTHOR(S) MAJ Robert K. Simm, Jr., USAF				
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) U.S. Army Command and General Staff College Attn: ATZL-SWD-GD Ft. Leavenworth, KS 66027-6900			8. PERFORMING ORGANIZATION REPORT NUMBER	
9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)			10. SPONSORING/MONITORING AGENCY REPORT NUMBER	
11. SUPPLEMENTARY NOTES				
12a. DISTRIBUTION/AVAILABILITY STATEMENT Approved for Public Release; distribution is unlimited.			12b. DISTRIBUTION CODE	
13. ABSTRACT (Maximum 200 words) This study examines the influence of ground forces on the conduct and outcome of the Desert Storm air operations. This influence took three distinct forms. First, Coalition ground forces were instrumental in fixing the Iraqis in static positions in the Kuwait Theater of Operations. These positions were vulnerable to air attacks, as they were initially concentrated in relation to the Coalition units in Saudi Arabia, rather than dispersed in honor of the air threat. Next, the Coalition ground offensive seized the strategic initiative by forcing the Iraqis to consume supplies much faster than their logistics system could support, due to the effectiveness of air interdiction. The resulting increase in the tempo of operations provided additional opportunities for air power. Finally, the ground offensive produced an insoluble predicament for the Iraqis: they could leave their prepared positions to counter the maneuvering surface forces, thereby facing additional exposure to air attacks; or they could attempt to evade air attacks by remaining in their positions, thereby succumbing to the ground attack. The thesis concludes that there is a requirement for doctrinal change, which would take advantage of situations in which ground forces may support air operations.				
14. SUBJECT TERMS Desert Storm, Air Operations, Parallel Warfare, Campaign Planning, Joint Doctrine.			15. NUMBER OF PAGES 117	
			16. PRICE CODE	
17. SECURITY CLASSIFICATION OF REPORT UNCLASSIFIED	18. SECURITY CLASSIFICATION OF THIS PAGE UNCLASSIFIED	19. SECURITY CLASSIFICATION OF ABSTRACT UNCLASSIFIED	20. LIMITATION OF ABSTRACT	

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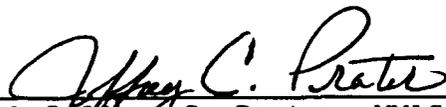
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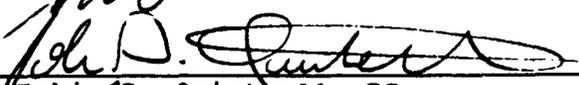
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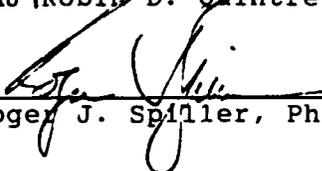
Name of Candidate: MAJ Robert K. Simm, Jr.

Thesis Title: Operation Desert Storm and a New Paradigm:
Ground Forces in Support of Air Operations.

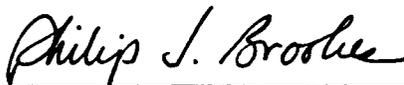
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The opinions and conclusions expressed herein are those of the student author and do not necessarily represent the views of the U.S. Army Command and General Staff College or any other governmental agency. (References to this study should include the foregoing statement.)

ABSTRACT

OPERATION DESERT STORM AND A NEW PARADIGM: GROUND FORCES IN SUPPORT OF AIR OPERATIONS by MAJ Robert K. Simm, Jr., USAF, 117 pages.

This study examines the influence of ground forces on the conduct and outcome of the Desert Storm air operations. This influence took three distinct forms. First, Coalition ground forces were instrumental in fixing the Iraqis in static positions in the Kuwait Theater of Operations. These positions were vulnerable to air attacks, as they were initially concentrated in relation to the Coalition units in Saudi Arabia, rather than dispersed in honor of the air threat. Next, the Coalition ground offensive seized the strategic initiative by forcing the Iraqis to consume supplies much faster than their logistics system could support, due to the effectiveness of air interdiction. The resulting increase in the tempo of operations provided additional opportunities for air power. Finally, the ground offensive produced an insoluble predicament for the Iraqis: they could leave their prepared positions to counter the maneuvering surface forces, thereby facing additional exposure to air attacks; or they could attempt to evade air attacks by remaining in their positions, thereby succumbing to the ground attack.

The thesis concludes that there is a requirement for doctrinal change, which would take advantage of situations in which ground forces may support air operations.

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ACKNOWLEDGEMENTS

I would be remiss if I neglected to acknowledge the substantial contributions of my family, in the research and preparation of this thesis, made over the course of a busy and challenging year. My daughter, Jennifer, sacrificed many bedtime stories so that I might work on my "book." My wife, Teresa, not only typed the entire thesis (graciously enduring numerous last-minute editorial changes), but constantly encouraged me in my efforts to complete the project. For their patience, understanding, and support, I will always be grateful.

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INTRODUCTION

The Persian Gulf War of 1991 was a conflict of many "firsts": the first war in which space-based systems dominated communications, navigation, mapping, intelligence, and targeting; the first in which "stealth" technology permitted some aircraft to evade radar detection; the first war to feature the use of cruise missiles, fired from aircraft, surface ships, and submarines; and the first war in which ballistic missiles were intercepted and destroyed in flight by defensive missile systems. In addition to those notable "firsts," the Gulf War may have set the conditions for a new relationship between air and land forces, in which traditional notions of who provides the main and supporting efforts are reversed.

Since the advent of military aviation, the traditional role of air power has been one of subordination to surface forces. In the United States military, powered flight originally came under the purview of the U.S. Army Signal Corps, in the same role fulfilled by hot air balloons during the Civil War: the observation of enemy movements and the adjustment of artillery fires. By the close of World War I, this role had been expanded to

include attacks on ground troops, although these attacks were conceived as artillery fires delivered by another method.

Since that time, roles and missions debates within the Department of Defense (DOD) have often centered on the proper employment of air power. While some have argued the need for an independent role for air forces (one which, so the argument runs, promises decisive strategic results), others have maintained a traditional concept of air power as an auxiliary of ground forces. Indeed, current U.S. Army doctrine, known as AirLand Battle, while recognizing the contributions of some air power missions (such as counter air and air interdiction), relegates "tactical air" to a supporting annex of surface operations. The Army contends that

...air forces are normally more efficiently used to attack in depth [emphasis added] those targets whose destruction, disruption, or delay will deny the enemy the time and space to employ forces effectively.¹

Since "depth" is one of the four tenets of AirLand Battle, air attacks (as well as other "fires") are "directed against enemy forces not in contact [and are] designed to influence conditions in which future close operations will be conducted" ("Close operations bear the ultimate burden of victory or defeat.").² Thus, for the Army, air power serves to "shape the battlefield" upon which surface forces

will decide the issue--Marine Corps aviation also plays a subsidiary role to the surface battle.

The great air power theorist of the early Twentieth Century, Italian General Giulio Douhet, believed that the capabilities of the military aircraft demanded a more prominent role than that of mere adjunct to traditional land warfare. In fact, Douhet envisioned a doctrine of air power which was well beyond the capabilities of the frail fabric and baling wire aircraft of his era, and which some would claim has yet to be validated. Nonetheless, Douhet insisted that

in the wars to come the decisive field of action will be the aerial field; and therefore it is necessary to base the preparation for and direction of the war on the principle: resist on the ground in order to mass your strength in the air [emphasis in the original].³

More than sixty years before Operation Desert Storm, Douhet had suggested a revolutionary revision of modern military thought, which denied the primacy of surface forces and asserted that decision in warfare could be achieved from the air.

Neither Army nor Marine Corps doctrine envision a scenario in which air power will be the decisive instrument of war. This is the result of a cultural bias within those institutions which holds that decision in warfare can only be attained on the ground. Yet, throughout the forty-three days of Operation Desert Storm, air forces were actively

engaged in direct combat operations, while the battle role of the ground forces was generally limited to the final hours. Nevertheless, did Coalition ground forces influence the conduct and outcome of Desert Storm air operations? This thesis will examine the conflict to determine the link between ground forces and the air operations.

To that end, it is useful to begin with some theoretical background for the air operations, then a brief account of the events that preceded Desert Storm, followed by separate accounts of the air operations and the ground operations. Then, three major themes will be examined. The first is the notion that the deployment and positioning of the Coalition forces may have served the purpose of "fixing" the Iraqis--that is, holding them in place, or "fixed" positions, to honor the threat posed by Coalition armored forces--which in turn left the Iraqis vulnerable to air attack. Next, there is an examination of whether air operations had reached a point of diminishing return. In other words, was the effort expended from the air producing fewer results, such that it was necessary to employ the ground forces to retain the initiative and complete the campaign? The final theme discusses the dilemma posed by the Coalition ground offensive: the Iraqis were faced with the choice of abandoning their fortifications to counter the Coalition maneuvers, thereby becoming exposed to

renewed air assault, or remaining in their redoubts to avoid air power and thus eventually succumbing to the ground assault.

The author assumes that ground forces did, in fact, influence the conduct and outcome of the Desert Storm air operations. This thesis addresses those areas other than what may be termed "traditional supporting roles" provided by ground forces to aerospace forces during combat operations, such as air base defense or logistics support. Instead, the focus is on the atypical roles that ground forces might fulfill during a campaign--roles that are, perhaps, inadequately addressed or missing from current doctrine. Whether planners intended any such influence is immaterial to this thesis, but may be an important topic for future doctrinal consideration.

The author also intends that the terms "aerospace forces" and "air power" refer to "the various uses of airborne vehicles and forces to achieve national needs by the projection of military power or presence at a distance" [emphasis in the original].⁴ These include but are not limited to fixed-wing aircraft, rotary-wing aircraft, unmanned aerial vehicles (UAVs) or remotely piloted vehicles (RPVs), cruise missiles, etc. These forces do not constitute a specific branch of service or country, and they could equally represent the U.S. Air Force, Army, Navy, and Marines, or the United Kingdom, Saudi Arabia,

France, etc. The author intends to focus on the application of air power in the operational art, while avoiding lines formed by inter-service rivalries.

The major limitation of the thesis has been imposed by the relatively small amount of information currently available on Operation Desert Storm. Of the limited sources currently available, many remain classified. Of the unclassified sources, many may be characterized as "tabloid journalism," capitalizing on the sensationalism of the war and lacking in serious analysis of key events. The remaining accounts, both primary sources and secondary analyses, provide adequate commentary on the central events of the Gulf War, though their sparsity has narrowed the perspective and influenced conclusions drawn from the research.

The primary delimitation of this study is the restricted focus on the events of Operations Desert Shield and Desert Storm. While a recounting of the events that precipitated the Iraqi invasion of Kuwait may enhance an understanding of the origins of the conflict, it is beyond the scope of this study, which seeks to address the influence of ground forces upon the subsequent air operations. That end is more readily served by narrowing the research to the period characterized by American involvement, since the United States brought the preponderance of power to the battlefield and led the Coalition effort.

However, some doctrinal considerations that predate the conflict are included. Specifically, there are elements of the Army's AirLand Battle doctrine, as well as the theories of Air Force Colonels John Warden and Dennis Drew, and Air Force Lieutenant Colonel Price Bingham (concerning employment of air power and "parallel warfare"), that merit discussion. Each of these elements can be seen in the events of the war.

The significance of this study is twofold. First, it supplements the existing body of literature regarding military operational art, which links the tactical level of war to the strategic level of war. This level of warfare focuses on military campaigns. At present, there are few studies of this nature available on Operation Desert Storm. Additionally, the thesis should stimulate thought and discussion within the professional military community concerning the planning and conduct of joint warfare. In that regard, perhaps the Desert Storm air operations will provide a new paradigm of joint cooperation, wherein ground forces may (under the appropriate circumstances) support a main effort conducted through air power. This is not to infer that the more traditional concept of air support for land operations (or of warfare at sea, for that matter) will no longer be applicable, only that the synergistic effect inherent in modern combined arms combat requires innovation to ensure success. This point is addressed in

Joint Pub 1, Joint Warfare of the U.S. Armed Forces:

Synergy results when the elements of the joint force are so effectively employed that their total military impact exceeds the sum of their individual contributions. Synergy is reinforced when operations are integrated and extended throughout the theater, including rear areas. The full dimensional joint campaign is in major respects 'non-linear.' That is, the dominant effects of air, sea, space, and special operations may be felt more or less independently of the front line of ground troops [emphasis added]. The impact of these operations on land battles, interacting with the modern dynamics of land combat itself, helps obtain the required fluidity, breadth, and depth of operations and enable these operations to be supported and extended throughout the theater.⁵

While Joint Pub 1 (published after Desert Storm) does acknowledge a reciprocal relationship between air and land forces, its authors declined to propound a case for a complete reversal of the established roles. Such a case, however, had been suggested by some air power theorists before the war, as will be discussed in the following chapter.

CHAPTER ONE
THE CHOICE FOR AIR POWER

The Gulf War was waged at the northern end of the Arabian Peninsula, an enormous expanse of sparsely-populated desert. The armed forces of Iraq were opposed there by a coalition of Western, Arab, and Islamic powers. Both sides had high-technology arsenals of aircraft, ships, missiles, and artillery. Both fielded huge numbers of armored and mechanized combat vehicles, manned by hundreds of thousands of soldiers.

The conflict was sparked by the Iraqi seizure of the Emirate of Kuwait in August 1990. Following their conquest, the Iraqis sought to consolidate their gains in the face of international outrage by sending additional troops into Kuwait and fortifying the Emirate's southern border with Saudi Arabia. Meanwhile, the United Nations sponsored a United States-led military coalition to defend Saudi Arabia from further Iraqi aggression. This coalition would eventually expel the Iraqis from Kuwait. While the forces of the Iraqi dictator, Saddam Hussein, constructed their defenses in Kuwait, the United States hurriedly deployed its military forces to the region. Despite the complexity

of preparing for combat in such a distant and inhospitable theater, the Americans soon found that maintaining the tenuous Coalition could be equally challenging.¹

The Coalition's military plan evolved from an initial defense of Saudi Arabia with limited forces, to liberating Kuwait by a combined arms assault of overwhelming power. As the requisite conditions for such an assault were realized (i.e.: the solidification of the Coalition and the continued arrival of forces sufficient for its implementation), key campaign planners realized air power would play a central, perhaps dominant role.²

Initially, this was a matter of expediency. Air power assets were the first to arrive in Saudi Arabia following the invasion of Kuwait. Therefore, development of an independent air campaign plan was the natural result of the fact that air power, as an offensive means, was available long before ground forces arrived.

Because of the speed with which aerospace forces could be deployed, as well as the relative ease of their sustainment, and the existence in Saudi Arabia of an exceptional network of airfields and support infrastructure, air power appeared a viable counter to the Iraqi threat. However, the key consideration which may have led planners to rely upon air power was a realization that certain conditions favored the employment of air power in the Southwest Asia Area of Responsibility (SWAOR).

Weather patterns were characterized by clear skies and good visibility (although the actual weather conditions under which the Desert Storm air operations were conducted were atypically poor). Terrain was generally level and devoid of vegetation and concealment, such as the triple canopy jungle that hampered air operations in Vietnam. Lines of communications (LOCs--the road and rail network upon which modern military forces are dependent for transportation and sustainment) were extended and vulnerable; and the enemy was reliant upon a rigid command and control (C²) structure susceptible to destruction from the air.

While land and sea forces were capable of exploiting many of these same weaknesses, other factors frustrated their efforts. The first factor was time. While the U.N.-imposed naval blockade of Iraq certainly created economic hardship within the country, a great deal of international debate focused on the Iraqi brutalization of Kuwait, which seemed to demand more forceful and expeditious measures. Ultimately, the U.N. ruled to break the deadlock and on 29 November 1990 issued United Nations Resolution (UNR) 678, authorizing the use of "all necessary means" to remove the Iraqis from Kuwait if they did not depart voluntarily before 15 January 1991.³ Congress concurred in its Joint Congressional Resolution of 12 January 1991, which authorized the use of American armed forces to implement

UNR 678.⁴ The world would not wait for Saddam Hussein to submit to the naval blockade.

On the other hand, the mere massing of land forces in Saudi Arabia posed even less of an inducement for the Iraqis to depart Kuwait. The Iraqis were confident they would win a defensive land war in light of their recent experience in the war with Iran. The Iraqis also placed great faith in the extent of their massive field works in Kuwait, as well as the apprehension in the West of huge casualty lists, which, it was feared, would be the price of an assault upon the Iraqi positions.⁵ Hussein skillfully manipulated such fears through his constant rhetoric on the forthcoming "mother of all battles."

Air power, however, offered planners the option of skirting the Iraqi fortifications in what might be termed a "vertical" envelopment, which would entail

an offensive maneuver in which the main attacking force passes around or over [emphasis added] the enemy's principal defensive positions to secure objectives to the enemy's rear.⁶

In other words, air power could strike directly at the Iraqi center of gravity. According to the Army definition, a "center of gravity" is:

that characteristic, capability, or locality from which [a] force derives its freedom of action, physical strength, or will to fight. Clausewitz defined it as 'the hub of all power and movement, on which everything depends.' Its attack is--or should be--the focus of all operations.⁷

The key lies in determining the enemy's center of gravity.

However, as the air power theorist, Air Force Colonel John Warden, has suggested in his book The Air Campaign: Planning for Combat, once that determination is made, attacks directly on the center of gravity by air power could offer decisive results.⁸

Another related factor for favoring a reliance upon air power was the concern over the Iraqi arsenal of weapons of mass destruction. In the Iran-Iraq War of the previous decade, the Hussein regime had employed chemical weapons on several occasions. Iraq was also known to have developed a biological warfare capability, and Western analysts feared the Iraqis were nearing completion of atomic or nuclear weapons programs, if, indeed, they did not already possess such weapons.⁹ Hussein's threat to employ all the means at his disposal to repel any Coalition attack was thinly veiled in rhetoric.

Since these weapons were manufactured, assembled, transported, and stockpiled well to the rear of the Iraqi frontlines, traditional land and sea forces were incapable of attacking such sites without confronting and defeating the forward-deployed Iraqis--a confrontation that may have triggered the use of the very weapons the Coalition was so anxious to avoid. Aerospace forces, on the other hand, were capable of attacking those weapons without first confronting the fortifications in Kuwait.¹⁰

This is a concept referred to as "parallel warfare." Air Force Colonel (retired) Dennis Drew, the first Dean of the School of Advanced Airpower [sic] Studies (SAAS) and a former member of the Air University Center for Aerospace Doctrine, Research, and Education (AU CADRE), in a post-war discussion of parallel warfare asserted:

Surface warfare has historically been bound in a two-dimensional world. Operations were and remain sequential in nature, typically--(1) defeat the fielded enemy army, (2) push the enemy back until, (3) the enemy's centers of gravity are threatened (prompting surrender) or (4) the enemy's centers of gravity are destroyed (forcing collapse). Modern airpower [sic] changes all that by making the enemy vulnerable everywhere all the time. No longer are sequential operations required, and the sequential mindset may actually hinder not just the application of airpower [sic], but may also limit the development of synergistic air and surface operational concepts.¹¹

It is only fair to note that the concept of parallel operations is a relatively recent idea, and air power too was historically sequential in nature, although the sequence in air warfare may have differed from that on the land. For instance, the recipe for success in the air calls for the establishment of air superiority, perhaps in conjunction with a campaign to roll back the enemy's air defenses, followed by a strategic air offensive, etc. In fact, this concept was adhered to closely in the planning of the original phases of air operations for Desert Storm. Nevertheless, the realization (if not the actual articulation) of the advantages offered in the employment of parallel

warfare in the Gulf War scenario prompted senior planners to adopt just such a course of action. This was facilitated by the decision, taken in November 1990, to double the aerospace resources in the theater in preparation for an offensive. Thus, air operations eventually encompassed the entire forty-three days of combat during the war, and their success was the prerequisite for the commitment of ground forces in the final four days of battle.¹²

CHAPTER TWO

PRELUDE TO WAR: OPERATION DESERT SHIELD

At 0100 hours on 2 August 1990, armored and mechanized elements of the Iraqi Army, the fourth largest in the world at that time, crossed the border into the Emirate of Kuwait. Supported by special operations forces, artillery, and helicopters, as well as aircraft of the Iraqi Air Force (IQAF), the speed of the assault surprised the international community and overwhelmed the Kuwaitis. Despite isolated instances of spirited opposition, the Iraqis reached the capital, Kuwait City, within hours and by the second day of the invasion were arrayed along the northern border of Saudi Arabia.¹

Global reaction was swift and remarkably cohesive. On 2 August the United Nations Security Council (UNSC) drafted and adopted UN Resolution 660, condemning the invasion and demanding Iraq's unconditional and immediate withdrawal from Kuwait. Saddam Hussein, the dictator of Iraq, ignored the mandate and cloaked the Iraqi aggression in rhetoric, accusing the Kuwaitis of border infractions and manipulation of the world oil market in a deliberate attempt to undermine the Iraqi economy.²

That same afternoon, U.S. President George Bush expressed his outrage over the invasion of Kuwait. By 7 August, Bush resolved to deny the Iraqis any further opportunity for aggression in the Persian Gulf, and he ordered U.S. troops to begin deployment to Saudi Arabia (at the invitation of King Fahd, the Saudi ruler). As American combat and support units rushed to SWAOR, the United States, under the auspices of the United Nations, began the delicate process of forging the multi-national Coalition to oppose Iraq.³

The Coalition eventually included combat forces from the United States, Great Britain, France, Italy, Saudi Arabia, Egypt, Syria, Kuwait, Bahrain, Oman, and Qatar. Small contingents arrived from several other nations, to include non-combat units from some Eastern Block countries (such as Poland and Hungary), and Soviet naval forces assisted in the blockade of Iraq. Several nations supported the Coalition through contributions of money, resources, or the use of military bases. These nations included Portugal, Spain, Turkey, Israel, Germany, and Japan, as well as others. In addition, virtually every other member of the United Nations supported the Coalition in council and on key votes (notable exceptions were Jordan, Yemen, and Cuba)--Iraq was effectively isolated.⁴

Nevertheless, Hussein continued to defy the UN and steadily increased his forces in Kuwait. Iraqi combat

engineers, considered by some experts to be the best in the world following their long experience in the war against Iran, constructed an elaborate system of defensive works along the Saudi-Kuwaiti border.⁵ Hussein soon declared Kuwait the nineteenth province of Iraq, citing historic claims to the region. Meanwhile, the UNSC adopted Resolution 678 on 29 November 1990, which established 15 January 1991 as the deadline for Iraqi withdrawal from Kuwait, and which further authorized the use of "all necessary means" to expel the Iraqis after that date.⁶

As early as the first week of Desert Shield, during the buildup of forces for the defense of Saudi Arabia, General H. Norman Schwarzkopf, the Commander in Chief (CINC) of U.S. Forces Central Command (CENTCOM), had initiated planning for an eventual offensive to drive the Iraqis from Kuwait.⁷ At that time, General Schwarzkopf's options for an existing, off-the-shelf plan for combat in the Persian Gulf were limited to a draft version of Operations Plan (OPLAN) 1002-90, Defense of the Arabian Peninsula, tested as recently as July 1990 during Exercise Internal Look. That exercise was a computer war game which had simulated the command and control required to repulse a limited Iraqi attempt to seize the Saudi oil fields along the Persian Gulf.⁸

Since OPLAN 1002-90 was primarily geared toward the defense of Saudi Arabia, Schwarzkopf turned to other

sources for an offensive plan to oust the Iraqis from Kuwait. The first of these sources was Air Force Lieutenant General Charles A. Horner, the commander of U.S. Central Command Air Forces (CENTAF), who immediately initiated staff planning for combat air operations in SWAOR.

At the same time, Air Force officers at the Pentagon were conducting a separate planning effort for air operations in the Gulf region. This effort was sponsored by the Air Staff Plans Directorate (popularly known as "Checkmate"), headed by Colonel John A. Warden III. The officers of Warden's staff responded with a detailed plan to destroy the Iraqi military through a strategic air campaign.⁹

Warden and his staff believed that the circumstances in the Persian Gulf theater permitted air power to strike directly at the Iraqi strategic center of gravity, and thus topple Iraqi resistance. Checkmate officers identified the center of gravity as the Iraqi civil and military leadership, which could be attacked through the national C² network. Next in importance were the key production facilities, especially those producing electrical power and refined oil. Following key production was the national infrastructure: transportation nodes, railroads, and bridges. Although the civil populace would theoretically provide the next most important target set, in the conceived campaign the people of Iraq were to be

targeted by means of "psyops" (psychological operations) messages, and spared from the direct effects of the air war as much as possible. Finally, Hussein's fielded military forces constituted the last important targets (figure 1).¹⁰

This concept for waging air war is one of the theories raised by Colonel Warden in his 1988 book, The Air Campaign: Planning for Combat, and is known as "The Five Strategic Rings." This refers to the arrangement of the target sets which, if placed on a dart board, for instance, would depict leadership at the hub, with targets of descending importance in subsequent rings expanding outwards, to military forces along the rim. From this perspective, it is assumed that ground forces must contest the outer rings enroute to the central, critical target--the bull's eye--while air power may strike directly at that point or any others on the "dart board."¹¹ Warden's concept probably preceded the notion of parallel operations, which is very closely related.

From this concept the Checkmate officers assembled a sample of the tasking required to put such an air offensive into effect. Colonel Warden then briefed the current Air Force Chief of Staff, General Michael J. Dugan, on the concept; Dugan directed Warden to brief both Horner and Schwarzkopf. With their approval, Warden and key Checkmate officers traveled to Riyadh to assist with development of the initial Air Tasking Order (ATO) that would implement

Instant Thunder, as the evolving strategic air operations for Desert Storm were to be known.¹² The title was intended to distinguish the planned operation from its Vietnam era predecessor, Rolling Thunder, which had relied upon a gradual--and ineffective--escalation of the tempo of air operations. Instant Thunder, in contrast, was to be a massive and overwhelming application of air power that offered the enemy no respite, and which could prove decisive of itself.¹³

Colonel Warden was in Riyadh only briefly. However, one of his key staff officers, Lieutenant Colonel David A. Deptula, remained for the duration of Operations Desert Shield and Desert Storm. Deptula played an important role in the planning and implementation of the strategic air operations. Under the direction of Brigadier (later Major) General Buster C. Glosson (CENTAF Director of Campaign Plans), Deptula helped inaugurate the special planning and operational action group known as the "Black Hole" (named for the astrophysical phenomenon which draws into itself anything within its gravitational grasp, including light, but permits nothing to escape again; the title is an inference to the secrecy surrounding the efforts of the group). Author James Coyne has paraphrased General Horner, who noted the contributions of this staff group during testimony before the Senate Armed Services Committee (following the war):

The Black Hole created an air campaign with five basic objectives: Isolate and incapacitate Saddam's regime, gain and maintain air superiority, destroy his weapons of mass destruction (nuclear, chemical, and biological weapons and production facilities), eliminate Iraq's offensive military capability, and render the army in the Kuwaiti theater of operations ineffective.¹⁴

From these objectives, the Black Hole planners developed the target sets that were the foundation of the ATO.

Satisfied with the direction of the emerging concept for air operations, General Schwarzkopf turned to the employment of the ground forces. Even before the full complement of defensive forces arrived in Saudi Arabia, the CINC initiated planning for a land offensive. To this end he requested and received the assistance of several exceptional officers, who were transferred to the CINC's staff in Riyadh. Each of these officers was a graduate of the Army's School of Advanced Military Studies (SAMS), an intensive year-long course designed to produce experts in the operational art of campaign planning. These officers became the land warfare counterparts of Deptula and the Black Hole staff, and authored the subsequent ground offensive. The most striking feature of the plan was its intended envelopment of Iraqi forces in Kuwait (popularized by the media following its execution as the "Left Hook" or the "Hail Mary Play," from comments made by General Schwarzkopf during a press briefing).¹⁵

Schwarzkopf provided the staff with his intent for ground operations: engage and destroy the Republican Guards Forces Command (RGFC). The Republican Guards were Saddam Hussein's elite troops. Originally a palace guard, the RGFC had grown in size and importance during the Iran-Iraq War. Well-trained, well-equipped, with a high level of morale and extremely loyal to Hussein, the Republican Guards were postulated to be the main threat to a Coalition offensive.¹⁶

Following the subjugation of Kuwait, the Guard had been pulled back to positions in northern Kuwait and southern Iraq where, CENTCOM planners believed, they were to bolster less reliable frontline units and serve as the Iraqi strategic reserve. It was further believed that the Iraqi scheme of battle, in the event of an allied drive into Kuwait, envisioned the exhaustion and attrition of Coalition units in front of the formidable defensive positions, followed by a powerful counterattack from the Republican Guards. If, on the other hand, the Allies were able to break through the frontline units, then the RGFC would maneuver to shore up the defenses.¹⁷

The Commander of Army Component, Central Command (ARCENT), Lieutenant General John J. Yeosock, identified the RGFC as the Iraqi center of gravity.¹⁸ This conflicts with the center of gravity identified by the Air Force planners, who believed it to be the Iraqi leadership,

which may be closer to the "hub of all power" that Clausewitz intended. General Schwarzkopf may have contributed to the confusion on this issue by naming both Saddam Hussein (as the central figure of Iraqi leadership) and the RGFC as "another center of gravity."¹⁹ This rather careless use of the term may simply have been Schwarzkopf's epithet for the principle antagonist for the Coalition, or may have reflected his attention to operational level concerns, while Checkmate and the Black Hole were intent upon the strategic air operations. This represents a significant discrepancy, at the highest level of Coalition command, in identifying the crucial focus of the campaign. Such a discrepancy certainly contributed to the confusion (discussed below) of some senior Army commanders who felt air operations were misdirected. Schwarzkopf, however, was impervious to any ambiguity, since he approved and subsequently directed the air operations as conceived by CENTAF.

Regardless of the semantics of the issue, Schwarzkopf deemed it part of his charter to ensure the destruction of the RGFC so that the Iraqis would be unable to mount an offensive threat to the region for the foreseeable future; on this point he was unequivocal. It was to this purpose the "Left Hook" was designed.

As staff officers prepared offensive plans in Riyadh, Coalition forces continued to arrive in SWAOR.

On 8 November 1990, acting upon the advice of General Schwarzkopf and Chairman of the Joint Chiefs of Staff (CJCS), General Colin Powell, President Bush doubled the commitment of U.S. forces to provide adequate troops, weapons, and materiel to evict the Iraqis from Kuwait. General Powell (at the President's direction) ordered the U.S. VII Corps from its garrisons in Europe to join the U.S. XVIII Airborne Corps, already in place in Saudi Arabia. The addition of VII Corps to Coalition forces provided the heavy armor element for the envelopment of the Republican Guards.²⁰

CHAPTER THREE
DESERT STORM: AIR OPERATIONS

The air operations that commenced Desert Storm in the early morning hours of 17 January 1991 were intended to span four separate phases of the overall campaign. Each of these phases neatly subscribed to the sequential mindset of the contemporary Air Force doctrine--a linear progression through established objectives, like a croquet ball through wickets. Such a progression, as noted in the introduction, would normally require the establishment of air superiority, followed by the roll back of enemy air defenses, then a strategic air offensive, and so forth. However, this tidy strategy was overcome by events that originated with a most unexpected sponsor: the Joint Forces Commander (JFC), General Schwarzkopf's insistence that the phases be conducted simultaneously, to the limit of available resources, was born of the purely practical (and sequential) anticipation of what he deemed to be the truly decisive phase, the ground offensive. Effectively, though, the simultaneous conduct of the air phases may have been the first practical (though unwitting) demonstration of parallel warfare. Yet, the target sets are still

referred to by their original planned phases, and it is useful to discuss them here in that light.

The first phase was a strategic attack intended to buckle Iraqi will, and destroy their capability to continue defiance of the U.N. resolutions. During this phase, known as "Instant Thunder," targets included command, control, and communications (C³) facilities; NBC research, production, and storage complexes; electrical power generating stations; petroleum, oil, and lubricants (POL) refineries; and elements of the Scud missile inventory.

Scud missiles, or the Iraqi variants of the basic 1950s Soviet design, the Al-Husayn and the Al-Abbas, are surface-to-surface missiles. Fairly crude by today's standards, these SSMS nevertheless can carry conventional or, theoretically, NBC warheads, of approximately one thousand pounds to a range of about four hundred miles. Though relatively inaccurate, they are effective in terrorizing cities, as the Iraqis and Iranians proved during their struggle. Scuds were Hussein's only real, though limited, means of lashing back at the Coalition. He also used them while trying to provoke Israel into some precipitate action, thus hoping to sever the Coalition.¹

As a subset of the first phase of the air operations, CENTAF would also pursue the battle for air superiority by conducting Offensive Counter Air (OCA) operations. According to Air Force doctrine, air superiority provides

dominance at a given time and place without prohibitive interference to one's own air operations, while air supremacy (which is the ultimate objective of OCA), is that level of air superiority that ensures the enemy is incapable of effective interference.² This is a subtle, yet important, distinction. It is based upon the judgment of the responsible commander, which in this case was the Joint Forces Commander (JFC), General Schwarzkopf, in concert with the Joint Forces Air Component Commander (JFACC), Lieutenant General Horner. The judgment is made in light of the commander's operational objectives and the level of attrition he is willing to suffer. The importance in distinguishing between air superiority and air supremacy is the resulting level of effort that will be dedicated to continuing OCA operations.

The OCA fight is a crucial aspect of successful air operations. It requires the suppression or destruction of the enemy's aerospace forces, typically accomplished through attacks on his airfields, as well as through aerial engagements. At the same time, the enemy's surface-to-air defenses must also be degraded, suppressed or destroyed, through operations known as the suppression of enemy air defenses (SEAD), which may be effected through electronic means (such as jamming), or by actual bombing attacks on radar sites, air defense centers, or the surface-to-air missile (SAM) and anti-aircraft artillery (AAA) batteries.³

In an assessment of the importance of air superiority during combat operations, Colonel Drew noted:

...although airpower [sic] can do many things and can be the dominating influence in war, nothing works in or from the air without control of the air. The first priority is always control of the air.⁴

Colonel Drew might have gone further to say that without control of the air, not much works on the ground, either (as the Iraqis were to discover).

Phase two of the Desert Storm campaign was to be the suppression of air defenses in the KTO. This phase was postulated to last for one to two days and was the prerequisite for the next phase of the air operations.⁵

The third phase was to be an air assault upon Hussein's forces in Kuwait. This attack would concentrate on enemy armor and artillery. General Schwarzkopf, concerned by the sheer volume of such systems in the Iraqi arsenal, had mandated the destruction of at least fifty percent of the armor and artillery in the KTO as the prerequisite for initiating the ground phase of the campaign.⁶

The fourth and final phase of the Desert Storm campaign involved the commitment of Coalition ground troops.

CINCENT built the Phase IV Offensive Ground Campaign plan on the assumption that air power alone would reduce Iraqi combat effectiveness in the KTO by about half. If all went as planned, Saddam Hussein and his forces in the Kuwait theater would be immobilized--unable to coordinate an effective defense, or to plan and execute large-scale counter offensives. Continued attacks and restrikes would

maintain desired levels of disruption. If the Offensive Ground Campaign became necessary, it would be fought on Coalition terms.⁷

At that point, the emphasis for air operations would be support of the surface forces by way of close air support (CAS). Meanwhile, CENTAF would continue to fly OCA, SEAD, strategic attack, and air interdiction (AI) missions, though at a reduced rate in favor of CAS.⁸

Although independent air operations were originally planned to occur in three separate, sequential phases ("Instant Thunder," KTO SEAD, and the reduction of Iraqi surface forces in the KTO), the resources available following President Bush's doubling of forces in November permitted attacks across the spectrum of planned operations. Thus, CINCCENT directed CENTAF to combine the phases and strike targets from each phase simultaneously.

The first of these attacks occurred at 0238 (Baghdad time) on 17 January 1991, when US Army AH-64 Apache attack helicopters, led by US Air Force MH-53J Pave Low special operations helicopters, and known collectively as Task Force Normandy, struck and destroyed two crucial Iraqi Early Warning (EW) radars just north of the Saudi border. At the same time, F-117 Stealth fighters destroyed two additional sites, blasting a hole in the Iraqi command and control net through which Coalition aircraft poured into the country (chart 1).⁹

At 0300 local time--"H-Hour"--Tomahawk Land-Attack Missiles (TLAMs) fired from vessels in the Red Sea and the Persian Gulf, as well as Air-Launched Cruise Missiles (ALCMs) fired from B-52s on round trip combat missions from Barksdale AFB, Louisiana, and additional attacks by F-117s, all struck targets in Baghdad. Amidst intensive anti-aircraft fire, generated by the earlier destruction of the border radar posts and fueled by the mounting attacks in the city, the Tomahawks, ALCMs, and F-117s systematically destroyed preplanned targets.¹⁰

At the same time, Coalition aircraft struck other critical targets throughout Iraq. The opening waves of the assault were intended to blind the Iraqis as to the nature, scale, and direction of the Allied operations, while simultaneously denying Saddam and his commanders the ability to communicate with their forces. The success of the attacks may be measured, to some extent, by the ineffectiveness of the Iraqi defenses. Whereas Iraqi anti-aircraft fire was reported by returning pilots as extremely heavy (corroborated by the video accounts provided by Western journalists remaining in Baghdad), only one Coalition aircraft, of hundreds engaged in the opening attacks, was lost to enemy fire. Pilots reported that SAMs and AAA were fired wildly and at random, in most cases without the fire control guidance of the supporting radars, which were themselves the victims of some of the SEAD attacks.¹¹

Meanwhile, the Iraqi Air Force fared as poorly as the rest of the integrated air defense system (IADS). Only a few Iraqi pilots managed to get airborne during the initial assault, and most of these were quickly downed by patrolling American F-15C fighters. The IQAF never recovered from the first night's losses, and by the war's end thirty-five Iraqi aircraft were destroyed in air-to-air combat without inflicting a single loss upon the allies. This is not to infer there were no Coalition losses, but all of these were suffered through surface-to-air action.¹² This one-sided air-to-air ratio illustrates the effectiveness of the overall OCA effort, which so severely degraded the Iraqi command and control system, upon which enemy pilots were absolutely dependent, that the IQAF was left floundering. The ratio also suggests the superiority of American doctrine, training, and technology.

By the ninth day of the air war, the IQAF sortie rate had dwindled to nil, but CENTAF staff officers remained concerned that the enemy still posed a viable threat. The Americans harbored the fear that Hussein would unleash an "air Tet," on the order of the North Vietnamese Tet Offensive of 1968 that came as a complete surprise to American forces, inflicted heavy casualties, and shattered U.S. resolve to continue that war. This concern was based on the hundreds of aircraft still remaining in the Iraqi arsenal, as well as Hussein's demonstrated unpredictability.¹³

The Coalition therefore redoubled the efforts to destroy the IQAF, this time on the ground. While Iraqi airfields had been subjected to repeated attacks from the very outset of the campaign, the initial focus of these attacks had been to deny the enemy the use of the airfield facilities. This was done by bombing the runways, taxiways, hangars, support facilities, and POL dumps. However, such attacks were best suited for the temporary suppression of the airfields, since the majority of these structures and supplies could be rebuilt or replaced. This in turn required Coalition attackers to revisit such targets, thus increasing their exposure to the surface defenses and risking additional losses. Such a scheme (that is, the attrition of Coalition aircraft by the ground defenses) may have suited Hussein's purposes precisely.¹⁴

The Iraqi dictator's reluctance to commit the largely intact IQAF after the first week's isolated and lopsided air battles led to the husbanding of the remaining aircraft in an extensive network of superb hardened aircraft shelters (HAS). Designed and constructed by Western contractors during the Iran-Iraq War, each HAS housed one to two aircraft, some ordnance, and associated support equipment. Believed to be able to withstand the effects of a near miss from a nuclear weapon, the shelters rivalled anything available to NATO.¹⁵

By going to ground with his air force, Hussein may have been attempting to preserve it for some future action, or possibly he hoped to lure Coalition aircraft into the deadly anti-aircraft fire protecting his airfields. The effectiveness of this fire was demonstrated by the ill fortune of the British Royal Air Force, which lost six Tornado fighter-bombers attempting low-altitude airfield attacks during the first week of the war.¹⁶ Whatever his motive, CENTAF planners were able to counter Hussein's use of the HAS network. This involved the employment of laser-guided bombs (LGB), dropped from outside the effective range of most airfields' indigenous defenses. The Iraqis were startled to discover such weapons were more than capable of penetrating their shelters and destroying anything within. Thus began a desperate shell game, wherein the Iraqis attempted to hide their remaining aircraft in the dwindling number of shelters, which the Coalition systematically destroyed.¹⁷

By the end of the second week of the war, the IQAF again took to the air, this time in a bid to escape the incessant attrition from Allied attack. In a move that caught the Coalition completely by surprise, portions of the IQAF began to flee to Iran. The exodus continued for the duration of the war. As many as 120 aircraft may have made the escape, although several were shot down or crashed in the attempt. However, those that arrived in Iran were

interned along with their crews. Whatever Saddam Hussein hoped to achieve by this surprise move was nullified by the outcome, since that portion of his force was now effectively hors de combat.¹⁸

On 27 January, CINCCENT was able to declare air supremacy in the AOR. The degradation of the Iraqi air defenses as of that date permitted Coalition air power to move across the theater with relative impunity and select the time and place for any attack, while denying the Iraqis any similar opportunity. Air supremacy was not only crucial for air operations, but also for the movement and massing of the Allied ground forces which was then under way. Although counter-air and SEAD targets would continue to be struck throughout the war, the focus of air operations shifted at this point to interdiction and the destruction of enemy forces in the KTO.

The interdiction effort was intended to degrade or prevent the movement of additional Iraqi troops and supplies to the KTO, as well as to hamper the activities of those already there. To this purpose, the transportation network in the KTO and Iraq was an important target set, especially the numerous bridges across the Tigris and Euphrates rivers between Baghdad and Basra. Several of the primary bridges were felled in the first week of the war, but the repeated attacks dedicated to the remainder of the bridges (following Coalition attainment of air supremacy)

slowed enemy movement in the theater to a trickle. The immediate impact of these attacks was to cause backlogs of motor traffic at the bridgeheads, producing additional lucrative targets for Allied air power. Another benefit of the destruction of many of the bridges was the further degradation of the already strained Iraqi C² system, due to the fact that the Iraqis used the bridges to mount fiber optic telecommunications cables which were typically destroyed along with the supporting bridge.¹⁹

The other aspect of the interdiction effort was the destruction of Iraqi military traffic to or within the theater. In this, the Coalition was aided by the technology of the Joint Surveillance and Target Attack Radar System (JSTARS). This was a developmental system consisting of two prototype aircraft, each containing an advanced ground surveillance radar, and highly trained crews that included many civilian technicians and defense contractors. The JSTARS were rushed to the AOR at CINCCENT's request, over the concern of the program development office at the Pentagon that a failure under combat conditions could jeopardize the future acquisition of the system. However, General Schwarzkopf was certain that JSTARS would be highly valuable in the coming battle. In this assessment he was proven correct.²⁰

JSTARS has the unique capability to detect, classify, track, and provide targeting data for earthbound

objects as small as an individual vehicle. During the course of the war, this uncanny ability was used repeatedly by the Coalition to locate, attack, disrupt, and destroy most significant Iraqi efforts to move through the KTO, as seen during the Battle of Al-Khafji and the action at Mutlah Pass (to be discussed in more detail later in this paper). JSTARS also played a pivotal role in the effort to locate and destroy the Iraqis' mobile Scud launchers.²¹

While the interdiction effort continued, CENTAF also conducted an air assault upon Iraqi troops in the KTO. Although these forces had come under repeated attack since the opening of the war, by the third week this effort expanded to comprise the bulk of the Coalition's air combat sorties. The key targets for this portion of the campaign were the numerous Iraqi tanks, armored personnel carriers (APCs), and artillery pieces. Attacks on such targets were carried out around the clock by virtually every type of combat aircraft in the current Allied inventories: A-10s, A-6Es, AV-8Bs, A-7s, A-4s, B-52s, F-15Es, F-16s, F/A-18s, F-111s, Tornados, and others.²²

The immediate goal of such attacks was to reduce those enemy systems in the KTO by fifty percent. This was a number that General Schwarzkopf had used as an early estimate for the level of attrition that would tip the odds of a successful ground assault in favor of the Allies. Schwarzkopf mentioned this percentage to Colonel Warden

when the latter presented the Checkmate air campaign plan to the CINC on 19 August 1990--fifty percent attrition became the objective in all planning thereafter.²³ This was a ballpark figure that would roughly approximate the Army's doctrinal three-to-one force ratio required for offensive success. This percentage was the desired theater-wide attrition, wherein selected units (primarily those front-line enemy units that opposed Coalition ground forces at the planned breach sites) were scheduled for a greater level of punishment, while many Iraqi units were struck only infrequently.²⁴

Throughout this process of planned attrition, a serious contention arose between air operations planners and intelligence officers concerning bomb damage assessment (BDA). This is the process of determining the level of damage produced by bombing. It involves the analysis of various sources of intelligence, as well as imagery and pilot reports, in order to assign a measure of effectiveness to the air effort.

BDA is important in determining whether a target has been destroyed or whether it should be rescheduled for attack. The issue was obfuscated during Desert Storm by the difficult battlefield conditions that prevailed: low cloud ceilings and visibility, as well as the dense smoke from burning oil wells (all of which frequently obscured the targets from reconnaissance efforts, especially those

conducted from American satellites). Additionally, the historic over-optimism of pilots' combat reports was further suspect as a result of the same environmental conditions, as well as the high release altitudes flown for most attacks in order to avoid the dense AAA fire (thus making the target even harder to discern), and the lack of adequate combat documentation means, such as cameras or video tape recorders, on many of the attacking aircraft. These factors required a subjective judgment on a case by case basis when developing the BDA. Unfortunately, each of the numerous agencies concerned, including the Defense Intelligence Agency (DIA), the Central Intelligence Agency (CIA), each of the armed service components, the separate staffs in Riyadh, etc., developed a different model for assessing BDA.

These different models soon became the focus of a heated debate. Lieutenant General Horner and the staff officers of the Black Hole voiced concern throughout the campaign that the BDA provided through national intelligence channels was too conservative, to the point that additional and possibly unnecessary effort was required to revisit targets already destroyed, thus diluting the air effort and placing pilots and aircraft at additional risk. For instance, the single laser-guided bomb (LGB) used against a hardened aircraft shelter (HAS) would penetrate the external shell of the HAS, leaving a relatively small

entrance hole, before detonating inside. More often than not, the exterior of the HAS would reveal virtually no damage when the post-strike photos were assessed, and intelligence officers might rate the effort to destroy that particular target as only partially successful or unsuccessful altogether. This flies in the face of all logic, and is a clear case of failure to see the woods for the trees. The fact of the matter is that the point of such attacks was to destroy the IQAF as a fighting organization, so the actual target was not the HAS (which has no offensive potential), but the aircraft inside. It is a fairly reasonable assumption that when a two thousand pound steel projectile--filled with explosives pre-set to detonate once inside the HAS--and traveling at near-supersonic speeds, penetrates the roof of a small, enclosed shelter (which would contain and amplify the ensuing explosion), anything within would be completely incapacitated through sheer kinetic energy alone. That conclusion was not always reached during the BDA process. The same problem existed in accounting for enemy armor, which might have a small penetration hole caused by a baseball-sized submunition from a Cluster Bomblet Unit (CBU), and which may have been completely gutted by the projectile, but which could otherwise display little external damage to the analysts. In the end, however, General Schwarzkopf retained sole judgment on the effectiveness of air operations, since the

initiation of the ground offensive hinged upon the outcome of the air battle. By 23 February 1991 he was satisfied that air power had accomplished its task, regardless of the BDA controversy.²⁵

Prior to that date, however, another contention strained the Army/Air Force rapport. At issue here was the nature of the target selection process. Some senior Army commanders, most significantly Lieutenant Generals Gary Luck (XVIII Airborne Corps Commander) and Fred Franks (VII Corps Commander) felt the existing process failed to respond to their requirements to "shape the battlefield" (that is, to strike those targets whose destruction was deemed paramount to the success of the impending ground battle). Their concern may have been exacerbated by the attitude of some CENTAF officers, who made prominent display of a sign posted in their Riyadh command post that stated: "We are not preparing the battlefield, we are destroying it!" Again, the accuracy of the various BDA models was in question when it came to how effectively air power was "destroying" the battlefield; but of greater concern was the continuing debate between the services regarding interdiction and whether the Air Force was destroying the proper targets.

On the surface, the issue may appear to be a matter of semantics. The term in dispute was "battlefield air interdiction" (BAI). This term had been recognized for

some time, as outlined in Army Field Manual (FM) 100-5, to describe

the air interdiction attacks against targets which have a near term effect on the operations or scheme of maneuver of friendly forces, but are not in close proximity to friendly forces.... The primary difference between BAI and the remainder of the air interdiction effort is the near term effect and influence produced against the enemy in support of the land component commander's scheme of maneuver.²⁶

As such, targeting for BAI was seen to be the purview of the ground commanders.

By the time of Operation Desert Storm, however, the Air Force no longer recognized BAI as a valid doctrinal concept, but addressed interdiction strictly as AI. Air Force doctrine had evolved to a view that interdiction should constitute a unified effort, that produced an effect upon the enemy and his subsequent courses of action, which should not be confused or fragmented by its occurrence in proximity to friendly forces. Any such confusion, in the Air Force estimate of the matter, would only serve to dilute the effectiveness of the overall interdiction effort, akin to the parceling of small packets of air power to suit the requirements of individual ground commanders that occurred during Operation Torch in North Africa in 1943. The impact there had been the absence of the principles of mass and unity of effort in the air operations, resulting in some degree to the initial American setbacks of that campaign.²⁷

The shortcomings in the North African campaign had been rectified (at least in the view of the Army Air Forces officers of that period) by a command reorganization that placed theater air components under a single air commander having some latitude for independent action. While those issues had been addressed nearly fifty years prior to Desert Storm, a concern obviously still existed with the contemporary targeting process. In theory, the extant process of joint targeting should have alleviated any such concerns. Within this system, commanders from each service component could nominate targets for air attack which best suited their respective objectives. These nominations were, in turn, reviewed by a joint targeting coordination board composed of operations and intelligence experts from each of the components. The board wedded the target nominations with the CINC's guidance, as well as the campaign objectives, and the apportionment and allocation decisions, to derive a single target list, reflected in the daily Air Tasking Order (ATO), executed by CENTAF.²⁸

Nonetheless, Generals Luck and Franks felt their target nominations were not receiving due priority. What the two corps commanders failed to appreciate, however, was the broader context in which the finite air assets were being employed. They were not privy to General Schwarzkopf's counsel on all aspects of the war, especially the direction of air operations at the strategic level.

as was Lieutenant General horner, by virtue of his position as the Joint Force Air Component Commander (JFACC). Luck and Franks, consequently, were concerned with the visible effects of air operations that impacted their lesser span of control, at the tactical level. This is the traditional focus of ground commanders, who are more concerned with the threat directly in front of them than the distant, long-term strategic goals. It is the myopia induced by the sequential warfare mindset, which holds that strategic aims are achieved by battering through the intervening levels of enemy resistance. Air power historian Richard Hallion has termed this focus a "dangerous fixation," blaming it specifically for the historic defeats in the Battle of France in 1940, and again at Kasserine Pass in 1943.²⁹

Yet, it was an Army officer, General Schwarzkopf, who had the foresight to husband his finite air resources for decisive purposes, thereby preserving unity of effort. At the same time, in all fairness to Lieutenant Generals Franks and Luck, their concern over air allocations reflected their own level of control which, under the AirLand Battle Doctrine, was absolutely dependent upon tactical air support. Their frustration may have been compounded by the actual execution of the ATO. In many instances, duly nominated targets were not struck, even after they appeared in the ATO, for a variety of reasons: aircraft maintenance problems, weather or smoke obscuration of the target,

as well as the airborne divert of some missions for the attack of time-sensitive targets (especially Scuds). In any of these cases the previously approved target nominations would have to undergo the entire targeting coordination process again, often entailing a delay of three additional days to reappear on the ATO (due to the planning time required to construct each ATO, a document the size of a metropolitan phone book).

In the case of airborne divers, however, the two corps commanders believed that CENTAF was manipulating the process by relying on aircraft tasked for interdiction to service rapid reaction divers (vice counter air or strategic attack aircraft), to the detriment of the Army's legitimate concerns. Additionally, both Lieutenant General Yeosock, the ARCENT Commander, and Lieutenant General Boomer, the MARCENT Commander, also believed the joint targeting process was not responsive to the concerns of the ground commanders. In late January, the two component commanders brought these frustrations to the attention of the CINC, who appointed his deputy, Army Lieutenant General Calvin Waller, to arbitrate the process. General Waller instituted procedures for expediting renomination requests and for balancing the divert tasking, thus easing somewhat the tensions between the Army and Air Force.³⁰

By the time Coalition ground forces were committed to battle (24 February 1991), CENTAF began concentrating

air operations on support of the advancing Allied soldiers. With the exception of the fighting at Al-Khafji, and some isolated instances involving Special Operations Forces (SOF), the remaining four days of the war involved the only air operations in close proximity to friendly troops. These Close Air Support (CAS) missions required detailed coordination between the air and ground forces, to ensure effective support while precluding incidences of so-called "friendly fire" or fratricide, which is the inadvertent engagement by fire of one's own forces. Such coordination, difficult even under the best of circumstances, was further complicated by the rapid progress of the advance, as well as the abysmal weather conditions (the worst in the fourteen years of USAF record keeping for the region), and a couple of well-publicized incidents of air-to-ground fratricide did occur.³¹

CAS became a supreme effort for the Coalition flyers during the final phase of the war. General Horner, the JFACC, rescinded his previous restriction that kept most Allied aircraft above the preponderance of AAA and infra-red (IR) SAM fire. This permitted aircrews to press their attacks to lower altitudes for optimal support of engaged ground forces. The corresponding toll of Coalition aircraft and pilots was high--eight aircraft were lost in the final week of the war.³² However, during this final phase, "the Coalition's speedy conclusion of the war, with

minimal casualties, high-lighted the synergy of powerful air and ground forces."³³

In forty-three days of continuous combat, Coalition pilots flew over one hundred thousand sorties, and decimated the world's fourth largest army in the process (chart 2). General Merrill A. McPeak, Air Force Chief of Staff, commented after the war: "[Desert Storm] marked the first time in history that a field army had been defeated by air power."³⁴ While air power may have played a decisive role in Desert Storm, victory required the combined efforts of each branch of service, and in the end it was the impetus of the massive ground assault that eventually drove the Iraqis from Kuwait.

CHAPTER FOUR

DESERT STORM: GROUND OPERATIONS

Towards the end of the second week of air operations, the first significant contact between the opposing ground forces occurred. On the night of 29-30 January, elements of the Iraqi 5th Mechanized and 3rd Armored divisions launched an assault from Kuwait towards the Saudi coastal town of Al-Khafji. The audacity of the attack, coming as it did in the face of escalating air operations, took the Coalition by surprise.

The Iraqis were met by United States Marine Corps (USMC) and Saudi Arabian National Guard units. Though outnumbered substantially, the Coalition forces offered stout resistance. The Iraqis were able to fight through to capture the deserted town, but the delay imposed by Marine and Saudi ground action permitted Coalition air power to impose a stiff penalty on the attackers.

The battle continued into the next day as Saudi Arabian and Qatari armored units counterattacked the dwindling force of invaders. By 31 January, Iraqi resistance ceased and Al Khafji was liberated. The Iraqis suffered the loss of virtually the entire assault force.

While the surface battle unfolded, Coalition air forces continued round the clock disruption of Iraqi efforts to sustain and reinforce the invaders. During the night of 30-31 January, JSTARS and other surveillance assets detected two additional Iraqi divisions massing across the Kuwaiti border. The ensuing action is described in the Department of Defense's Conduct of the Persian Gulf War: Final Report to Congress:

For eight hours, throughout the night, Coalition air power systematically attacked and decimated the two divisions; by daybreak the divisions were retreating in disarray. If they had been able to attack into Saudi Arabia in good order, they might have precipitated a large-scale ground engagement and caused significant Coalition casualties. Instead, they were repulsed. III [Iraqi] Corps suffered numerous casualties and lost a substantial number of tanks and an undetermined number of other vehicles.... The destruction inflicted on the two Iraqi divisions by Coalition aircraft seemed to presage what awaited any Iraqi force that left dug-in defenses to conduct a mobile operation. The strategic significance: any Iraqi unit that moved probably would be struck from the air. Any unit that remained in place eventually would be struck either from the air, or by the impending ground assault [emphasis added].¹

The result of the Battle of Al-Khafji was an important victory for the Coalition--the Iraqis were bested in the opening surface encounter of the war. It also demonstrated the influence of ground forces on the air operations.

Meanwhile, under the aegis of the continuing air offensive, Coalition ground forces were preparing for the fourth and final phase of the Desert Storm campaign. This phase was intended to expel the Iraqis from Kuwait by means

of a massive ground assault. The attack was to be launched along several axes that comprised: a frontal assault into southern Kuwait to fix the Iraqis in place; a screening movement far to the west to secure the Coalition's left flank; and an armored envelopment of the Iraqis' open western flank, which constituted the Coalition's main effort (chart 3).

The planned ground offensive entailed massive shifts among Coalition forces. The positions originally occupied by most of the units were intended to convince the Iraqis that any surface assault would come directly across the Saudi-Kuwaiti border. This array prompted the Iraqis to concentrate their forces almost exclusively in Kuwait, thus leaving a flank unguarded further to the west, along most of the Saudi-Iraqi border (chart 4). This incredible opportunity for the Coalition may have been the result of several factors. These include a possible Iraqi belief that navigation in the trackless deserts of that region was impossible, or that Iraq itself would never be invaded in a contest to determine the fate of Kuwait. Whatever the reason, CINCCENT hoped to encourage the Iraqis to continue such self-delusions. As a result, General Schwarzkopf waited until air supremacy had been obtained before permitting any redeployment. At that point the Iraqis were unable to monitor the Coalition's movements, and the CINC remained optimistic that surprise could be achieved.

The ensuing movement of Coalition units was a monumental undertaking. Over two hundred thousand soldiers, and all their equipment, moved an average distance of two hundred and fifty miles, along a single two-lane road. The enormity of such a feat is best realized when considering the fact that a military vehicle passed any point along the route every fifteen seconds, twenty-four hours a day, for nearly a month. Additionally, several enormous logistics bases were established near the tactical assembly area (TAA) of the combat units to provide sustainment for an anticipated sixty days of combat operations.²

At the conclusion of this massive shifting of forces, units were arrayed along the line of departure for the assault (chart 3). From west to east this array consisted of: XVIII Airborne Corps, VII Corps, Joint Forces Command-North (JFC-N), I Marine Expeditionary Force (MEF), and Joint Forces Command-East (JFC-E).

Throughout the Desert Shield build-up, and well into the Desert Storm campaign, planning was conducted for an amphibious assault on the Kuwaiti coastline. A large force of seventeen thousand U.S. Marines was eventually assembled in an Amphibious Task Force (ATF) to provide CINCCENT the option of attacking the Iraqis from the sea. In a series of well-publicized training exercises, most notably Exercise Imminent Thunder (along the Saudi coast in November 1990) and Exercise Sea Soldier IV (on the coast of

Oman in late January 1991), the Iraqis were demonstrably reminded of their vulnerability to amphibious assault in Kuwait. These demonstrations served an important function, in addition to the training provided to the Marines: the Iraqis committed four infantry and one armored division to the defense of the Kuwaiti beaches that would not take part in the crucial battles further west.

The coastal defenses constructed by the Iraqis rivalled their inland fortifications, and probably exceeded any faced by the USMC during World War II. These formidable obstacles were of great concern to the Marine leaders of the ATF. An additional and related concern involved the mandatory reduction of the Iraqi coastal defenses prior to any amphibious assault. Such an attempt was certain to damage the Kuwaiti civil infrastructure extensively, since many of the obstacles and defenses were sited within urban and industrialized areas. For these considerations, among others, General Schwarzkopf never ordered the planned assault (although the ATF did conduct several highly-visible feints and occupied some small islands off the Kuwaiti coast).³ Nevertheless, he was satisfied that the ATF had a significant impact on the outcome of the campaign:

We continued heavy operations out in the sea because we wanted the Iraqis to believe we were going to conduct a massive amphibious operation. The Iraqis thought we were going to take them head on into their most heavily defended area. We launched amphibious feints and naval gunfire so they continued to think we were going to be attacking along the coast, and therefore fixed their forces in this

position and with a ground attack [from the south], we would basically keep the forces here [in southern Kuwait] and they wouldn't know what was going on out in this area [west of Kuwait]. We succeeded in that very well.⁴

Thus, CINCCENT exploited another opportunity to fix large Iraqi forces, meanwhile maneuvering to their vulnerable flank for a decisive battle of annihilation. That decisive battle commenced at 0400 hours, 24 February 1991--"G-Day."

On the opening day of the ground offensive the Iraqis experienced precisely what they had been expecting for months, that is, an assault across the huge sand berm along the Saudi-Kuwaiti border, into the teeth of their prepared positions. The weight of this attack was provided by I MEF, comprising two Marine divisions, plus the U.S. Army's Tiger Brigade which was attached to I MEF to augment the Marines' armored firepower. To the right of the Marines, JFC-E began a near simultaneous attack along the coastal highway. Further west, covering the left flank of I MEF, JFC-N lunched their attack later that same day. Additionally, the 1st Armored Cavalry Division, prior to assuming its role as the Coalition theater reserve, conducted a brief feint northward along the Wadi Al-Batin. The Wadi is a traditional invasion route from the south into the Tigris and Euphrates river valleys and marks Kuwait's western border with Iraq--it is a route the Iraqis expected the Coalition to employ and was thus heavily defended (chart 4).⁵

Heavy artillery barrages, in coordination with aerial attacks, preceded the advance of ground forces. Breaching operations at several points along the massive sand berm permitted the Coalition soldiers to advance rapidly. Iraqi resistance was sporadic. Enemy artillery fire was desultory, failed to shift with the advancing invaders, and was quickly silenced by Coalition counter-battery fire or air attack. In many instances the Iraqi defenders resisted only briefly (if at all)--many were anxious to surrender. These front-line troops had been a prime objective of more than five weeks of repeated air attacks, and most showed effects from lack of food, water, medicine, and adequate shelter. The enemy's resulting lack of will to fight allowed the Marines to accelerate their advance, reaching the day's objectives by early afternoon.

Meanwhile, far to the west, the largest airborne assault in history was under way. XVIII Airborne Corps set out prior to dawn on G-day to secure the Coalition's left flank. This action was initiated by the 6th French Light Armored Division (supported by the U.S. 82nd Airborne Division), which started overland into Iraq to secure a highway intended as a future Coalition supply route. A few hours later the 101st Airborne Division (Air Assault) began a massive helicopter invasion of Iraq to secure Forward Operating Base (FOB) Cobra, halfway to the Euphrates River. The Iraqi defenders in both cases, startled by the

sudden and unexpected appearance of Coalition forces (hundreds of miles from where the Iraqis believed the decisive battle would be fought), offered only light resistance. The left flank was secure.⁶

During the time that both XVIII Corps and I MEF were reaching their initial objectives, VII Corps was completing its final preparations for the main attack, scheduled to begin the following day. However, due to the rapid progress on both the east and west flanks of the invasion, General Schwarzkopf sought to advance the attack schedule to exploit Iraqi inertia. After consulting with both the commander of Army Component, Central Command (ARCENT), Lieutenant General John Yeosock, and VII Corps Commander Lieutenant General Fred Franks, CINCCENT directed the VII Corps attack to begin fifteen hours ahead of schedule. The attack was initiated by the 2nd Armored Cavalry Regiment (ACR), which swept west of the Iraqi defensive belt and into Kuwait. The cavalry was followed by the 1st and 3rd Armored Divisions, which advanced thirty kilometers into Iraq. Further east, the 1st U.S. Infantry Division (Mechanized) began breaching the Iraqi forward defenses. This operation concluded the VII Corps advance for the day (chart 5).⁷

G + 1 (25 February) began in the VII Corps zone with the "passage of lines" of the 1st U.K. Armoured [sic] Division. The Army defines this maneuver as the

passing [of] one unit through the positions of another, as when...an exploiting force moves through the elements of the force that conducted the initial attack....⁸

Once through the breach, the British wheeled to the east to attack the Iraqi tactical reserves on the flanks of the VII Corps zone.

Meanwhile, the 1st U.S. Infantry Division (Mechanized) continued breaching the sand berm and the obstacles in front of its positions, to facilitate the passage of combat service support (CSS) units; 1st and 3rd U.S. Armored divisions continued north, while 2nd ACR (in the lead) made first contact with the Tawakalna Division of the RFGC.⁹

While VII Corps pushed deeper into Iraq on G + 1, the supporting attacks of XVIII Corps in the west and the combined Coalition forces in the east also made rapid progress. In the XVIII Corps zone, the 3rd Brigade of the 101st Airborne Division (Air Assault) conducted the deepest helicopter combat air assault in history when it occupied positions along the south bank of the Euphrates River, over 175 miles from the division's tactical assembly areas (TAA). At the same time, the 24th Infantry Division (Mechanized) attacked overland to seize its major objectives, along with thousands of prisoners.¹⁰

To the east, I MEF secured its second day objectives against the heaviest opposition it faced during the

entire war. The Marines relied upon strong air support to break up several Iraqi counterattacks, which were then defeated in detail by Marine and Army armor. Along the coast, JFC-E advanced against light opposition, but further west, JFC-N was still unable to secure all of its first day objectives by the close of the second day of the offensive. As was the case in both the VII and XVIII Corps zones, thousands of Iraqis surrendered to the advancing Coalition forces in Kuwait (chart 6).¹¹

By 26 February, the Iraqis began a large scale retreat from the eastern portions of the theater. Their positions in Kuwait were rapidly becoming untenable as a result of the mounting pressure of the Coalition assault from the south and west, plus the emerging threat of encirclement from the north as XVIII Airborne Corps advanced across the Iraqi LOCs along the Euphrates River. Coalition air power took a heavy toll of the fleeing Iraqis as they became entangled with elements of their own operational reserves. The ensuing confusion provided lucrative targets for Allied airmen, with the Iraqis milling about the approaches to Kuwait City or stalled in the massive traffic jams along the few available escape routes.

While many Iraqi soldiers attempted to flee, and others elected to surrender at the earliest opportunity, Coalition units did meet increasingly stouter resistance as they progressed--testament to the effectiveness of the air

operations of the earlier phases, which had focused on the enemy's forward units. This was especially true in the VII and XVIII Corps zones, where by G + 3 the lead elements of each corps (now eastbound into the Iraqi rear areas) were locked in combat with the Republican Guards. As expected by the CENTCOM planners, the RGFC fought with determination and some skill. Huge artillery preparations and swirling tank duels, such as the "Battle of 73 Easting," named for its occurrence near the 73 East grid line on maps of the area, characterized the action on the ground during this phase of operations. The four hour battle, fought under terrible conditions (darkness, smoke from burning oil wells, rain, and a sand storm with winds gusting from 25 - 42 knots), resulted in the destruction of more than 50 Iraqi armored vehicles and the capture of 1300 members of the Tawakalna Division of the RGFC. Meanwhile, JFC-N, I MEF, and JFC-E continued their respective advances and prepared to liberate Kuwait City on the following day. At day's end, the Coalition had rendered 26 of the 43 Iraqi divisions in the KTO combat ineffective and captured 30,000 prisoners, and in the process had destroyed the Iraqis' second echelon operational forces (chart 7).¹²

On the following day, VII and XVIII Corps continued their respective confrontations with the Republican Guards. In the XVIII Corps zone, the 101st Airborne Division (Air Assault) advanced down the Euphrates River valley, further

reducing the avenues of escape for the retreating Iraqis while the 24th Infantry Division (Mechanized) overran Tallil and Jalibah airfields in their advance across south-eastern Iraq. VII Corps, meanwhile, completed the destruction of the Tawakalna Division, and then overwhelmed the Al-Madinah and Adnan Republican Guards divisions with a "double envelopment" attack, which is

a form of enveloping maneuver executed by forces which move around both flanks of an enemy position to attack the flanks or objectives in the rear of the enemy [and] the enemy normally is fixed in position by a supporting frontal attack or by indirect and/or aerial fires.¹³

I MEF consolidated its positions in Kuwait, while JFC-N entered Kuwait City from the west and JFC-E entered from the south. The significance of the day's events was the destruction of the RGFC units which had not already escaped the KTO across the Tigris and Euphrates rivers (chart 8).¹⁴

At 0800 on 28 February, G + 4, General Schwarzkopf, at the direction of the National Command Authorities (NCA), halted offensive operations in SWAOR. By this time, effective Iraqi resistance in Kuwait had virtually ceased, and Coalition troops held positions hundreds of miles inside Iraq. Sporadic fighting did occur over the next few days as some ill-informed Iraqi units, attempting to extricate themselves from their former positions, ran afoul of the Coalition cease-fire lines. Although some enemy soldiers managed to escape a final reckoning with Coalition forces in the KTO, they were able to salvage only a fraction of

the equipment and materiel they had brought into the theater. The unconditional expulsion of the Iraqis from Kuwait satisfied the overt objectives of the Coalition, while the dismemberment of the Iraqi war machine ensured Saddam's menace to his neighbors in the region was greatly diminished for the foreseeable future.

CHAPTER FIVE

THE INFLUENCE OF GROUND FORCES ON AIR OPERATIONS

President George Bush summarized the historic importance of Operation Desert Storm when, on 29 May 1991, he announced:

Gulf [war] lesson one is the value of air power....[It] was right on target from day one. The Gulf war taught us that we must retain combat superiority in the skies....Our air strikes were the most effective, yet humane, in the history of warfare.¹

That air power was decisive in the Persian Gulf is unequivocal; that it was the sole arbiter of success is doubtful. This prompts the question of how ground forces may have influenced air operations. Retired Air Force Lieutenant Colonel Price Bingham, in several trenchant articles and monographs (in which he exhorts a new, dominant role for air power that echoes Douhet's earlier chidings), has suggested several areas for consideration. First, there is the prospect that ground forces may have "fixed" the Iraqis in Kuwait, thereby heightening their vulnerability to air assault, especially to air interdiction. Next, there is the question of whether ground forces were required to maintain the Coalition initiative once air power had reached some point of diminishing returns. Finally, there

is an examination of the Iraqi dilemma posed by the synergy of coordinated ground maneuver and air interdiction.

The halting of Iraqi forces along the Saudi border on 4 August 1990 was, in essence, the final significant military initiative to emanate from Baghdad, and may have been the event to first fix the Iraqis in Kuwait. Although the halt was self-imposed, it did serve to "prevent the enemy from moving any part of his forces from a specific location and/or for a specific period of time...."²

Whether the halt constituted an "operational pause" to consolidate and resupply the Iraqi forces prior to invading Saudi Arabia, whether it was a considered reaction to international sanctions and warnings, or whether it reflected the intended limit of Saddam Hussein's aspirations is open to speculation. The fact that the Iraqis did stop in early August ceded the initiative to the fledgling Coalition and marked the positions from which many of the enemy troops never returned.

By 6 August, King Fahd had requested American assistance in defending Saudi Arabia (should the Iraqis attempt an invasion), and on the following day U.S. forces began deployment to the region (chart 9). USAF F-15C fighters of the 1st Tactical Fighter Wing were in the theater within thirty-six hours of unit deployment notification; elements of the Army's 82nd Airborne Division arrived soon after. At the same time, Marine

Pre-positioning Ships (containing USMC combat supplies) and American naval forces began moving toward the Persian Gulf. The flow of American and Coalition troops, equipment, and materiel into the theater that was begun in early August continued until the final Iraqi capitulation the following March.

The effect this continuing flow of war resources into the region had on the Iraqis established some of the conditions for the eventual campaign to oust them from Kuwait. Specifically, it appears the Iraqis selected their positions in deference to the arrival and siting of their Coalition counterparts (compare chart 9 and 10). It was noted in the DOD's Conduct of the Persian Gulf War that the

buildup of Coalition forces south of Kuwait was attracting stronger Iraqi defensive deployments. Also, Coalition force buildup in the west caused the Iraqis to shift forces in the western KTO opposite Coalition forces.³

While Saddam Hussein had, by the end of October, probably forfeited the opportunity to extend his invasion further south (in light of the expanding Coalition military presence), he seems to have been content in the interim to consolidate his gains in Kuwait. Whereas he possessed the capacity to simply overrun arriving Coalition forces until that time, based on sheer weight of numbers alone, he began to fortify his positions in Kuwait instead. These fortifications were on the model of those which had proven so effective to the Iraqis in their long war with Iran in the

1980s. During that conflict, the Iranians battered themselves against the Iraqi defenses without appreciable gain, and in their exhaustion settled for a stalemate.

Saddam Hussein appears to have selected a similar strategy for the 1991 conflict. What he neglected to appreciate, however, was the value of American air power. In fact, Saddam Hussein scoffed at the capabilities of modern air power which, through misapplication and ineptitude, had played an insignificant role in his war with Iran. He claimed: "The United States relies on the Air Force and the Air Force has never been the decisive factor in a battle in the history of wars."⁴ He preferred, instead, to concentrate his preparations on the Coalition ground threat. This was, as events have proven, an underestimation of far-reaching impact. For, as DOD analysts have laconically noted: "although Iraqi forces were dug into strong positions built to defend against ground attack, they were vulnerable to air attack."⁵

Until the commencement of combat air operations, the Iraqis continued to pour troops into the KTO while strengthening their positions there against ground assault. General Schwarzkopf, for one, was sensitive to the fact that the Iraqi deployments were guiding upon the placement of Coalition units to the south. As additional Allied forces arrived in theater, the CINC ensured their assembly areas were sited so as not to arouse any Iraqi suspicion of

the impending flank assault to the west. In fact, Schwarzkopf delayed the movement of the units that were to conduct "The Left Hook," despite the anxiety of some of his principal commanders, who feared that any further delay would jeopardize the massive undertaking. Not until the Iraqis were blinded by Coalition air operations (that point at which air supremacy was declared) did CINCCENT permit VII and XVIII Corps to begin the long march to their western TAAs. This is significant, in that the theater commander (and by implication, the key staff members and planners) recognized that the ground forces had fixed the Iraqis in their positions, from which some benefit would accrue.

That benefit was first realized during the air operations of the opening phases of Desert Storm. As the primary target of one of those phases (which were conducted concurrently, due to the availability of sufficient assets and the CINC's insistence that the phases occur simultaneously), Iraqi forces in the KTO suffered the consequence of their static positions, oriented as they were on the Coalition surface threat. The current edition of Air Force Manual (AFM) 1-1, Basic Aerospace Doctrine of the United States Air Force, published after Operation Desert Storm, posits the value of such a situation:

Interdiction can be an extremely effective means for destroying enemy surface forces. Enemy surface forces that have been fixed in place [emphasis added] or trapped by the loss of their mobility can

provide lucrative targets for air interdiction. Enemy forces attempting to move rapidly also are much more vulnerable to destruction by air interdiction.⁶

That the Iraqis had been "fixed in place" was the contribution of the Coalition ground forces--that they were unable to "move rapidly" after D-Day was the result of air power.

The air operations that opened Desert Storm were highly successful: air superiority was achieved in hours, followed several days later by absolute air supremacy; Iraqi command and control was degraded to a dependence on couriers. Saddam Hussein's arsenal of weapons of mass destruction was heavily damaged and his program for further development of NBC weapons appears to have suffered a substantial setback. The reinforcements and supplies essential to the sustenance of Iraqi troops in the KTO were reduced to a trickle, while at the same time, attrition rates in most of those units were exorbitant. In fact, author James Coyne has noted that

...it was once customary to regard a military force as utterly defeated when it had been 'decimated,' or reduced by ten percent. The Iraqi forces had been decimated several times over in the air campaign.⁷

Additionally, efforts to deal with the SCUD menace resulted in a drastic reduction in the number of launches; collateral damage and casualties among the Iraqi civil populace were remarkably low; and Coalition losses were but a fraction of those predicted in the worst case scenarios.

Notwithstanding those accomplishments, General Schwarzkopf committed Coalition ground forces to the battle on 24 February 1991. Had air power reached a point of diminishing returns by that date? Was the effort expended on air operations disproportionately greater than the results obtained? Historian Richard Hallion comments:

The hidden subtext, of course, was really the question of air power's effectiveness: had it reached the point where it could do no more, where ground action was the only alternative for decisive result? The answers depended on one's service orientation and view of history. Horner and Glosson did not think so, and recommended deferring to air power. But some ground commanders, eager to launch an offensive and show what their forces could do, argued that only ground forces had ever inflicted decisive defeat. Others who were more dispassionate--particularly Norman Schwarzkopf--recognized the danger of triggering a ground offensive too soon. In their eagerness to do their part, proponents of ground action could unnecessarily risk the lives of their troops.⁸

That particularly damning appraisal is balanced by the perspective of Colonel Richard M. Swain, the Director of the Army's Combat Studies Institute (CSI) at Fort Leavenworth, Kansas. Colonel Swain served in Southwest Asia throughout Desert Shield and Desert Storm as the Army's official historian for the conflict, and in a draft of the manuscript he is preparing on the war has stated:

It was clear that the logic of the strategic situation would not require a follow-on ground operation if Saddam Hussein bowed to the logic of his situation and agreed to withdraw and comply with the pertinent U.N. resolutions. Certainly the air operations provided some not insignificant persuasions to that end. Equally certain is the fact that air operations were unsuccessful in convincing

Saddam to depart in a time period and under circumstances acceptable to the President and Coalition leadership [emphasis added]. The requirements for subsequent political permission to undertake ground operations, and its apparent delay for the final Soviet peace initiative, shows clearly that the ground offensive was conceived to be an escalation and separate from the air attacks, indeed contingent, not concomitant to the air campaign.⁹

Colonel Swain's observation underscores the fact that the option to initiate the ground offensive was not a question of whether air operations had reached a point of diminishing returns. Rather, the decision hinged upon political expediency.

As a case in point, "tank plinking" was the term coined for the nightly attacks by Coalition aircraft, primarily USAF F-111s and F-15Es, employing low-light sensor technology and precision-guided munitions (PGMs), to target and destroy individual vehicles. These tactics were destroying an estimated one hundred to one hundred and fifty armored vehicles per night (some estimates claim two hundred), prior to the commencement of the ground offensive. There is nothing to suggest that this level of destruction could not have been maintained as long as there was ordnance available. With command of the air virtually unchallenged, interdiction operations effectively prevented additional tanks or armored vehicles from entering the theater. Thus, with a finite number of tanks in the theater to begin with, and no more arriving to replace those being so rapidly consumed from the air, it was only a

matter of time before the remaining vehicles would be destroyed as well. This would reduce the Iraqis in the KTO to the status of "leg infantry"--no match for the modern Coalition armored force they opposed.

The question, then, was less a matter of diminishing returns than one of patience. Using conservative figures, of approximately seven thousand Iraqi armored vehicles in the KTO on 15 January 1991, if fifty percent had been destroyed by 24 February ("G-Day"), as the CINC insisted prior to any ground operations, then the remainder would require approximately three to four additional weeks to destroy. Of course, there are other factors that would bear on that equation, such as the reliability of the BDA, the finite supply of necessary PGMs, the difficulty of distinguishing between decoys, burned-out hulks, and bona fide targets (which hampered not only the analysts, but Coalition pilots as well), plus any Iraqi initiative to further disperse, camouflage, or otherwise confound the effectiveness of the air attacks. Any of these factors, among others, would prolong the war in its current form. The fact remains, however, that the air attacks were still an effective means of attriting the Iraqi army in Kuwait as of G-Day. Clearly, though, the NCA was unwilling to extend the conflict while air power completed the task, and instead elected to authorize the ground offensive.

General Schwarzkopf came under increasing pressure from leaders in Washington to hasten the preparations for ground combat. In his memoir, he notes that on 18 February:

The next twenty-four hours brought four more calls from Powell for further details as to why we couldn't launch all or part of our attack right away. At one point he and I and [Secretary of Defense] Cheney had a conference call, in which I argued that militarily there was nothing to gain: 'his [Hussein's] army is unraveling and time is on our side' [emphasis added].¹⁰

Two days later the CINC complained that "the increasing pressure to launch the ground war early was making me crazy."¹¹

Nevertheless, military prerogatives are but one consideration leaders must examine in the conduct of war. There were also economic factors to consider, but perhaps the most important concern was the political will to prolong the conflict in the face of traditional American impatience for swift victory, as well as a growing international concern that the "all possible means" clause of UNR 678 had been too broadly interpreted, and that the strategic air operations were causing unwarranted suffering for the Iraqi populace. From this perspective, the ground offensive option appeared a promising prospect, especially in light of the success of the air operations up to that point. Secretary of Defense (SECDEF) Richard Cheney subsequently outlined the rationale for committing Coalition ground forces to the battle:

The ground offensive ensured that the Coalition would seize [retain?] the initiative. A protracted air siege alone would not have had the impact that the combination of air, maritime and ground offensives was able to achieve. Without the credible threat [emphasis added] of ground and amphibious attacks, the Iraqi defenders might have dispersed, dug in more deeply, concentrated in civilian areas, or otherwise adopted a strategy of outlasting the bombing from the air.¹²

Secretary Cheney's remarks raise an interesting issue. Of course, on the surface his comments explain the decision to commence ground operations. Yet, what is left unsaid is that the mere threat of ground and amphibious attacks was sufficient to induce the Iraqis into a course of action they otherwise might not have chosen if facing the air threat alone. Specifically, they did not disperse, they did not dig in more deeply, and they did not otherwise adopt "a strategy of outlasting the bombing from the air," because they also had to consider the Coalition ground threat. The course of action upon which the Iraqis ultimately settled produced circumstances which the Coalition was able to exploit through air power. Thus, Coalition ground forces did, in fact, influence the air operations without firing a shot.

Yet, Cheney's remarks gloss over that point. Was the SECDEF, to some extent, simply merchandising the "jointness" that has become so fashionable in the Department of Defense? For the lesson was clear, following Cheney's removal of Air Force Chief of Staff General Michael J. Dugan, on 17 September 1990 (after the latter's

importunate remarks to journalists), that there would be no tolerance of any suggestion that circumstances favored one arm of the military over any other.¹³ It is probable that, in addition to "jointness," Mr. Cheney's statement reflects the traditional assumption that only land warfare can be decisive; the inverse of which, as Saddam Hussein propounded and which was noted earlier in this chapter, is that "the Air Force has never been the decisive factor in battle in the history of wars."

A similar theme is found in a monograph submitted to the School of Advanced Military Studies, entitled "In Search of Quick Decision: The Myth of the Independent Air Campaign." The author, Major Charles Jacoby, asserts:

The air operation was not allowed to culminate. Before the Iraqis were able to adapt to the bombardment through by-passes, decreased activity, attrition of coalition airpower [sic] or will, or through the recovery of their air defense system, the coalition [sic] kept the initiative by transitioning to the ground phase. Airpower struck the decisive points of support, command and control, and morale that exposed the Iraqi center of gravity, the Republican Guard divisions, for the 'KNOCKOUT' [sic] blow. All the circumstances were either present or created for the successful use of airpower. Of course, the same can be said for army heavy forces, army aviation, and naval carrier and battleship battle [sic] groups.¹⁴

Whether or not the Army delivered the "KNOCKOUT" blow is debatable. Hallion quips that "thanks to air, the ground 'offensive' resembled less a blitzkrieg than the Oklahoma land rush...."¹⁵ Yet Jacoby is correct, in that air

power did not culminate, there was simply another alternative for regaining the initiative.

Although a point of diminishing returns for the air effort is not cited as the rationale for the ground offensive, several experienced and knowledgeable military experts mentioned an imperative to seize the initiative. Whereas the Coalition had maintained the tactical initiative since the opening shots (with the possible exception of the temporary distraction at Al-Khafji), senior leaders evinced a concern over the broader issue of strategic initiative. Specifically, Chairman of the Joint Chiefs of Staff (CJCS) General Colin Powell, noted in an address to the House Armed Services Committee that

Many experts and others in this town believe that [our objectives] can be accomplished by surgical air strikes or sustained air campaigns without the use of other forces, particularly ground forces. The fundamental flaw in such strategies is that they leave the initiative in Saddam's hands.¹⁶

General Powell then proceeded to discuss his concern that the Iraqis might "hunker down" and maintain the strategic initiative; that is, outlast the political will of the Coalition and, in the end, retain the conquered Kuwaiti territory. The solution, according to Powell, lay in "making the Iraqis face the consequences of a combined air, land, and sea campaign from a powerful Coalition force."¹⁷

The question then became whether or not the Iraqis could, in fact, hang on in Kuwait. Once again, the debate returned to the effectiveness of the air operations in

preventing the resupply and sustenance of the enemy. Past examples, specifically that of the Korean War, demonstrate the ability of a determined opponent to continue resistance, in the face of overwhelming air supremacy, until mutual exhaustion leads to a negotiated settlement. Major General (Ret) Julian Thompson of the British Royal Marine Corps, makes this point in his fascinating history of military logistics, The Lifeblood of War:

Air Power was indispensable. It came nearer than at any other time in history to bringing victory unaided. [Yet] despite all the efforts by the airmen, the logistics of the Iraqi army seem to have continued working. Until they were brought to battle on the ground, they could have survived, still in possession of Kuwait. Slessor's words..., 'in short, it [air power] cannot absolutely isolate the battlefield from enemy supply or reinforcement', are as true in 1991 as they were in 1944.¹⁸

If Americans had learned only one thing from their last experience leading a U.N. coalition at war, it may have been that the bloody stalemate of the final two years of the Korean War would not be acceptable in 1991. American leaders were determined to provide a swift decision this time around. Thus, although air operations had not reached the point of diminishing returns, political exigencies demanded the use of ground forces to seize the strategic initiative.

Once the ground forces were fully committed to the shooting war, the character of air operations changed completely. In addition to the new emphasis on CAS, the

tempo of the air interdiction (AI) effort increased dramatically. The KTO became, in fighter pilot jargon, a "target rich environment." This was the direct result of the theater-wide flurry of enemy activity caused by the Allied invasion. Everywhere the Iraqis were moving, either to surrender, flee, reposition, resupply, reinforce, or counterattack. That this plethora of targets had not existed immediately prior to the ground offensive relates to the previous point made by Major General Thompson, which is further elaborated through his observation of the French AI efforts during the Battle of Dien Bien Phu:

...an air interdiction campaign cannot [entirely] prevent an enemy moving supplies forward. Only if he is forced to expend supplies, the vital ones being ammunition and fuel, faster than he is receiving them, will he become logistically bankrupt.¹⁹

If we are to concede that air interdiction cannot completely isolate the battlefield, then a suitably prepared and determined adversary may be able to outlast the resolve necessary to overcome him. In this instance, it is essential to maintain the initiative by means of another method of attack. The solution in Desert Storm was the ground offensive, though conceivably it could have taken the form of the alternative amphibious invasion. Regardless of the means employed to "stir the pot," once the conditions of the battlefield were changed by the invasion, Coalition air power enjoyed renewed opportunities to engage the moving

Iraqis. Secretary Cheney summarized this point in his introduction to The Conduct of the Persian Gulf War:

As was recognized by senior decisionmakers from the earliest days of planning a possible offensive campaign, the combination of air, naval and ground power used together would greatly enhance the impact of each. The air campaign not only destroyed the combat effectiveness of important Iraqi units, but many that survived were deprived of tactical agility, a weakness that our own ground forces were able to exploit brilliantly. The threat of ground and amphibious attacks forced the Iraqis to concentrate before the ground attack and later to move, increasing the effect of the air attacks [emphasis added].²⁰

Lieutenant Colonel Bingham, the outspoken air power advocate, had explored this very concept of synergy in a joint offensive in a 1989 monograph entitled "Ground Maneuver and Air Interdiction in the Operational Art." This incisive essay presented the argument that

...air interdiction and ground maneuver must be synchronized so that each complements and reinforces the other. Synchronization is important because it can create a dilemma for the enemy that has no satisfactory answer.²¹

The dilemma that Bingham describes is the enemy's unsavory alternatives, poised by the combined threat of simultaneous ground and air attack: he may either maneuver to counter the ground threat, thereby increasing his vulnerability to aerial attack (based on detection, exposure, etc.); or, he may take measures to lessen his vulnerability to air attack (such as to disperse his forces, dig in, etc.), thereby negating his crucial mutual support and maneuverability in the face of a modern armored ground assault. As Lieutenant

Colonel Bingham emphasizes, there are "no satisfactory answers" to the question of choices in this case.

General Schwarzkopf highlighted the impact that air operations had on the subsequent ground maneuver in his detailed briefing to reporters in Riyadh on 27 February 1991:

...in the earlier phases we made great progress in the air war. In the latter stages...the enemy had burrowed down in the ground as a result of the air war. That, of course, made the air war a little bit tougher, but when you dig your tanks in and bury them, they're no longer tanks. They're now pill-boxes.²²

Of course, the implication is that these improvised pill-boxes were no match for the American M1A1 Abrams and the British Chieftan tanks.

The reciprocal advantage accrues to air power as a result of ground maneuver. As a result of the demonstration of this concept during Desert Storm, as well as both the earlier and subsequent works of air power theorists such as Bingham, the Air Force now endorses the concept of synchronized air and ground attacks. The March 1992 edition of AFM 1-1, Basic Aerospace Doctrine of the United States Air Force includes the following:

Complementary employment of interdiction and surface maneuver should be designed to present the enemy with a dilemma. Actual or threatened surface maneuver can force an enemy to respond by attempting rapid movement or resupply. These responses can provide excellent and vulnerable targets for interdiction efforts, creating an agonizing dilemma for the enemy. If the enemy attempts to counter the surface maneuver,

his forces will be exposed to unacceptable losses from interdiction; if the enemy employs measures to reduce such losses, his forces will not be able to counter the surface maneuver. Gaining maximum advantage from the enemy's dilemma depends on the ability of friendly forces to exploit the enemy's delay and disruption.²³

The significance of the inclusion of this principle in the current AFM 1-1 is that, for the first time, a doctrinal manual has suggested that surface forces can be employed to facilitate air operations. Of course, the relationship is mutual, in that air operations also facilitate ground maneuver, but the key term that connotes a fundamental evolution in the doctrine is the reference to "threatened surface maneuver." No longer is it absolutely necessary, in all cases, to commit ground forces in massive, time-consuming, and costly invasions, when the mere threat of doing so may entice the enemy to alter his tactics or dispositions to honor that threat. Furthermore, if properly planned and executed, air power may capitalize on the resulting enemy disarray. The conclusion is that ground forces are indeed able to influence the conduct and outcome of an air campaign.

There is at least one notable historic example of the benefit of coordinated air and ground attacks. It occurred during World War II and is described by historian Richard Hallion:

Operation Strangle, an attempt in 1944 to interdict supplies moving down the Italian peninsula, failed to inflict supply denial. Even though large amounts were destroyed, the supplies that

did get through were generally sufficient to maintain Wehrmacht strength. Its successor, Operation Diadem, combined air and ground-maneuver warfare much more productively, since the level of fighting forced the Germans into using those supplies that did get through, and the ground-maneuver threat forced German units to come out from cover and reposition themselves, where subsequent air attacks devastated them. The lesson here was an important one, for it demonstrated a synergy between offensive maneuver and air interdiction....²⁴

Yet the lesson went largely unlearned, for it was not replicated in Korea, and it was immaterial to the unconventional warfare of Vietnam. Fortunately, it was more or less reclaimed for use during Desert Storm, under the influence of Warden and like-minded airmen in the Black Hole.

At the receiving end of Operation Diadem in 1944, German General Frido von Senger und Etterlin, Commander of the XIV Panzer Corps, commented on the effectiveness of the combined assault:

In a battle of movement a commander who can only make the tactically essential moves by night [due to enemy daylight air attacks] resembles a chess player who for three of his opponent's moves has the right to only one.²⁵

Had von Senger und Etterlin faced the capabilities of current air power--to attack with precision during night and adverse weather--his analogy might have conceded "Check-mate" at the opening move. Colonel Swain observed of this very situation during Desert Storm that "there is as little so psychologically dislocating as daily battering from which there is no relief and for which there is no reply."²⁶ These were precisely the conditions that

caused the rapid collapse of the Iraqis in the KTO once the ground offensive was unleashed.

There are numerous instances of the deadly consequences of synchronized AI and ground maneuver during Desert Storm. The first case was the Battle of Al-Khafji. Although certainly more clear in retrospect than it was at the time, Colonel Swain has surmised that

...the success of U.S. airpower [sic] against the Iraqi armored forces in the case of Kafji [sic] probably indicated that Coalition success was inevitable once the Iraqi forces had to come above ground and concentrate to resist the attacking ground forces.²⁷

The Battle of Al-Khafji, in addition to serving as the first demonstration of synchronized AI and surface maneuver during Desert Storm, presents another key point to consider in the discussion of the synergy of air and ground attacks. This revolves around the speculation of Saddam Hussein's intent for initiating such a hopeless attempt to seize Saudi territory, in the face of overwhelming air supremacy. Unless that was not his intent. It has been suggested that he hoped to initiate the ground war before the Coalition was fully prepared, by drawing Allied ground forces, pursuing the retiring Iraqi invaders, back into the fortified Iraqi positions in Kuwait. At that point, the theory runs, Hussein would bloody the Coalition forces, hoping to weaken the resolve of his opponents by producing the large casualties that characterized the Iranian assaults on similar positions only a few years earlier.

The scenario is quite plausible, but once again Saddam Hussein omitted the factor of air power from his equation, to the detriment of his plans.

However, Hussein's ploy was a two-edged sword. It illustrates the concept that, in order to effect the desired opportunities for air power, ground maneuver need not be offensive. This is suggested by Patton's comment to Eisenhower on 19 December 1944, when the two commanders were discussing their options to counter the German lunge into France known as the Battle of the Bulge. Patton is alleged to have said: "Hell, let's have the guts to let the bastards go all the way to Paris, then we'll really cut them off and chew them up."²⁸ Which is not to suggest that General Schwarzkopf should have let the "bastards" go all the way to Riyadh, merely to up the ante for attrition--anything other than a determined fight for Al-Khafji was politically unacceptable. Rather, the point is that there may be instances in the future when a feigned or actual withdrawal by ground forces may persuade an enemy to overextend his pursuit, and thereby present an opportunity for air power to annihilate his forces.

Once the Coalition ground offensive began, the success of the Al-Khafji lesson was repeated scores of times:

Combat elements that attempted to shift position, retreat or advance, were identified by Coalition reconnaissance and surveillance systems such as U-2, TR-1, JSTARS, and RC-135s and were subjected

to air attack. Iraqi forces thus were on the horns of a dilemma: if they remained in position, they would be struck either from the air or by advancing Coalition ground forces; if they tried to move, they made themselves extremely vulnerable to patrolling Coalition aircraft, including attack helicopters.²⁹

Once again, the inescapable "dilemma" that confronted the Iraqis demonstrated the value of the synergy of coordinated air and ground attacks.

The events of Desert Storm established a new pattern for warfare, a pattern that capitalizes on the synergy between air and ground operations. The evolution of this new pattern came about through the influence of ground forces upon air operations. During Desert Storm, this influence took three distinct forms. In the first place, Coalition ground forces fixed the forces of the enemy, thereby preventing Iraqi dispositions that might have withstood an independent air campaign. By means of a skillful deception plan and the careful positioning of the Coalition units, the Iraqis were led to believe they were more vulnerable to a surface attack than to the air offensive that eventually unfolded. This presented additional vulnerabilities which were readily exploited during the air operations, such as the concentration of Iraqi units to meet the Allied armor formations. Second, the effectiveness of the ensuing air attacks soon drove the Iraqis to bury their vehicles in an effort to preserve them, although their efforts were in vain due to the technological capabilities of

the Coalition air forces. However, it is likely that the Iraqis would have adapted in some measure to the continuing air assaults. Before air operations had reached a point of diminishing returns, therefore, Coalition ground forces were employed to seize the strategic initiative. Whereas air power may have continued to destroy Iraqi forces in the KTO for an indefinite period, the final objective of expelling the Iraqis from Kuwait required the active combat participation of the ground forces. Finally, once the ground forces were engaged, air operations assumed a new complexion. The impetus of the Coalition ground maneuver stimulated a flurry of Iraqi activity, which was highly susceptible to air interdiction, and the final four days of the war marked the most effective interdiction efforts of the campaign. Thus, the influence of ground forces on the Desert Storm air operations provided the conditions for victory.

CONCLUSION

Operation Desert Storm was a new kind of war. It demonstrated the great effectiveness of simultaneously waging war across the spectrum of operations, by attacking targets at the tactical, the operational, and the strategic levels. This concept is known as parallel warfare and it differs from the traditional method, which may be termed sequential warfare. The older model for war was characterized by a linear mindset, that perceived a conflict in two dimensions (vice three), and that relied upon a progression across the levels of war in order to conclude it: the emphasis was on individual battles, a series of which made up a campaign, with two or more campaigns comprising the entire war. Whether through careful consideration or conducive circumstances, that did not occur in Desert Storm.

The instrument that made this historic transition possible was air power, for only air power could strike selectively at any target. Of course, the unique circumstances of the conflict presented opportunities that favored air power and which may not be present in all situations. Air Force historian Major Mark Clodfelter's

essay, "Of Demons, Storms, and Thunder: A Preliminary Look at Vietnam's Impact on the Persian Gulf Air Campaign," examines this issue:

The combination of [several] factors--an urban populace accustomed to many of the conveniences of Twentieth Century industrialization and splintered in its support for the government, a dictator who depended on ties to his army and his police force to stay in power, an army that waged conventional war, and an almost complete isolation by the international community--made Iraq an ideal target for a strategic air campaign that simultaneously attacked war-making capacity and the will to resist [emphasis added].¹

It was this ability to simultaneously attack both the enemy's war-making capacity as well as his will to resist that distinguished air power as the decisive strategic force for the conflict.

Yet the contributions of air power extended into the operational and tactical realms as well. It was necessary from the earliest stages of planning for war with Iraq to seriously consider the likelihood of ground combat, should the Iraqis not accede to the pressures of the air operations. From that perspective it was obviously desirable to enter any land battles under circumstances favorable to the Coalition. Once again, air power could attack the crucial targets which would ensure the follow-on success of the ground battle, such as the enemy's command and control, his means of sustenance, and key elements of his combat power, specifically the armor and artillery.

While this "preparation of the battlefield" (to borrow an Army euphemism) was under way, the ground forces were able to contribute greatly to its success, though rarely firing a shot. SAMS candidate Jacoby correctly noted that "the presence of 400,000 ground troops made it more than an air show from the beginning."² Yet, that is a somewhat disingenuous admission that the role of ground forces in this war was far different from that envisioned in the tenets of AirLand Battle. Bingham offers a more definitive explanation for the presence of so many troops:

During Desert Storm, General Schwarzkopf demonstrated that it was possible to achieve campaign objectives at an extraordinarily low cost in terms of friendly casualties when surface forces were used to support the employment of air power [emphasis added]. He did this by using coalition [sic] ground and amphibious forces at the beginning of the campaign to 'fix' Iraqi units into positions where air interdiction could inflict terrible destruction, as was achieved by 'tank plinking,' while simultaneously denying these units effective resupply....After his air power had destroyed the ability of the Iraqi army to fight effectively, he used the maneuver of his surface forces during the ground offensive...to force Iraqi units into the open where air power could pursue them and inflict even greater destruction like that on the 'Highway of Death.'³

This influence was the result of missions and roles that had been overlooked by the Army up to that point.

This oversight is clearly a failure of doctrine to foresee the pivotal role of technology, especially as applied to aerospace forces; it may have resulted from the misapplication of historical lessons. Bingham believes that:

Perhaps one of the reasons the Army's doctrine fails to see the full potential of air power can be found in its use of history. AirLand Battle doctrine uses Gen [sic] Ulysses S. Grant's Vicksburg campaign during the Civil War, rather than the campaigns that employed air power such as those conducted by General McArthur in the Pacific during World War II, to illustrate the fundamentals of the offensive. Given the 'air' in its title, this is somewhat akin to a book on modern football containing only discussion and diagrams for running plays.⁴

If the Army had used MacArthur's Pacific campaigns as a model for the offensive, Colonel Warden (for one) believes that the lesson would illustrate the value of inverting "the established order of things" by using "ground forces as an adjunct to air...primarily to seize bases from which air forces could extend the bomb line."⁵ Of course, there are scores of other episodes in military history, from which one may extract different lessons, but the point is that the application of air power should not be limited by doctrine merely because its consideration is inconvenient or does not conform to current notions of linear warfare. Air power, as was demonstrated in Desert Storm, is a valuable instrument of national power projection, and is likely to retain that value well into the future.

Richard Hallion has noted:

As dominant land power characterized a Pax Romana and dominant sea power a Pax Britannica, dominant air power is the characteristic of modern America.⁶

It is essential to realize that implication and plan for the most effective use of such a potent tool.

That realization begins with the new paradigm established by Desert Storm, whereby under the appropriate circumstances ground forces are positioned, committed, or maneuvered to influence an air campaign. The planning begins with doctrine. Bingham has suggested that:

...we are fortunate Desert Storm gave us the opportunity to learn so cheaply that much of the US military's current doctrine, which tends to see air power primarily as support for the employment of surface forces, needs to be changed to recognize that air power can play a dominant role. Under these doctrinal changes, US military forces would be organized, trained, and equipped to fight conventional campaigns in which surface forces are employed to enhance the effectiveness of US air power while minimizing the risk of friendly casualties.⁷

This suggestion is remarkably similar to the general concept of national defense policy for the United States in the 1950s. At that time, the economic and domestic politics of the country demanded massive cuts in the military budget; air power, following the noted impact it had on World War II, was deemed a less costly and more efficient instrument of war, tailor made to the American situation. However, with an almost dogmatic reliance upon nuclear deterrence, that notion was incredibly naive and provided few realistic options for unconventional contingencies. Vietnam quickly demonstrated an urgent need for additional considerations in such a policy. A valuable project for future study would be a comparison of the situation in the 1950s with that of the 1990s. Such a study may provide the crucial lessons for sound policy decisions as the United

States considers its defense requirements for the opening decades of the 21st century.

None of this is to suggest that the United States does not need strong and flexible surface fighting forces. To the contrary, the history of our country's conflicts since the 1950s, including the Cold War, indicates the indispensability of Army and Marine forces organized, equipped, and trained to perform a wide variety of missions. Air power is not the single solution for all of the nation's difficult defense choices. Yet, technology has ensured some very significant capabilities for air power that, in many scenarios (such as Desert Storm), can be decisive. Ground forces will, nevertheless, remain a critical component of the defense formula, but as Bingham has noted, "...they should not dictate how air forces are employed. Instead, our campaigns should be planned and executed so surface operations complement and reinforce air operations."⁸

To accept such a notion will require an entirely new way of thinking about warfare. Colonel Drew, the first Dean of the School of Advanced Airpower Studies, recently delivered a paper entitled "Airpower in the New World Order" at a seminar sponsored by the Army War College. The gist of his address was the concept of "airmindedness":

Airmindedness, a term coined by General of the Air Force Henry H. 'Hap' Arnold, refers to rethinking traditional concepts of warfare in airpower terms. The airmindedness plea seeks to make modern warfare

three-dimensional rather than two-dimensional warfare with an airpower annex.⁹

This requires a fundamental and profound change in military thought. It is a change that will also produce a new relationship between air and ground forces, which will see the traditional platitude, that air power exists primarily to support ground operations, overturned. The events of Operation Desert Storm have provided the new paradigm for a future relationship--it is a future in which ground forces will operate in support of air campaigns.

ENDNOTES

Introduction

¹Department of the Army, FM 100-5, Operations (Washington, D.C.: Government Printing Office, May 1986), 47.

²Ibid., 19.

³General Giulio Douhet, The Command of the Air, trans. Dino Ferrari (Washington, D.C.: Office of Air Force History, 1983), 251.

⁴Richard A. Hallion, Storm Over Iraq: Air Power and the Gulf War (Washington, D.C.: Smithsonian Institution Press, 1992), x.

⁵Department of Defense, Joint Pub 1, Joint Warfare of the U.S. Armed Forces (Washington, D.C.: National Defense University Press, 1991), 48.

Chapter One

¹Thomas G. Blake, The Shield and the Storm (New York: The Commemorative Group, 1992), 60-61.

²Hallion, Storm Over Iraq, 141-144.

³U.S. News and World Report, Triumph Without Victory: The Unreported History of the Persian Gulf War (New York: Times Books, 1992), 429-430.

⁴Ibid., 449-450.

⁵Ibid., 129.

⁶Department of the Army, FM 101-5-1, Operational Terms and Symbols (Washington, D.C.: Government Printing Office, October 1985), 1-30.

⁷Department of the Army, FM 100-5, 179.

⁸Colonel John A. Warden III, The Air Campaign: Planning for Combat (Washington, D.C.: National Defense University Press, 1988), 157-159.

⁹Department of Defense, Conduct of the Persian Gulf War: Final Report to Congress, Pursuant to Title V of the Persian Gulf Conflict Supplemental Authorization and Personnel Benefits Act of 1991 (Public Law 102-25). (Washington, D.C.: Government Printing Office, April 1992), 10-11; 18-19.

¹⁰Hallion, Storm Over Iraq, 151-153.

¹¹Colonel (Ret) Dennis M. Drew, "Airpower in the New World Order," in U.S. Army War College Fourth Annual Conference on Strategy: Strategy in Periods of Transition (Carlisle Barracks, Pa.: U.S. Army War College, 1993), 20.

¹²General (Ret) H. Norman Schwarzkopf, It Doesn't Take a Hero (New York: Bantam Books, 1992), 319-320.

Chapter Two

¹James Blackwell, Thunder in the Desert: The Strategy and Tactics of the Persian Gulf War (New York: Bantam Books, 1991), 69-73.

²Major Ronald N. Mazzia, "Tracking the Storm," Military Review 71 (September 1991), 65.

³Blake, 61.

⁴Department of Defense, Conduct of the Persian Gulf War, Appendix I.

⁵Blackwell, Thunder in the Desert, 61-66.

⁶Mazzia, "Tracking the Storm," 66-70.

⁷Schwarzkopf, It Doesn't Take a Hero, 317-318.

⁸Department of Defense, Conduct of the Persian Gulf War, 40-42.

⁹Hallion, Storm Over Iraq, 142-143.

¹⁰Ibid., 150-152.

¹¹Ibid.

¹²James P. Coyne, Airpower in the Gulf (Arlington, Va: Air Force Association, 1992), 43-47.

¹³Hallion, Storm Over Iraq, 143.

¹⁴Coyne, Airpower in the Gulf, 46.

¹⁵Schwarzkopf, It Doesn't Take a Hero, 354-360.

¹⁶Blackwell, Thunder in the Desert, 52-55.

¹⁷Ibid., 61-66.

¹⁸Lieutenant General John J. Yeosock, "Army Operations in the Gulf Theater," Military Review 71 (September 1991): 7.

¹⁹Schwarzkopf, It Doesn't Take a Hero, 319-320.

²⁰Mazzia, "Tracking the Storm," 69.

Chapter Three

¹Hallion, Storm Over Iraq, 177-188.

²Department of the Air Force, Air Force Manual (AFM) 1-1, Basic Aerospace Doctrine of the United States Air Force, vol. 1 (Washington, D.C.: Government Printing Office, March 1992), 10-11.

³Ibid.

⁴Drew, "Airpower in the New World Order," 18.

⁵Hallion, Storm Over Iraq, 150-154.

⁶Schwarzkopf, It Doesn't Take a Hero, 319.

⁷Department of Defense, Conduct of the Persian Gulf War, 135.

⁸Hallion, Storm Over Iraq, 154-155.

⁹Ibid., 166-169.

¹⁰Department of Defense, Conduct of the Persian Gulf War, 118-119.

¹¹Hallion, Storm Over Iraq, 172-173.

¹²Department of the Air Force, "Air Force Performance in Desert Storm" (Washington, D.C.: U.S. Air Force, 1991), 2-3.

¹³U.S. Department of Defense, Conduct of the Persian Gulf War, 168.

¹⁴Ibid., 169-171.

¹⁵Blackwell, Thunder in the Desert, 46-48.

¹⁶Coyne, Airpower in the Gulf, 74.

¹⁷Department of Defense, Conduct of the Persian Gulf War, 169-171.

¹⁸Coyne, Airpower in the Gulf, 53-54.

¹⁹Department of Defense, Conduct of the Persian Gulf War, 173-174.

²⁰Blackwell, Thunder in the Desert, 120-121.

²¹Blake, The Shield and the Storm, 151-153.

²²Department of Defense, Conduct of the Persian Gulf War, 176-177.

²³Schwarzkopf, It Doesn't Take a Hero, 319.

²⁴Department of Defense, Conduct of the Persian Gulf War, 190-191.

²⁵Hallion, Storm Over Iraq, 204-206.

²⁶Department of the Army, FM 100-5, 49.

²⁷William W. Momyer, Air Power in Three Wars (WW II, Korea, Vietnam) (Washington, D.C.: Department of the Air Force, 1978), 39-44.

²⁸Hallion, Storm Over Iraq, 206-209.

²⁹Ibid.

³⁰U.S. News and World Report, Triumph Without Victory, 267-268.

³¹Coyne, Airpower in the Gulf, 90.

³²Department of Defense, Conduct of the Persian Gulf War, 194-197.

³³Ibid., 120.

³⁴Barbara Opali, "Desert Storm Lifts U.S. Air Power Role," Defense News, 15 April 1991, 38.

Chapter Four

¹Department of Defense, Conduct of the Persian Gulf War, 175-176.

²Ibid., 341.

³Ibid., 294-305.

⁴Ibid., 249.

⁵Ibid., 367-373.

⁶Ibid., 360-361.

⁷Ibid., 365-367.

⁸Department of the Army, FM 101-5-1, 1-54.

⁹Department of Defense, Conduct of the Persian Gulf War, 379-383.

¹⁰Ibid., 377-378.

¹¹Ibid., 384-387.

¹²Ibid., 387-399.

¹³Department of the Army, FM 101-5-1, 1-27.

¹⁴Department of Defense, Conduct of the Persian Gulf War, 399-407.

Chapter Five

¹Department of Defense, Conduct of the Persian Gulf War, 117.

²Department of the Army, FM 101-5-1, 1-32.

³Department of Defense, Conduct of the Persian Gulf War, 102.

⁴Major Mark Clodfelter, "Of Demons, Storms, and Thunder: A Preliminary Look at Vietnam's Impact on the Persian Gulf Air Campaign." Airpower Journal vol. V, No. 4 (Winter 1991), 30.

⁵Department of Defense, Conduct of the Persian Gulf War, 130.

⁶Department of the Air Force, AFM 1-1, vol. 1, 13.

⁷Coyne, Airpower in the Gulf, 99.

⁸Hallion, Storm Over Iraq, 225.

⁹Colonel Richard M. Swain, untitled/unpublished draft manuscript on the history of Desert Storm, 169-170.

¹⁰Schwarzkopf, It Doesn't Take a Hero, 442.

¹¹Ibid., 443.

¹²Department of Defense, Conduct of the Persian Gulf War, xiv-xv.

¹³Hallion, Storm Over Iraq, 144-146.

¹⁴Major Charles H. Jacoby, Jr., "In Search of Quick Decision: The Myth of the Independent Air Campaign" (Fort Leavenworth, Ks.: School of Advanced Military Studies, U.S. Army Command and General Staff College, 15 May 1991), 39.

¹⁵Hallion, Storm Over Iraq, 253.

¹⁶Colonel (Ret) Harry G. Summers, Jr., On Strategy II: A Critical Analysis of the Gulf War (New York: Del Pubs, 1992), 198.

¹⁷Ibid.

¹⁸Major General (Ret) Julian Thompson, The Lifeblood of War: Logistics in Armed Conflict (New York: MacMillan Publishing Company, 1991), 343.

¹⁹Ibid., 173.

²⁰Department of Defense, Conduct of the Persian Gulf War, xv.

²¹Lieutenant Colonel (Ret) Price Bingham, "Ground Maneuver and Air Interdiction in the Operational Art" (Maxwell AFB, Al.: Center for Aerospace Doctrine, Research, and Education, September 1989), 2.

²²Coyne, Airpower in the Gulf, 177.

²³Department of the Air Force, AFM 1-1, vol. I, 12.

²⁴Hallion, Storm Over Iraq, 12.

²⁵Bingham, "Ground Maneuver and Air Interdiction," 5.

²⁶Swain, untitled/unpublished manuscript, 170.

²⁷Ibid., 172.

²⁸Michael D. Pearlman, "Flexibility: The U.S. Third Army at the Battle of the Bulge, 1944," in Combined Arms in Battle Since 1939, ed. Roger J. Spiller (Fort Leavenworth, Ks.: U.S. Army Command and General Staff College Press, 1992), 134.

²⁹Department of Defense, Conduct of the Persian Gulf War, 193.

Conclusion

¹Clodfelter, "Of Demons, Storms, and Thunder," 25.

²Jacoby, "The Myth of the Independent Air Campaign," 39.

³Bingham, "Air Power in Desert Storm and the Need for Doctrinal Change," in Airpower Journal, V, number 4 (Maxwell AFB, Al.: AU Press, Winter 1991), 35.

⁴Bingham, "Air Power and the Need for Doctrinal Change," 38.

⁵Warden, The Air Campaign, 30-31.

⁶Hallion, Storm Over Iraq, 267.

⁷Bingham, "Air Power and the Need for Doctrinal Change," 44.

⁸Bingham, editorial response in "Ricochets,"
Airpower Journal, VI, #2 (Maxwell AFB, Al.: AU Press,
Summer 1992), 70.

⁹Drew, "Airpower in the New World Order," 11.

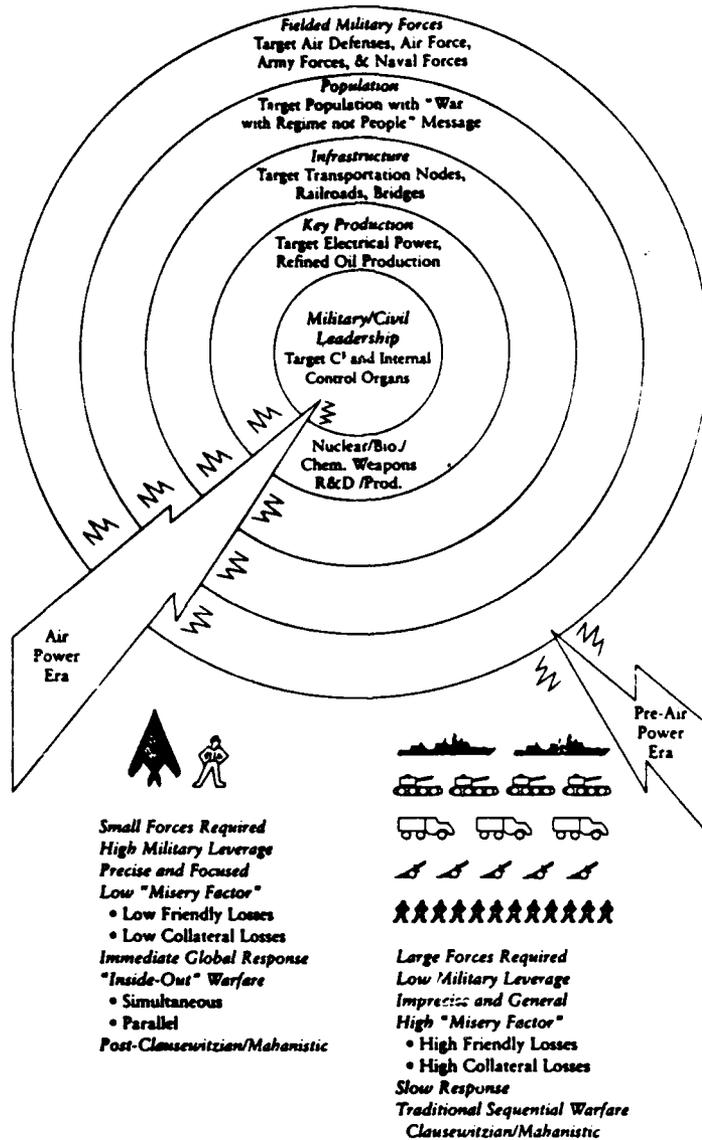
APPENDIX A
ABBREVIATIONS AND ACRONYMS

AAA	antiaircraft artillery
AB	air base
ACR	armored cavalry regiment
AFB	Air Force Base
AFM	Air Force Manual
AI	air interdiction
ALCM	air-launched cruise missile
APC	armored personnel carrier
ARCENT	Army Component, Central Command
ATF	amphibious task force
ATO	air tasking order
AU CADRE	Air University Center for Aerospace Doctrine, Research, and Education
BAI	battlefield air interdiction
BDA	battle (bomb) damage assessment
CAS	close air support
CBU	cluster bomblet unit
CENTAF	Air Force Component, Central Command
CENTCOM	US Central Command
CIA	Central Intelligence Agency
CINC	Commander-in-Chief

CINCCENT	Commander-in-Chief, Central Command
CJCS	Chairman, Joint Chiefs of Staff
CSI	Combat Studies Institute
CSS	combat service support
C ²	command and control
C ³	command, control, and communications
DOD	Department of Defense
DIA	Defense Intelligence Agency
FM	Field Manual
FOB	forward operating base
HAS	hardened aircraft shelter
IADS	Integrated Air Defense System
IQAF	Iraqi Air Force
IR	infra-red
JFACC	Joint Forces Air Component Commander
JFC	Joint Forces Commander
JSTARS	Joint Surveillance Target Attack Radar System
KTO	Kuwait Theater of Operations
LGB	laser-guided bomb
LOC	line of communication
MARCENT	Marine Forces, Central Command
MEF	Marine Expeditionary Force
NATO	North Atlantic Treaty Organization
NBC	nuclear/biological/chemical
NCA	National Command Authorities
OCA	offensive counter air

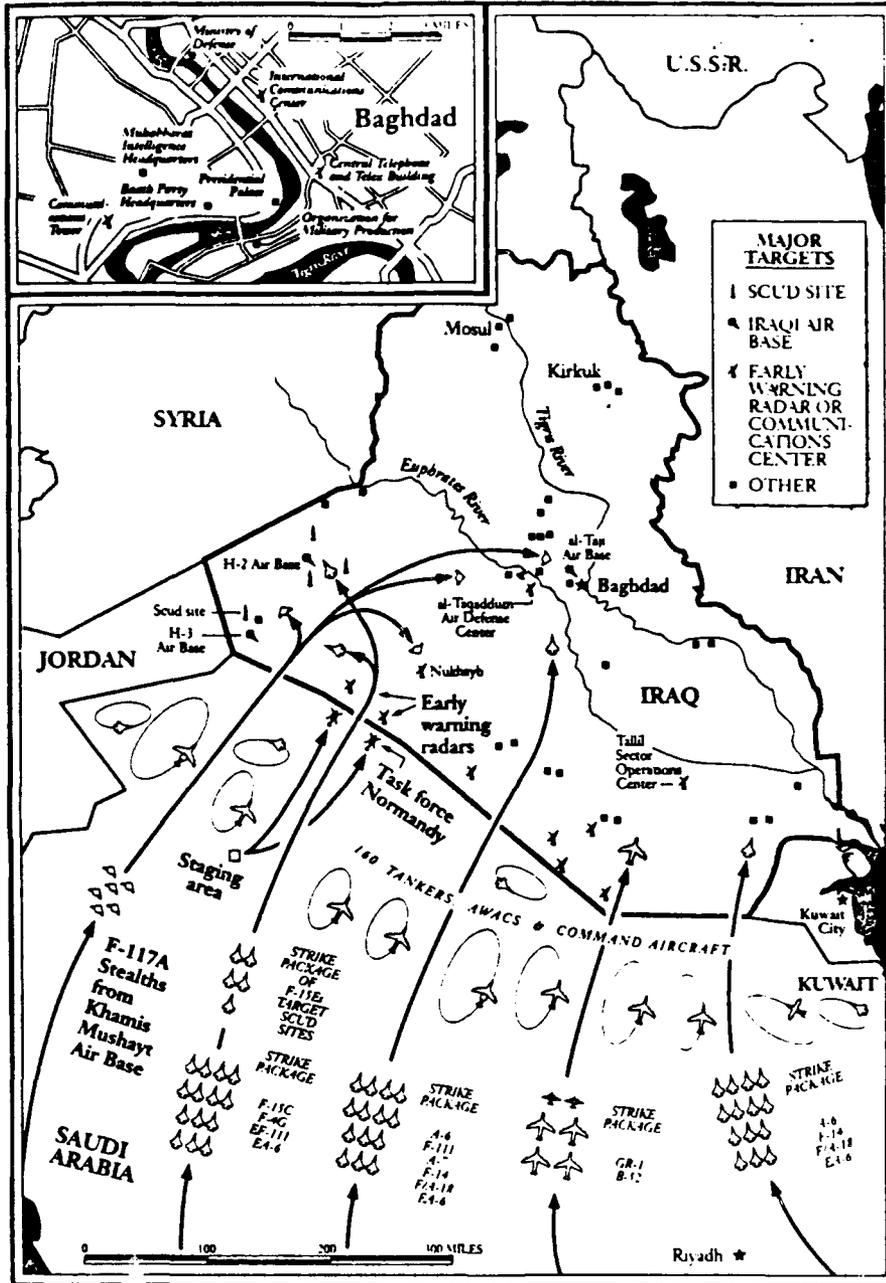
OPLAN Operation Plan
PGM precision-guided munition
POL petroleum, oil, and lubricants
PSYOP psychological operations
RGFC Republican Guards Forces Command
RPV remotely piloted vehicle
SAAS School of Advanced Airpower Studies
SAM surface-to-air missile
SAMS School of Advanced Military Studies
SEAD Suppression of enemy air defenses
SECDEF Secretary of Defense
SOF Special Operations Forces
SSM surface-to-surface missile
SWAOR Southwest Asia Area of Responsibility
TAA tactical assembly area
TLAM Tomahawk land-attack missile
UAV unmanned aerial vehicle
UN United Nations
UNR United Nations Resolution
UNSC United Nations Security Council
USAF United States Air Force
USMC United States Marine Corps

APPENDIX B
 FIGURES AND CHARTS



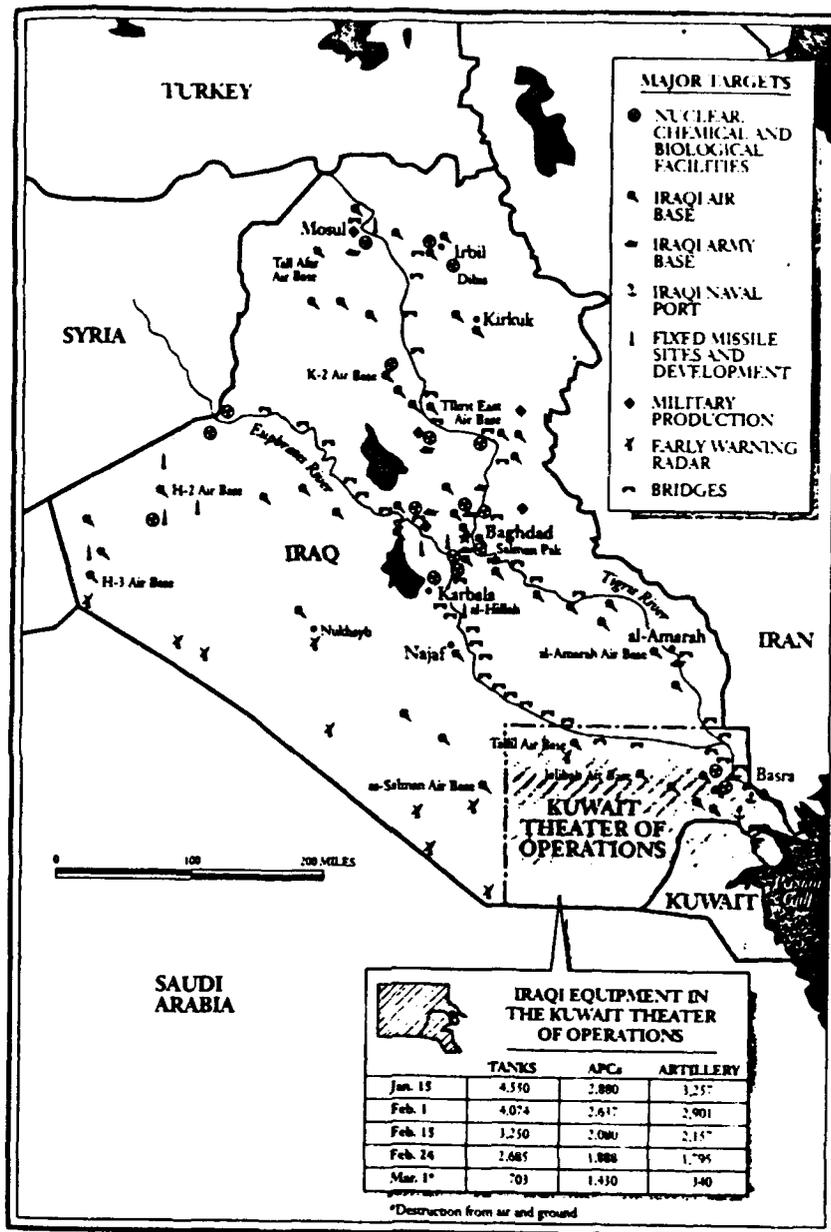
5.1 The Five Strategic Rings Only air power can strike across the spectrum of objectives unconstrained by traditional limitations.

Figure 1. Richard P. Hallion, Storm Over Iraq: Airpower and the Gulf War (Washington, D.C.: Smithsonian Institution, 1992), 152.



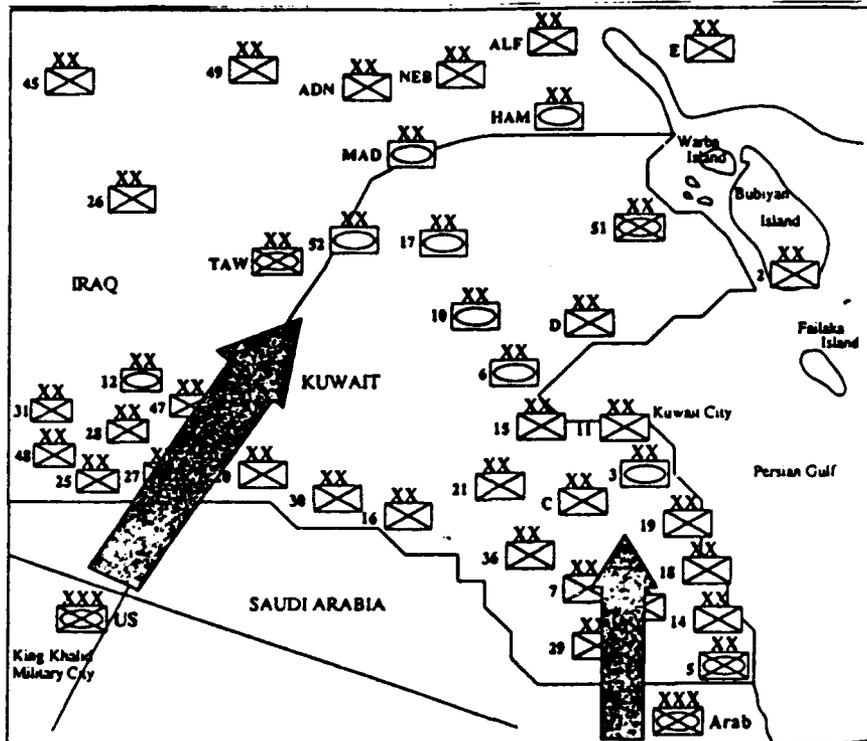
MORE THAN 400 COMBAT AIRCRAFT HIT TARGETS IN IRAQ IN THE OPENING HOURS OF THE AIR WAR, JANUARY 17, 1991

Chart 1. Reprinted, by permission, from US News and World Report, Triumph Without Victory: The Unreported History of the Persian Gulf War (New York: Times Books, 1992), 227.



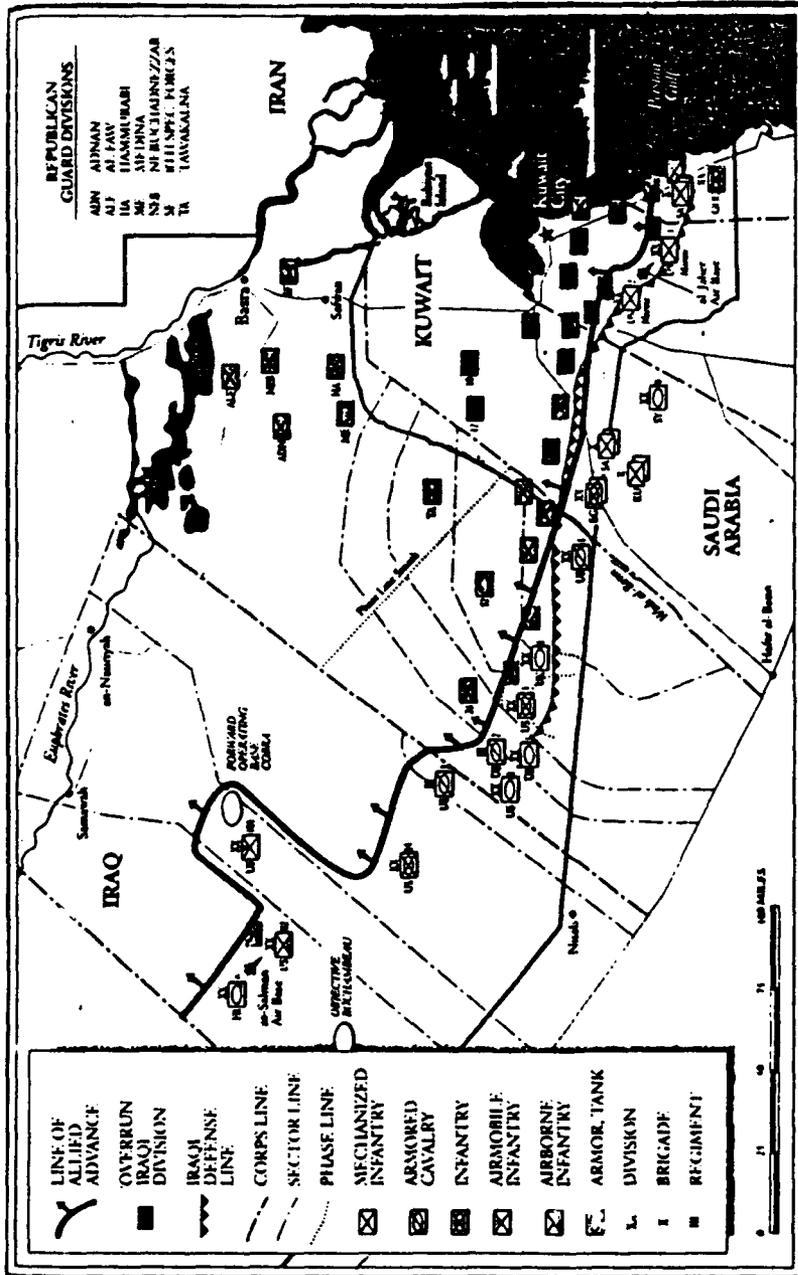
THE AIR WAR AGAINST IRAQ TARGETED A MULTITUDE OF STRATEGIC SITES AS WELL AS GROUND FORCES

Chart 2. Reprinted, by permission, from US News and World Report, Triumph Without Victory: The Unreported History of the Persian Gulf War (New York: Times Books, 1992), 269.



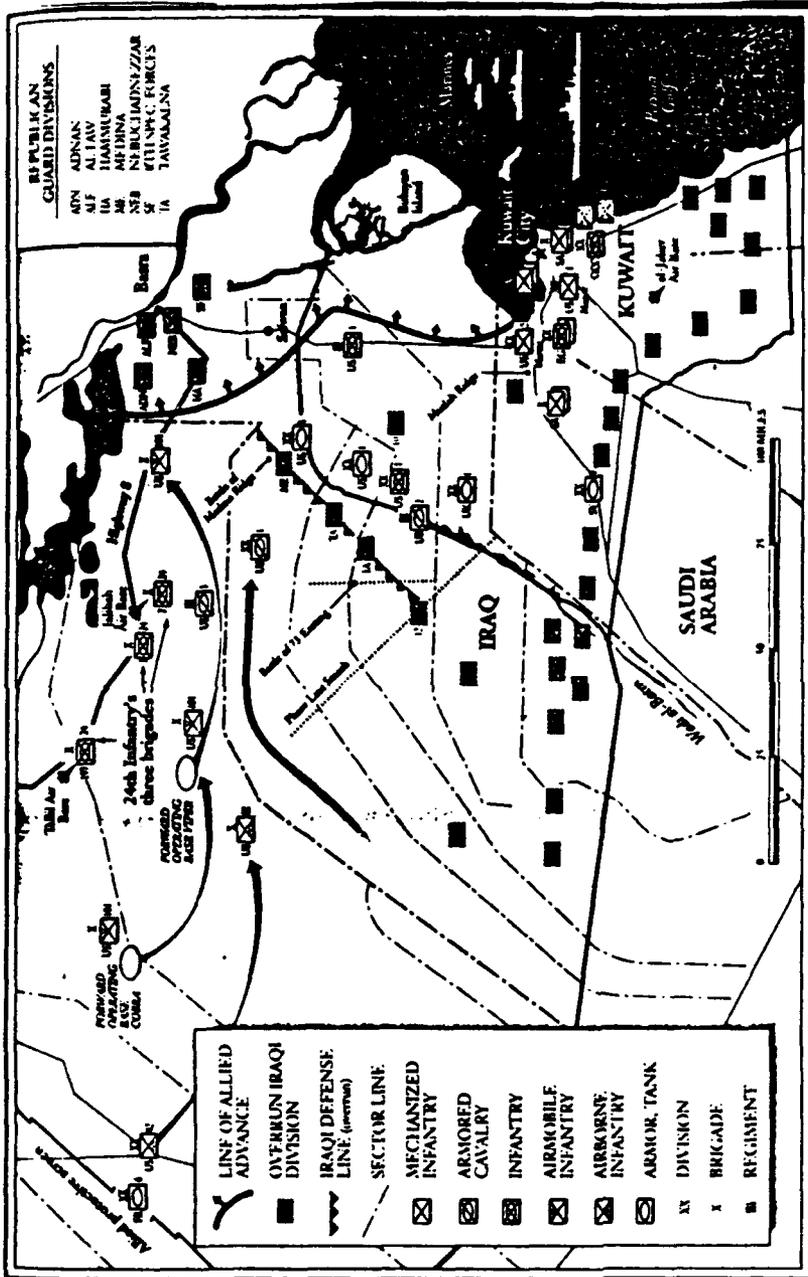
Iraq's Anticipation of Allied Ground Offensive

Chart 4. Reprinted, by permission, from James Blackwell, Thunder in the Desert: The Strategy and Tactics of the Persian Gulf War (New York: Bantam Books, 1991), 158.



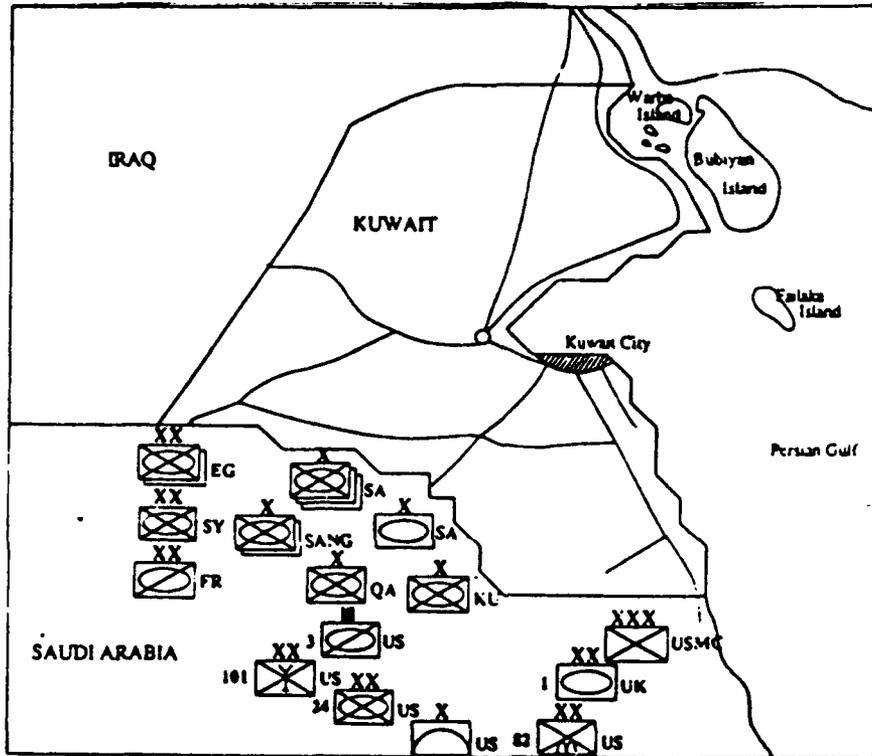
FEBRUARY 24, 1991: ALLIED TROOPS OVERRAN IRAQI DEFENSES ON THE FIRST DAY OF THE GROUND WAR

Chart 5. Reprinted, by permission, from US News and World Report, Triumph Without Victory: The Unreported History of the Persian Gulf War (New York: Times Books, 1992), 305.



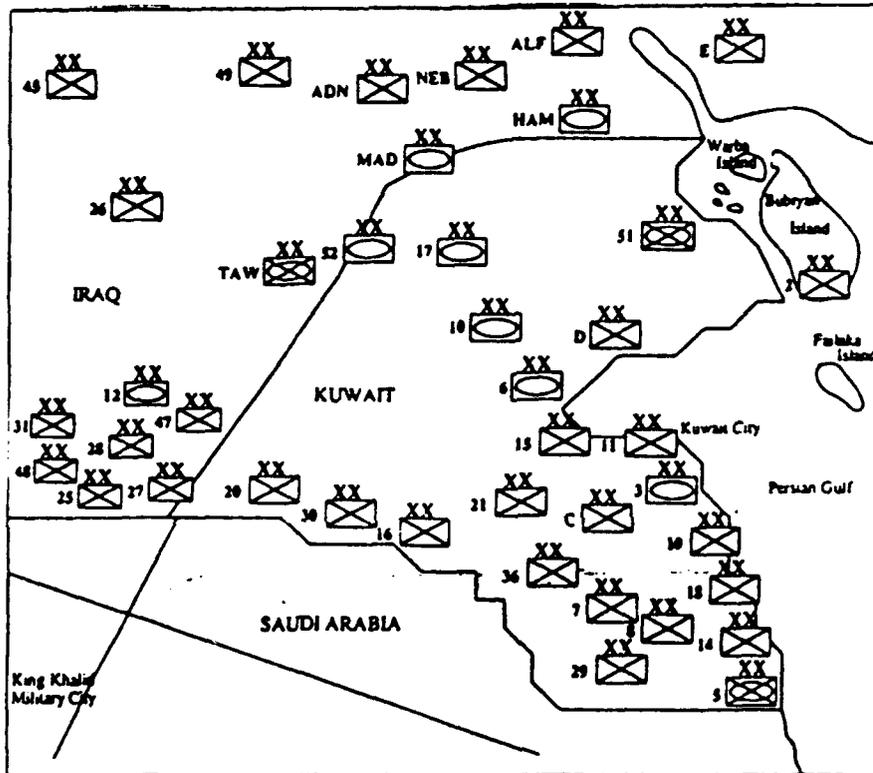
FEBRUARY 27, 1991: BY THE END OF THE FOURTH DAY, THE REPUBLICAN GUARD WAS DEFEATED OR FLEEING TO BASRA

Chart 8. Reprinted, by permission, from US News and World Report, Triumph Without Victory: The Unreported History of the Persian Gulf War (New York: Times Books, 1992), 375.



Coalition Troop Deployments for Operation Desert Shield

Chart 9. Reprinted, by permission, from James Blackwell, Thunder in the Desert: The Strategy and Tactics of the Persian Gulf War (New York: Bantam Books, 1991), 101.



Iraqi Defense of Kuwait

Chart 10. Reprinted, by permission, from James Blackwell, Thunder in the Desert: The Strategy and Tactics of the Persian Gulf War (New York: Bantam Books, 1991), 108.

BIBLIOGRAPHY

Books

- Blackwell, James. Thunder in the Desert: The Strategy and Tactics of the Persian Gulf War. New York: Bantam Books.
- Blake, Thomas G. The Shield and the Storm. New York: The Commemorative Group, 1992.
- Coyne, James P. Airpower in the Gulf, Arlington, Va.: Air Force Association, 1992.
- Douhet, Giulio. The Command of the Air. Translated by Dino Ferrari. Washington, D.C.: Office of Air Force History, 1983.
- Hallion, Richard P. Storm Over Iraq: Air Power and the Gulf War. Washington, D.C.: Smithsonian Institution Press, 1992.
- Hiro, Dilip. Desert Shield to Desert Storm: The Second Gulf War. New York: Routledge, 1992.
- Momyer, William W., General, USAF (Ret). Air Power in Three Wars (WW II, Korea, Vietnam). Washington, D.C.: Department of the Air Force, 1978.
- Schwarzkopf, H. Norman, General, USA (Ret) and Peter Petre. It Doesn't Take a Hero. New York: Bantam Books, 1992.
- Shultz, Richard H. Jr. and Robert L. Pfaltzgraff, Jr., eds. The Future of Air Power in the Aftermath of the Gulf War. Maxwell AFB, Al.: Air University Press, 1992.
- Spiller, Roger J., ed. Combined Arms in Battle Since 1939. Fort Leavenworth, Ks.: US Army Command and General Staff College, 1992.
- Summers, Harry G. Jr., Colonel, USA (Ret). On Strategy II: A Critical Analysis of the Gulf War. New York: Dell Publishing, 1992.

Thompson, Julian. The Lifeblood of War: Logistics in Armed Conflict. London: Brassey's, 1991.

US News and World Report. Triumph Without Victory: The Unreported History of the Persian Gulf War. New York: Times Books, 1992.

Warden, John A. III, Colonel, USAF. The Air Campaign: Planning for Combat. Washington, D.C.: National Defense University Press, 1988.

Witherow, John and Aidan Sullivan. The Sunday Times War in the Gulf: A Pictorial History. New York: St. Martin's Press, 1991.

Articles

Bingham, Price T., Lieutenant Colonel, USAF (Ret). "Air Power in Desert Storm and the Need for Doctrinal Change," Airpower Journal V, 4 (Winter 1991): 33-46.

_____. Editorial response in "Ricochets," Airpower Journal VI, 2 (Summer 1992): 70.

_____. "US Air Interdiction Capability Challenges Ground War Doctrine," Armed Forces Journal International (October 1992): 62-64.

_____. "The Air Force's New Doctrine," Military Review 72 (November 1992): 13-19.

Clodfelter, Mark, Major, USAF. "Of Demons, Storms, and Thunder: A Preliminary Look at Vietnam's Impact on the Persian Gulf Air Campaign," Airpower Journal V, 4 (Winter 1991): 17-32.

Coyne, James P. "Plan of Attack--Off the Shelf Plans Did Not Suffice for the Air Campaign that General Schwarzkopf Envisioned in the Gulf," Air Force Magazine 75 (April 1992): 40-46.

Drew, Dennis M., Colonel, USAF (Ret). "Four Air Power Lessons Obvious From Gulf War," Air Force Times 52 (30 September 1991): 27.

_____. "Desert Storm as a Symbol: Implications of the Air War in the Desert," Airpower Journal VI, 3 (Fall 1992): 4-13.

_____. "New Perspectives Can Broaden Air Power's Use," Air Force Times 53 (15 February 1993): 31.

- Eshel, Tamir. "The Most Successful Air Campaign Ever?" Military Technology 4 (15 April 1991): 36-38.
- Glosson, Buster C., Major General, USAF. "War Planner--Civilians Didn't Change Target List: Interview by Casey Anderson," Air Force Times 51 (8 July 1991): 27.
- Grossman, Larry. "Col John A Warden III: Air Force Veteran Battles for New World Order," Government Executive (February 1992).
- Horner, Charles A., Lieutenant General, USAF. "A Conversation With Chuck Horner: Interview by Richard MacKenzie," Air Force Magazine 74 (June 1991): 57-64.
- _____. "The Air Campaign," Military Review 71 (September 1991): 16-27.
- _____. "Desert Shield/Desert Storm: An Overview," Air Power History 38 (Fall 1991): 5-9.
- Luttwak, Edward N. "Victory Through Airpower," Commentary 92 (August 1991): 27-30.
- Mason, R.A. "The Air War in the Gulf," Survival 33 (May-June 1991): 211-229.
- Mathews, Tom and others. "The Secret History of the War: Prodigious Planning and Unshakable Will Produced a Famous Victory," Newsweek 117 (18 March 1991): 28-39.
- Mazzia, Ronald N., Major, USA. "Tracking the Storm," Military Review 71 (September 1991): 64-95.
- Opall, Barbara. "Desert Storm Lifts US Air Power Role," Defense News 6 (15 April 1991): 18-38.
- Schwarzkopf, H. Norman, General, USA (Ret). "Central Command Briefing, 27 February 1991," Military Review 71 (September 1991): 96-108.
- Winton, Harold R. "Reflections on the Air Force's New Manual," Military Review 72 (November 1992): 20-31.
- Yeosock, John J., Lieutenant General, USA. "Army Operations in the Gulf Theater," Military Review 71 (September 1991): 2-15.

Government Publications

- US Air Force. AFM 1-1, Basic Aerospace Doctrine of the United States Air Force. Washington, D.C.: Department of the Air Force, 1992.
- US Air Force. Air Force Performance in Desert Storm: A White Paper. Washington, D.C.: Department of the Air Force, 1991.
- US Air Force. Reaching Globally, Reaching Powerfully: The United States Air Force in the Gulf War--A Report. Washington, D.C.: Department of the Air Force, 1991.
- US Army. FM 100-5, Operations. Washington, D.C.: Department of the Army, 1986.
- US Army. FM 101-5-1, Operational Terms and Symbols. Washington, D.C.: Department of the Army, 1985.
- US Department of Defense. Conduct of the Persian Gulf War: Final Report to Congress, Pursuant to Title V of the Persian Gulf Conflict Supplemental Authorization and Personnel Benefits Act of 1991 (Public Law 102-25). Washington, D.C.: Department of Defense, 1992.
- US Department of Defense. Joint Pub 1, Joint Warfare of the US Armed Forces. Washington, D.C.: National Defense University Press, 1991.

Unpublished Dissertations, Theses, and Papers

- Bingham, Price T., Lieutenant Colonel, USAF (Ret). "Ground Maneuver and Air Interdiction in the Operational Art." Monograph, Center for Aerospace Doctrine, Research, and Education, 1989.
- Drew, Dennis M., Colonel, USAF (Ret). "Airpower in the New World Order." Paper delivered at US Army War College Fourth Annual Conference on Strategy: Strategy in Periods of Transition, 1993.
- Jacoby, Charles H. Jr., Major, USA. "In Search of Quick Decision: The Myth of the Independent Air Campaign." Monograph, School of Advanced Military Studies, 1991.
- Swain, Richard M., Colonel, USA. Untitled draft manuscript on the history of Operation Desert Storm.

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