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**“Battle of Khafji”
Air Power Effectiveness
In The Desert
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TABLE OF CONTENTS

| | |
|---|-----------|
| EXECUTIVE SUMMARY | |
| | 1 |
| INTRODUCTION | |
| | 2 |
| BEFORE THE BATTLE | |
| | 7 |
| THE AIR CAMPAIGN STARTS | |
| | 11 |
| IRAQI ADVANCE | |
| | 13 |
| AIR INTERDICTION | |
| | 18 |
| AIR POWER RESPONSE | |
| | 19 |
| WITHDRAW UNDER FIRE | |
| | 23 |
| AFTERMATH OF KHAFJI | |
| | 24 |
| EFFECTS OF THE GULF WAR AIR CAMPAIGN ON GROUND FORCES | |
| | 25 |
| THE ATTRITION REQUIREMENT AND THE GO AWAY BRIGADE | |
| | 28 |
| DIFFICULTIES WITH BDA | |
| | 31 |
| POSTMORTEM | |
| | 34 |
| CONCLUSION | |
| | 36 |
| APPENDIX A | |
| HISTORICAL PERSPECTIVES ON KHAFJI: AIR POWER VS TROOPS | |
| | 41 |
| APPENDIX B | |
| INTERVIEW WITH GENERAL (RET) CHARLES HORNER, USAF | |
| | 56 |
| APPENDIX C | |
| INTERVIEW WITH MAJ GENERAL (RET) THOMAS OLSEN, USAF | |
| | 63 |
| APPENDIX D | |
| INTERVIEW WITH COLONEL DAVE DEPTULA, USAF | |
| | 72 |
| APPENDIX E | |
| INTERVIEW WITH MAJOR MICHAEL EDWARDS, USAF | |
| | 78 |
| APPENDIX F | |
| INTERVIEW WITH CAPTAIN ROB GIVENS, USAF | |
| | 83 |
| APPENDIX G | |
| INTERVIEW WITH MAJOR PAUL HAVEL, USAF | |
| | 90 |
| APPENDIX H | |
| INTERVIEW WITH CAPTAIN CHARLES STONER, USAF | |
| | 96 |
| APPENDIX I | |
| INTERVIEW WITH TSGT WILLIAM ALEX, USAF | |

| |
|--|
| 102 |
| APPENDIX J |
| INTERVIEW WITH TSGT RON JOHNSON, USAF |
| 107 |
| APPENDIX K |
| INTERVIEW WITH TSGT KEN TAYLOR, USAF |
| 110 |
| APPENDIX L |
| INTERVIEW WITH TSGT CLAY WATSON, USAF |
| 119 |
| APPENDIX M |
| INTERVIEW WITH SSGT BRAD SIMS, USAF |
| 123 |
| APPENDIX N |
| INTERVIEW WITH MAJOR JIM BRADEN, USMC |
| 127 |
| ACRONYMS |
| 140 |
| BIBLIOGRAPHY |
| 143 |
| DISTRIBUTION |
| 149 |

TABLE OF FIGURES

| | |
|--|-----------|
| FIGURE 1: KUWAITI THEATER OF OPERATIONS (KTO) | 2 |
| FIGURE 2: OPERATION DESERT STORM AIRCRAFT BASES | 10 |
| FIGURE 3: THE KHAFJI BATTLEFIELD | 13 |
| FIGURE 4: BOEING/GRUMMAN E-8A JSTARS | 20 |
| FIGURE 5: KILLBOX GRID OF KUWAIT AND SOUTHERN IRAQ | 21 |
| FIGURE 6: 30 MILE BOX AROUND THE WASHINGTON BELTWAY | 22 |
| FIGURE 7: MECHANIZED DIVISION VEHICULAR STRENGTH | 29 |
| FIGURE 8: TANK DIVISION VEHICULAR STRENGTH | 30 |
| FIGURE 9: BATTLEFIELD ATTRITION, 23 FEB. 1991 | 34 |

EXECUTIVE SUMMARY

Gulf Lesson One is the value of air power. President George Bush¹

On the night of 29 January, 1991 elements of an Iraqi Corps attacked forward deployed units from Saudi Arabia, Qatar and the US Marines south of the Saudi Arabian/Kuwaiti border. The Iraqis seized the Saudi town of Al Khafji before being stopped by coalition air power and ground units. Saudi Arabian National Guard forces, reinforced with Qatari tanks, and supported with coalition air power reclaimed the town on the 31st of January. Coalition air interdiction efforts conducted inside of Kuwait prevented the Iraqi reinforcements from ever reaching Khafji, allowing the in-place coalition ground forces to deal with the Iraqi offensive.

Coalition air supremacy permitted air power to execute perhaps the ultimate flanking maneuver in the third dimension and enveloped Iraqi follow-on reinforcements from the air. Thus the Iraqi attempt to draw the coalition into a ground war of attrition, at a time of their choosing, failed. CENTCOM retained the initiative, did not have to reposition any coalition ground forces in response, and was able to continue moving coalition ground forces westward for the eventual flanking attack sometimes referred to as the “Great Wheel,” or the “Hail Mary” as General H. Norman Schwarzkopf referred to it.

AFSAA is re-creating this battle for the Chief of Staff of the Air Force (CSAF)

and the Director of Modeling, Simulation and Analysis (AF/XOM). This battle provides a historical demonstration of air power effectiveness against moving armor in the desert, and will provide a framework for further analysis. Information has been extracted from numerous documents and interviews with actual “Battle of Khafji” combatants. This information is supplemented with the best available intelligence and US Army Training and Doctrine Command (TRADOC) standard ground force employment and tactics information to provide the higher levels of detail needed for a re-creation in a mission-level model.

This document presents initial and unclassified background information on the battle. General information about the conflict, the air campaign, bomb damage assessment (BDA), air power effects on ground forces, and other relevant information is also presented. The additional information will foster a better understanding of the “Battle of Khafji” and general air power effectiveness in the desert. Selected transcripts of interviews conducted for the project, which contain significant information, are included as appendices.

Continuing work will re-create battalion and brigade size portions of the battle in a mission-level model, and overall Operation DESERT STORM activity in a campaign level model for analysis purposes. Mission level modeling and simulation will have a real-time virtual capability. This battle re-creation will then provide a historically based framework for analysis of force structures, weapon systems, tactics, surveillance, command and control, and their interactions.

The lesson from the “Battle of Khafji” is that air power can be very effective against massed and moving ground forces in the open desert. This in and of itself is not a new lesson, as a review of modern military aviation in warfare has shown. The new twist to this lesson from the “Battle of Khafji,” is that *air power can effectively attack these moving ground forces, even when they imagine they are concealed by darkness.*



Figure 1: KUWAITI THEATER OF OPERATIONS (KTO)

INTRODUCTION

War is a matter of vital importance to the State, the province of life or death, the road to survival or ruin. It is therefore mandatory that it be thoroughly studied. Sun Tzu²

This report is part of an effort on the part of the Air Force Studies and Analyses Agency (AFSAA) to re-create the historical Operation DESERT STORM “Battle of Khafji” for the Chief of Staff of the Air Force (CSAF) and the Air Force Director of Modeling, Simulation and Analysis (AF/XOM). The overall objective is to analyze the effectiveness of air power, demonstrated during Operation DESERT STORM, as a combat resource for a warfighting CINC. This is an effort to gain a better understanding of air power effects on fielded ground forces and to provide better calibration for commonly used analysis models since they may not adequately represent and integrate the full range of air power capabilities at present. An added benefit will be an increased virtual modeling and simulation capability for the Air Force. To fully understand the “Battle of Khafji” requires a quick review of Operation DESERT STORM and of the air campaign. In addition, one cannot fully understand the outcome of the “Battle of Khafji” and its implications without an understanding of air power effects in general, and specifically those effects demonstrated in Operation DESERT STORM.

The “Battle of Khafji” is a suitable combat operation to analyze for several reasons. It was the first and only ground offensive action initiated by Iraqi forces during Operation DESERT STORM. The offensive involved some of Iraq’s better units, such as the 5th Mechanized Division. Just days before this battle, the air campaign had shifted its focus to attacks on the fielded ground forces in Kuwait. Therefore, most of the Iraqi equipment involved was still intact or undamaged; they were also relatively well supplied, and their morale hadn’t been severely eroded yet. Indeed, one of the Air Naval

Gunfire Liaison Company Officers (ANGLICOs) attached to the Saudi Arabia National Guard unit that reclaimed Khafji, asserted the Iraqis that made it into Khafji were top notch troops who were well supplied with arms, equipment, food and water, and especially anti aircraft artillery (AAA) pieces and ammunition.³ Since the Iraqi units involved were heretofore mostly intact, the study will show the effects of air power on fresh battle ready Iraqi forces on the offensive, and not the effects on a pummeled and beaten force trying to retreat as a study of later actions might have produced. Also, air power was given the major role in this battle as CENTCOM was busy redeploying forces in preparation for the “Great Wheel” flanking attack, and didn’t want to reposition any coalition ground forces, nor divert any US Army forces from their movement westward. In addition, the Saudi Arabians had a great interest in retaking the town themselves, and their success demonstrated their combat ability and boosted coalition morale.

In general, air supremacy assured the coalition uncontested use of the air and denied it to the Iraqis. In-place coalition units consisted of a Saudi Arabian National Guard (SANG) Brigade reinforced with Qatari tanks, two US Marine battalions of light armored infantry (LAI) and artillery to hold against the initial attacks. Attacking Iraqi elements came from two separate Corps and included one armored division, two mechanized divisions, an infantry division, and special forces. With close air support (CAS), the in-place units held against the attacks, except at Al Khafji.

The citizens of Al Khafji had already abandoned the city at the direction of the Saudi government and the city was screened by light forces that withdrew under Iraqi attack. Air interdiction destroyed much of the follow-on Iraqi reinforcements, and totally disrupted the entire operation. Once the Iraqis in Khafji were cut-off from reinforcement, the coalition was able to reclaim Khafji. The failed attempt at Khafji was a turning point in Operation DESERT STORM. Afterward, the Iraqis attempted no other offensive actions and only dug in deeper, dispersed their forces more widely, and otherwise attempted to survive the continuing air strikes. The coalition victory had a positive effect on morale and showed that the “battle-hardened” Iraqis could be defeated. The foundations were laid for greater cooperation between the coalition forces, and valuable lessons were learned allowing better coordination of air and ground power in the coming ground war.

The true magnitude of the Iraqi operation was not even realized at that time because the ongoing actions and preparations for the upcoming ground war did not allow sufficient time, or resources to adequately analyze the “Battle of Khafji” at that time. In addition, so few Iraqi units actually made it to the front because of the effectiveness of the air interdiction, the attack appeared smaller than it actually was. Indeed, many references to the “Battle of Khafji” only refer to the limited ground action in and around Khafji, with only minor reference to the interdicted reinforcements. In retrospect, air power gave the warfighting CINC, General Schwarzkopf, the capability to crush the Iraqi offensive action, and to retain the initiative and continue preparations to execute the ground war, at a time of his own choosing, without being prematurely drawn into a potentially bloody ground war by the Iraqis.

When blows are planned, whomever contrives them with the greatest appreciation of their consequences will have a great advantage.
Frederick the Great⁴

The “Battle of Khafji” was the first time in history that air power was successfully employed against large units moving at night. Joint Surveillance Target Attack Radar System (JSTARS) and other real-time surveillance systems provided the information necessary to successfully target those maneuvering ground units. Nearly the entire range of Operation DESERT STORM coalition strike aircraft were then used in an interdiction effort to attack, halt, and turn back follow-on reinforcements inside of Kuwait. Meanwhile, those aircraft best suited for close-in work, such as the AV-8 and the A-10, were used to provide CAS for the outnumbered US Marine, Saudi Arabian, and Qatari ground forces in and around Khafji. The battle’s outcome demonstrates the effective synergy between surveillance and reconnaissance to include airborne real-time intelligence, command and control, and strike aircraft to achieve the CINC’s goals, which in this case was to handle the Iraqi attack without diverting additional ground forces.

This project examined data from intelligence organizations, historical archives, interviews with combatants and leaders, and written accounts. Various written accounts cover the CAS supported ground battles in and around the town of Khafji. However, data necessary to re-create movements, combat actions, and results or battle damage assessments at the vehicle level of detail for actions occurring inside of Kuwait have been difficult to find, or in some cases, nonexistent. In general, various data sources are incomplete, many times contradictory, and in some cases perhaps wrong.

Very few Iraqi documents covering intentions, attack plans, orders, troop strengths, outcomes, or other details are available. Indeed, not much postwar analysis of captured or destroyed Iraqi equipment is available for various reasons. Furthermore, some air power effects are somewhat elusive and difficult to quantify for model use. Any real measure of air power effects must be more than a mere tally of destroyed or damaged vehicles or casualties per sortie flown or munitions expended. Indeed, the larger component of air power effects may be the psychological effects of air strikes.

Unfortunately, available data on the coalition forces is only slightly better. The ground force information at the vehicle level of detail is also lacking for the coalition forces. The air power information is more complete, but still lacking somewhat. Indeed, a recent study conducted by the Government Accounting Office (GAO) encountered similar data limitations and deficiencies.⁵ Documented sources do contain a fairly accurate accounting of fixed wing sorties employed, but lack any information on rotary wing assets employed. The sources also do not accurately account for the actual re-targeting, weapons used, and the subsequent bomb (or sometimes battle) damage assessment (BDA). Indeed, BDA was a hotly contested issue during Operation DESERT STORM, and there may have never been a reliable tally of vehicles destroyed.

Therefore, the best available information from intelligence, operations and other appropriate sources have been used to augment existing data to either supply missing

details or provide higher levels of detail required for modeling and simulation. In addition to this report, ongoing efforts will re-create the “Battle of Khafji” within a Simulated Warfare Environment Generator (SWEG) scenario. SWEG is a mission-level, many on many, Distributed Interactive Simulation (DIS) capable model, with virtual or constructive modes. This re-creation will be augmented with an analysis of JSTARS data files from the battle to calibrate a THUNDER campaign level scenario for further analysis.

The military student does not seek to learn from history the minutiae of method and technique. In every age these are influenced by the characteristics of weapons currently available and the means at hand for maneuvering, supplying, and controlling combat forces. But research does bring to light those fundamental principles, and their combinations and applications, which, in the past, have produced success. General of the Army Douglas McArthur, USA⁶

An abbreviated analysis of air power effects on ground forces throughout history was completed for comparison with the air power effects observed at the “Battle of Khafji.” Historical examples where ground forces were detected and targeted with sufficient air power resources were examined to determine if the Battle of Khafji outcome was consistent with historical battles. Air power has been applied in a variety of situations and environments throughout military aviation history. In summary, air power effectiveness against ground forces during the “Battle of Khafji,” is consistent with air power effects in similar situations. However, only similar situations were considered in this analysis. An in-depth summary is included in Appendix A. This historical analysis also provides valuable qualitative insights to better calibrate common analysis models. Of course technology has changed throughout history, on both sides, however, Trevor Dupuy recently did note that “History provides a base from which the anticipated effect of the new technology can be judged. History also provides insights into the performance of human beings in war, and despite new technology, combat remains a very human undertaking.”⁷

If we lose the war in the air, we lose the war, and we lose it quickly. Field Marshal Montgomery, Royal Army⁸

The tremendous impact air power can have on a modern battlefield was amply demonstrated by the Battle of Khafji. Throughout modern history airpower has shown enormous potential to control and influence the results of a ground engagement by slowing reinforcements and disrupting the flow of supplies headed for the front. Since the advent of airpower, armies have tried to move, eat, sleep, dig, and camouflage themselves by night, to lessen the chances of detection.⁹ Until recently, the great limitation of air power has been the relative inability to operate effectively against moving ground forces during hours of darkness. (See Appendix A: Historical Perspectives on Khafji: Air power versus Ground Forces). The Battle of Khafji, as a subset of the entire Gulf War effort, demonstrated that air power can finally operate at all hours of day and night, and effectively deny the sanctuary that darkness had long

provided moving Armies.

The coalition air campaign that led off Operation DESERT STORM featured several historically significant points:

- Complete domination of the skies over the enemy homeland. The *aerial supremacy* achieved by the coalition air forces meant that the Allies could pick the times and locations of strikes and assure that their ground forces would never face an airborne threat to restrict their freedom of maneuver. In particular, it allowed the US Army to conduct unobserved its “Great Wheel” movement that completely flanked the Iraqi Army and inevitably led to its final defeat
- Denial of the night sanctuary: Never before in air warfare has one side been able to deny the use of night as concealment by an Army attempting to mass or maneuver large forces in the field.
- Real-time intelligence of enemy rear-area movements. The E-8A JSTARS and other assets gave commanders an unprecedented ability to know what the Iraqis were doing well beyond any capability previously demonstrated on the battlefield.

General Ronald Fogleman recently noted the some of these same advantages the coalition commanded during Operation DESERT STORM. These advantages allowed the coalition to leverage their sophisticated military capabilities to achieve US objectives in an effective application of an asymmetric force strategy.¹⁰

BEFORE THE BATTLE

Air power has become predominant, both as a deterrent to war, and -- in the eventuality of war -- as the devastating force to destroy an enemy's potential and fatally undermine his will to wage war.

General of the Army Omar Bradley, USA¹¹

Many intelligence agencies, at least initially, assessed that Saddam Hussein did not merely intend to take over Kuwait, but had offensive designs on the entire Persian Gulf.¹² However, the opposing array presented to coalition Air Forces soon became one of a primarily defensive ground force that included many green conscripts deployed and dug in across the Kuwaiti and Iraqi desert. However, those defensively arrayed forces only represented a part of a considerable threat with an estimated 1.2 million men, 5,500 tanks, 7,500 armored personnel carriers, 3,500 artillery tubes, supported with an air defense system, surface-to-surface missiles, attack helicopters and other fixed wing aircraft.¹³ One of the first US responses was a true demonstration of the Air Force's “Global Reach-Global Power” vision.¹⁴ F-15s from the 1st Tactical Fighter Wing, supported with KC-135 tankers were in place on Saudi soil within 38 hours of the president's “Go” authorization.¹⁵ Indeed, a full ten squadrons of fighters had deployed to Saudi Arabi during that first week.¹⁶ Coalition air, ground and sea forces continued to build for the next several months.

To counter coalition air power, the Iraqis counted heavily on the protection provided by surface-to-air missile (SAM) and AAA systems, as used by other Soviet client states in earlier wars against the US or its allies. What the Iraqis did not foresee was the impact American Suppression of Enemy Air Defense (SEAD) campaign would have on the air war. These systems, developed after Vietnam, would be able to virtually shut down the Iraqi air defense system, and provide a medium-to-high altitude sanctuary from which coalition aircraft could attack Iraqi ground forces. Coalition air supremacy provided the ability to operate at will over Iraqi skies, rendering Iraqi ground units vulnerable to the air interdiction forces, and sealed the fate of many of these forces. This outcome of Operation DESERT STORM prompted the Soviet Minister of Defense, Marshal Dmitri Yazov, to state that a complete review of Soviet air defenses was needed.¹⁷

If the enemy has air supremacy and makes full use of it, then one's own command is forced to suffer the following limitations and disadvantages:

By using his strategic air force, the enemy can strangle one's supplies....

The enemy can wage the battle of attrition from the air.

Intensive exploitation by the enemy of his air superiority gives rise to far-reaching tactical limitations for one's own command. Field Marshal Erwin Rommel¹⁸

The two protagonists in Operation DESERT STORM, not surprisingly, approached the coming conflict with opposite views on how best to wage war. The Iraqis experience from a long and bloody war with neighbor Iran, viewed coalition air power as dangerous, but not decisive to the final outcome.

“The United States depends on the Air Force. The Air Force has never decided a war.” said Saddam Hussein to CBS News in August, 1990.¹⁹ The Iraqi leader counted on a repeat of the “Vietnam syndrome”, where thoughts of thousands of body bags returning to the United States would render the country unable to fight. “Yours is a society which cannot accept 10,000 dead in one battle.” he said.²⁰ Hence, his country's strategy would be almost the same as it had been for Iran, layered ground defense that would cause severe casualties in any Army foolish enough to conduct frontal assault. Saddam seems to have been a master of propaganda and used the media to spread the word that his army could enforce terrible attrition on enemy troops. Elaborate drawings of typical Iraqi fortifications in Kuwait appeared in many media outlets. Considerable publicity was given to reports that Iraq had effective chemical and biological weapons, and that they would be delivered against troops caught in an extensive belt of obstacles. By the end of 1990, Saddam was predicting huge US casualties, and he was willing to lose as many as two million Iraqi lives in order to inflict those casualties.²¹ Even former Army Chief of Staff General Edward C. “Shy” Meyer estimated 10,000 to 30,000 American casualties against dug-in Iraqi troops.²²

The American view of war had been developed over the 20 years since Vietnam,

and was also influenced by Israeli desert wars. Nonetheless, the Americans' Army was wary of its Iraqi counterpart. General Norman Schwarzkopf, the head of coalition Forces, was as concerned about sustaining American losses as Hussein was about inflicting them. Therefore, he was determined to reduce the strength of the Iraqi Army, as much as possible, through air power. In particular, Schwarzkopf required the Air Force destroy half the Iraqi ground forces before even starting the ground offensive.²³

Air power can either paralyze the enemy's military action or compel him to devote to the defense of his bases and communications a share of his strained resources far greater than what we need in the attack. Winston Churchill²⁴

The Iraqis appear to have been surprised by the magnitude and violence of the American-led air campaign that was entirely separate, but integrally related to the future success of the planned ground war. The planned attacks for the first day alone, included more targets than the total number of targets hit by the entire Eighth Air Force in all of 1942 and 1943.²⁵ The Iraqis, having faced American trained Iranians during their war with their neighbor, did not expect an air attack to last more than three to seven days before initiation of ground combat.²⁶ Soviet Marshall Sergei Akhromeyev explained that "according to classical theory and exercise practice in recent years, five to seven days are allotted to independent air actions" in a combined-arms operation.²⁷

When Operation DESERT STORM kicked off on the night of 17 January, 1991, few foresaw that the first six weeks of the war would consist almost entirely of air strikes throughout the length and breadth of Iraq. The Iraqis, confident in their French-built Kari air defense system that had handled the Iranians, could not conceive of an air campaign of the nature the coalition forces were planning. Where their Persian neighbors had sent small numbers of aircraft the Allies would send hundreds coming from bases throughout the world, (Figure 2) completely overwhelming Iraqi air defenses.

On the one hand the coalition planners expected a stronger response out of the Iraqi air force, due to the sophistication and variety of modern Western and Soviet weapon systems. On the other hand, the coalition probably should not have been surprised with the extremely light response. During the Iran-Iraq war the most important mission for the Iraqi air forces was to deter the enemy from escalating the conflict in strategic terms. Therefore, maintenance of that deterrent capability and thus attrition became vital considerations. Losses in that war caused the air forces to largely abandon the offensive initiative and replace it with a conservative posture.²⁸ This led both sides to an extreme sensitivity to offensive attrition, particularly when there is little prospect of quickly replacing losses.²⁹ During the Iran-Iraq war, Saddam Hussein proclaimed he would not allow the Western media to force him to use up his air force and said, "We will not use our air force. We will keep it. Two years hence our air force will still be in a position to pound (Iranian President) Bani-Sadr and his collaborators."³⁰ Iraqi behavior with air power during Operation DESERT STORM was much the same as during the Iran-Iraq war, as evidenced by their extraordinary efforts to retain their air forces, and the

coalition should not have surprised by the relative inactivity of the Iraqi air force.

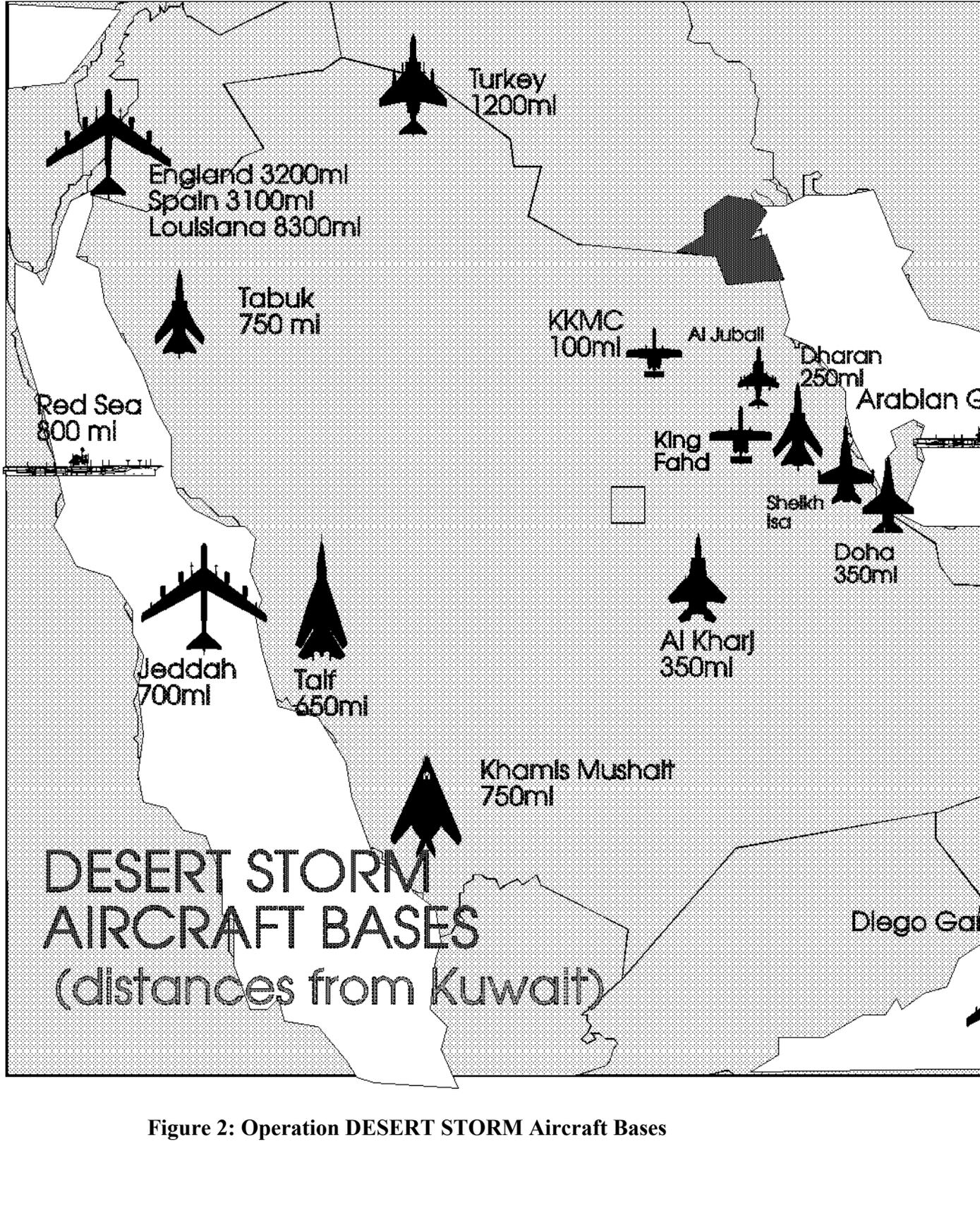


Figure 2: Operation DESERT STORM Aircraft Bases

THE AIR CAMPAIGN STARTS

It is absolutely true in war, were other things equal, that numbers -- whether men, shells, bombs, etc. -- would be supreme. Yet it is also absolutely true that other things are never equal and can never be equal. There is always a difference, and it is the differences which by begging to differ so frequently throw all calculations to the winds. Maj Gen J.F.C. Fuller, Royal Army³¹

At the start of the war in January, 1991, the Iraqi Army in the Kuwaiti Theater of Operations (KTO) was estimated to be at 530,000 men; about 4,300 tanks, 2,700 armored fighting vehicles, and 3,000 artillery pieces. Later estimates stated these counts were far too high, and that Iraq never had more than about 300,000 troops in Kuwait and just inside Iraq.³² In fact, Jane's Intelligence review reported, "the army has consistently operated with a hollow organizational structure. Its large numbers of divisions have never been manned and equipped according to their tables of organization and equipment.... Divisional structures were often intended to be filled out by reservists or additional conscripts in time of crisis... This discrepancy between nominal and real strength certainly deluded outside observers during the Gulf crisis, and it is quite likely that it deluded Saddam himself as to the true state of his military establishment."³³ Whatever their size, these units, deployed throughout the desert, would become the primary targets of 23,430 sorties or 56.3% of air attack sorties targeted surface forces during the war.³⁴

It is worth noting that there were two main purposes for starting and sustaining air operations for several weeks before commencing the ground war. A simple tally of the estimated combat forces of the two opposing sides before the air campaign started on January 17th, would show Iraq as having the numerical advantage in nearly any category, except air power. Rules of thumb dictate at least a three-to-one advantage before launching an offensive and a six-to-one advantage is desirable at the point of penetration to ensure success. This advantage can be achieved in a number of ways to include massing an overwhelming force in front of a weak spot in the enemy's defenses, or by wearing down the enemy's defenses with fires before beginning combat.³⁵

The air campaign was designed to accomplish the former and facilitate the latter. Phase III "battlefield preparation" of the air campaign was required to reduce Iraqi armored forces by 50% in order to achieve the desired ratio for a ground attack.³⁶ Additionally, striking the bridges and supply lines isolated the Iraqi forces in the Kuwaiti Theater of Operations (KTO). This was to prevent resupply and reinforcement which could restore the Iraqi strength which was lost through air strikes.³⁷ Therefore isolating the battlefield was required to maintain the more favorable force ratios produced by

sustained air operations against fielded Iraqi forces in the KTO.

The air campaign facilitated the massing of an overwhelming force at a weak spot by limiting Iraqi reconnaissance means, so that the “Great Wheel” could proceed unobserved to catch the Iraqis unaware in the area out west. This was also where they were also weakest. General H. Norman Schwarzkopf made a special point to explain this aspect during a press briefing by saying, “I think this is probably one of the most important parts of the entire briefing I can talk about. As you know, very early on we took out the Iraqi air force. ... Therefore, when we took out his air force, for all intents and purposes we took out his ability to see what we were doing down here in Saudi Arabia. Once we had taken out his eyes, we did what could best be described as the ‘Hail Mary play’ in football.”³⁸ This operation moved a considerable amount of men and equipment to the west, including more than 64,000 wheeled and tracked vehicles and 255,000 soldiers.³⁹ He further explained that, “...once the air campaign started, he [Saddam] would be incapable of moving out to counter this move, even if he knew we made it.”⁴⁰

The future battle on the ground will be preceded by battle in the air. This will determine which of the contestants has to suffer operational and tactical disadvantages and be forced throughout the battle into adopting compromise solutions. Field Marshal Erwin Rommel⁴¹

The Iraqi Army that initially faced the coalition was deployed and dug-in throughout Kuwait and Southern Iraq. The Iraqis firmly believed that just as in their war with Iran, they could inflict serious and politically insupportable casualties on their enemy from defensive positions, and force a favorable end to the war.⁴² The one factor they had not had to contend with before was the constant attention of effective and aggressively employed air power. Beginning on the night of 17 January, coalition air forces struck Iraqi fielded forces along with targets well inside the home country. The Iraqis were faced with the grim prospect of having their Army decimated with no return in the field if a ground war was not soon initiated.⁴³ Perhaps with this concern in mind, Iraq launched a three-prong attack towards the Kuwait-Saudi border on the night of 29 January. (Figure 3)

THE KHAFJI BATTLEFIELD

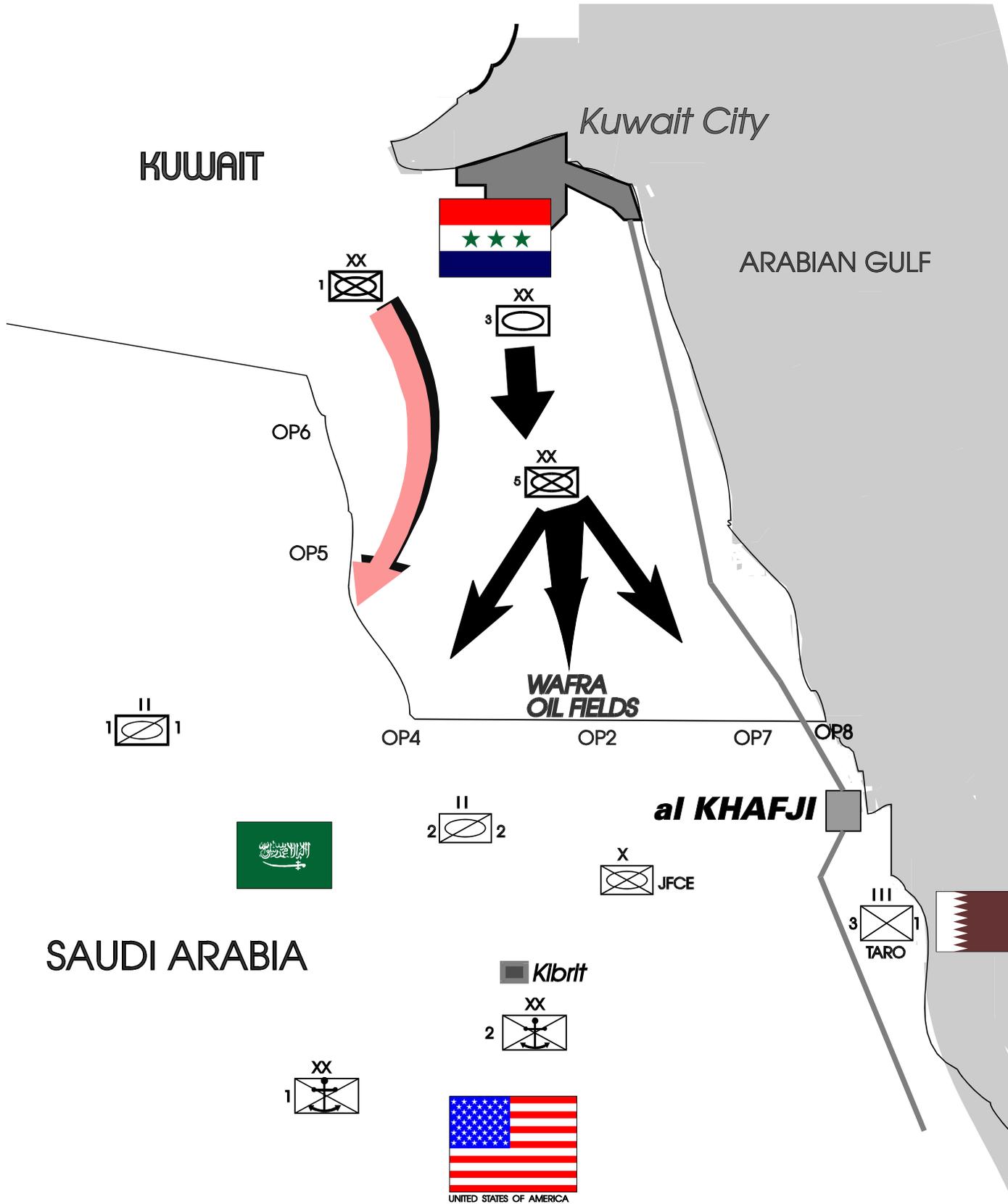


Figure 3: The Khafji Battlefield

IRAQI ADVANCE

As far as Saddam Hussein being a great military strategist, he is neither a strategist, nor is he schooled in the operational art, nor is he a tactician, nor is he a General, nor is he a soldier. Other than that, he's a great military man. General H. Norman Schwarzkopf, USA⁴⁴

Possibly lured into the attack by an elaborate deception effort mounted by the XVIII Airborne Corps, Saddam, blinded and battered by the air operation, had hoped to preempt the coalition ground operation, inflicting as many casualties as possible to embarrass the allies before withdrawing. While the XVIII Airborne Corps was actually in the process of moving to the west, corps and divisional deception teams had established an elaborate electronic and visual signature south of Al-Wafra about 30 kilometers from the border. Intended to mask the corps' movement and deceive the Iraqis into thinking its forward headquarters and units were moving into attack positions, the deception effort may have caused Saddam to jump the gun.⁴⁵

Senior US leaders were publicly proclaiming they were in no hurry to turn to ground fighting. At a joint press conference on January 24th, Secretary Cheney and General Powell contended that the United States has achieved air superiority and was not in a hurry to stop the pounding of Iraqi targets before turning "if necessary" to ground fighting where casualties could be heavy.⁴⁶ General H. Norman Schwarzkopf said, "There are a lot of parallels between what Hussein may be doing and what he did in the Iran-Iraq war." Almost every time he knew the Iranians were planning an offensive, Hussein's first strategy was to sit in his defense in depth and absorb the offense.⁴⁷ Schwarzkopf therefore proclaimed he would not get into a war on Hussein's terms.⁴⁸

Time is necessary to both belligerents,...the only question is: which of the two, judging by his position, has most reason to expect special advantages from time? Clausewitz⁴⁹

Saddam's only chance for any real or even perceived battlefield or political victory would require a casualty laden ground war, which the coalition was proclaiming they were in no hurry to start. "Baghdad radio quoted President Saddam Hussein as denouncing 'the forces of arrogance and evil' arrayed against him during a visit to the front. The broadcast said field commanders had told him the allies were displaying 'cowardice and fear' by waging war in the air and avoiding ground combat."⁵⁰ Meanwhile the entire range of targets, including deployed ground forces, inside of Kuwait and Iraq were being struck by coalition air power. In reality, concentrated attacks on deployed forces in the KTO as part of phase three battlefield preparation were only just beginning in the days prior to the "Battle of Khafji." For example, just a few

days prior to the Battle for Khafji the Tawakalna Division got pounded for three solid hours; a total of 154 planes hit them with bombs, Mavericks, and 30mm bullets.⁵¹

On the morning of January 29th, almost prophetically, the American press had predicted the coming Iraqi offensive, with the Washington Times proclaiming, “Big strike by Saddam expected soon.” They surmised that his hand would be forced by the repeated allied bombing of military sites. “Only an idiot would sit there forever while his military is being destroyed,” a Pentagon source said. “He’ll soon be at the point where it’s use it or lose it.”⁵²

Whatever the reason for initiating the attack, Saddam may have perceived several benefits from the offensive:

- Heighten morale of Iraqi troops by taking the offensive, instead of simply enduring further air attacks with virtually non-existent, or perhaps more accurately non-effective, air defenses
- Humiliate Saudi forces and inflict casualties on coalition troops, especially US troops
- Perhaps split the coalition when Arab forces were faced with the prospect of actually attacking other Arabs in cooperation with non-Arabs
- Take prisoners as a source of intelligence, since Iraqi reconnaissance flights were not possible in the face of coalition air superiority

The Iraqis only had a few units that would be capable of an offensive. Challenging missions like attack, passage of lines, and counterattack could only be accomplished effectively by certain units, principally the Republican Guard and III Corps.⁵³ Units from Iraqi III Corps (including the 3rd Armored, 5th Mechanized and 14th Infantry Divisions) spearheaded the assault. (figure 3.) Of these, the 5th Mechanized Division was considered a “top notch” unit by General Schwarzkopf.⁵⁴ They were supported by a portion of IV Corps, Commandos, and by members of the vaunted Republican Guard held in reserve. Off the coast, several Iraqi commando units sped south on high-speed boats toward Saudi Arabia. Leading the force was Major General Salah Aboud Mahmoud, reportedly one of Iraq’s most capable field officers.⁵⁵

In all, three separate probes crossed the border into Saudi Arabia that night, with advances made across the width of the “bootheel” of Kuwait. (Figure 3) The operation was complicated, involving heavy units from two adjoining corps and at least three divisions in a night passage-of-lines and subsequent attack. Coordination problems were evident as the units missed their passage points in returning. Movement times were slow and often delayed, allowing the coalition to react more quickly.⁵⁶ It should be noted that none of these drives were provided with Iraqi air support, which was still suffering from the effects of two weeks of heavy attrition at the hands of Allied air superiority.⁵⁷

Although the Iraqi air force has in theory a CAS role, they rarely carried out that role in the Iran-Iraq war, except in extremely dire situations. The Iraqis had also learned the possible attrition costs of CAS during the Arab-Israeli war of 1973.⁵⁸ Although the “Battle of Khafji” could have been considered a dire situation on their part, the necessity of preserving their air forces as previously discussed probably outweighed any possible benefits in that situation.

Every soldier generally thinks only as far as the radius of action of his branch of the service and only as quickly as he can move with his weapons.

General Karl Koller, Luftwaffe⁵⁹

Lacking any air cover themselves, the Iraqi battalions leading the attack into Al Khafji suffered great casualties from airstrikes prior to even reaching the town. The Iraqi forces that initially reached Al Khafji were the remnants of the lead three battalions. The equipment remaining from those three battalions amounted to a little more than one battalion would have originally had.⁶⁰ Initial contact with the other advancing Iraqi forces was met by Saudi border units and US Marine reconnaissance teams. Marine Light Armored Vehicles (LAVs), along with hastily diverted Marine and Air Force aircraft, were able to blunt the Iraqi probes in the western and central portion of the “bootheel”. Off the beaches, the commando units were met by English and American naval and helicopter units, which effectively eliminated them from the battle. On the coast road, however, the Iraqis were able to take the Saudi border town of Al Khafji, which they occupied with units of the 5th Mechanized Division at approximately 2100, 29 January.⁶¹

Of course the Iraqis were quick to claim victory, as Radio Baghdad trumpeted the thrust into Saudi Arabia as a move “to teach the aggressors the lessons they deserve,” and it said it had been planned by President Saddam Hussein and senior aides on Saturday.⁶² Iraqi radio proclaimed that the storming of the Saudi town of Al Khafji was the advent of a punishing ground war that would turn allied forces into “food for birds of prey and corpses blown up by the desert wind.” Saddam certainly made some political gains with the attack, as there was jubilation in Jordan and Algiers following the attack, with tens of thousands of Muslims calling for a holy war against the west.⁶³ In fact even after Al Khafji was reclaimed, Saddam was still proclaiming victory by hailing the brief capture of Al Khafji by his troops as “the beginning and omen of the thundering storm that will blow on the Arabian desert.”⁶⁴

However overblown these claims might have been, the action at Al Khafji did “strengthen the impression that Iraqi forces were neither beaten by air and artillery bombardment, nor were they incapable of combat. In fact, the Iraqi forces that made it into Al Khafji put up fierce resistance. Indeed, an US Army officer with combat infantry experience in Vietnam, who observed the battle while advising the Saudis, described the volume of fire from the Iraqis as “flabbergasting.”⁶⁵ The capability to mount an offensive after two weeks of air attack did confirm the impression of a powerful opponent

in the minds of many media representatives and thus the public at large.⁶⁶ The Iraqi offensive prompted a reporter to ask General Schwarzkopf how and why Iraqi troops could muster the force for such attacks after the heavy allied aerial bombardment.⁶⁷ The battle did fuel media speculation on potential casualties from any attack on entrenched Iraqi positions in Kuwait.⁶⁸

Everything in war is very simple, but the simplest thing is difficult. These difficulties accumulate and produce a friction which no man can imagine exactly who has not seen war. Clausewitz⁶⁹

Although CENTCOM had received some indications of a possible Iraqi attack a few days earlier, they were not able to deal with it in an instantaneous manner.⁷⁰ It was after midnight before Generals Horner and Glosson were even aware of the thrust, and initiated a coordinated response.⁷¹ Earlier, the Central Intelligence Agency (CIA) had chosen to discount a tip from based on one of its informants inside occupied Kuwait. Therefore, although they were aware of some Iraqi movement in front of them prior to the attack, other commanders chose to discount the likelihood of an imminent Iraqi attack across the border.⁷² Initial Iraqi intent in the the “Battle of Khafji” was unclear to the coalition and was viewed by some leaders as a minor reconnaissance mission. Marine Corps leaders were convinced the Iraqis were out to destroy a forward logistics base that had been established between their lines and the Kuwaiti border.⁷³ For whatever reason the attack was initiated, it rapidly became clear to CENTAF planners that such a large scale operation by the Iraqis would not be possible without a long logistical tail being exposed across the desert. It was this target that they went after with a vengeance over the next two days through extensive air interdiction.

AIR INTERDICTION

The advantage of the offensive in war is obvious: it disorganizes the enemy, upsets his plans and combinations; the assailant to some extent, imposes on him his initiative, his will. Jean Colin⁷⁴

CENTAF provided the solution to General Schwarzkopf’s direction to deal with the Iraqi offensive without repositioning any other ground forces. Air powers’ unique qualities with respect to speed, range, perspective and three-dimensional maneuverability provided a capability to quickly deal with the Iraqi offensive.⁷⁵ US Marine and Saudi units were provided CAS and a concerted effort was made to isolate the Iraqi forces already in Al Khafji and prevent any reinforcements through air interdiction.⁷⁶

Joint Publication 1-02 defines interdiction as: “An action to divert, disrupt, delay, or destroy the enemy’s surface military potential before it can be used effectively against friendly forces.⁷⁷ Therefore, air interdiction is the application of air power to attack enemy personnel and resources before they engage in surface combat. In some circles,

interdiction is identified almost exclusively as support to friendly forces by merely reducing the flow of men and materials to the enemy front lines.

To have command of the air means to be able to cut an enemy's army and navy off from their bases of operation and nullify their chances of winning the war. General Giulio Douhet, Italy⁷⁸

The intent of interdiction is to hit the enemy as far away from friendly ground forces as practical, in order to prevent them from reaching the front, let alone give them a chance to engage. In descending priority, the objectives of interdiction are to destroy enemy forces and their support before they can be used offensively against friendly forces, limit the military potential of engaged enemy forces, and control the time of engagement to that most advantageous to friendly forces.⁷⁹

However, interdiction goes far beyond this limited scope -- it directly strikes enemy land forces as well as their lines of communication.⁸⁰ Although definitions of interdiction usually refer to preventing enemy forces from engaging with friendly forces, interdiction is fundamentally offensive rather than defensive in nature. The prevention aspect of interdiction usually entails actual destruction of enemy forces.⁸¹ Major General Leslie W. Bray believed improved technology gave air power the potential to “emerge as a significant and perhaps decisive factor for countering enemy land forces in the future.” He referred to this direct attack aspect of interdiction as “counterforce.”⁸² Perhaps the future he envisioned occurred in January of 1991.

AIR POWER RESPONSE

Once the command of the air is obtained by one of the contending armies, the war must become a conflict between a seeing host and one that is blind. H. G. Wells⁸³

Among the first to see that Iraqi forces were moving into Saudi Arabia was the crew of an E-8A JSTARS aircraft. (Figure 4.) The E-8 is a highly modified Boeing 707 aircraft equipped with a synthetic aperture radar which, when in the targeting mode, the radar canis capable of searching a 20-square kilometer area and detecting assembly areas, routes of travel and even individual vehicles to an accuracy sufficient for attack by air or artillery⁸⁴. It was with JSTARS that the war planners were able to rapidly confirm the Iraqi unit movements and identify potentially lucrative target areas. JSTARS's unique abilities gave leaders an unprecedented look at real time intelligence of an enemy army's activities in the field. This intelligence, when combined with a robust airborne command and control net (via E-3 AWACS and EC-130 ABCCC aircraft), allowed tactical commanders to rapidly shift airborne strike assets to meet the needs of a changing battlefield. In one incident, JSTARS was able to divert airborne A-10's and F-16s onto an exposed convoy and destroy 72 out of a total of 80 armored vehicles.⁸⁵

“Front-line Marine commanders near Al Khafji reported that five or six divisions, a force of some 60,000 troops had gathered near the Kuwaiti town of Al Wafra.”⁸⁶ Marine Lieutenant Colonel Dick White, Harrier squadron commander said that 800 to 1,000 Iraqi military vehicles were moving south toward the Saudi border with Kuwait. [US Marine General] “Boomer remarked they were observing, ‘a lot of movement’ among the Iraqis ‘in the last few days. We’re watching very carefully to see if we can discern what he [Saddam] might try to do.’”⁸⁷ “‘There were so many aircraft out there,’ said a marine officer who watched goggle-eyed as the plane zoomed in over his head to attack the Iraqis, ‘that it was like standing on the median of an interstate.’”⁸⁸

There was no line of cleavage between strategic and tactical air forces. It was over-all effort, uniting all types of aircraft, coordinated for maximum impact. General “Tooe” Spaatz, USAAF⁸⁹

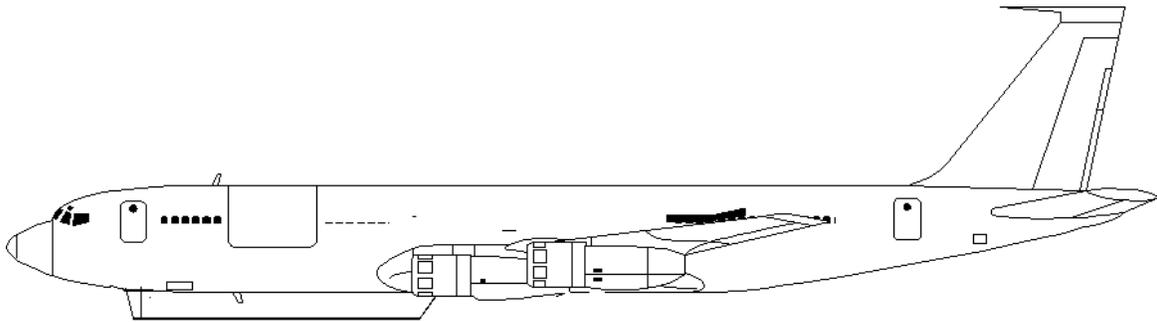


Figure 4: Boeing/Grumman E-8A JSTARS

Once it became apparent the Iraqi Army was in the open, many more strikes were ordered into the area, leading to 262 recorded sorties in the Al Khafji area during the 28 to 31 January time frame.⁹⁰ The first night AC-130H strikes shut down the coastal road and halted reinforcements moving south towards Khafji. A-10s halted reinforcements near Al Wafra moving east towards Al Khafji. Subsequently, types utilized for strikes ran the gamut of American air power deployed to the area, and included the LANTIRN-equipped F-16C, F/A-18, A-10A, A-6E, AV-8B, B-52G, AC-130H, and rotary wing assets. Many of these were assigned to work the AG4 and AG5 “killbox” areas, (Figure 5) 30 mile grid squares located in the southern part of Kuwait where attack aircraft searched out and destroyed targets of opportunity. (For illustrative purposes, Figure 6 depicts a representative 30x30 mile square box superimposed over the Washington Beltway for a sense of size).

These strikes were not without sacrifice however, as the worst single aircraft loss of the war for the Air Force was during the battle of Al Khafji, when a 1st SOW AC-130H *Specter* was shot down by a MANPAD SAM (probably an SA-14 or -16) with the loss of fourteen lives on the morning of 31st.⁹¹ The Spectre may have been trying to

destroy an Iraqi FROG rocket battery to support the US Marines in the area. The Iraqis had expected a strong air power response from the coalition and provided heavy IR SAM and AAA support. Once coalition source thought the Iraqis were attempting to create a “flak” trap at Al Khafji.⁹²

While the Battle of Khafji was occurring, the rest of the air campaign was still underway. Relatively few sorties were actually diverted from the other planned strikes against strategic targets and Republican Guard forces in Iraq and northern Kuwait. In addition, a significant number of sorties were also flown in an effort to eliminate the SCUD threat. The SCUD attacks may have been a rather cheap and effective strategy to divert coalition air power from other uses.⁹³ However, the Iraqi action at Khafji neither diverted large numbers of coalition sorties, nor was it a cheap operation for the Iraqis in terms of equipment destroyed.

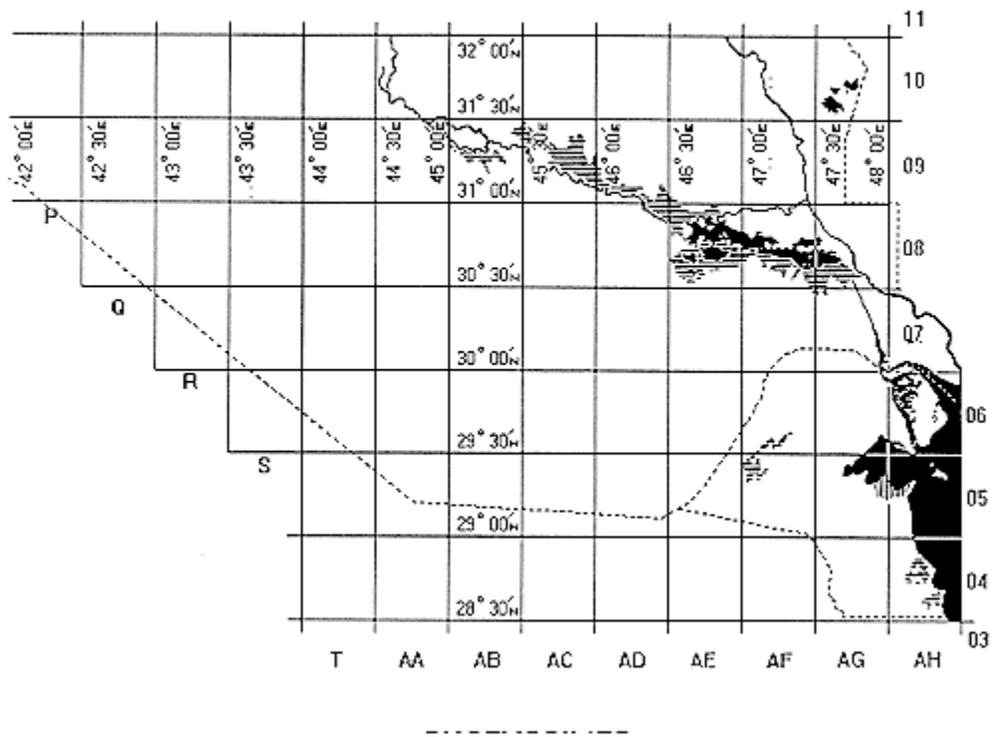


Figure 5: Killbox grid of Kuwait and Southern Iraq

We do know there was some movement, so we went after it. We like to see that, because when the enemy tanks and personnel carriers and other combat vehicles come out of their prepared positions, they're easier targets than when they're in prepared positions. Lt General Thomas Kelly, USA⁹⁴

From the very beginning of DESERT SHIELD, there was some skepticism about the capability of air power to halt moving armored forces.⁹⁵ While air power's capability to destroy stationary forces seems to have been fairly well accepted as evidenced by the "50% attrition" requirement, some may have been misled to believe that without precise fixed targeting coordinates, air power wouldn't be effective. It is certainly true that the various aircraft available to the coalition had diverse equipment, weapons and tactics, and employed them with different effects against moving targets. General Olsen explained, "They were mobile, they were lined up in columns on roads, they were easy find, they were easy to strike, and they became viable targets."⁹⁶

Obviously, there is a great difference between attacking dug-in, dispersed, and camouflaged forces hidden among decoys, and attacking forces massed and on the move. The former present fortified and protected targets that are hidden among multiple revetments and decoys (to include previously struck equipment), and present a formidable challenge to overcome. The latter are clearly visible, at least in the open desert, and are without the protection offered by revetments and decoys making them lucrative targets for air power. "Mass, a valued principle of war, in some situations is a vulnerability."⁹⁷ The "Battle of Khafji" amply demonstrated the effectiveness of air power employed against moving ground forces, night or day.

It is a doctrine of war not to assume the enemy will not come, but rather to rely on one's readiness to meet him; not to presume that he will not attack, but rather to make one's self invincible. Sun Tzu⁹⁸

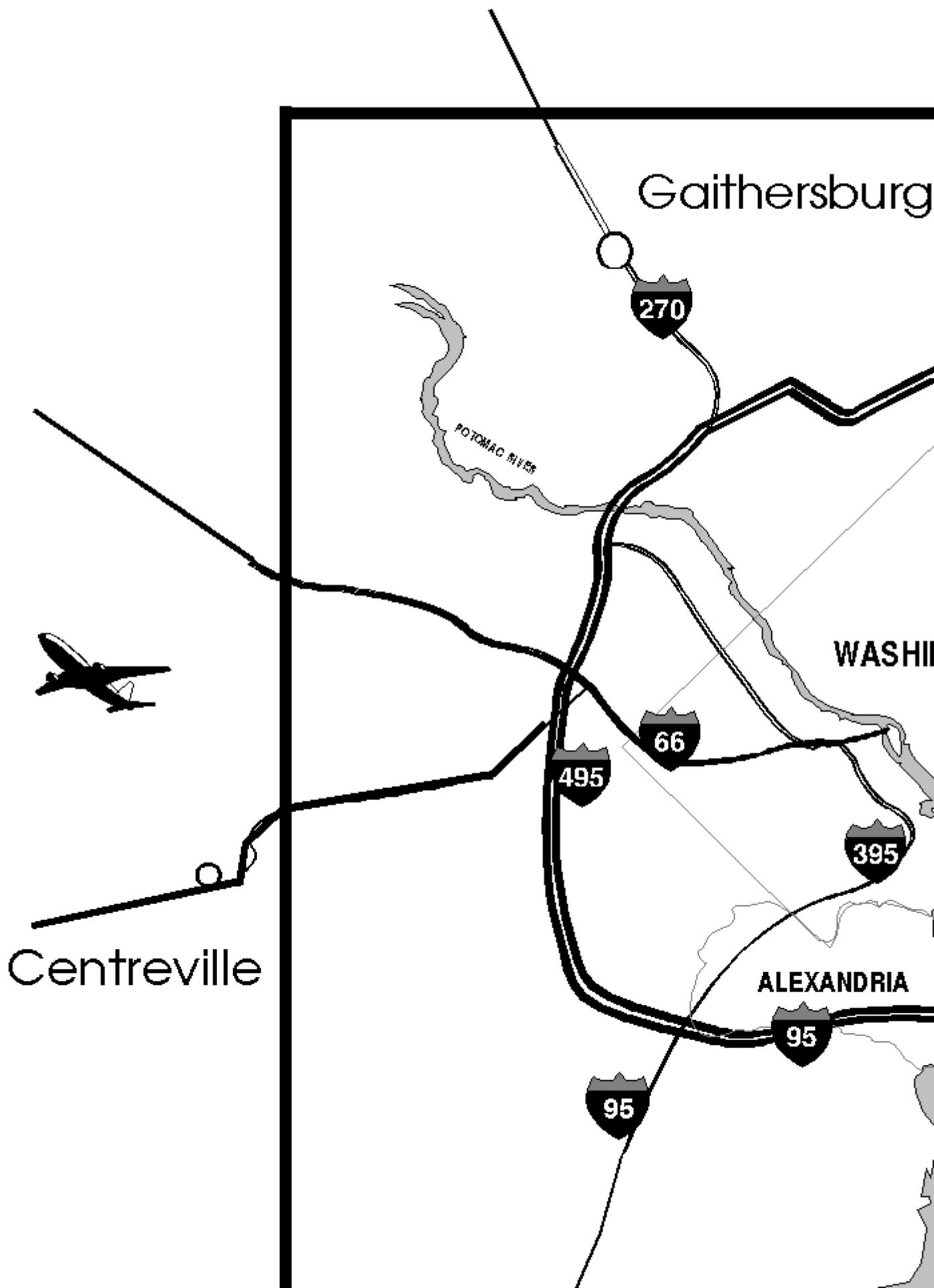


Figure 6: Illustrative 30 Mile Box Around the Beltway

Of course, CENTAF predominately employed those aircraft most suitable to conduct night attacks to halt the night movements into Al Khafji. According to General Horner, “Systems that were especially effective were the AC-130 gunship patrolling the coast road by being just offshore of the coast in southern Kuwait. The A-10s, because they had the infrared Maverick gave them a very limited night capability that proved to be very effective. We used the B-52s against the mobile targets, not individually, but against the areas where they were coming into and leaving. So we were hitting the built-up areas and the amazing thing about the B-52 strikes, while they probably killed very few vehicles, they forced the Iraqis to continually keep on the move and be strung out, so they then fell prey to other systems such as the F-16s and the A-10s.”⁹⁹ Indeed, it was most fortunate for the coalition that those actually entrusted with the task knew how to get the job done despite the skeptics.

WITHDRAW UNDER FIRE

We have the enemy surrounded. We are dug in and have overwhelming numbers. But enemy air power is mauling us badly. We will have to withdraw. Japanese infantry commander, situation report to Headquarters, Burma, World War II.¹⁰⁰

On the morning of 31 January, Saudi and Qatari armored units, with the support of US Marine forces, fought their way into Al Khafji, and pushed the remaining Iraqi forces back across the frontier. Meanwhile, coalition air forces continued battering the enemy units that struggled to retreat across the desert. Iraqi Enemy Prisoner of War (EPW) reports are noteworthy in their almost universal fear of air attack. One Iraqi Captain stated that his brigade, which had been tasked to support units in Al Khafji was stopped dead, short of the border by a combination of air power and Saudi tanks.¹⁰¹ The spearhead 5th Mechanized Division was almost entirely destroyed, and monitored Iraqi reports afterward indicated that only twenty percent of that division made it back.¹⁰² The fear of aircraft attack led some Iraqi units to enter their own minefields, or simply abandon their vehicles altogether. According to one captured officer, he had witnessed more destruction in 15 minutes of retreat than he had seen in eight years of fighting the Iranians.¹⁰³

Brigadier General John A. Liede, the CINC’s intelligence chief, told Schwarzkopf on the 31st: “Sir, I hate to say this but these guys aren’t worth a shit. They can’t put it together in a cohesive way and they can’t operate coherently above a brigade level.”¹⁰⁴ When asked about the battle by a reporter, President Bush remarked, “obviously, there were devastating losses on the Iraqi side -- no question about the amounts of armor that were killed and, regrettably, the loss of life. But there’s no question that this was a humiliating defeat.”¹⁰⁵ President Bush further proclaimed, “Saddam Hussein will not set

the timing for what comes next. We will do that.”¹⁰⁶

AFTERMATH OF KHAFJI

Khafji is a tremendous victory for the Saudi army, it's a tremendous victory for air power, and it's a tremendous victory overall in terms of what happened in Operation DESERT STORM, because it laid the final nail in the coffin of the Iraqi army. General Charles Horner, USAF¹⁰⁷

Although not recognized as such at the time, the battle of Al Khafji was a strong barometer of air power application in the war, and the lopsided victory for the coalition was to become the norm for the remainder of Operation DESERT STORM. The action proved, once again, that an unsupported Army moving in the field is highly vulnerable to air power. It also proved to be an apt demonstration of how strike aircraft, when backed by a robust airborne command and control element, remain a highly flexible and effective option for the warfighting CINC on a rapidly changing battlefield.

General Horner explained, “In many ways the battle of Khafji was downplayed at the time. First of all we really didn't understand what the objectives of the Iraqi army were. Second of all, so few Iraqis actually made it across the border it appeared to be some sort of minor action. And then finally we were so engrossed in the oncoming offense in the western area, the so called “Hail Mary” operation, that we didn't have time to look at it, didn't have time to see it for what it really was. After the war and we had time and you saw the condition of the Iraqi army that surrendered to our oncoming forces that did come across the border, you begin to realize the battle of Khafji was a very critical battle. Because it's the one where the Iraqis were attempting to seize the initiative, its the one where they were attempting to turn around this sort of death spiral their army was caught up with as it was locked in place in the desert and pounded from the air.”¹⁰⁸

“The mere fact that they launched these attacks indicates they have a lot of fight left in them,” said General Schwarzkopf.¹⁰⁹ The coalition was able to effectively deal with a large-scale Iraqi offensive conducted by top notch units while avoiding a large-scale, and potentially bloody, ground effort. The highly effective air interdiction of follow-on reinforcements allowing the smaller light Saudi, Qatari and US Marine units to retake Al Khafji, permitted General Schwarzkopf to later remark on Cable News Network that the fight in Al Khafji was “as significant as a mosquito on an elephant.”¹¹⁰ On a more practical level, the US Army gained some valuable insights from the action at Al Khafji.¹¹¹

EFFECTS OF THE GULF WAR AIR CAMPAIGN ON GROUND FORCES

Air power is, above all, a psychological weapon -- and only short-sighted soldiers, too battle-minded, underrate the importance of psychological

*factors in war. Liddell Hart*¹¹²

Air strikes and artillery have similar firepower effects on ground forces, although air power is not simply flying artillery. Firepower has four major effects on an enemy. The first is the “neutralizing effect,” which prevents movement, observation, or equipment operation. The second is the “material effect,” which is the destruction of equipment. The third is the “lethal effect,” which is the physical destruction of enemy personnel. The fourth is the “morale effect,” which is shock or the demoralization that results among troops under fire. The “morale effect” may render them unable or unwilling to use their weapons, even though no physical damage or injury has occurred, and weaken their resolve to do so, even if they are physically able. The magnitude of these effects are also dependent on the enemy’s training and preparations to resist the effects, through mobility, protection, deception and moral resolve.¹¹³ Furthermore, firepower contributes to the generation of combat power through its relationship with maneuver. Firepower enhances your maneuver capability by suppressing the enemy’s fires and also by disrupting the enemy’s capability to maneuver.¹¹⁴

The following are examples comparing the effects of airpower and artillery. A study of WWII Operation TOTALIZE (Normandy, Aug 1944) compared the effects of artillery and air power. Some objectives were taken with air power more easily than others with artillery. Bombing certainly delivered a far greater weight of fire at greater range more suddenly. World War I lessons also compared air power and artillery by both their physical and morale effects. *Airborne bombardment, was judged to be more effective, lasting for one hour, after which the enemy would probably have recovered and taken advantage of positions in rubble and craters. With Artillery, the morale effect was judged to last just two minutes.* Aircraft were judged better suited for deep attack, but their inflexibility made them less suited to sustained and accurate support during assault phases.¹¹⁵

“To soldiers and citizens on the ground, few experiences are more terrifying than being subjected to an intense and sustained aerial bombardment such as US and allied military forces began this week over Iraq,” proclaimed military experts and historians. The violent explosion of munitions dropped from planes far overhead can obliterate a building and all those inside in a few seconds. The bombs can also generate localized shock waves and air blasts worse than any earthquake or tornado, and blind or deafen those fortunate to survive, experts say. “... During sustained air attack, soldiers and citizens of past wars recall feeling helpless and dazed, their ears bleeding, comrades stumbling or cowering from the combined effects of surprise, concussion and noise.... Under such firepower, even battle-hardened soldiers in World War II and Vietnam sometimes fled from bunkers or were found unable to fight.”¹¹⁶

Loss of hope, rather than loss of life, is the factor that really decides wars, battles, and even the small combats. The all-time experience of warfare shows that when men reach the point where they see, or feel, that further effort and sacrifice can do no more than delay the end, they commonly lose the will to spin it out and bow to the inevitable. Liddell

*Hart*¹¹⁷

Enemy Prisoner of War (EPW) interviews at the end of the war are laced with fear and respect of Allied air power. In report after report, EPWs stated that front-line units were ill supplied with basic necessities such as water and food because of the disruption of the Iraqi supply system. Tank crewmen well back from the lines found that even staying near their vehicle was an invitation to personal disaster as Allied aircraft attacked specific vehicles with laser guided bombs day and night. Although the actual numbers of tanks destroyed appears to be lower than originally believed, the psychological impact of these attacks cannot be under-emphasised. Information from captured Iraqis prior to the ground war were summarized by General Schwarzkopf as he recalled, "They all say the number of line crossers would be greater if not for the minefields, the Republican Guard, and fear of retaliation against their families. They all say as soon as the ground war begins their compatriots will surrender in large numbers."¹¹⁸ Despite any arguments about the accuracy of reports given by those who might have been predisposed to surrender anyway, they did prove to be accurate assessments of the will to resist on the front-line, as the ground war would later prove.

"We wanted to maximize the shock that relentless bombardment can produce" General H Norman Schwarzkopf, US Army¹¹⁹

Air power, when properly applied, can dominate the battlefield and pave the way for friendly ground forces. In Operation DESERT STORM, air power also proved to be of significant psychological value, as by the end of the war, the mere appearance of aircraft was frequently enough to induce the surrender of Iraqi troops.¹²⁰ After weeks of bombing, regular Iraqi Army units were short of supplies due to loss of transport and material from air attack. Supply columns that tried to operate at night frequently came under attack from Forward Looking InfraRed (FLIR) equipped aircraft such as the F-111F, A-6E, and LANTIRN-equipped F-16C. A-10s were also very effective at night as their pilots had developed a tactic using the infrared display from the Maverick missiles they carried for night detection and targeting. B-52 strikes were found to be particularly frightening. Even when a neighboring unit was under attack, Iraqi soldiers were impressed by the sounds and trembling of the ground, and thus the actual strike effectiveness was somewhat irrelevant. The psychological effects of the bombing were often more effective than physical destruction. Once tank-plinking¹²¹ began, tankers and troops left their vehicles, as they knew to stay on board would sooner or later bring death.¹²² All of these attacks had a massive psychological effect on the troops in the field. As eloquently stated in Air War in the Persian Gulf:

"Iraqi soldiers had no idea of whether bombs impacting down the road were hitting targets or not; psychologically, the air attacks added to the sense of an endless terror - a situation moreover, where the Iraqis could undertake no action to retaliate for the punishment that coalition aircraft inflicted on them."¹²³

It was not appreciated, and has scarcely been appreciated today, that the fighting power of an army is the product and not the sum of the arms

*composing it. Maj Gen J.F.C. Fuller, Royal Army*¹²⁴

While this was going on, the coalition forces were free to maneuver at will, while operating under the air umbrella provided by F-15C *Eagles*, F-14 *Tomcats* and other coalition fighters. During the war there was only one known attempt by the Iraqi air force to penetrate south of their forces, and during this engagement two aircraft were shot down by a Saudi F-15C *Eagle*.¹²⁵

Largely unremarked in the war is the potential chaos that would have been created if Iraqi aircraft such as SU-24s or MiG-23s had penetrated into Saudi Arabia and struck supply depots and American troops in the open. One American media observer remarked: "If an Iraqi pilot had managed to penetrate the airspace over the border area during the great shift west, he would have been stunned by the panorama below. It was mile after mile of tank transporters, gasoline tankers, troop and ammunition carriers... I shudder to think what a couple of Iraqi planes could have done to that column on a strafing and bombing run."¹²⁶

*The Iraqi army was demoralized and lost its combat capacity due to powerful air strikes. Soviet Marshal Sergei Akhromeyev*¹²⁷

Even more telling is the impact the war had on foreign observers, notably former American adversaries such as the Soviets. The USSR had equipped a good portion of the Iraqi Army, and had no small amount of interest in its equipments' Gulf War performance. The severity of the Allied air campaign astonished even the Soviets, and they quickly realized that the best equipment that they could build was of little use against American air power as employed over Iraq. Soviet Colonel General Deinekin bluntly stated "the tank inventory of 40,000 vehicles in our country has become pointless in modern war..."¹²⁸. In the end, the Soviets had to draw the conclusion that the Allies owned the night, and could operate their air forces with impunity.¹²⁹

THE ATTRITION REQUIREMENT AND THE GO AWAY BRIGADE

*Objectives vary considerably in war, and the choice of them depends chiefly upon the aim sought, whether the command of the air, paralyzing the enemy's army and navy, or shattering the morale of civilians behind the lines. This choice may therefore be guided by a great many considerations -- military, political, social, and psychological. General Giulio Douhet, Italy*¹³⁰

As 1991 arrived, Allied forces had 740,000¹³¹ troops facing an estimated 450,000 Iraqis in the Kuwaiti desert.¹³² Many military experts state that an attacking force requires an advantage of 3:1 to guarantee victory, and 5:1 when attacking well entrenched troops.¹³³ In any case Trevor Dupuy surmised from an exhaustive study of historical

battles that, “When all of the circumstances are quantified and applied to the numbers of troops and weapons, the side with the greater combat power on the battlefield is always seen to prevail.”¹³⁴ Faced with odds of about 1.5:1, coalition commander General Schwarzkopf called upon his air forces to inflict 50% attrition on the Iraqi ground forces before he initiated the liberation of Kuwait.¹³⁵ Not only would this attrition help ensure coalition ground victory, but would drastically decrease the number of coalition casualties sustained in the process. (Figure 7 and Figure 8 are provided for reference, and depict Iraqi divisional strength figures in tabular form, along with strength levels at increasing levels of attrition.)

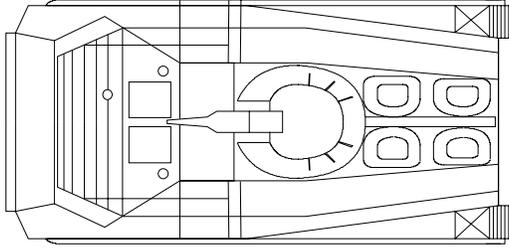
Although air power had been used for decades to pummel enemy forces prior to ground attack, the request for a one-half reduction of strength was unprecedented, and hints at a great desire on the part of General Schwarzkopf for air power to greatly reduce the amount of coalition casualties by taking the fight out of them prior to any ground action. During WWII, heavy bombardment by 14 and 16-inch naval guns and/or massed airstrikes were considered necessary to “soften up” defenses prior to landing Marines in the Pacific theater and artillery and/or airstrikes were repeatedly used to weaken defenses in the European theater, but the use of a hard number to work towards was probably unprecedented in warfare. The problem facing coalition leaders was how to judge the effectiveness of their air efforts.

| | |
|--------------|----------------|
| | unit |
| | Tanks |
| | APC/IFV |
| | Trucks |
| | TOTAL |
| | Div HQ |
| | 0 |
| | 3 |
| | 49 |
| | 52 |
| | MR BG |
| | 35 |
| | 105 |
| | 245 |
| | 385 |
| | MR BG |
| | 35 |
| | 105 |
| | 245 |
| | 385 |
| Tank Rgt/Bde | |
| | 105 |
| | 35 |
| | 228 |
| | 368 |
| | Arty Rgt |
| | 0 |
| | 96 |

| | |
|--------------|-------------|
| | 272 |
| | 368 |
| AT Bn | |
| | 0 |
| | 32 |
| | 26 |
| | 58 |
| AD Rgt | |
| | 0 |
| | 8 |
| | 121 |
| | 129 |
| Recon Bn | |
| | 0 |
| | 41 |
| | 46 |
| | 87 |
| Eng Bn | |
| | 0 |
| | 5 |
| | 50 |
| | 55 |
| Sig Bn | |
| | 0 |
| | 0 |
| | 68 |
| | 68 |
| Trans Bn | |
| | 0 |
| | 0 |
| | 390 |
| | 390 |
| Maint Bn | |
| | 0 |
| | 0 |
| | 88 |
| | 88 |
| Chem Def Bn | |
| | 0 |
| | 9 |
| | 87 |
| | 96 |
| Med Bn | |
| | 0 |
| | 0 |
| | 70 |
| | 70 |
| TOTAL | |
| | 175 |
| | 439 |
| | 1985 |
| | 2599 |
| | 95% |
| | 165 |

417
1886
2469
90%
157
395
1787
2339
85%
149
373
1687
2209
80%
140
351
1588
2079
75%
131
329
1489
1949
70%
123
307
1390
1819
65%
114
285
1290
1689
60%
105
263
1191
1559
55%
96
241
1092
1429
50%
88
220
993
1300

Figure 7: Notional Mechanized Division Vehicular Strength¹³⁶



Whatever the actual level of attrition achieved, air power was still depended on to help pave the way for the Army's breakout at the start of the ground war. When the US Army's VII Corps began its ground war, it found the task made easier by air power. As pointed out in an official Army history of the war: "Badly mauled by air attacks before the ground operation and surprised by (VII Corps') envelopment, Iraqi forces offered little resistance."¹³⁷

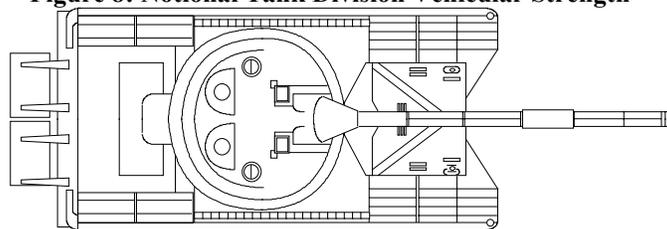
The single clear lesson of World War II was that the visionaries were correct that all future warfare would be dominated from the air. They agreed on that. What they argued about was just how air power would dominate surface warfare. Lt Col David MacIsaac USAF¹³⁸

| | |
|---------|----------|
| | Unit |
| | TANKS |
| APC/IFV | |
| | TRUCKS |
| | TOTAL |
| | Div HQ |
| | 0 |
| | 3 |
| | 49 |
| | 52 |
| | Tank BG |
| | 105 |
| | 35 |
| | 228 |
| | 368 |
| | Tank BG |
| | 105 |
| | 35 |
| | 228 |
| | 368 |
| | MR Bde |
| | 35 |
| | 105 |
| | 245 |
| | 385 |
| | Arty Rgt |
| | 0 |
| | 86 |
| | 204 |
| | 290 |
| | AD Rgt |
| | 0 |
| | 8 |
| | 121 |
| | 129 |
| | Recon Bn |
| | 0 |
| | 41 |
| | 46 |

87
Eng Bn
0
5
50
55
Sig Bn
0
0
68
68
Trans Bn
0
0
390
390
Maint Bn
0
0
88
88
Chem Def Bn
0
9
87
96
Med Bn
0
0
70
70
TOTAL
245
327
1874
2446
95%
233
311
1780
2324
90%
221
294
1687
2201
85%
208
278
1593
2079
80%
196
262

1499
 1957
 75%
 184
 245
 1406
 1835
 70%
 172
 229
 1312
 1712
 65%
 159
 213
 1218
 1590
 60%
 147
 196
 1124
 1468
 55%
 135
 180
 1031
 1345
 50%
 123
 164
 937
 1223

Figure 8: Notional Tank Division Vehicular Strength¹³⁹



One shining example of the effect of how this was achieved came from what became known as the “Go-Away Brigade”. Early in planning, it had become apparent that the Iraqi 52nd Armored Brigade of the 52nd Armored Division was astride the planned assault route of the US VII Corps into Iraq. VII Corps Commander General Franks reportedly told his targeteers “I want you to make that unit go away”. With that comment, the 52nd was doomed. The unit, a tactical reserve for the Iraqi 7th Corps, came under air attack on 17 January from Air Force A-10s. In the initial strike, 13 vehicles were destroyed and 15 men killed. From then on, things only got worse.

Subsequently, three to four armored vehicles were destroyed a day, and the men quickly learned to stay away from their vehicles to stay alive. By 21 February the Iraqi Brigade Commander reported his unit as only 10% effective as a result of constant air attacks. On G-day, the first day of the coalition ground assault, no single tank battalion in the “Go-Away Brigade” had more than seven (out of approximately 31 estimated at the beginning) tanks remaining. Casualties and desertions left only 500 (out of approximately 1500 estimated at the beginning) troops remaining in the Brigade. The 52nd Armored Brigade had, in fact, “Gone Away” due to the concentrated use of air power.¹⁴⁰ When then US VII Corps started its push north, the Iraqi 52nd Brigade was not a factor, due to its premature air power induced extinction.

DIFFICULTIES WITH BDA

“We had the most difficulty in telling how we were doing with regard to destroying his [Saddam’s] tanks and armor.” General Charles Horner, USAF¹⁴¹

Although it may be difficult to measure the effects of air strikes against leadership, communications, weapons of mass destruction and other strategic targets, one would think it should be simple matter to “tally” the number of tanks, armored personnel carriers, artillery and other combat vehicles. In fact, the simple “tally” turned out to be a very difficult matter during Operation DESERT STORM. Different agencies used different sources and criteria to compile their “tallies,” and the sheer magnitude of the task itself overwhelming. The result was contradictory “tallies” with much dispute among the various agencies. These difficulties with BDA have rendered it impossible to obtain a definitive tally of Iraqi vehicles destroyed or damaged by the interdiction effort during the Battle for Khafji. Indeed, even the official daily BDA summary reports have been impossible to locate. Additionally, no thorough post-war survey of that battlefield appears to have been conducted. Sources do allow a fairly accurate tally of Iraqi vehicles destroyed by ground forces supported with CAS in and around Khafji and other locations along the Saudi/Kuwaiti border during the attack.

BDA is the normal yardstick used for determining the effectiveness of aerial strike against an enemy. BDA can come from a variety of sources, and run the gamut from a visual assessment from the aircrew involved all the way to using national level assets. The problem during Operation DESERT STORM would be which sensors to use, and how to analyze the frequently conflicting data produced by different intelligence sources.

Many agencies and organizations, including the Army carried out BDA of the Iraqi forces they would later face. Several weeks into the air war, it was noted that stringent reporting methods led to low BDAs of critical Iraqi units two weeks into the air war. General Schwarzkopf noted that vehicles had to be “on their backs like dead cockroaches” before they were counted as kills.¹⁴² In one case after 300+ sorties on one Republican Guard Division by F-16s and B-52s, only the few attacks made by A-10s were used to calculate the BDA, with understandably low results. During the conflict a

four-span bridge would be reported as being only “50% damaged” if two of its spans were dropped into the water.¹⁴³

The central problem is not collecting and transmitting information, but synthesizing for the decision maker. Richard Burt¹⁴⁴

ARCENT and MARCENT had separate ways of computing BDA, which also changed through the war. ARCENT counted BDA in terms of only tanks, Armored Personnel Carriers (APCs), and artillery when confirmed by A-10 mission reports or confirmed by imagery intelligence (IMINT) or signals intelligence (SIGINT) when shown as probable, killed, or destroyed. They did not count BDA when unconfirmed by IMINT or SIGINT when shown as possible killed or unconfirmed by CAS when shown as probable kill.¹⁴⁵ Eventually the kills already verified by the Ground Liaison Officer (GLO) using videorecorders for F-111Fs and F-15Es, were then also cut by half before inclusion into the daily tallies.¹⁴⁶ The MARCENT BDA also understandably included mission reports from AV-8's.¹⁴⁷

Other coalition air strikes did not count in BDA unless overhead sensors picked up equipment damage. The destruction of critical support - ammo depots, supply areas, command posts, food, and water - was not factored in by ARCENT and MARCENT.¹⁴⁸ This may indicate that the BDA tallies did not account for a significant amount of damage. For example, tanks, APCs, and artillery accounted for only 57 percent of the targets confirmed destroyed by A-10 units. The rest were a mixture of trucks, buildings, air defenses, surface-to-surface missiles, bunkers, and airfield targets. There was no formal assessment system for targets in the Kuwaiti Theater of Operations other than armor, artillery and APCs.¹⁴⁹

BDA assessment was further complicated because attack aircraft struck from medium altitudes, usually above 10,000 feet. At these ranges, it was difficult to determine exactly what the target was and what happened to it. Tanks could look like APCs, and trucks in bunkers could be mistaken for combat vehicles. Further, it was not always possible to determine if a vehicle had been previously damaged or destroyed.¹⁵⁰

War is the realm of uncertainty; three quarters of the factors on which action in war is based are wrapped in a fog of greater or lesser uncertainty. A sensitive and discriminating judgment is called for; a skilled intelligence to scent out the truth. Clausewitz¹⁵¹

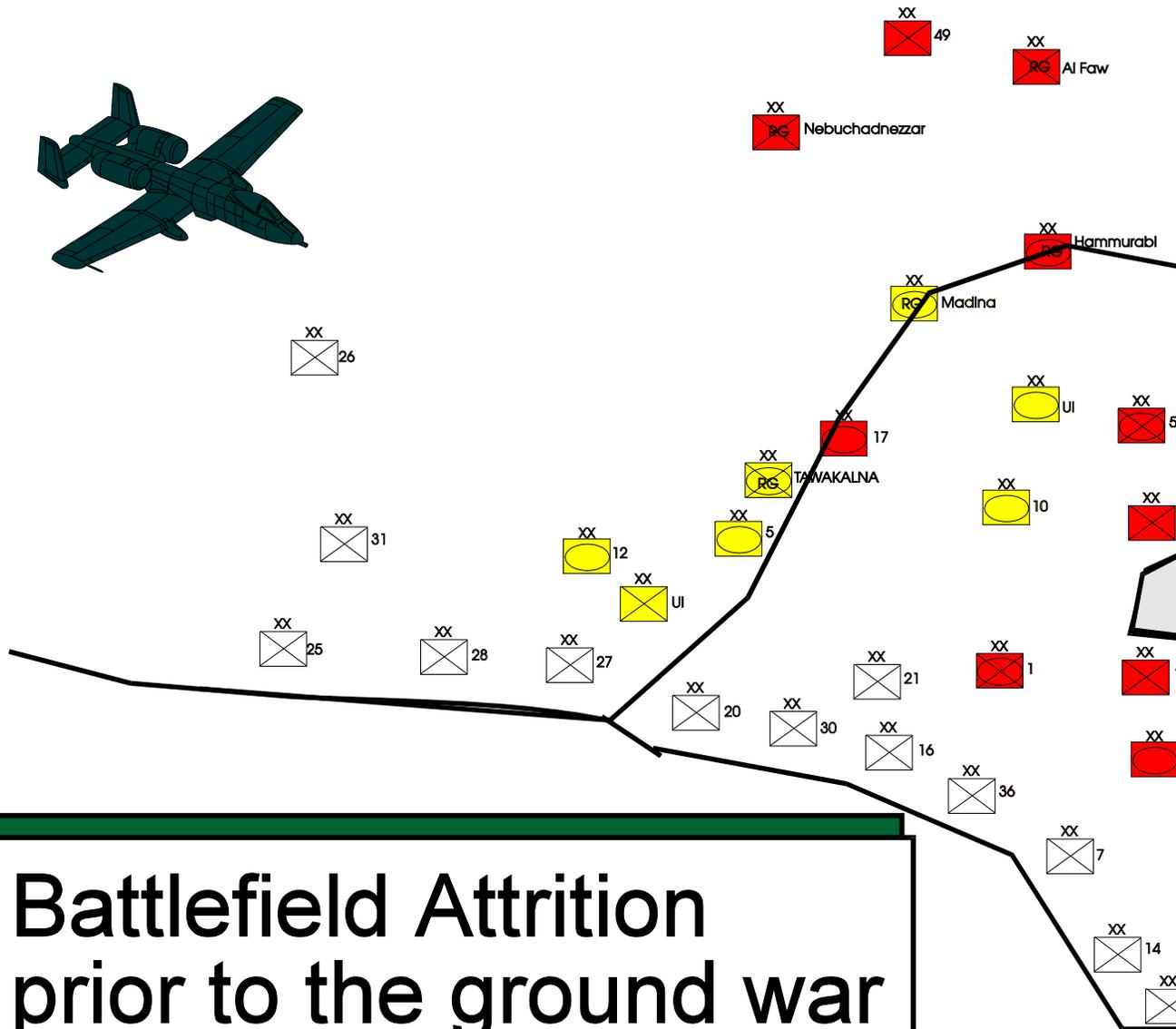
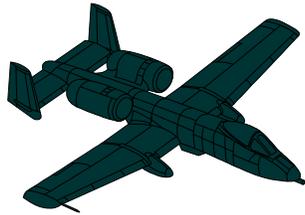
For example, it was not uncommon for A-10 pilots to dive and shoot tanks with their guns after expending their Maverick missiles. Pilots reported that while they felt they were actually destroying the tanks, often they were not able to start the tank burning - or at least cause a fire that they could see. (Many of the tanks that were hit burned inside, but they didn't find out until after the war.) Of course, they were not likely to generate an explosion such as that caused by the impact of a Maverick. So they reported the tank kills where they saw a fire or explosions, and the BDA estimators were left with

many hundreds of other tanks listed in the “possible damage” category - tanks that had been fired on with the guns, but which did not reveal any immediately obvious signs of destruction.”¹⁵²

In addition the Iraqis were masters of camouflage and deception. One A-10 pilot remarking about a mission said, “What we found was that they had a lot targets down there, but they also had old beat up pickup trucks and other junk in some of the revetments, and they had camouflaged a lot of the stuff. From higher altitudes you would think they had a lot of stuff in there.” Another A-10 pilot reported, “They S-turned over the division and found that about half the stuff down there were good targets. The other stuff included old farm equipment, plywood decoys, old pickup trucks and barrels of oil.”¹⁵³

Where judgment begins, there art begins. Clausewitz¹⁵⁴

BDA would remain an inexact science throughout the war. By the 12th of February, CENTCOM reported that 25% of the Iraqi Army had been attrited by air power, while the DIA estimate was set at 10%. In any event, no objective intelligence source could identify the fear of air attack and loss of morale that the air war afflicted upon the average Iraqi soldier. And it was in this intangible manner that aircraft contributed the most to the pre-offensive campaign. There is every reason to believe that while the Iraqi Army had not suffered 50% attrition *materially* at the start of the ground war, the actions of many units gave testimony to suffering a loss of *fighting spirit* well in excess of 50%. Although it is not exactly clear how General Schwarzkopf himself evaluated the battle damage assessments he received, he did place more emphasis on the number of air strikes against Iraqi units as the primary indicator of enemy effectiveness rather than the damage reported.¹⁵⁵ Indeed as the ground war would prove his estimates were probably more correct than others based on more objective measures.¹⁵⁶ (see Figure 9 for further information.)



Battlefield Attrition prior to the ground war 23 Feb, 1991

SOURCES: SCHWARZKOPF, IT DOESN'T TAKE A HERO, pp448,449
SCHUBERT, THE WHIRLWIND WAR, pp136,137

IRAQI UNIT /
 <50% strength
 50-75% strength
 75-100% strength

Figure 9: Battlefield Attrition, 23 Feb. 1991

POSTMORTEM

In my view, al-Khafji was a pivotal battle of the war. It was a turning

point as significant as the Coalition's battle for air supremacy in the first few minutes of the air campaign. HRH General Khaled Bin Sultan¹⁵⁷

Although not proclaimed as such at the time, The Battle of Khafji was a decisive coalition victory. During the battle, Allied air power destroyed most of an Iraqi Army Division and prevented follow-on reinforcements from III Corps from massing to support the operation against coalition ground forces. As a portion of the overall war, air power allowed friendly Army units to achieve their goals with less loss and, ahead of schedule.

The outcome of the Battle of Khafji effected the morale of both the victorious and the defeated. "In numbers and firepower, the Iraqi army still commanded considerable respect. Saudi troops had never experienced battle. Qatari forces had never deployed outside of their country for training purposes, let alone in war. General Khaled Bin Sultan explained that, "Had the battle gone badly, the blow to our morale would have been severe. But the victory changed the mood of our soldiers to an amazing degree ... They had successfully mounted a major counterattack against a tough invading force. Conversely, the battle robbed the Iraqis of the will to fight. They knew that Saddam Hussein was leading them to destruction."¹⁵⁸ General Sultan counted on air power to make his victory possible by freeing them from the threat of massive Iraqi reinforcements.¹⁵⁹

True economy of force is using the indirect approach to effect a psychological defeat without engaging in actual combat. Liddell Hart¹⁶⁰

General Olsen characterized the impact on the Iraqis as a loss of the will to fight. He said, "The psychology there was that by the use of air power -- and the effective use of air power on them -- they lost their will to fight. When they lost that will to fight, they also lost any confidence they may have had that they could win any battle against coalition forces. If you do those two things, you're already whipped, whether or not you have superior numbers -- superior technology. If you don't feel you are going to win you're not. You don't have that confidence. I think air power early on caused that, and once they got into the battle they saw it first hand and they definitely lost their will to fight."¹⁶¹

General Horner summarized the outcome of the Battle of Khafji as air power being a great force multiplier. "If you are looking for a bottom line on Khafji, I think you have to look at the output, the results. For example, you had three Iraqi divisions, one armored, two mechanized, that's a lot of force. The forces that defeated them on the ground, other than the Marine Corps elements which was not a significant effort, it was a sharply fought battle, but not significant numbers of forces, were a company of Saudi national guard in armored cars, they went in, rescued the American ANGLICO team, a Qatari tank company, and about a brigade of Saudi Arabian forces. You stack that up-a brigade plus versus three divisions, and now you begin to understand the impact of air power on the Iraqi army in the battle of Khafji."¹⁶²

One may be tempted to surmise that coalition victory in the Battle of Khafji and Operation DESERT STORM at large was due to the employment of our superior technology. This view would certainly be strengthened by a review of the weapon systems employed during Operation DESERT STORM; such as JSTARS, the F-117, M1A1 Abrams, M2/3 Bradley fighting vehicle, Patriot, cruise missiles, Tomahawks, Army Tactical Attack Missile (ATACMs), remotely piloted vehicles for surveillance, the tactical information broadcast system (TIBS) and others. Since the F-4G has been around for awhile it may surprise some to know that Operation DESERT STORM was the first combat application of that aircraft with the APR-47 electronic suite and the high speed anti radiation missile (HARM). Of course the heavy doses of cockpit video of “high tech” laser guided bombs and missiles, broadcast daily by the media would only strengthen that impression. However, it took people to employ those weapons.

All of this talk about super-weapons and push-button warfare is a pile of junk. Man is the only war machine. Man has to drive the tanks, fly the planes, crawl through the mud, pull the triggers, and push the buttons. We must train to be strong in body and mind. Always remember man is the only war machine. General George S. Patton, Jr.¹⁶³

General Olsen said, “people were the key to the whole operation. You look at what the Iraqi people did, they were deployed to Kuwait and southern Iraq, and what did they do? They dug in, sat on their duffs, and didn’t improve their capabilities one iota. When all of the allied forces came in, they were put into a completely new situation, one that most of the people had not thought about, had not planned for, had no preparation for this kind of operation, and over a period of several months or even weeks in certain cases were able to bring their forces up to a combat capability and to perform in a combat arena, successfully. This goes all the way down from the aircrews flying the airplanes, down to the mess sergeants providing food for those troops. They had to learn to operate in a situation, in an area that was hostile to everyone’s background, because the desert brings nothing to you. You have to bring everything to the desert. If you can’t bring it all to the desert you have to improvise with what you brought with you. We found that was true in many, many cases, from building tents, to driving vehicles, to flying airplanes, to loading weapons, to whatever portion of the force you want to talk about, communications, intelligence, it was all necessary. You had to have that flexibility built in and people made that difference!”¹⁶⁴

CONCLUSION

Although Edward I, in 1298, perfected the use of the longbow at the Battle of Falkirk, “English chroniclers....forgot that the archers had prepared the way,” and they reported that it was the “victorious charge of the knights at the end of the day that ensured victory against the Scots.”¹⁶⁵

Lest they make the same mistake, modern chroniclers of Operation DESERT

STORM should not forget that air power prepared the way for the highly successful, lightning quick “100 hour” ground war. This does not mean the accomplishments of coalition ground forces should be downplayed by any means; only that each component should be given proper credit for their accomplishments. Indeed, a ground defeat of Saddam’s forces was perhaps necessary to prevent him from withdrawing his forces and subsequently claiming political victory for enduring coalition air strikes. In fact, the coalition ground forces did fight some fierce battles with some of the Iraqi units deployed deep inside of Kuwait and southern Iraq. Nonetheless, air power also made a direct contribution to those battles by setting the conditions for the lightning quick ground advance through the front-line units to catch the deeper units unaware, and sometimes bunkered down in anticipation of air attacks. Operation DESERT STORM was the latest, and so far the best, example of successful joint and combined warfare. In modern times no one service has ever won a war by itself. Winning wars has been a joint effort by two or more services. The employment of forces on the modern battlefield to achieve military objectives takes the coordinated effort of two or more services.¹⁶⁶

General Paul Funk, USA, explained the Air Force contribution to Operation DESERT STORM by stating, “Now once the bombing campaign started you wouldn’t expect them to be out on the ground doing a lot of running around. The Air Force...that’s kind of an unsung part of the Air Force, but as far as I’m concerned for a ground commander it’s one of the most important parts. It made him spread out, and made him hunker down. They got a bunker mentality. Never mind whether they killed all the tanks or anything else, that didn’t matter nearly as much. We can kill tanks and we did it. But they did even more important things in that regard.”¹⁶⁷

***An enemy defending himself without mobility is doomed to defeat.
General Nikolai Klotov, Head of Strategy Section, Soviet General
Staff¹⁶⁸***

Soviet Colonel D. Belski appears to agree with this assessment. He explained that repeated air attacks denied Iraqi forces in the KTO of any mobility, thus forcing them into a “static posture.”¹⁶⁹ Indeed this “bunker mentality” contributed greatly to the fast pace of the subsequent ground campaign and low coalition casualties. In essence, Iraqi troops were conditioned to abandon their weapons, when they learned early in the air campaign that the Coalition’s principal target was Iraqi equipment and that if they attempted to man their weapons they would risk death from air strikes. As a result, the nearly continuous coalition aircraft presence meant the troops routinely distanced themselves from their armored vehicles, artillery pieces, and in many instances their ADA [Air Defense Artillery] weapons.¹⁷⁰ Army Lt Col E.W. Chamberlain explained his unit’s advance across the Euphrates Valley as, “If we had not had the effectiveness of the air campaign, we’d have lost a lot of guys fighting our way into this valley. [The] Air Force did a hell of a job hitting the right targets on the ground.” Thanks to air, the ground “offensive” resembled less a blitzkrieg than the Oklahoma land rush.¹⁷¹

This “bunker mentality” conditioning effected the entire range of Iraqi troops

from the poorest trained conscripts on the front lines, to the elite Republican Guards held further back as mobile reserves. Accounts from engagements with front-line units recount that, “Many Iraqi artillerymen apparently either fired blindly or remained in their bunkers and never fired their weapons during the coalition breaching operations. Moreover, many Iraqi armored crews either failed to man their vehicles at all or rapidly abandoned them once coalition ground forces fired on them.”¹⁷² An account from the US Army engagement with elements of the elite Tawakalna Republican Guard in the “Battle of 73 Easting” shows air power conditioned even elite units with the “bunker mentality.” A postwar assessment observed, “The Iraqi soldier was out of his tank because of previous air attacks. When Echo main attack hit, Iraqi soldiers had no idea that M-1 tanks were hitting them. Too late for the Iraqi soldiers to jump back in to fight their tanks.”¹⁷³

Another account of the same battle by US Army Major Lute relates that, “Initially the reports seemed to suggest that they thought they were under air attack because they couldn’t imagine that anyone was going to come at them in those weather conditions on the ground. Because they could not see anything, they didn’t appreciate that we could. So initially they were very much in their bunkers. Once they saw us, there was a flurry to mount their combat vehicles, so it’s a question of where you caught them in that game.”¹⁷⁴ Some crews did not ever make it back into their combat vehicles and some tanks and APCs destroyed in the battle were unoccupied at the time they were hit, as indicated by after-battle analyses.¹⁷⁵

Soldiers usually are close students of tactics, but rarely are they students of strategy and practically never of war. Bernard Brodie¹⁷⁶

It is interesting to note that those same elite forces, conditioned to abandon their vehicles for the relative safety of bunkers when under air attack, would be any more eager to engage in combat with coalition ground forces. Indeed this phenomenon was initially very puzzling. However, upon further analysis it became clear that they had been conditioned through the air campaign that there was no defense against the air attacks, and the only way to survive air attacks was to distance themselves from their equipment. Since they had not previously experienced coalition ground attacks, they were not similarly conditioned and must have felt they had some chance against ground forces, whereas they had been convinced they had no chance at all against air power.

This “bunker mentality” really began to take hold of the Iraqi army after their defeat at Al Khafji. It became clear to them that it would become impossible to maneuver their forces without being destroyed by overwhelming and unchallenged coalition air power.¹⁷⁷ General Olsen explained that “after the Battle of Khafji -- they [Iraqis] changed to more a group of hermits. They dug in even further with their forces, they didn’t try to mass their units, they didn’t try to move them, because they figured they were going to become targets once they identified themselves.... I think their psyche was if you don’t want to be a target, don’t be near your vehicle and maybe not even be on the battlefield. It may be better to take leave in Baghdad.”¹⁷⁸

Offense is the essence of air power. General of the Air Force, “Hap” Arnold, USAF¹⁷⁹

Air power effects during the “Battle of Khafji” may best be summed up by an Iraqi 5th Mechanized Division veteran of the Iran-Iraq war, who managed to survive through the air attacks at Al Khafji and who remarked that his brigade underwent more damage in thirty minutes than it had in eight years in the previous war. One must carefully evaluate such accounts and temper them with other existing knowledge. However, in the absence of detailed post-battle surveys or captured Iraqi documents they do provide useful indicators.

However, other accounts paint quite a different picture of air power effects in Operation DESERT STORM. One such account is the Iraqi battalion commander who reported, “When the war started, I had 39 T-72s; after 38 days of air attack, I was down to 32. After 20 minutes with the 2d Armored Cavalry, I was down to zero.”¹⁸⁰ These two examples illustrate the wide variance in air power effects experienced by different Iraqi units. One must remember that different units at different locations, with various levels of preparation and decoys, were targeted by different levels of air power from different aircraft and weapons. Air power was not evenly applied against Iraqi ground forces. Concern over front-line Iraqi unit strengths, which would impact coalition breaching actions, demanded more air power efforts than did the more elite units deployed deeper inside Kuwait and Iraq, especially after the “Battle of Khafji.”¹⁸¹ One must also remember that massed forces on the move are much more vulnerable to air power, once detected and targeted as demonstrated in the “Battle of Khafji.”

President George Bush explained the true strength of joint operations not as the equal participation of every service in every operation, but as the proper use of “the proper tools at the proper time.”¹⁸² Air power was the proper tool at the proper time for the “Battle of Khafji.” While there is no doubt that the Iraqi offensive could have been otherwise handled with coalition ground forces, there would certainly have been a price for doing so. Repositioning sufficient coalition ground forces to handle the offensive, instead of using overwhelming air power, would have impacted the timing and preparations for the flanking “Hail Mary.” Saddam may have even gotten the heavy coalition casualties he had hoped for. The “Battle of Khafji” demonstrates the strength of joint operations. Air power was effectively employed against the massed and moving Iraqi forces. This meant the bulk of coalition ground forces could continue repositioning for the “Hail Mary” flanking attack without interruption. The in-place coalition ground forces, with CAS and air interdiction support, were able to stop and hold an attack by superior Iraqi forces, and eventually reclaim the town of Khafji.

It falls to you to derive the lessons learned from this war.
President George Bush¹⁸³

It would be foolhardy to think the next war will be just like the last one. A brief perusal of military history will show how different successive wars can be. Contrast the

highly static trench warfare of WWI with the highly mobile armored warfare and “blitzkrieg” of WWII, to see how quickly warfare can change. Changes are spawned by new technologies and weapons, new strategies and tactics, different political or geographical conditions, and other factors. Nonetheless there are lessons of value to be gained from Operation DESERT STORM. This point has not been lost on the Soviets, as Defense Minister Dimitri Yazov directed tasks for applying the Gulf War experience for training Soviet command and military units.¹⁸⁴ The lesson from the “Battle of Khafji” is that air power can be very effective against massed and moving ground forces in the open desert. This in and of itself is not a new lesson, as a review of military aviation in warfare has shown. The new twist from the lesson of the “Battle of Khafji,” is that *air power can effectively attack these moving ground forces, even when they imagine they are concealed by darkness.*

APPENDIX A

HISTORICAL PERSPECTIVES ON KHAFJI: AIR POWER VS TROOPS

Officers no longer look upon history as a kind of dust heap...they go to it as a mine of experience where alone the gold is to be found, from which right doctrine-the soul of war-can be built up. Sir Julian Corlett¹⁸⁵

Since the first military aircraft took to the skies, it has been used as a steadily improving weapon against troops. Since World War I, technology and time have allowed the aircraft to make evolutionary steps to where it is now, capable of finding, and attacking troops and vehicles at night and in most weather conditions. The following information is provided to give the reader a basic history of air power versus troops in the field.

After over eighty years of combat operations, four points can be made about the use of air power against ground forces. These points come through in war after war:

1. Ground units massed in the field without air cover are vulnerable to enemy air attack. While under air attack, they are frequently unable to maneuver, organize an offensive or dictate the tactical situation. When under air attack, a ground unit's only concern becomes defense and survival, and offensive ground maneuver rapidly becomes a distant, secondary concern.
2. Air superiority is a prerequisite for the successful application of maneuver warfare. With air superiority, your ground forces are able to move at will, unimpeded by enemy air attack. Without air superiority, your ground forces are vulnerable to attack in both day and night, and will be unable to move without risking heavy loss, loss of unit cohesion and possibly lead to your ground units' destruction.
3. Elite or highly disciplined ground units cannot be expected to rout even while under heavy air attack. They will be forced to either slow their advance while under attack, or at the very least be heavily inconvenienced and perform less effectively if their supply source is disrupted by air interdiction. Green, or poorly trained units have a tendency to rout under heavy air attack, to the point of abandoning perfectly good equipment in order to preserve themselves.
4. As with ground combat, certain terrain is more suitable to efficient air interdiction than others. The same attributes that make the desert highly suitable for tank warfare also make it a killing ground for air power. Air interdiction is less effective in forested or mountainous country while heavy jungle/rain forest, with its potential for concealment and camouflage, is the most difficult environment for the conduct of air strikes.

WORLD WAR I:



Royal Air Force F2b Bristol *Fighter*

Neither the Army nor the Navy is of any protection, or of very little protection, against aerial raids. Alexander Graham Bell¹⁸⁶

WWI was notable for its static defense lines and the infancy of air power. The aircraft of the period were primitive in construction, unable to carry a significant load, and restricted to only fair weather conditions. There are few instances in the Western European front where air power was able to seriously influence the course of a ground battle, although air power was recognized by some theorists as being much more effective at delivering concentrated fire at long distances when compared to conventional artillery. By the end of WWI, the psychological effect of air attack was considered to last in excess of an hour, while the recovery time of an enemy force following artillery fire was judged to be about two minutes.¹⁸⁷

In the middle-east, British forces under General E.H.H. Allenby successfully integrated a small force of RAF aircraft into a battle plan that defeated the Turkish Army in Palestine during September, 1918. Allenby's Commonwealth ground forces succeeded in breaking the Turks, and forcing them to retreat into a valley of the Esdraelon River near present day Jordan. The retreat, well ahead of pursuing English forces, was contested by the RAF, and recorded by Col T.E. Lawrence ("Lawrence of Arabia"):

"... For four hours our aeroplanes replaced one another in series above the doomed columns: nine tons of small bombs or grenades and fifty thousand rounds....rained upon them. When the smoke had cleared it was seen that the organization of the enemy had melted away. They were a dispersed horde of trembling individuals, hiding for their lives in every fold of the vast hills. Nor did their commanders ever rally them again. When our cavalry entered the silent valley the next day they could count ninety guns, fifty lorries and nearly a thousand carts abandoned with all their belongings. The RAF lost four killed. The Turks lost a Corps."¹⁸⁸

WORLD WAR II:

If we should have to fight, we should be prepared to do so from the neck up instead of from the neck down. General Jimmy Doolittle, USAAF¹⁸⁹

By the Second World War, most of the great powers had developed some form of doctrine defining the employment of their new air forces. Aircraft were faster, bigger and more accurate than seen in the first war, but were still generally limited to daylight hours when attacking troops. Innovations such as the dive bomber and anti-tank aircraft were widely deployed, and were used in every theater of the war. Close air support doctrine was developed and used to some degree by most countries. Armies found that movement in daylight with enemy aircraft present was a dangerous and daunting prospect, although they were generally still able to move at night. By the end of the war, it was apparent that no offensive ground operation could be conducted without proper concern for the use of air power.

The Start of World War II: 1939.

World War II was initiated on 1 September, 1939 by German Luftwaffe strikes on Poland, while armored units poured across the border. Nazi dive bombers, notably the Junkers JU-87 “Stuka” and even obsolescent Henschel HS-123 bi-planes, were utilized in a fashion not seen before, being used as “flying artillery” as they opened holes in the Polish Army for the Panzers to exploit. The psychological effects of dive bombers were not lost upon the Germans as they equipped their “Stukas” with wind-driven noise generators that howled ferociously during their attack.

German aircraft flew over 5000 interdiction sorties over the first five days of the war, usually well ahead of their advancing forces due to a lack of suitable ground-to-air communications equipment which would allow close support.

The Polish Army, although not materially effected by the attacks, was traumatized by the constant bombing, and quickly found it could only travel unhindered at night. Historians record that:

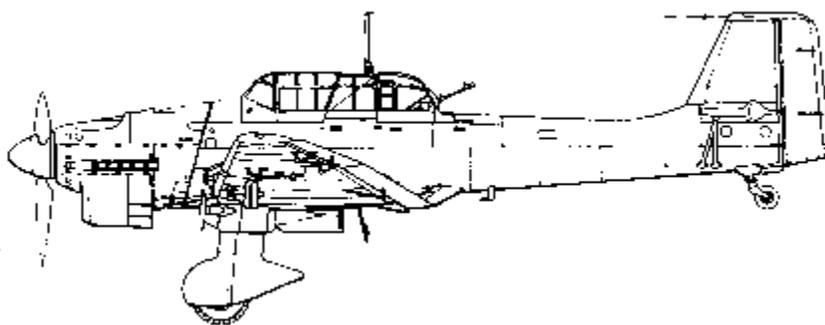
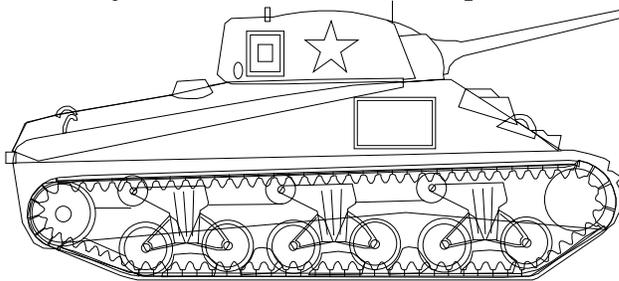
“...although material results were often meager, air power caused widespread demoralization and disorganization, including the disruption of (the) Polish telecommunications network....aircraft of *Lufflotte 4* were able to halt all road and rail traffic, thus preventing the main Polish Reserve Army from carrying out its planned counterattack at Kielce; later this force, its route to the Vistula (River) blocked, was pounded from the air until 60,000 men laid down their arms.....At that time, it seemed almost as if the Apocalypse had come, as testimonies of Polish Officers and other survivors prove.”¹⁹⁰

Although they did not possess air supremacy over Poland per se, German bombers were generally able to operate in the Polish skies on their terms due to a strong fighter force overwhelming their Polish counterparts. Once the invasion of France was undertaken, in May, 1940, German strikers faced much stronger opposition in the form of British, French and Belgian fighter aircraft. With neither side initially having air superiority, interdiction missions became high risk operations for both sides. French

bomber forces, facing serious losses to German fighters in the first few days of the attack, largely gave up on daylight missions, and switched to more survivable, but much less effective night attacks. The English suffered the loss of 89 attack aircraft (largely slow Fairey *Battles*, in their last major combat operation of the war), during daylight attacks on bridges over the Meuse River around Sedan on 14 May, 1940. At Dunkirk in late May/early June, a combination of weather and RAF fighters rendered German bombers ineffective in trying to stop the evacuation of trapped Allied forces from Europe. By the end of the “Battle of France” it had become obvious to both sides that a condition of air superiority had to exist for strike aircraft to operate effectively.

US Army II Corps in North Africa, January-February 1943.

My regiment has fought well, has had rather severe losses, but can go on. I have talked with all ranks possible and am sure that men cannot stand the mental and physical strain of constant aerial bombing without feeling that all possible is being done to beat back the enemy air effort. News of bombed cities of ships or ports is not the answer they expect. They know what they see and at present there is little of our air to be seen. Brigadier General Paul M. Robinett, USA, Combat Command B of the 1st Armored Division¹⁹¹



US Army Sherman medium tank- 1943.

Luftwaffe JU-87 “Stuka”- 1943

Through most of its history, the US Army has not been forced to operate in the face of sustained enemy air attacks. The most notable exception to this was the Tunisian portion of North Africa campaign of 1942-43. American troops, almost all entering combat for the first time, faced German and Italian forces battle hardened after several

years of combat against the English. The German Luftwaffe had at its disposal a small, but very competent force of dive (Junkers JU-87 “Stuka”) and medium (JU-88) bombers and fighters (largely Messerschmitt ME-109E/F). These aircraft were actively employed against advancing Allied units while maintaining air superiority in the region throughout the early parts of the campaign.

Although the Allies had several fighter groups (P-38 *Lightnings*, P-40 *Warhawks* and English *Spitfires*) available in theater, low serviceability rates (due to both logistical and environmental problems), doctrinal arguments and coordination problems often led to US Army units operating in daylight with little or no fighter cover. On the morning of 31 January, 1943, units of the 1st Armored Division were ordered to attack a German post at Sened Station, Tunisia. Combat Command “Charlie”, including the 1st Battalion, 168th Infantry Regiment, along with supporting reconnaissance and armor units, came under air attack almost immediately after starting the morning march on their objective. As documented in the Divisional History:

“...about half-way from Gafsa to Sened Station (the column’s) leading units drew the attention of strafing enemy ME-109s. The tanks in the second section of the column moved from the road across country to an assembly area to the north and waited for orders.” Infantry units which arrived two and a half hours later “...arrived just in time to be hit by JU-87s. Heavy casualties and the shock of the attack disorganized the infantry battalion to the point where it was unable to attack Sened Station later that afternoon and the attack was called off.”¹⁹²

Air power is like poker. A second-best hand is like none at all -- it will cost you dough and win you nothing. General George Kenney, USAF¹⁹³

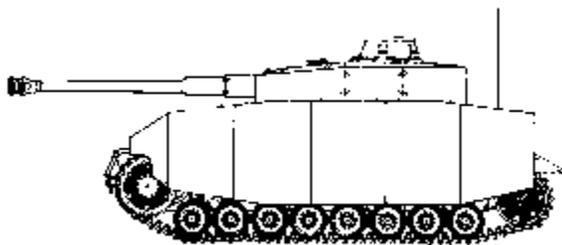
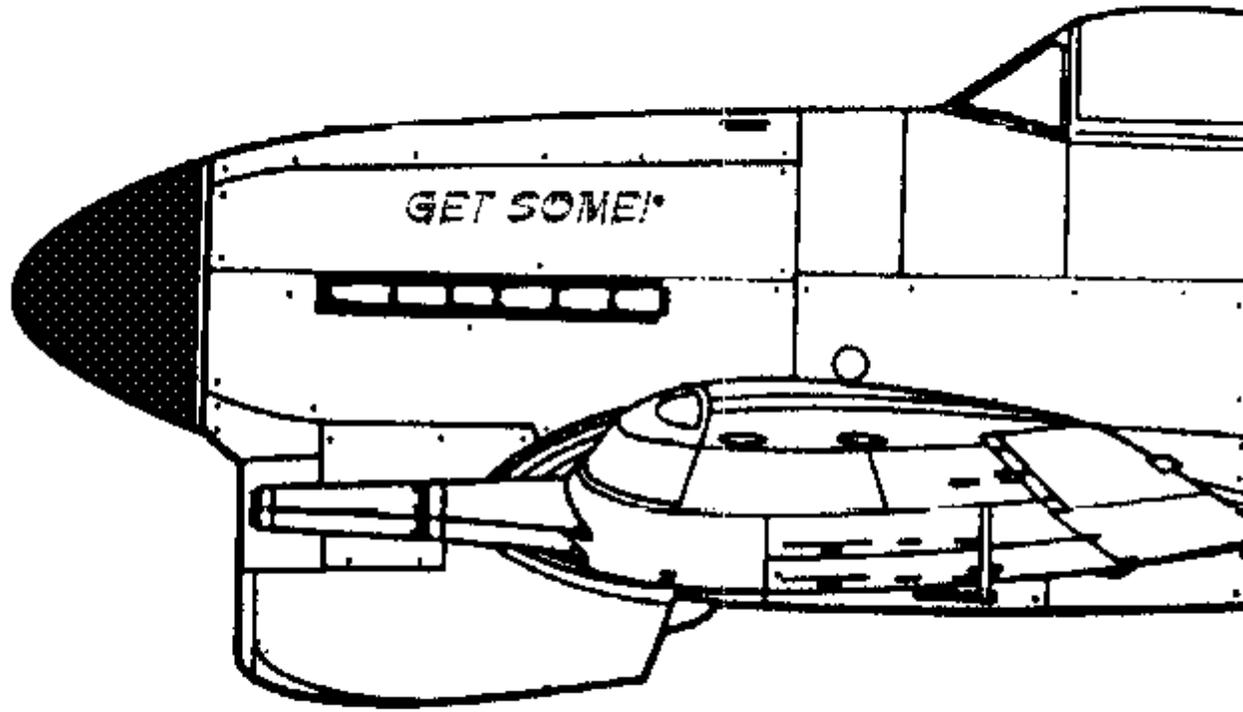
Throughout the North Africa campaign the Germans demonstrated an uncanny ability to coordinate air attacks with ground assaults which helped demoralize the new American troops. These soldiers, frequently without the benefit of American fighter top cover, found themselves under the constant threat of attack from marauding Luftwaffe aircraft while German ground units maneuvered for assault while covered by the confusion of air attack. Reserve units found themselves harassed by Luftwaffe aircraft behind the battle front, making it particularly difficult to deploy to plug holes in the lines. At the battle of Sidi Bou Zid on 14 February, 1943, Combat Command “Able” ordered units of the 1st Armored Regiment and 701st Tank Destroyer Battalion (75MM) to pre-empt an anticipated German armored move on the Poste de Lessouda road. The blocking force came under air attack as soon as it started movement, and was slowed sufficiently that by the time they had arrived at their objective, they found it already occupied by units of the German 7th Panzer Regiment.¹⁹⁴ On the following day, counter attacking American units (including the 2nd Battalion, 1st Armored Regiment) were subjected to intense dive-bombing and strafing attacks by Luftwaffe aircraft. These attacks caused the American counterattack to fail, and allowed the 5th Panzer Regiment to move unobserved to a position flanking the American units strung out on the road. The constant air attacks, along with well prepared German ground defenses, soundly defeated the attacking American Army units, who sustained the loss of 298 troops and 15

officers and 40 tanks over the day.¹⁹⁵ It is interesting to note that these one-day losses exceeded all casualties sustained a half century later by US forces in Operation DESERT STORM.

The psychological effect of German air power on American troops in the North African Campaign was substantial. As stated in the US Army's Official History of WWII: "... Axis dominance in the air was so great that training in aircraft identification seemed fruitless. Experienced men learned never to fire first at an aircraft lest it bring on retribution. US M-3 half-tracked troop carriers, while lightly armored, were found highly vulnerable to aircraft gunfire (typically 7.92 or 20 mm) and were known as 'Purple Heart Boxes'. When asked by a senior officer if enemy aircraft bullets penetrated the half-tracks, one soldier replied 'No sir, they only come through the wall and then rattle around.'"¹⁹⁶ This statement would later be immortalized in the movie PATTON.

It would take a complete reorganization of Allied air in late February along with improved logistics and increases in aircraft strength for the skies over Tunisia to be wrested from the Luftwaffe. Only then would American troops have the air umbrella they required to win the war on the ground.

WWII: NORTHERN EUROPE 1944



RAF *Typhoon* 1b, 1944

Wehrmacht Pzkw IV medium tank, 1944

The measure of air power is the ability of a nation to exploit airspace for its own purposes -- and in wartime deny it to an enemy. Admiral Arthur Radford, USN¹⁹⁷

By the time of the invasion of northern Europe in June, 1944, the Allies had achieved a measure of air superiority over France. Interdiction of German ground forces prior to the invasion led most Wehrmacht units to move only at night, and the Allied dominance of the skies around Normandy was such that only a handful of Luftwaffe aircraft were able to attack the beaches on 6 June. Allied fighters posed a threat to anything moving on the roads during daylight hours, and impacted command and control as well as fighting units. Field Marshall Erwin Rommel, Commander Army Group "B", and General "Sepp" Dietrich, commander of the 5th Panzer Army, were both wounded by strafing Allied fighter aircraft while riding in their staff cars. Field Marshal Guenther von Kluge, Commander in Chief of the West, and his staff were forced off a French road on 15 August by fighter-bombers. With his car and all of its radio gear destroyed, it would not be until dark that the highest ranking German Officer in theater could re-establish contact with his headquarters.¹⁹⁸

As opposed to North Africa, when the Luftwaffe was present in force, American soldiers in Europe could presume aircraft overhead were friendly. On the other side, German Army units were subjected to constant and savage daylight attacks from US 9th Air Force fighter-bombers (largely P-47 *Thunderbolts* and P-38s) and English 2nd Tactical Air Force (2TAF) *Typhoons*. For the remainder of the war for Northern Europe these airborne forces would attack, disrupt and destroy German tank units that would otherwise have engaged Allied ground units at significant Allied risk of loss.

At the Battle of Mortain (France) on 7 August, 1944, Allied aircraft caught large numbers of German tanks from the 2nd SS Panzer Divisions in the open. English *Typhoons* flew over 1000 sorties in a day-long effort, with a typical load of eight 60lb HE rockets and four 20mm cannon. By sundown, pilots had claimed 84 tanks destroyed and 55 damaged, plus another 114 soft-skinned vehicles hit or burning. This was achieved for the loss of 14 British fighter-bombers, and three pilots.¹⁹⁹ Even allowing for excessive claims by the pilots, it is believed that RAF air power, by itself, destroyed over a Regiment of Panzers at Mortain, with total Allied casualties numbering less than the crew of a *single Sherman tank*.

While the English were engaged at Mortain, the 2nd, 116th and 1st SS ("*Liebstandarte Adolf Hitler*") Panzer Divisions were initiating attacks against American ground forces further south. Their units were caught in the open by 9th AF fighter bombers, with results best described by the Germans themselves in various command journals:

"We made a swift advance of about ten miles and suffered only three tank losses..... Suddenly the Allied fighter-bombers swept down out of the sky. They came in hundreds, firing their rockets at the concentrated tanks and vehicles. We could do nothing

against them, and we could make no further progress.”²⁰⁰

The German 7th Army’s war diary reported:

“The actual attack has not made any progress since 1300 hours because of the large number of fighter-bombers and the absence of our own Air Force.”²⁰¹

In wars throughout history, events have generally proved the pre-hostilities calculations of both sides, victor as well as loser, to have been seriously wrong. Bernard Brodie²⁰²

US Army reaction to the battle at Mortain is contained in their Official History: “At the outset of the (German) attack, American officers had estimated that the enemy seemed capable of driving a wedge to Avranches to rupture the front, and make the (US) position south of the forces south of Avranches logistically untenable. (Instead) The enemy had very quickly been forced to abandon his ambitious efforts....because of heavy tank casualties from allied air attacks....”²⁰³

The Battle of Mortain proceeded a much larger engagement that became known as the Battle of Falaise Gap. Beginning on 12 August, the German 7th Army was compressed in a “pocket” between the US 1st and 3rd Armies on the south and the 1st Canadian and 2nd British Armies on the north. The goal was total encirclement and destruction of the 7th Army, with Allied join-up near the towns of Argentan-Falaise. The gap, measuring roughly 30 miles by 15 miles, contained an estimated 150,000 German troops and eight or nine Panzer Divisions.²⁰⁴ Allied fighter-bomber units, along with artillery fire, were given carte blanche to attack anything that moved in the pocket.

Roving flights of American and British fighter-bombers created chaos and panic as they strafed, bombed and rocketed the doomed German 7th Army. On 13 August alone, 9th Air Force P-47s flew 649 sorties and claimed 106 tanks and 570 other vehicles. On this day the 366th FG single-handedly destroyed a convoy of 30 fuel trucks and their liquid cargo with its *Thunderbolts*.²⁰⁵ The 405th FG, also flying P-47s, had a group of German soldiers leave the French woods with white flags while they were being strafed. The Flight Leader did the best he could to point the Nazis and start them marching in the direction of nearest Allied ground forces before he returned his flight to base.²⁰⁶

Ground force delays slowed the encirclement, and considerable numbers of German soldiers were able to escape, however when it was over, an estimated 60% of the German forces had either been killed or captured and thousands of vehicles of all descriptions were either destroyed or abandoned in the field.²⁰⁷ Some German Divisions, typically line infantry, crumbled under the three days of unrelenting air and artillery attacks. Desertions and mass surrenders were reported. Some looting and mutiny were also documented.. Other units, such as elite paratrooper or SS Panzer Regiments were able to conduct an organized fighting withdrawal with their morale intact, even if with only a fraction of their authorized vehicle strength remaining.²⁰⁸ Many vehicles were found intact in the field by advancing Allied units, either out of gas or abandoned by their

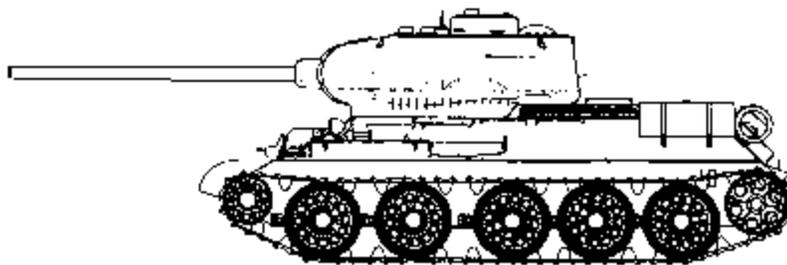
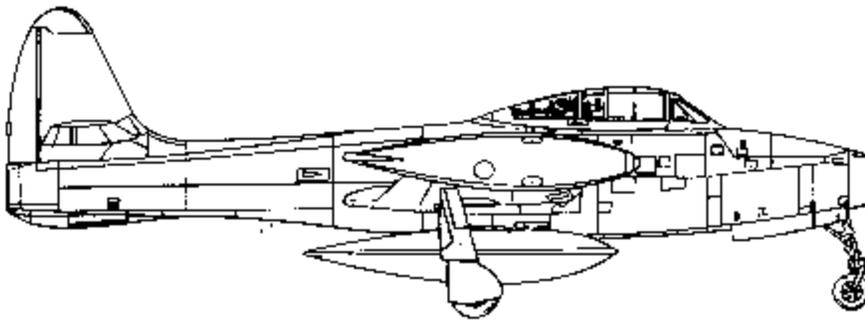
frightened occupants.²⁰⁹

Field Marshall Rommel provided a telling statement as to the impact of Allied air power on German forces following the landings at Normandy. His comments were to prove prophetic for the remainder of the war:

“During the day, practically our entire traffic -- on roads, tracks, and in open country -- is pinned down by the powerful fighter-bomber and bomber formations, with the result that the movement of our troops on the battlefield is almost completely paralyzed, while the enemy can maneuver freely. Every traffic defile in the rear areas is under continual attack, and it is very difficult to get essential supplies of ammunition and petrol up to the troops.”²¹⁰

Following the battles of Mortain and Falaise, the Germans would be unwilling and largely unable to risk their armor in the open during periods of good weather and daylight. The next major action involving masses of Nazi tanks would be during the Winter of '44, in what would become “The Battle of the Bulge”, when foul weather would allow armored operations without being subjected to the depredations of Allied air.

Korea and the Era of Violent Peace



USAF F-84G *Thunderjet*- 1951

No. Korean (Soviet) T34-85 medium tank

Because of its independence of surface limitations and its superior speed the airplane is the offensive weapon par excellence. General Giulio Douhet, Italy²¹¹

When the North Koreans launched their surprise attack on the south in June, 1950, heavily outnumbered UN troops were quickly forced to retreat to a small perimeter near the southern port city of Pusan. Air Force and Navy aircraft became the only weapon available to attack the North Korean People's Army (NKPA) during its advance. The widespread use of jet aircraft was the largest technological step taken during the war, but otherwise the US forces that fought in Korea under the United Nations banner used essentially the same equipment and tactics that won World War II.

The NKPA, with its aircover effectively neutralized by UN fighters, became highly vulnerable to attack from the air as it marched south. By mid-July, the Army had all but stopped all movement on roads during daylight, making its moves at night. On the occasions they did expose themselves during daylight hours, they were usually dealt with severely. On 10 July, 1950, 5th Air Force aircraft discovered a large convoy of tanks and vehicles gridlocked in the open. The resulting strikes destroyed a battalion of Korean armor and over 100 trucks, and was described in the Official Army history of the war as "...the greatest destruction of enemy armor of any single action of the war."²¹²

UN Air Forces used every aircraft available from WWII era F-51 *Mustangs* to new F-80 *Shooting Star* jets to defend the Pusan perimeter. New ground-based radar bomb systems were used to control B-29 and B-26 night carpet bombing attacks. B-29s, each carrying forty 500lb fragmentation bombs, proved particularly effective against troop concentrations, with post-strike BDA by ground troops frequently reporting enemy casualties in the hundreds after such strikes.²¹³

Morale makes up three quarters of the game, the relative balance of manpower accounts for only the remaining quarter. Napoleon²¹⁴

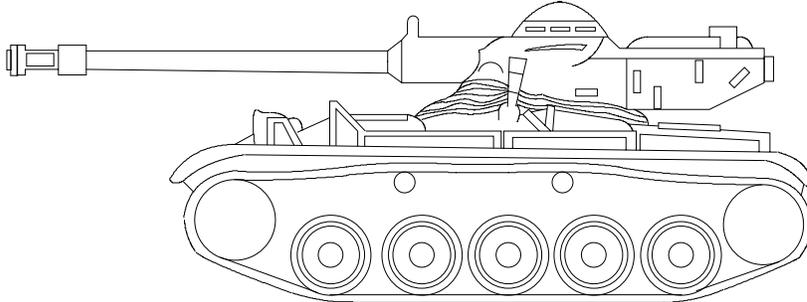
The effects of this campaign were telling, and was credited with allowing the US 24th and 2nd Infantry Divisions to complete their withdrawal to the Pusan perimeter in July, 1950. Members of the NKPA 3rd Division captured during this period reported serious deficiencies in food and sleep due to American air attacks, as well as lowered combat effectiveness.²¹⁵ Certain weapons dropped from the air had understandable psychological effects on Korean troops. Major Dean Hess, an F-51 pilot assisting the Republic of Korea Air Force, stated that: "...as soon as we start dropping napalm or thermite in their vicinity, they would immediately scatter and break any forward movement."

That the US Army appreciated the contribution air power made in the Korean War is evident in this statement made by General Matthew Ridgeway, the head of all UN forces in theater.:

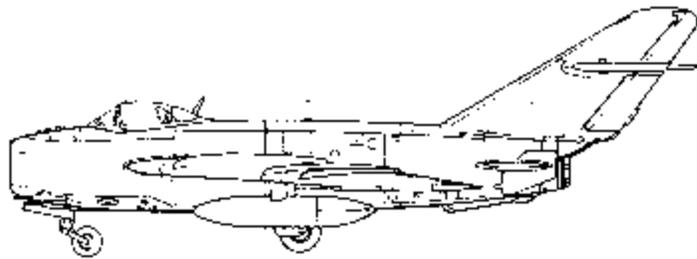
"Not only did air power save us from disaster, but without it the mission of the

UN forces could not have been accomplished.”²¹⁶

ARAB-ISRAELI WARS: 1967 and 1973



Israeli (French) AMX-13 tank



Egyptian (Soviet) MiG-17

War is not an affair of chance. A great deal of knowledge, study, and mediation is necessary to conduct it well. Frederick the Great²¹⁷

The country of Israel has been in an almost continuous state of war with its Arab neighbors since its formation in 1948. Although both the War of Independence (1948-49) and the Suez Conflict of 1956 involved aircraft, it would be in the later wars that the strengths and limits of air power were notably demonstrated.

The 1967 “Six Day War” was kicked off by devastating Israeli Air Force (IAF) preemptive attacks against at least 25 Arab air bases in Egypt, Syria, Jordan and Iraq. In Egypt alone, in excess of 300 aircraft were destroyed on the ground and over 100 pilots, or about one-third of all trained military aviators in the country, killed.²¹⁸ While this aerial assault was conducted, the Israeli Army was moving into the Sinai and Golan Heights areas totally unopposed by the Arab air forces. Over the next six days, the Israeli Army, under the canopy of the IAF air supremacy, generally rolled over all ground opposition en route to the Suez Canal. The few Egyptian aircraft that managed to get airborne were either shot down by Israeli fighters or carried out fleeting attacks that were hardly noticed by the IDF’s armored units.

By the third day of the war, IAF aircraft were heavily engaged in bombing and

strafing the Egyptian forces retreating ahead of the advancing Israeli Army. In the Mitla Pass, thousands of vehicles of all descriptions were described as having been either destroyed or abandoned under the relentless attacks from the air.²¹⁹

The Israeli Defense Force (IDF) armored ground forces rolled across the Sinai Desert behind the IAF's devastating attacks and mastery of the air. By the end of the war, Egyptian President Gamel Abdul Nasser admitted that over 80% of his country's equipment committed to the battle in the Sinai had been lost. The Israeli's overwhelming victory would prove similar to what coalition forces accomplished in somewhat similar conditions 24 years later in Kuwait. Over 10,000 Egyptian soldiers died and 5000 more were captured in the Sinai. More than 700 tanks and 1000 trucks were lost. Israeli losses in the Sinai amounted to 300 men killed and 61 tanks.²²⁰

No study is possible on the battlefield. Marshal of France Ferdinand Foch²²¹

It has been suggested that the IAF's role in the 1967 victory was not fully appreciated until the 1973 war. In the "Six-Day War" the Israeli Army was almost completely free from Egyptian Air Force interference because of the domination of the desert skies by the IAF. The IAF also kept continuous daylight pressure on the Egyptian Army which gave them little chance to regroup or form for counterattack against the approaching IDF ground forces. Both of these conditions changed considerably during the 1973 "Yom Kippur War."

While the 1967 war started off with an Israeli preemptive strike, the 1973 conflict was initiated by simultaneous ground attacks by the Egyptians and Syrians. In the Suez, Egyptian forces came across the canal in a surprise attack which rolled over the "trip wire" forces that held the "Bar Lev" defensive line on the canal. Only 26 minutes after the start of the war the IAF began attacking the Egyptian Army. Unlike 1967, however, this time the Israeli Air Force took heavy losses at the hands of the Egyptians.

In the six years between wars, the Arabs had heavily re-equipped and trained with new equipment from the Soviet Union. Among this gear were new SA-6 ("Gainful") and SA-7 ("Grail") surface to air missiles (SAMs) that moved with the Army, along with mobile ZSU-23-4 gun systems. Behind the mobile forces were improved SA-2 and SA-3 SAMs that would influence airspace over 50 kilometers into the Sinai.²²² IAF aircraft, attacking at the low altitudes that had been so successful during the 1967 war, were chewed up. Accounts suggest that over thirty Israeli aircraft, mostly US built *Phantoms* and *Skyhawks*, were destroyed the first day of the war, extremely serious attrition for the IAF, which had suffered the loss of only 40 aircraft throughout the entire 1967 conflict.

The Egyptian Army pushed its forces well into the Sinai. The IAF, stung by Egyptian SAM units, was forced to raise its attacks to altitudes where their non-precision weapons, optimized for low altitude delivery, were largely ineffective. The Israeli Army, struggling to hold the line in the Sinai while mobilizing its large reserve components, found itself under attack from strong Egyptian Army and some Air Force units. On 8

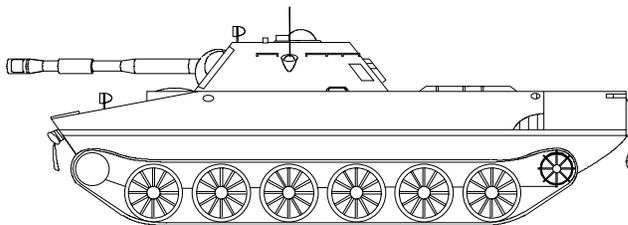
October, in what has been described as “the worst defeat in the history of the Israeli Army,” a large Israeli armored force was forced to retreat from the critical Mitla Pass.²²³

Attempts by the IAF to deal with the Egyptian Air Force early in the war met with continued heavy losses from SAM units. It was not until the Egyptian Army moved out from under its fixed SAM coverage, its mobile SAMs ran out of missiles, and a massive American resupply effort (that included new aircraft, EW gear and standoff weapons), that the IAF was finally able to work effectively near the battlefield. As stated by one Egyptian ground commander: “When we tried to move out beyond the SAM umbrella, we took unacceptable losses from the Israeli Air Force.”²²⁴

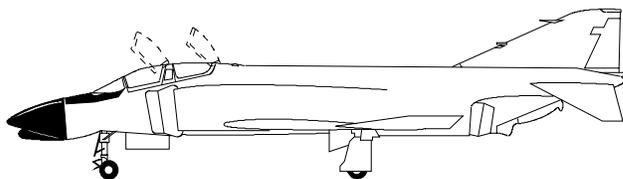
In the Golan Heights, the IAF did have some effectiveness working against supply columns and truck convoys well behind the front, although they were at risk from SA-7 missiles. At the front however, the presence of SA-6s once again usually forced the Israeli tank units to face the Syrians with little or no air support. The resultant tank battles, although epic in their scale and intensity, led to heavy armor losses on both sides.

Not surprisingly, there was a tremendous amount of frustration among the Israeli Army units over the relative lack of support given by the IAF in 1973 when compared to 1967. One source notes that of more than 1500 Arab tanks taken by the end of the war, not one appeared to have been damaged or destroyed by air weapons. Although the IAF was given credit for high altitude air superiority during the war, with over 300 aerial victories, as far as the Israeli Army was concerned, the Air Force had been of little or no value.²²⁵ The effectiveness of initial Arab mobile SAM batteries had rendered the IAF relatively impotent in the opening, and critical stages of the war, and left the Israeli Army vulnerable to attack from a much larger enemy. Only when tactics and equipment were changed to deal with the new threat, was the IAF able to regain the air superiority over the battlefield which allowed the Israeli Army to retake the Sinai.

VIETNAM: 1972



NVA (USSR) PT-76 light tank



USN F-4B *Phantom II*

In war, situations are the products of mutually exclusive and incompatible wills. Thus, they are practically always fluid. Brigadier General S.B. Griffith USMC²²⁶

From 1964 to 1972, the conflict in the South of Vietnam was characterized as a guerrilla war, with air power rarely having the opportunity to use its strengths against a frequently invisible enemy. US forces found themselves fighting an opponent who only exposed himself in short, fleeting attacks after which he rapidly escaped into the shadows of the Indo-Chinese jungles. Built to deal with a conventional Soviet attack in Western Europe, air power rarely had an opportunity to catch large numbers of troops in the open and punish them. The few times the North Vietnamese exposed themselves, they were severely punished by air power.

In 1968, 6,700 Marines at Khe Sanh were besieged by almost 30,000 North Vietnamese. The North hoped to turn the camp into another Dien Bien Phu, where in April 1954, a similar stand by French forces had been overrun by the Viet Minh, subsequently leading to the end of French presence in Indo-China. Where the French lacked effective air power to augment its defense, the Americans flew over 8000 sorties into the area over a ninety-day period. At the peak of the siege, the defenders could count on a cell of three B-52s arriving from Guam or Thailand every 90 minutes to pound the Vietnamese troop concentrations in the jungle.²²⁷ Their forces, weakened by constant air attack, the Vietnamese were unable to take Khe Sanh with human-wave attacks and were finally forced to withdraw from the area.

Similar results occurred in the Spring of 1972 when the North invaded the South with conventional Army units, including significant amounts of armor.

American forces in the South were at low ebb when the North Vietnamese offensive started, most having been withdrawn in favor of South Vietnamese units over several years. US Air Force strength in March, 1972, was down to 365 strike aircraft distributed between Thailand and South Vietnam. With the "Easter Invasion," American air power rapidly redeployed to South East Asia, and by the end of May, over 600 strike aircraft were in theater, including over 100 B-52D and Gs deployed to Anderson AFB in Guam. The Navy deployed four additional aircraft carriers to the South China Sea, bringing the number of flight decks available for use to six while the Marines deployed six squadrons of warplanes to the region.²²⁸

These new aircraft immediately went to work trying to blunt the North's invasion, often flying their first strikes within 24 hours of arrival in theater. North Vietnamese Army (NVA) forces attacking Quang Tri and Hue were repeatedly struck in order to keep friendly South Vietnamese units from being overrun. At Quang Tri the Vietnamese 18th Cavalry Regiment was being forced back when air power arrived to stabilize the situation. Major J.R. Joy, USMC, an advisor to the Vietnamese reported that:

"... The 18th Cavalry fought well and held the enemy on the north side of the bridge. Then in one of the most timely and most devastating air shows ever witnessed, Tactical Air, guided by a Forward Air Controller with flare light, put in air strike after air

strike on the enemy on the north end of the bridge. The attack was beaten off and resulted in five out of five tanks destroyed.....”

At the same location on the following day, another advisor wrote:

“The air cover commenced at 1530 as F-4s delivered every type of ordnance. The tactical situation dictated that normal safe distances be waived. So, we could do nothing but watch, wait, and thank GOD for the US Air Force.”²²⁹

Throughout the Spring invasion, the North’s new armor concentrations proved particularly vulnerable to air attack. North of Hue in Military Region I, with little cover available, tactical air was credited with the destruction of 285 PT-76 and T-54 tanks over the campaign. During a major attack on the My Chanh River defense line on 20 May, 1972, aircraft destroyed 18 tanks and killed over 300 troops. Without the timely application of air power, it was considered unlikely that the embattled and outnumbered ground forces could have held the line.²³⁰

“A large shocking rumble is suddenly upon you, like the voice of God. The shock, fury, the noise.... The combination is deadly.” Dr. Richard Hallion²³¹

In Military Region III the story was much the same, as air power was used decisively to break up determined NVA attacks on An Loc. The B-52 was singled out by Army Brigadier General J.R. McGiffert as “....the most effective weapon we have been able to muster.” During the April and May defense of An Loc, B-52s flew 3800 sorties out of Thailand and Guam, frequently changing targets while airborne to take advantage of the changing tactical situation. The chief of American advisors in the region, Army Major General Holligsworth reported on the 11th of May that many panicked enemy soldiers were fleeing in a state of disorganization from the areas hit by B-52s. On the 14th, he stated that an expected heavy attack “....was dissuaded by the timely delivery of three B-52s.”²³²

As to the difference that air power made in 1972, Vietnamese Lt General Tran Van Minh stated that in 1975, when the North invaded the South again and won, the ground forces were roughly equivalent to what had been present in 1972. In his opinion, the difference in outcome was the massive bombing and airlift capabilities provided by the USAF in 1972.²³³

In addition to the obvious role air power played in breaking up the North’s Easter invasion, Vietnam was the proving ground for night interdiction systems that would grow to fruition in the 1980s. At the start of Vietnam, the night remained a sanctuary for enemy ground forces which allowed movements of troops and supplies down the Ho Chi Minh trail. Aircraft attacks were typically limited to hunting under flares, as had been done a decade previously in Korea. By 1972 the US Air Force had deployed systems in the AC-130A *Spectre* that allowed it to use low-light and IR sources to find and destroy targets in the night. The Navy A-6C *Intruder* TRIM and Air Force B-57G *Canberra* both operated with pioneer Forward Looking Infra-Red (FLIR) systems that provided

single aircraft the ability to hunt and kill ground targets at night with unprecedented levels of success. While the limitations of these aircraft were obvious (relatively low number of aircraft equipped with these advanced devices along with higher than average equipment maintenance rates), they pointed to warplane features that would be common only two decades later. The continued development of these systems would be validated beyond all doubt when the enemy completely lost its night sanctuary in Operation DESERT STORM.



APPENDIX B

INTERVIEW WITH GENERAL (RET) CHARLES HORNER, USAF CENTAF COMMANDER DURING OPERATION DESERT STORM

27 Feb 96

03:21 During the battle of Khafji there were a number of perceptions. One, the Marine Corps were absolutely convinced the Iraqis were out to destroy their logistics base located between their lines and the Kuwaiti border. The Saudi Arabian eastern area command was unsure as to the Iraqi objectives. They knew of course that the Iraqis had entered the town of Khafji. But they were located somewhat back. They had pulled back to get out of artillery range, and so they were a little bit in the dark. I think overall none of us knew what the objective of the Iraqi force was. We knew several days ahead of time something was up, and we began to see the armored vehicles move but we really didn't have a full understanding of what the Iraqi intentions were.

04:17 In combat, one thing you become sure of is you really don't know what is going on. In the case of the Khafji operation, Jack Leide from CENTCOM J-2 had told us that something was up but he didn't know what it was. Then on the 25th of January the JSTARS started to see the movement of the Iraqi vehicles, particularly around Al Jabbar airfield. Of course, finally, we had good evidence from the Marine Corps with the Pioneer drones which picked pictures up, which gave us pictures of the Iraqi armored cars. And finally, the entry of the Iraqi forces into the town of Khafji confirmed we had some sort of limited engagement. All told I don't think we really understood the battle of Khafji until the battle was over.

05:14 Our success in the battle of Khafji is directly attributable to the Joint STARS. JSTARS gave us the critical information we needed early in the battle to destroy the Iraqis before they ever arrived at the battle in Saudi Arabia. For example, on the night of the 25th, JSTARS picked a convoy up coming out of Al Jabbar airfield into the Wafra oilfields. Out of that convoy of about 80 armored vehicles, A-10s and F-16s destroyed 72 of them. You saw later on film the impact of air power when you looked through the infrared Mavericks as that film was brought back from the pilots. That was all directly attributable to Joint STARS. Joint STARS was one of the superstars of this battle.

06:27 From an overall perspective of Khafji, we had three Iraqi divisions attacking along the coast. Allied units consisted of the Eastern Area command which was commanded by Saudis. Next to them was the Marine Corps. Further out to the west was the Army VII Corps which was moving into position. The Khafji incident caused great concern on the part of VII Corps because they had not completed their move and were in sort of a tactical movement position so they couldn't defend themselves very well. The Marine Corps of course thought the battle was against them, and in reality the two main divisions were going against the Saudis in the Eastern area corps. I think in the fog of war

everyone believes they're the object of attack. But in the post battle analysis it was clear the Iraqis were not attacking the Marine Corps. They were strictly putting up a screening force, so the Marines could not come to the assistance of the Saudis. As it turned out the Saudis fought the ground battle of Khafji with the Marines handling the screening force on the western side.

08:03 During Khafji moving targets became the primary target. That was the thing you wanted to hit. The tip-off came from Joint STARS. It was reinforced later by other intelligence resources to include UAV, the unmanned aerial vehicles of the Marine Corps. Systems that were especially effective were the AC-130 gunship patrolling the coast road by being just offshore of the coast in southern Kuwait. The A-10s, because they had the infrared Maverick, had a very limited night capability that proved to be very effective. We used the B-52s against the mobile targets, not individually, but against the areas where they were coming into and leaving. So we were hitting the built-up areas. And the amazing thing about the B-52 strikes, while they probably killed very few vehicles, they forced the Iraqis to continually keep on the move and be strung out, so they then fell prey to other systems such as the F-16s and the A-10s.

09:21 We don't know what the aim of the Iraqis was in the battle of Khafji, and we may never know. We've had reports from enemy prisoners of war that they wanted to inflict casualties, that they could not sustain the pounding they were getting from air power in southern Kuwait and southern Iraq and they had to do something to change the initiative. Finally, there's no doubt about it, I think they felt they could defeat the combined Arab forces in the east, and their objective was well south of Khafji. I think the best guidance was the guidance that Saddam Hussein gave his III Corps commander who commanded that battle. He said "I want you to make this the 'Mother of All Battles.'" Unfortunately, after the 30th, he called back to Saddam and said "the mother is killing her children."

10:39 In Khafji it was unclear as to what the threat really was. Now keep in mind most of the action in Khafji occurred in southern Kuwait with the air attacks against the attacking forces, the three armored divisions. On the other hand the Saudis, particularly in the eastern area command, were very concerned about Khafji because in a way this was a test of their ability to be an equal partner in the coalition. So while General Schwarzkopf and the CENTCOM staff viewed the action closely, they were very relieved to see the Saudis do such a good job of handling the attack.

12:30 I think people miss the significance of the Battle of Khafji.

12:51 In retrospect as you look at the battle of Khafji, there's probably four battles of Khafji. There's the battle for the town itself, the one that was fought by the Saudi national guard, and later by the eastern area command under General Khaled. There was the battle that was fought in Kuwait with air power killing the attacking forces before they crossed the border. There was the battle the Marine Corps fought because they perceived the attack was against them and their forward log bases, when in fact they were just bumping into the screening force on the west. And then finally, there was the battle

that was never fought. And that was the battle that I think all of us believed was part of an overall scheme on the part of Saddam Hussein: where after he was successful against the Saudis in eastern area corps, he would then drive another attack down the Wadi al Batin into the Egyptian and Syrian forces who were located in the northern area corps and defeat them. So many of us planned for that last battle which never occurred because we had so much success in the first battle.

14:21 One of the problems we had in the Tactical Air Control Center was knowing what was happening, we could see action. We could see the enemy columns, and we kept diverting air power as we gained information on this. It started on the 25th, grew on the 26th, 27th, 28th, 29th. One of the other things we had to do is when the Saudis became engaged, we diverted a large number of close air support assets into the Khafji area. But unfortunately, we were unable to employ them, because the teams, the Air Land Ground Liaison teams, ANGLICO teams that the Marines had provided the eastern area corps were trapped in the town of Khafji. They were hiding on top of a building and were not able to control the airstrikes we were sending there. So the aircraft then had to overfly the town of Khafji and strike the attacking Iraqis inside of Kuwait.

15:58 We put a lot of air there. On one point, like on the 29th, we were just sending everything to Khafji. With regard to the air effort at Khafji, it began to grow as we saw the battle unfolding. Towards the end on the 29th, we were diverting most everything we could over to that battle area. Unfortunately, not a lot of air force close air support was used because that's in the area of the Marine Direct Support Center, the DSC, and they were more comfortable working with their Marine assets. So the Marines tended to do the close air support and the Air Force aircraft and coalition aircraft tended to do the overflight mission and strike the Iraqis inside Kuwait.

17:16 During an air battle such as we find during late January time frame, you use all the airplanes. For example we had F-111s attacking tanks with laser guided bombs inside southern Kuwait and Iraq. So, in fact, they were supporting the battle indirectly. Then you had B-52s bombing the areas that the Iraqi forces were coming through. And while this is, in some ways, nothing more than nuisance attacks, it also helped funnel the Iraqi forces to areas where they were picked off more finitely by systems such as A-10s with infrared Mavericks and F-16s, and other Marine aircraft and systems that could operate at night.

18:57 If you are looking for a bottom line on Khafji, I think you have to look at the output, the results. For example, you had three Iraqi divisions, one armored, two mechanized, that's a lot of force. The forces that defeated them on the ground, other than the Marine Corps elements which was not a significant effort, it was a sharply fought battle, but not significant numbers of forces, were a company of Saudi national guard in armored cars, they went in, rescued the American ANGLICO team, a Qatari tank company, and about a brigade of Saudi Arabian forces. You stack that up-a brigade plus versus three divisions, and now you begin to understand the impact of air power on the Iraqi army in the battle of Khafji.

20:51 [Question was about relative numbers of aircraft by service used at Khafji]
During the Gulf war, air power was indivisible. We didn't know whether a sortie was American, French, British, Saudi Arabian, or Baharani. That was unimportant. What mattered was where the airplanes took off from, where they could go, and what kind of ordinance, what kind of sensors they had, were they a day strike type aircraft or night type strike aircraft, were they short range, long range, did they have good penetration [attributes] like low RCS or were they aircraft that required a lot of ECM? Of course during Khafji that battle occurred in the vicinity of the Marine Corps and the Navy being off the coast in their carriers, and in Jabal airfield and Bahrain. So you would expect the majority of the sorties going into the vicinity of Khafji to be things like the short range AV-8 and F-18s off the boat. Also we had a large number of the A-10 sorties coming out of King Fahd airfield just down the road, and sorties of F-16s coming out of the UAE which tends to be close to that area. So if you look for a sortie count as to who won the battle of Khafji you can slice it any way you want to, but it comes down to one thing-air power. Well it's true. We need to give the Saudi army credit because they did a super job. I mean they really did. They were scared to death and they fought very well.

22:45 Air to ground munitions most effective against the Iraqis during this battle tended to be things like the infrared Maverick because the initial battle was at night, and the Iraqis thought they had a sanctuary traveling at night. Of course that just wasn't the case. Other things we used were the cluster bomb units. We could have benefited greatly if we had modern munitions like the sensor fuzed munition. Again the AC-130s-there is no getting around the effectiveness of the 105 howitzer firing into vehicles coming down that coastal road. I think those are probably our most effective munitions during the battle of Khafji.

23:41 Throughout Operation DESERT STORM, and particularly in this one very tenuous battle, the Iraqis were denied use of the air where we had complete control of the air. I think the outcome speaks for itself. If you don't control the air, you'd better not go to war.

25:00 [talking about declaring air superiority]
I never did, Schwarzkopf did. He just was dying to say something. I would never tell him anything. Why should I declare it? Then if one Iraqi bombs us, then he's mad at me. So I just said "how are we doing?, we are about on schedule, that's what I told him."

25:40 Air power is not going to replace land power, and airmen must understand that each has it's place -- land, sea, air, and space. On the other hand, we saw in Operation DESERT STORM how important it is to use air power wisely and effectively. There is no doubt about it, air power was the deciding factor in the battle of Khafji. On the other hand, this in no way diminishes the heroic efforts and the very, very competent efforts of, for example, the eastern area command, the Saudi forces, the Qatari forces-they fought magnificently and aggressively and in many respects their efforts won the day as much as air power.

27:25 In war, you are always dealing with half truths. The glass is always half full or

half empty, depending on how you look at it. During Khafji there were movements among other Iraqi elements. The prudent commander is the one who plays the “what-if” games. What if he does this, what do I do? In the case of Khafji, of course, we were concerned about a secondary attack coming through the Wadi al Batin into the Egyptian/Syrian forces. And in fact, we took some measures. I went to the VII Corps and said your Apache helicopters would be very effective should the Iraqis attack the Egyptians and become intermingled, and we’d need the kind of discriminating fire they could provide, for example. And so we had contingency plans for doing that. We were so successful in the battle of Khafji, the other battle never occurred.

29:00 During Khafji we saw a great increase in the tempo of air operations into southern Kuwait and southern Iraq. The reason being, of course, airplanes were being diverted into that area. Because we were unable to bring them to bear in terms of close air support, because command and control structure was not in place, they then continued on into Kuwait and southern Iraq where they hit units like the Republican Guard and some of the heavily armored units along the Iraqi/Kuwaiti border.

30:04 We were very unsure as to what was going to unfold in terms of Khafji. We had intelligence reports. We had reports from the Kuwaiti resistance which told us about a staff meeting on January 26th. We put 2000 pound bombs onto the middle of the house where the meeting was held and we do not know what impact that had on the overall battle. The other thing is, we were amazed when we saw these large numbers of vehicles moving on the Joint STARS screens. But I can tell you that we really never had an understanding of what was going on until after the battle was over.

33:54 In many ways the battle of Khafji was downplayed at the time. First of all, we really didn’t understand what the objectives of the Iraqi army were. Second of all, so few Iraqis actually made it across the border, it appeared to be some sort of minor action. And then finally, we were so engrossed in the oncoming offense in the western area, the so called “Hail Mary” operation, that we didn’t have time to look at it, didn’t have time to see it for what it really was. After the war, we had time, and you saw the condition of the Iraqi army that surrendered to our oncoming forces that did come across the border. We began to realize the battle of Khafji was a very critical battle. Because it’s the one where the Iraqis were attempting to seize the initiative. It’s the one where they were attempting to turn around this sort of death spiral their army was caught up with as it was locked in place in the desert and pounded from the air. In retrospect, the Battle of Khafji is a tremendous victory for the Saudi army, it’s a tremendous victory for air power, and it’s a tremendous victory overall in terms of what happened in Operation DESERT STORM, because it laid the final nail in the coffin of the Iraqi army.

35:36 One of the outcomes of the Battle of Khafji was the Iraqis discovered night was not a sanctuary for moving large forces. Sure they could move individual tanks, put them in other bunkers, and things like that. But once the battle was joined, and once they were defeated, they understood that Joint STARS had vision on the battlefield at night, and any convoys they formed up were going to get destroyed before they got to where they were going. A second thing I think Khafji did, was maintain the initiative for the allied forces.

That is very, very important because you see that's the whole concept behind things like information warfare and all the new concepts that we feel were formed in the what we call the revolution in Operation DESERT STORM.

37:50 The battle of Khafji brought home certain lessons, certainly for the Iraqis. One is they had no sanctuary for movement of large number of forces at night. Joint STARS is going to pick them up, and air power is going to pick them off. The second thing is, they could not gain the initiative. We snuffed that effort in the bud, and we kept them from getting out of the locked-in position, where they were being pounded by constant air attack day and night. And I guess the last thing is, it showed to the coalition they could fight and win. Remember those forces that fought the battle of Khafji had not been in war before. This was their baptism by fire and when they succeeded against what were referred to as "battle-hardened" troops of Iraq, that was a major plus for the whole coalition.

39:20 I'm often amused when I hear people talk about the hundred hour war. There wasn't a hundred hour war, there was a thousand hour war of which the last hundred consisted of actions on the ground when you take away the battle of Khafji. I think there is no doubt about it, every battle will be fought based on the weather, the political objectives, military capabilities, strategies, tactics, training. But Operation DESERT STORM was a thousand hour combat operation of which 90 percent of it was done from the air.

40:20 [asked about the oil fires]

They may have done that to hinder air operations. As it turned out they very seldom hindered air operations, we were bothered more by the weather, fog and drizzle, than the oil fires. They did obscure visibility, and when they were bad it was very very bad, but often as not it was blowing back onto the Iraqi lines as blowing into our lines. So the oil fires were really an example of criminal behavior, not good military operations.

41:26 One of the lessons I think we need to gain from Khafji is the importance of information, such as was generated by the drones and by the Joint STARS aircraft and by other intelligence assets, and the ability to bring them more quickly to bear on the battle. In Khafji we were always operating in the fog. We were able to attack those elements of the Iraqis that Joint STARS found for us, but we really didn't know the significance of those attacks until after the battle. It would have been very useful if we could have done a better job of bringing all our intelligence together very rapidly, say aboard an AWACS where a controller then could give more meaningful direction to the aircraft coming to the battle. As it was, we won because we had so much superiority; we had so much firepower. In the next battle we may not have those advantages, so we need to look at this battle and find out how we can better bring all of our information assets more quickly and more directly into the battle.

42:55 A-10 turned out to be a superstar of the war, it was used in so many different missions. During the battle of Khafji it was the fundamental system for the close in work, particularly in supporting the attacks with the Marine Corps and the attacks at night

up in southern Kuwait.

43:18 AC-130 is a vulnerable airplane, and of course we had the tragedy of the shoot-down of Specter 3. The AC-130 problem was it is vulnerable to ground fire, and of course, we had the tragic loss of Specter 3 with the people on board. On the other hand, it's ability to find targets at night and strike them with precise fire, through primarily it's 105 howitzer, was critical to stopping the establishment of particularly air defenses as the Iraqi forces came forward. It was blowing them away before they could get setup.

44:01 The LANTIRN pod on both the F-15 and F-16, of course, gives us the ability to turn night into day, and without it we are missing a significant night capability. The LANTIRN on the F-16 was also augmented, surprisingly enough, by the moving target indicator on the F-16 radar. It's interesting that we really didn't practice using this system in peacetime all that much, but found it invaluable during the war and particularly at Khafji.

45:59 The role of the F-111 went from a cold war low altitude strike bomber-we found out low altitude is non-starter. And where the F-111s really came into their own was what we called tank plinking-dropping individual 500 pound laser guided bombs on individual tanks-one bomb, one tank. Interesting enough, this attrition of the Iraqi army had to be a significant contribution to the success we found in the overall ground battle, and especially in Khafji.

45:33 The F/A-18, of course, constitutes the bulk of Marine and Navy attack sorties. These aircraft flew the next most sorties, next to the F-16, during the Gulf War. They provide the capability because of their stealthiness-the ability to penetrate. They provide dual mission capability, air-to-air and air-to-ground, and overall were very useful in this war.

46:05 The Marine Corps relied heavily on the AV-8B. They also were able to use the short field take-off by putting airfields out such as the Air Force did at King Khalid Military City. So you could take an AV-8B, take it over, drop it's bomb load, come back quickly rearm it, drop, quickly rearm, drop, and then return to it's base, just as we were doing with the F-16s and A-10s at KKMC.

46:42 During Khafji again we saw the tremendous advantage that armed helicopters provide in the close in battle. On the 30th, during the daytime, they were very useful supporting the Saudis.

47:00 It really is a hell of a story and the trouble is the Army doesn't want it told because the army wasn't involved. But it was the only battle, ground battle, that we fought in the war where the issue was in doubt. All the other battles were go forward collect prisoners, go forward collect prisoners, call in an airstrike -- somebody wants to shoot at you -- just blow them away and keep going. So it's really worth looking at.

APPENDIX C

INTERVIEW WITH MAJ GENERAL (RET) THOMAS OLSEN, USAF CENTAF DEPUTY COMMANDER DURING OPERATION DESERT STORM

The following is the transcript of an interview conducted with Maj General Thomas Olsen, USAF (RET) at the Pentagon on 13 May, 1996. **Bold** remarks indicate points of emphasis added by the speaker.

00:30 [Why did the Iraqis attack at Khafji?] They were looking for a way to get out from under the air attacks, for one. They saw it as an opportunity for them to initiate ground warfare on their own terms at a location of their choosing. And, the main purpose for Saddam, who was always threatening about the “Mother of All Wars,” was to show that he could generate that war and he would inflict massive casualties on the US and the other coalition teams, countries, and also take large numbers of prisoners. He could then hold that up to the world and, primarily to the Arab world, that he could do the things he said he could, and he was the true leader of the Arab world.

01:57 [What was the first indication of an attack?] There was some indicators back about three or four days earlier, that they were moving forces (some of their tanks and some of their armored personnel carriers) into positions where they could be moved further south, closer to the Saudi border. I think the earliest was about the 25th. We saw some of their tanks and APCs being assembled. We didn't know where they were going, but they were down in an area (of Kuwait) where they had an opportunity to move about. The first indicator was on 28 January when they came across north west of Khafji, and I think what they were trying to engage coalition Forces (the Marines happened to be there). However, I don't think they knew who they were going to engage because the indicators were, as we look back, that they didn't have any clue as to where our forces were. There may have been some deceptions given to them that there was an assemblage of forces south of the Kuwaiti border. That was done, for a very distinct reason, to make them think coalition forces were there, so they would stay in place. I think they came across, and their main thrust was going to be at Khafji, but they wanted to get out to block that avenue from any other coalition forces coming in to stop them. They found that the Marines were out there, and the Marine LAI battalions engaged them and did a pretty good job of it.

03:50 [What was the size of the attacking force?] Probably a mechanized infantry unit, probably battalion or larger and probably had some tanks associated with it, whether or not it was a full tank unit I'm not sure, but they employed enough to be a serious threat.

04:20 [Were there separate attacks at different locations?] The first one was actually west of Wafra, and then they came down through Wafra, and then came down, the third one came down into the Khafji area.

04:46 [Because they came down at three different places did that cause any confusion?]

Sure. First of all, we never thought they were going to do anything, because they hadn't done anything for so long. The indications were that they had the capability to do it, but whether or not they were going to actually do anything was still a question. I think when they came across, and they were reported moving across the border "that was a wake up call for everybody" that says "yeah, they are serious about this". There was a bit of confusion as to which way they were going to go and how much of the force they were going to bring. They had a good size force within Kuwait and if they mobilized it all, it could be a very serious threat. Those three avenues were the avenues that kind of laid themselves open to them.

06:00 [What in place forces did the coalition have to deal with it?] The initial forces were engaged by the Marine LAI battalions. When they moved into the Khafji area, they found the forward units of the Saudi National Guard and there were some ANGLICO units, Marines and some Special Operations Force (SOF) teams that were out there to be observers, sort of recon teams, to pickup any movement and announce it to the world that they were coming that way.

06:37 [What was the Coalitions initial response?] The initial response was to report and respond to any Iraqi ground attack when they came across the border. They were to engage and then to localize and stop the enemy forces -- prevent them from making any sizable penetration. I think the in-place forces did a very good job of that.

07:04 [How did air power's unique capability to rapidly concentrate force in the battlespace impact that response?] Air power was the key here. The ability to be flexible and to move the impact of air power was key to the success of this battle. When we figured out where they were and where they stopped, then they became fixed targets (easily became targets). We had a lot of air power going into Kuwait. We had aircraft going into northern, western, southern Kuwait, attacking the in place forces, attacking the air defenses, the air bases, whatever was necessary in Kuwait. Then once we knew the enemy's location, it was easy to shift some of those forces immediately over to that target area. We did that with the A-10 and some of the Marine AV-8s and other aircraft like the AC-130. So it was taking advantage of the sorties we had scheduled into that area and moving them from their original targets to these immediate targets. Once we had the immediate targets identified, we could funnel the air power over those targets on a regular basis.

08:34 [Was any diversion of other US Army or USMC forces considered?] First of all General Schwarzkopf told us that he didn't want to put any other forces over there. He wanted it stopped with the available ground forces -- with the Marines and the Saudis, and the Joint Force Command-East forces -- and use air power as the key element there to stop those forces. He didn't want to disrupt the movement of the VIIth Corps and all the other Army forces that were moving west for the "Hail Mary" operation. At that point it didn't look like there was going to be a great movement of Iraqi forces. And once we figured out who was coming and how many were coming -- they were coming in bits and pieces of their total force, rather than in any concentrated effort -- we figured the air forces could do that. General Schwarzkopf made comments to that point. He wanted to

do it with what was there.

10:00 [Tell us about the interdiction effort inside of Kuwait in support of Khafji?] I think you have to look at the extended battlefield, you can't just look at Khafji and say that's the only part of the battle. Because once you start the contact there and make the engagement, you have to assume there are going to be follow-on forces coming down to take advantage of any break through they might have had made. So we looked back up road and there were lots of units moving -- there were tanks and APCs moving. By their travel routes you could see they were going to come to the battle at Khafji. So then we put forces -- air power -- on those moving units -- they became targets. That was just part of the battlefield interdiction.

11:01 [How did you know they were there?] We had good intelligence. First of all we had air superiority over that battlefield -- over Kuwait and over the better part of Iraq. With that ability, we moved the JSTARS aircraft to look in that area so we could follow their movement. We took away the night time cover the Iraqis had used for many years against the Iranians, when they could maneuver their forces during nighttime without being seen. We took away that capability. Also the Marines, with their unmanned reconnaissance aircraft, could go in there and could determine where the units were actually located.

11:54 [Tell us more about how JSTARS was used.] The JSTARS, as you know, was brand new equipment. The JSTARS aircraft has a side-looking radar that picks up movement on the ground, and it can plot that movement very accurately. It can look at a very wide sector or a very narrow sector -- when you have movement identified and you can more or less actually count the number of vehicles moving in that sector. Although when they become stationary it is not as capable of seeing the enemy forces. Then you have to have some other capabilities -- some other asset to go in there and look if they are stationary. But JSTARS could pick up the moving vehicles, and it could generally count the vehicles, and also determine direction that they were traveling, and such as that. It gave us the information on a real time basis. We got a direct feed into the TACC from the JSTARS downlink, so that we could see the same picture in the TACC as they were seeing in the aircraft -- in real time.

13:38 [Did the Iraqi actions change over the three day period?] I would say no. They didn't really change, because they came across first of all with mechanized infantry with supporting armor, and that seemed to be the pattern they were following -- and one which they historically followed for many years. Once they had the infantry in place, the mechanized infantry, then they could bring the armor to exploit that positioning of those Iraqi troops and they never really changed from that. However, their ability to coordinate and accurately time the use of those assets became less and less effective as the battle went on. We could see the mechanized infantry on those second and third thrusts came across, but then the armor would be some time later or would even be on it's own -- it would not be coordinated with the infantry. But they never really changed from that.

15:05 [Did the Coalition's response change?] The Coalition's response was to first

identify the units as they came across according to size, direction and type of threat they presented. Then to put in a blocking force or to attack them is such a way as to slow them down or even stop them. Then we would follow that with air strikes once they were stopped. When we had them pinned down, they either had the choice of dying in place, or they could retreat, or they could vacate their vehicles. They did all three of those. Our method didn't really change over the three or four days there. We used the ground forces to block them, identify them, and to stop them and then air was put on top of them -- to kill them.

16:10 [Potentially what could have been the outcome if air power hadn't stopped the follow on forces?] It certainly could have effected the "Hail Mary" plan. If they had gained a foothold in the Khafji area, then they became a threat to the eastern coast of Saudi Arabia and all the assets (supplies) we had lined up in the Marine Corps, the other air bases, the supply points and the off loading in the ports, which were all key to the execution of the "Hail Mary". Because all of those assets were linked together, an Iraqis thrust far enough south could disrupt all that -- then yeah -- they would have become a major problem. But since they didn't have a capability to do that, and once we had them stopped it was all but over. They didn't have the intel and they didn't have air power.

17:25 [Talk about sorties diverted to the action at Khafji?] Some of the sorties were diverted from their original targets but they were in the same general area and they were just taken off of fixed targets which they were going to, to mobile targets. Yes, some were probably added for that specific reason. I would say we put a great focus on it with those assets because at that point we didn't want that incursion to fester and become a problem. But I think there were several other assets -- other factors there. At that point in time we were not using the A-10s, AC-130s, and AV-8s to their full sortie generation potential. They were being utilized, but they had an excess sortie generation capability. They could sortie surge and we took advantage of that capability. We got more sorties into that area than we would have on a regular day to day basis if that event hadn't occurred.

18:40 [Did the use of air power impact other air operations?] I don't think the impact of the Khafji operation had any real impact on the rest of the air campaign, because the SCUD hunting and the anti-SCUD operations were well established, and they were an ongoing process. The strategic (battle) air campaign portion was ongoing, and we had fixed targets there, and we had aircraft that were capable of striking them. Here again we probably had some excess sortie capability in all those aircraft models that were being used against those targets. Also at that same time, we had already been focused on the Republican Guard units for heavy attacks because they were starting to move around, and once they started moving then we had them identified very well. While they were dug in and not moving, it was difficult to really identify them. So once they became mobile targets, we could concentrate on them. That was one of the emphases General Schwarzkopf had made -- that he wanted to kill Republican Guard units. So we had never moved from that objective.

20:15 [Was there any concern that the Iraqi aircraft fleeing to Iran would somehow be

used at Khafji?] The easy answer is no. But when they moved to Iran there was a question as to whether Iran would support them in their future use. We didn't know what the Iranians were going to let them do. We did know the Iraqis were having some problems with landing over there, but once they were there we didn't know exactly what they were going to do. About three or four days later we found out that they weren't doing anything -- the Iranians were impounding the airplanes -- so that they were not going to be used. I think that would have been a fatal mistake by Iran, because they would have been brought into the war -- and that would have complicated our position totally if Iran had supported them. They've painted Iranian markings on them. They are part of the Iranian air force now, and have been for five years.

21:27 [Was there any concern about the use of chemical or biological weapons of mass destruction?] Yes, there was always the capability within the Iraqi Army (and Air Force) to use chemical and biological weapons, and there were some indicators -- we had some traffic, comm traffic -- that they were making some preparations. But they never moved those units. We thought they were just talking to forward units. From that point we said, "they don't really want to do it, they just made them ready." They may have just done that for us -- a ruse -- to make us think about it. They always had that capability, but they never choose to use it. On the other side of the coin, our US troops and the coalition troops were trained, equipped. They were prepared to fight in a chemical, biological atmosphere. So I think that would have been negated -- it would not have been a good thing -- but I don't think it would have changed the outcome of the war.

22:40 [Why did strikes continue after Khafji was retaken?] Well that's part of the ultimate defeat of those units. Once they had made a motion to come across and made an effort to make a penetration into Saudi to capture Khafji, they became viable threats, and those threats had to be taken out. They were mobile, they were lined up in columns on roads, they were easy find, they were easy to strike, and they became viable targets. One of our purposes was to reduce the Iraqi army's capability of conducting warfare by at least fifty percent before any coalition ground operation began. In those units that were particularly involved, I think we did a better job.

23:50 [Talk about the damage the Iraqis' follow-on forces suffered from air strikes.] BDA assessment was probably one of the low interest items at that point in the war. We didn't do a very good job of going back and to actually count vehicles damaged and also destroyed. We had a good count of those vehicles that were in Saudi Arabia because we could go out and touch them and count them. We found a very small percentage of them were actually destroyed, many of them were damaged, but to a greater extent abandoned. This was borne out in some of the A-10 and AC-130 video film that you would see a vehicle hit within the column, and they would stop, and the other vehicles' hatches would come open and the crews would come out and run away from the vehicles. They knew they were targets, and they would probably be struck, and we did strike most of those tanks and APCs when they were stopped. They may have also lost some of their own crews because once they got off the roads they were into the minefields and barbwire and those things they put up for their defensive measures. So they probably lost some of their own people that way. But the

numbers that were actually killed, it is difficult to say, because we didn't make an effort to go count them at that point in time. We had nobody to go count them at that point in time. If it were ever done, and I know the videotape is available somewhere, because we had access to those and saw them daily, you could go back and count. You could say this string of vehicles was 40 or 50 vehicles and that we hit directly, 20 or 30 of them were damaged and the others were just abandoned. Some may have been damaged completely, others may have been damaged to the extent that they were not effective weapons, but others pretty much totally intact.

27:08 [Can you comment on the psychological effects of air power?] The psychological effect was realized early. When we started attacking the in-place forces in Kuwait and just outside of Kuwait in Iraq, we noticed from films that we had, that they weren't living in their vehicles. It had been the normal for the Iraqi crews to live in their vehicles -- they would sleep in them and stay around them. They were building small trenches well back from their emplacements and they were digging holes in the ground and they were living there. Because they knew if they stayed in their vehicle or in their tank they might get struck and they would be dead. We noticed that very early, when we started to attack their in-place forces. I think this had an impact when they came to the battle of Khafji -- they knew that if they were left open, they were defenseless, that they came under air attack, then they were going to be targets, and it was not safe to stay in their vehicles. The psychology there was that by the use of air power -- and the effective use of air power on them **they lost their will to fight. When they lost that will to fight, they also lost any confidence they may have had that they could win any battle against coalition forces.** If you do those two things, you're already whipped, whether or not you have superior numbers, superior technology. **If you don't feel you are going to win you're not.** You don't have that confidence. **I think air power early on caused that, and once they got into the battle they saw it first hand and they definitely lost their will to fight.**

29:37 [What did we learn from the friendly fire and other losses?] As horrible as that is, to lose your own forces to your own fire, we learned several things from it. One, we needed to have better coordination, command and control of all of our forces, air and ground forces. We needed to know where the ground forces were located -- the air forces needed to know where those ground forces were. Two, we needed to have better communications between the ground commanders and the air commanders, or the air flight leaders, so they knew exactly where those ground forces were. (We had one case where we had a technology failure on one of the Mavericks, where it came off the A-10, but we don't think that the rocket fired. It just came off like a bomb, but the guidance system was working and once it fell off the aircraft it had enough maneuverability to find its way to that tank [actually light armored vehicle] that the Marines were in, but that was a technology failure.) It's just one of those things **you have to be able to identify the ground forces, you have to be able to communicate with them, and you have to have coordinated actions between the ground and air, so that you don't have fratricide. The other thing was that we needed better ways to identify visually and electronically where those friendly forces were located.**

32:00 **We needed to be able to identify friendly forces both visually and electronically. We needed to have better communications between the ground units and air units. We needed to have better coordination between the air and ground units prior to an operation, and also during an operation, so that we would preclude fratricide.**

32:34 [Have these lessons impacted operations since then?] I'm sure they have since this is a thing you are going to find in any conflict. But I think we get better at it at each event we have. But there is always that possibility when you have people shooting at each other and you have friendly forces in cooperation with air forces and naval forces. There is always an opportunity to have some lack of coordination or lack of communication somewhere that will cause an event like this. I think we have done much better each time as a result of learning. I don't know that we have solved that problem as well as we would like to now, as it is going to take some technological capability for that to happen.

33:40 [Did the air campaign have any indirect effects contributing to the Iraqi failure at Khafji?] **I think the outcome of the war was directly impacted by the effectiveness of air power.** In the battle of Khafji, air power was used effectively to stop Iraqi armor and infantry forces from moving into Saudi Arabia. When they did that, we proved we could stop them, we proved air power was successful (effective). When coordinated with our ground units it was even more successful. That had to have an impact on the overall psychology. As we go back to that, we find that the Iraqi forces' commanders really couldn't bring their forces together. They couldn't marshal them, they couldn't move them forward, and they didn't have the privilege of moving them at night, where they had to have that privilege during the Iranian war.

35:02 [Did the overall success at Khafji effect coalition morale?] Oh yeah, that was very clear because there was a lot of doubt, especially in the Arab army units from Saudi Arabia, Egypt, Syria, the Gulf States. Many of their units had never been in battle, and they had no confidence of winning, because they had no experience. They came out of that, especially the Saudis came out of this with a very high expectation and a very high morale -- that they knew that they could win, that they could beat the Iraqi army. But I think that permeated throughout the entire coalition of forces. Once we saw they could be beaten in this small battle, and we knew if we continued air strikes for the number of days we were going to prior to the ground war starting, that we would have that same effect on the overall Iraqi forces, which we did ultimately.

37:25 [Did you observe any changes in Iraqi behavior after Khafji?] I think the changes in the Iraqis after the Battle of Khafji -- they changed to more a group of hermits. They dug in even further with their forces. They didn't try to mass their units. They didn't try to move them, because they figured they were going to become targets once they identified themselves. There were only a couple of times after that where we thought "well they're going to come down the Wadi Al Batin area" -- and that was in the face of the Egyptian forces that were stationed there, and also the Seventh Army was going to come around that corner. We thought maybe they might have had some information we were moving that way, and they might be repositioning some of their forces. I really

don't know what their psyche was as to why they moved some of their forces down that way, but they didn't ever bring them into the battle -- never did move them into a position where they could come into the battle. I think their psyche was, if you don't want to be a target, don't be near your vehicle, and maybe not even be on the battlefield. It may be better to take leave in Baghdad.

38:55 [What aircraft were winners during the war?] They all had a card to play, each aircraft brings its own capability. But, I think there's a couple of airplanes that really did a great job. The A-10, here was an aircraft that was scheduled to go out of the inventory in 1990 and 1991, and just hadn't gotten to that point where they were going to be separated from the active duty Air Force. We were able to deploy them. They flew a large number of sorties. They were primarily a daytime attack aircraft, but over the time we were over there they developed their nighttime attack capability -- that paid off in spades. The other aircraft, the F-16s, especially those with LANTIRN, they were all brand new airplanes. The wings (crews) didn't even know how to maintain the LANTIRN system well -- they had just learned to operate them and were using them for the very first time. The same thing was true for the LANTIRN systems on the F-15Es, they were all brand new. The only aircraft that had proven capabilities that we had around for a long time in the Air Force was the F-111F. The F-111F had been the aircraft we had used to strike Khadafi (in Libya). They had developed an infrared system (Pave Tack) with a laser tracking system that could guide bombs to their targets. They were used very, very effectively. Once the 111s were taken off some of the strategic bombing, (when they were finished with those targets), they were very, very effective against fixed vehicles. They could carry four guided 500 pound bombs and they could come back with a kill on four vehicles on every mission. Once they started that "tank plinking," as we called it, they were very, very effective, and they did a great job. But the other aircraft had it really rough, being relatively new and they hadn't been tested operationally and we didn't have the supply support capability we wanted. We had to build those operations and maintenance capabilities. Many of the pilots had just learned to use those use systems. **That was rather unique. I think that sells the US Air Force and US military capabilities very well in that they could take those assets and put them into combat with just minimal training.**

42:00 [Can you tell us about the LANTIRN system?] The LANTIRN system is a two pod system, one is a navigation system with inertial guidance, and the other is a target finding laser direction system that can be used with laser guided bombs. They put those two pods on the F-16 and F-15. (Not to discount the AV-8, or the Navy and the US Marine Corps side. They had some limited capabilities in those same kind of weapons, but not to the same extent as the US Air Force had.) Some of the A-6s and F/A-18s had some of those capabilities but they weren't the same systems and I can't talk about those.

42:55 [Can you talk about coalition air forces capabilities?] Coalition air forces were primarily US, with NATO allies, this is a unique thing. Previous to coming to my job at Ninth Air Force, and prior to the Gulf War, I'd spent four years in NATO working these air-ground issues on a NATO level. Whom did I find when I got to Riyadh, but some of those same faces that I'd been working with -- the Brits, the French, the Italians -- who

had come there to bring their forces to the war -- and it was like old home week. We found out we all spoke the same language -- we understood the joint employment of air power. The thing that came though, is that (as it worked out) the US Air Force, the US Navy and the Marines had somewhat better capabilities within their aircraft than some of the allied countries brought. We had to negotiate some of those things out, as to where we could employ those European allied aircraft with ours, and how they would be employed, who would be controlling them, rather than going off and working their own issues by themselves and just doing their own thing. We couldn't have that, we had to have one command, we had to have one set of rules and everybody had to play by those rules. Luckily we had months to work that out, because it was not easy for countries to give up what they called prerogative of their own for the control of their aircraft in this coalition of forces. But when we got it all over with, the Arab forces airplanes, Saudis, Omanis, the Bahranis, all did a great job. As the war went on, we brought in Koreans with their airlift capability, the C-130. We had a total of eleven air forces, allied air forces working together, which is something we had never planned. The initial plans were that we would have the US Air Force, US Marine Corps, US Navy, and Saudis. But once we got it all pulled together we had a true coalition of air forces.

46:10 [Can you tell us about the AC-130 capabilities and uses?] The AC-130 had a long time proven capability, because it had been with us since the Vietnam war. All we've done in those years since the Vietnam war is to improve the capabilities of the AC-130. The only problem with the AC-130 is you can't put it into a heavily defended area. It has to go into an area where it can survive. When it was employed that 105mm cannon along with it's 20mm gatling guns, it's a very devastating weapon. You can not hide from it. If you're on the ground you'll be found, because it has infrared sensors. It has radar sensors and all these sensors locate the targets very, very well. It was unfortunate we lost one of those airplanes during this battle of Khafji. Because they were doing so well they stayed on their targets into the daylight and they became a target themselves. It was shot-down with a handheld (SA-7 type) infrared tracking missile. They just happened to be flying in an area where the sun was coming up behind them and so they were silhouetted very easily.

48:00 [You've talked a lot about technology, what about people?] The technologies that we gave our people were the best that we could -- the most advanced capabilities. We had the 117s, the stealth fighter, which we really had only used a couple of times in Panama. We had proven it could do it's job, but it had never been employed in any kind of force like we did in this war. So we had to learn how to employ those kinds of forces. We had to learn how to really use the LANTIRN system, and we had to learn how to use the A-10 in a role we had never planned for. By using the IR system on the Maverick missile as a reconnaissance tool, it could look at the ground and find targets, and may be able to locate those for other aircraft, so that was a real advantage. But let me just say that **people were the key to the whole operation**. You look at what the Iraqi people did, they were deployed to Kuwait and southern Iraq, and what did they do? They dug in, sat on their duffs, and didn't improve their capabilities one iota. When all of the allied forces came in, they were put into a completely new situation -- one that most of the people had not thought about, had not planned for, had no preparation for this kind of operation.

Over a period of several months, or even weeks in certain cases, they were able to bring their forces up to a combat capability and to perform in a combat arena successfully. This goes all the way down from the aircrews flying the airplanes, down to the mess sergeants providing food for those troops. They had to learn to operate in a situation, in an area that was hostile to everyone's background, because the desert brings nothing to you. You have to bring everything to the desert. If you can't bring it all to the desert, you have to improvise with what you brought with you. We found that was true in many, many cases, from building tents, to driving vehicles, to flying airplanes, to loading weapons, to whatever portion of the force you want to talk about -- communications, intelligence -- it was all necessary. **You had to have that flexibility built in and people made that difference!**

APPENDIX D

INTERVIEW WITH COLONEL DAVE DEPTULA, USAF DIRECTOR IRAQI TARGET PLANNING CELL DURING DESERT STORM

01:00 At the time of Khafji, I was a Lieutenant Colonel serving as the director of the Iraqi target planning cell, working directly for General Buster Glosson, who was the director of air campaign plans in Riyadh at the time. As the director of Iraqi target planning, I wasn't directly involved in any of the specifics in terms of targeting at Khafji per se. However, having been involved in the early design of the air campaign plan and responsible for the assembly of the Daily master attack plans, there were several issues that came about as a result of Khafji, and there were several concerns to us as planners.

01:30 My first involvement in the whole episode, I recall, was very very late on the night of the 29th or early on the 30th. It was around 1 AM time frame when we pretty much put to bed the master attack plan for the following 24 hour period, and General Glosson and I heard about something going on in the border vicinity. So we walked down from the black hole down to the TACC, at the other end of the hall in the Royal Saudi Air Force Headquarters building to see what was going on. At that time we got a data dump from the current ops folks of what was happening. General Glosson felt concerned enough to wake up General Horner, who I believe had already retired. The way we'd work the shifts was that General Glosson would be on and General Horner would be off, and vice versa. General Horner came down and I guess the first item to bring up of significance to us on the planning team was the fact that Khafji was an indication -- it was feedback to us -- that the air campaign was working. It was having its desired effects. Why? Because the Iraqis were forced to react. It was our view as planners all along that Saddam's strength resided on the ground, and this was an attempt by Saddam to suck in, if you will, coalition forces into a major surface engagement to cause as many surface casualties as he possibly could, and cause the fraying of support for the coalition. He knew the reluctance of the allied forces to sustain major casualties. So, the feeling at the time was, hey, this is a ploy, the air campaign's working, it's having its effect, and our next concern was, we need to make sure that the coalition ground force leaders don't get antsy and jump into this mess.

Quite frankly that was our biggest concern -- we did not want to get engaged in a major surface engagement. And, in fact one of the things I remember was when General Glosson was talking with General Horner at the planning table. I passed him a note that read in effect, "they're trying to suck us into a ground war... Let's not fall for it." Not speaking about the application of air, but speaking about what might happen on the ground.

04:27 One of the issues that deserves mention was the fact that early on there were several theories floating around held by some folks in pretty important places that, well, let's put it this way...were unfounded and Khafji proved so. There was a major concern, I'm speaking in the August-September time period, about the movement of Iraqi surface

forces and armor forces into Saudi Arabia, and what would we do if that happened. And would we have a lot of force to hold them because we didn't have enough forces on the ground. Well, quite frankly, to some of the planners, myself included, it was sort of a moot point. I mean, forces on the move are a heck of a lot easier to target than are forces that are dispersed over a large area. There are many pundits after the war who said, "Hey, this was like shooting fish in a barrel. If the Iraqis had moved early, what were you going to do?" Well, I submit to you that Khafji is a good example of what would have happened to their surface and armor forces if they got under way early on. They would have been decimated by air power, as was so convincingly demonstrated during the application of air power during the two days of Khafji. What am I talking about there? Just for statistical reference, during those two days there were over 500 vehicles, mix of armor, APCs, and trucks destroyed by air. In the previous 12 days, there had been, I believe, not more than, on the order of about 150 to 160 surface vehicles destroyed. So, when you get forces under way and moving, they convoy, they go together, they rely on particular logistics infrastructure, and it's much easier to attack than when you've got forces dispersed.

Now, in about that same time frame, we also discovered that we could use the GBU-12 to directly attack vehicles -- what became known as tank plinking. So, the Iraqis had the worst of it. They knew they were getting pummeled from the air when they were stationary. They decided they'd try to move under cover of night. With the combination of JSTARS with precision platforms as well as a significant number of non-precision platforms, which achieved a high degree of psychological impact, which is another element of air campaign planning that often times get neglected, and in fact can be one of the most significant elements of any campaign. Again, the Gulf War's a good demonstration of that. If we look at the large number of enemy forces that defected, deserted, and left as a result of the intensity of the air attacks, the unrelenting air attacks over a long period of time. I think if you take a look at the Enemy Prisoner of War (EPW) reports after the war you'll see that a large number of the Iraqis felt they would come under air attack 2 or 3 days max. But when it went on for 7 days, then when it went on for 14 days, and they couldn't get more than 2 or 3 hours of sleep, the air campaign had just a devastating psychological impact.

The Iraqis felt that this was an opportunity to surprise, and they did to a degree catch us by surprise, because as you're familiar, JSTARS orbits weren't complete, not providing 24 hour coverage. They had to be shifted. What JSTARS allowed us to do was detect large movements of ground forces, regardless of night or weather. What I like to call, and what became significant here is, "precision" C³I, command, control, communications, and intelligence. It is just as important nowadays, and it was demonstrated during Khafji, as are precision guided munitions. If you can precisely tell where the adversary is and what he is doing, then you can precisely attack him as well. And that's what we did. Immediately after Khafji, then, about the same time frame, we came up with tank plinking using GBU-12's. So now even arrayed forces that weren't under move came under just as significant and intense attacks as perhaps, well, let's put it this way, they came under more significant intensity of attack than before we started using precision munitions against their vehicles. So they experienced a double whammy.

They couldn't move at night or during weather because they'd have to mass when they moved and when they mass and you have precision C³I and you have precision intelligence and you have precision weapons, mass no longer is an asset. It becomes a hindrance. Again, Khafji is proof of that assertion. Then, when we started tank plinking after they stopped moving, it was virtually over with. And I think the 100 hour ground operation, to mop up what the air campaign did, is evidence of that.

10:01 Getting back to Khafji specifics again, some of the elements that were of concern during the time were the placement of restrictions, if you will, on the unfettered application of air power. By restrictions or hindrances, I am referring to the FSCL, the fire support coordination line, which at one point was moved 5 klicks, I believe 5 klicks or 5 miles, past the political border. You might ask, well, why is that a restriction? Well, the placement of a FSCL requires coordination with surface forces before you bring air to attack in that regime. From the planner's perspective, the air campaign planner's perspective, we in fact didn't want to have any coalition surface forces within about 50 kilometers of the border. Didn't need them, at the time. We were not attacking on the ground and we could achieve much better joint use of force, if you will, by applying air directly and unfettered in its full intensity against any movement of enemy surface forces south, without having to go through the elaborate procedures that are normally associated with close air support. Unfortunately, those kind of restrictions, as well as a surface warfare mentality, led to the presence of coalition surface forces in that immediate vicinity and unfortunately we had a couple of instances of fratricide that occurred that didn't need to happen. What do I mean by surface warfare mentality? We need to be applying forces in a joint fashion. What does joint mean? Joint means the most effective application of force, not necessarily the use of all forces simultaneously in the same vicinity. There was a prominent Marine, two star general at the time, who personally told me, and I quote, the first bomb that falls in Iraq ought to be after the first Marine crosses the line with his bayonet fixed. I submit to you that's not jointness, that's an example of blatant stupidity. We need to use our forces in the best possible fashion that they're designed to be used for. There is a time and place for all kinds of force, to include surface and air forces.

Khafji, again, back to specifics, was a great demonstration of what air power can do against forces on the move. We basically stopped the Iraqi 5th Mech and 3rd armor division. One of the difficulties is explaining the effects and impact of air power to people. However, the general public, the military, the Congress, decision makers that make decisions on how to use force and what kind of force to use -- is it's difficult to see. During a surface engagement, you can have reporters with cameras sitting on tanks, rolling into action like riding into the town of Khafji. If you recall, most of the coverage of Khafji was not about the air that was diverted from attacking the Republican Guard that stopped and pummeled the 5th mech and 3rd armor, it was about the folks in and around Khafji itself. Because air is moved quickly and can be reallocated, reporters don't have an appreciation for what it is doing -- it's too quick in its effectiveness. You come in hard, you hit, and in this particular case you leave. There was no need to linger although you could -- we've been lingering in Operation Southern Watch for four years now as an air occupation force.

We need to have folks experience airpower. One of the things I recall vividly about the whole 2 days at Khafji is going out in the morning of the 30th and hearing one of the Marine liaison officers who had come back from Khafji, who had been up in Kuwait watching the effects of airpower. And it was incredible. There was no better testimony to the impact of air power. He said it was like somebody going around with a hammer, hitting cockroaches running around on the ground. And every time there was a moving vehicle, or a cockroach, it would be hit and destroyed. It was a pretty incredible and vivid description.

We need to put reporters on B-52's. We need to put reporters in the back of an F-15E or into the back seat of an F-15C or F-16, if we've got one going, so they can experience and see and know what's going on. We need to put them in JSTARS, show them the pictures, make them understand exactly what airpower allows us to do.

Another impact that Khafji had on follow-on activities involved in the air campaign, as well as the entire theater campaign, involved the Republican Guard divisions that were arranged further north, just outside the western and northern border, of Kuwait. Some of the air that was targeted against those forces was reallocated, or re-rolled, to hit the 5th mech and 3rd armor, and forces moving south to resupply Khafji. As a result of that, a good portion of that air effort remained targeted against the Iraqi conscripts and regulars that were posted opposing the coalition surface forces in southern Kuwait even after Khafji. There was a good amount of debate at the time over whether that was the wisest thing to do, knowing that in fact those enemy forces didn't really want to be there, mostly made up of conscripts. They just couldn't move forward because there were minefields in front of them. They couldn't move back because the Republican Guards were behind them. As one might well understand, those particular forces were arrayed directly opposed to the coalition surface corps, and were extremely important to our corps commanders. On the other hand, the Republican Guard was a key target in the mind of, and as directed by General Schwarzkopf. In retrospect, the corp commanders won out and a large degree of effort was put against the front lines when some of us believed that we should have continued with a larger effort against the Republican Guards.

[19:58] Khafji was also a pretty good demonstration of coalition warfare and how forces interact. The U.S. obviously brought the preponderance of air power into the battle. We had the command, control, and communications, and the JSTARS set up. This precision command, control, communications, and intelligence architecture along with precision-capable aircraft that primarily resided with U.S. forces. However, the other coalition forces provided the main surface effort that went in and reoccupied Khafji on the ground. So, the various capabilities of all the coalition forces were used and integrated into one cohesive operation. Now, that's not to say that things went flawlessly. Things during wartime never do. There are all sorts of friction that occur. The Saudis initially didn't feel that they were getting air support in a quick enough fashion, but again this is one of the lessons in the difficulty with understanding the most effective use of air power. In fact, air power used by General Horner at the time was extremely effective. But you couldn't always see it. The Saudi commander on the ground couldn't see it, because what

was happening was air power was being used to prevent any reinforcements from the 3rd armor and 5th mech or anywhere else from getting into Khafji to reinforce the Iraqi positions. But that ground commander didn't see that. He wanted to know how come bomb's were not falling on those Iraqis sitting in Khafji right now. Well, you know, there are effective means of using force and there are more effective means of using force, and the best way to use it is not always visible to the immediate ground commander. That's why I also use Khafji as an example to reiterate the importance of properly applied air interdiction and how it can be much more effective than close air support. Not that we don't need to be able to do close air support well, but it's not always the most effective use of airpower to achieve surface objectives even though it may be the most visible.

[23:10] There are a lot of misperceptions about what is referred to as the Strategic Air Campaign Plan, why it was put together, and how it was put together. The bottom line was in the August time frame, the President of the United States and the United Nations needed a means to most effectively respond to any heinous act that Saddam Hussein might execute. The strategic air campaign was designed as a result -- to achieve the most devastating impact, to achieve an impact that would cause him to cease and desist whatever activity he was pondering or involved in. After we pretty much had a handle on how we would do that and what we would do with air to achieve those strategic objectives, we moved on to plan attacks against fielded military forces, and what would be the most effective means to affect those military forces, to cause them to cease and desist, and or withdraw. So a variety of analyses were performed, in terms of force application, different types of weapons, using different types of attrition. Some of the models were run by the Air Force Studies and Analyses Agency. Some of the numbers that were discussed, in terms of impact that we had to achieve, related back to historical Soviet doctrine, for when they would remove a division out of combat. The concept, according to U.S. Army doctrine floating around at the time, and again Soviet doctrine, was that generally if a surface unit had received 30% attrition, they would be removed from the line and replaced with a fresh unit. There were several discussions, several models run, and several discussions with General Schwarzkopf by some of the senior air commanders, and others. The 50% number percolated out of these discussions and considerations, knowing that 30% is enough to cause the Soviets to pull a unit off the line, 50% would be more than enough to cause a surface unit simply not to be effective any more as a fighting unit.

[27:03] I would suggest to you that the integrated use of both air and surface forces in this particular overall theater campaign was a good joint use of force, and General Schwarzkopf is certainly to be credited with coming up with this melding of different types of forces. I would suggest to you that in the Gulf War, air power, and when I say air power I'm referring not just to the Air Force, but elements of air power from all the services -- TLAMs, Tomahawk land attack missile, ATACMs, Army tactical missile system, helicopters -- those are all part of air power. I would suggest to you that air power was in fact the key force in the Gulf War. And surface forces, to include both maritime and ground forces, played a magnificent role as supporting forces. You raise a very good point in the ground force as essentially being a blocking force, if you will, while the air forces took the campaign directly to the heart of the enemy, not just to his

heart, but to his extremities as well, and attacked all elements of the enemy, from the leadership, all the way to the fielded military forces simultaneously.

[29:07] I think the Iraqi morale was already in the pits, but as I described earlier, once they tried this ploy (Khafji), that's about the best they could do. It was an attempt to get us to respond, to engage, and when that didn't work, they saw that they couldn't move to reinforce, because they'd be stopped from the air, and then the air attacks continued after that, that unrelenting pressure, again as evidenced by the thousands of EPW reports, confirmed that the air campaign destroyed their morale, and their effectiveness as a fighting force. Again, you don't have 80,000 EPW's without a good reason. And the reason was just the unrelenting force and impact of air, not necessarily to destroy, but to cause an effect.

[30:42] To a lot of people it was a surprise. To a lot of people the impact of air in stopping those divisions that were going to reinforce the Iraqis at Khafji was a surprise. To the air campaign planners it wasn't a surprise. I mean, it was a foregone conclusion. We just needed to be able to do it. And what we need to be able to do now is to be able to educate folks to understand what air power can do, not because we want to further the Air Force, or air forces, but because in these times of continuing fiscal restraint, we need to fight smartly. We need to use the most appropriate weapons systems at the most appropriate time. And we need to spend our resources on buying weapons that provide the most capability, not to continue to procure weapons just because we've always had them, or because it's time for the next evolution in their modification down stream. We need to balance capabilities and buy what's best for the country, not what's best to perpetuate a particular service.

[32:17] SCUDs are a long discussion. We had done everything we possibly could in terms of targeting the known locations. We had put together an alert response force for SCUDs that might pop up, you know, the mobile SCUDs. And when we wanted to become more responsive, we moved to airborne standby caps, guys sitting on tankers. Then we moved to airborne guys floating around, flying around looking for them. But the critical link was knowledge. I go back to precision C³I. It becomes very, very important. You can't hit what you don't know about. If you can tell us, or if you can narrow down that location, that we can then surveil and react to in an appropriate time, we've got the problem licked. But again, you can't hit what you don't know isn't there.

APPENDIX E

INTERVIEW WITH MAJOR MICHAEL EDWARDS, USAF OPERATION DESERT STORM A-10 PILOT

00:37 [What was your mission during the battle of Khafji?] Actually, when I was involved with Khafji, it was my second mission of the night. The first mission I had flown to the tri-border area and had done a turn at KKMC, getting a new load [of fuel and ammunition], and as I was coming out, I was re-tasked in the air by ABCCC to proceed east to Black List [an US Navy controller], which controlled that sector. Upon contacting them, they sent me to the southeast corner of Kuwait, which is around Khafji, and I held feet wet, and eventually contacted an OV-10 FAC, who was scouting the target area. En route I had a sense that some things were going on and that there was some movement, or something out of the ordinary that we normally did not see. As we were holding, I talked to the FAC. He said there had been some armor and APCs in the area, and he was searching the target area for something for me to hit. They sectored the area. I was on the eastern half, and there were some of my flying mates from the squadron in the western half, and I was monitoring their frequency also, trying to get a big picture view of what was going on and where I could be used, and what was happening, filling in my situational awareness. In the western half, Mark Rolling was the first guy in there, and he was hitting armor right and left. I could hear him. They were pretty excited. And I held for probably 45 minutes waiting to find a target. And because I had been diverted from KKMC, I was getting a little low on gas, and at that point, I also noticed that my inertial navigation system was going bad. So at that point I had to pass the lead on to my wingman, knowing that he was going to have to be the first one to employ weapons. I had great confidence in his ability, but I wanted to guarantee that friendlies were not a factor so I kind of held tight rein on him, so to speak. Eventually, the forward air controller said he had no targets in our area that he could find, so we were going to return to our base. But I pushed him to see if we could at least talk to the eastern sector, see if there was any targets for us to hit. And the forward air controller over there said he did have some targets. But we needed to stand by. There was a Navy A-6 coming in with CBU to hit a column. CBU has little bomblets inside -- a canister opens up -- to cover a greater area than a typical gravity bomb that we use. Again we were holding, now moving towards the western side, and running parallel to the border, westbound, and talking to the FAC, getting a picture of what was going on. The A-6 was running in. He dropped his CBU. We could see where it hit and any other ground fires that were down there, we built a picture and a reference point. And at that time the FAC said that there were possibly two APCs and a tank moving up around the Al Wafra area, along a road that was running northeast. I confirmed with my wingman that he had a correct picture, had good coordinates. And briefed him that we would do a shooter-shooter type tactic, where normally I prefer to do a shooter-cover, where I, or he, would observe my roll-in onto the target to make sure no AAA or ground fire would come up at us, and the other person could make some kind of radio call to break off the attacking aircraft and have him get some chaff and flares out. Because of the gas situation, I'd briefed shooter-shooter, with enough spacing so we could provide some cover for each other, and then I

sent him in first. Again, this is at night -- we're lights out -- using the air-to-air Tactical Air Navigation (TACAN0 [equipment] to deconflict between the two of us, and altitude to de-conflict. Because I knew my inertial navigation system was bad, I would have to use his explosion as my mark to place my aim point, so the Maverick was pointed in the correct direction. We had also set a time for the forward air controller to shoot a "Willie Pete" [white phosphorus] rocket that would give a flash and a good aim point. Again, this was very important to us because INS, or the navigation system can drift. We wanted to insure the target was definitely enemy units, that there were no friendlies in the area, and that we were past the friendly positions, in case we had a weapons system malfunction. We were in a trail type formation, about six miles apart, and number two rolled in, and I could see the maverick come off his jet, because we had a little call that we made when it came off because initially, early in the war, a lot of guys thought that was a SAM system coming up at us. Number two made the call, and I observed his maverick missile fly out. Then I saw it splash [hit the ground]. I did not see any secondaries from his Maverick, so I'm assuming he may have hit a hulk that had already been hit earlier, or something along that order. And then I placed my bore sight over his missile impact point, and as my wingman did a left hand pull off, he was going into cover position and climbing to a high altitude for the return to base, and I confirmed with the forward air controller that that was a good mark and that we were definitely looking in the right area. And then selected my maverick missile and I got a lockup, most likely an APC. We had great secondaries from it. Almost burned like a ZSU did -- they tended to burn a little more red. But this target had good secondaries coming from it. I saw that over my shoulder as I'd already pulled off and was climbing up and away from the target. The FAC confirmed a good hit, and he said they were retreating even more quickly. And then we were just climbing to conserve gas and to get home as soon as we could. And at that point Rob Givens was coming northbound. He was with some alert A-10's from our squadron that were launched. And it's our standard practice to do a fighter-to-fighter briefing exiting the target area. I explained the whole situation, the threats we'd encountered, where we'd been holding, the FACs we were working with, the different frequencies, and where he would probably proceed to, and what kind of targets he could expect -- so he could build a picture. He was also being passed information from ABCCC and Black List. That was my minimal part in Khafji, mainly because we had been diverted and we were low on gas. But, we had flares on board, and two more mavericks we could have employed, and there were lucrative targets. My picture from holding there and listening to what was going on, was that air power was very effective. Communications were working well, at least within the sector. Because our squadron had established procedures to talk to one another the situational awareness was very high. The only downfall was maybe some of the crossflow communications between the sectors, we could have maybe been diverted to the west earlier, to employ against some targets. That's difficult, though, when you're working with mobile targets. You like to have some assets ready on hand, ready to employ before they move into some area where you may lose them or not see them again.

09:31 [What area were you in again?] I was holding around Khafji, feet wet. It was my second mission that night, so we're probably talking midnight, 1 in the morning, their time. And I'm holding feet wet, high altitude, powered back, conserving gas. And I'm in

the eastern sector and we hold for approximately 45 minutes with no targets. We're actually not looking for targets at that time. A forward air controller assigned to that sector is searching for targets, and then he'll call us in when he finds one. But at that point he had nothing. I was almost bingo on gas. I knew I had to get out of there, and I asked him if he could flow me through the western sector, because I knew there were some targets there having listened to that sector's communications. As we flowed through to the west, we were employed against a few vehicles moving along a road. I believe they were APCs with a tank. Never did know if we got the tank, because of the fidelity we had with the maverick. To determine if it was a tank or not, we would have to get to a lower altitude, and I did not want to get that low and make maybe a second pass to confirm that it's a tank because we are low on gas. But there were definite vehicles moving along a road, and the forward air controller had said that they were APCs and possibly a tank. So we're actually launching Mavericks at a distance and altitude a little farther out than we normally would because they're moving and we have the confirmation with the FAC, we ended up employing one maverick each from my aircraft and my wingman's aircraft.

11:39 [How many different vehicles were there?] I saw 3 in my initial search, and I believe my wingman saw a few more.

11:58 You target the first vehicle normally, and if you're working in a set, you like to hit the first and the last and bottle them up. Problem is with desert warfare, a lot of times these guys can just turn off the road and head off into the desert. My experience was that normally when you destroy a vehicle, the others would just scatter, and it would be total confusion, you could tell, on their part. And they had no rhyme or reason to what they were doing, but either they would take off into the desert, or they'd actually shut down and dismount their vehicles at that point.

12:34 In our situation we didn't have the time to come around, and do another pass and confirm everything, but the forward air controller passed on that they were good kills.

13:09 [Why is your airplane so good? What's so special about your plane?] What I think is special about the A-10 is that it has the capability to loiter for long periods of time, it can carry a lot of ordinance of varied types, and it has a gun system that can be used for surgical removal of enemy systems when in close proximity to friendlies. Which a lot of systems do not have that capability to do. They may have a gun on board, but it does not have the killing power that the 30 mm has on the A-10. Those are probably the greatest advantages to the A-10.

14:02 Of course you love the plane that you're flying, but trying to be as fair as possible and remove myself from the emotions, Yes, I think the A-10 is a very capable system, and I think it's a system that is and will always be very successful in those types of battles or those types of combat scenarios. When you're dealing with those types of weapons systems that we had to face, large amounts of armor, APCs, there's not that many systems that can take out as many vehicles as we can because we can make multiple passes, and stay in the target area for a long period of time. Because you have to understand,

especially in close air support, it takes a while for the pilot to build a mental picture of where the friendlies are and where the bad guys are in a very fluid type environment. And to ensure the safety of our own people, you have to be patient and take the time to understand what's going on. Whereas some of the other aircraft may have difficulty staying there long enough to understand the real picture, because of gas constraints. Then they may have to be pushed off to target a little deeper, and not as close in, where the A-10 can get the total picture and be effective.

15:25 [What kind of thoughts did you have as you were striking against this first Iraqi offensive?] One of excitement because you could pick up the target much easier than in past missions. I mean, going back to what I had mentioned before, we had developed the night tactics using the IR maverick as the poor man's capability to see at night. So, you had to be extremely patient. You had to make multiple passes on a specific target. You had to determine whether it was a good target or a bad target, whether it was junk. You had to come from different directions because of shadows or the way the revetment was, because you did not want to waste a maverick missile on a junk pile. You had to go to low altitude, and again, you may have to make multiple passes. During the first Iraqi offensive you did not have to do that.

16:19 So back at Khafji, after having to be patient all the time, all of a sudden now you have a bunch of movers. You have vehicles moving down the road, and you know that it's definitely a target, and then you don't have to be as patient, and you don't have to go to as low of an altitude, and you can just come in and launch and leave, and end up employing more ordinance in a shorter amount of time.

16:50 [What was the hardest part of it?] The hardest part for me was holding for 45 minutes, knowing that there was another sector destroying a bunch of armor, and I just had to sit there and be patient because I knew I had a responsibility to that eastern sector and to that OV-10 doing his job on that side and any friendly ground forces we had. That was very difficult. And the other part was, when I finally did get to the western sector, I had to wait for the A-6 to do a couple passes, because he mis-IDed [mis-identified] the target and had to come off and come back around. So he ended up making 2 dry passes when I had a good picture in my mind of where the targets were and I was ready to employ, and I was low on gas, and this guy just kind of pushed me off until he was done.

17:45 [And what was the feeling when you landed your plane?] I knew I was a minor part. I hoped that I had helped in some sense, the information I had passed on. It wasn't until later on when some of the mates in my squadron had shown me their gun film and I saw the effect they had. And later on in the war, after the Marines had written a thank you note to my squadron, saying that we had saved a bunch of lives that night, then I really started to feel good about it. But seeing them engaged, armored columns, and seeing troops dismount and run away. It was a pretty exciting night for the whole squadron.

19:04 It was a fairly benign threat environment at that time. But we had to guarantee, always, that, that we knew what was going on around us. Who knows, some system

might come up all of a sudden. They might be upset and start shooting at us, so we had to always watch out for that.

19:41 [What's the KKMC?] That's the King Khalid Military City. That was the forward operating location for the A-10's. We were all stationed at King Fahd. But what would happen, to actually increase the number of sorties we could produce for the war effort, we would go fly a mission, and then we would land at KKMC, which was farther north and we would get gas and a new load of weapons, and then take off again. That was southwest of the tri-border area.

20:56 Mark Rolling was probably the first flight lead onto the target area. For the most part we were working the western half and not directly around Khafji. More around Al Wafra and then the outpost that was even farther to the west. And this is all recounted from seeing their tape and what had gone on. But they had hit the lead and trail vehicles. Also there were tanks being towed by other tanks. And they were taking those out. Very effective. You could hear the excitement in their voice, working with the forward air controllers and the ground FACs. The initial strikes, almost from the initial maverick hit, you could tell that these individuals, the Iraqis, knew that they were in trouble, because of the precision of the weapons. They knew it wasn't something random that was being launched at them, because they were stopping in their tracks and just leaving their vehicles. They were running away from their vehicles, because they knew that specific vehicle was being targeted. Versus maybe an artillery barrage, which is a much more random thing, it would have kept them in their vehicles, and then they would have dispersed and scattered. The other thing about that is, when they're in a column like that you can end up, especially if you have CBU or some kind of weapon system like that, again, the cluster bombs that we had talked about before, you can take out numerous vehicles at once. But once you start hitting the first vehicle, and you try to hit the trail vehicle also, to bottle them up, they will scatter out in the desert. But what you can see, the capabilities of the A-10, and the ingenuity and the flexibility of an air platform was that you would see these tanks running through the desert, and they would just follow that hot little track until they picked up the tank, trying to beat feet, and then they would just lock it up and take it out. Mark Rolling and Jack Thomas were working the outpost. Each one of those films started off using Maverick missiles for finding targets. Then they would launch the mavericks, they'd get great secondary explosions, the fires would keep burning. They would use that as a mark on the ground, and then they'd start dropping the flares with little parachutes to illuminate the target area. And then they'd come back in dropping freefall ordinance, either some kind of cluster bomb, or some gravity type bomb, general purpose bomb, trying to take out the vehicles at that point, and then also using the 30 mm gattling gun. And I'd say in those two cases they were very effective. I'll let Rob speak about his mission. He was kind of a cleanup action at the end. But those two, you could tell that they created total confusion, and just completely disrupted any efforts they had, and any organization they had.

25:09 Our squadron was the first night squadron. We had even during DESERT SHIELD seen the need for that night capability. So we were able to develop, in that time frame, night tactics very aggressively looking at the safest way to do it, and the most

effective way of doing it. We had some very experienced people in the squadron, and we looked at how to do it, and I think we came up with an effective means, using an older type of platform.

APPENDIX F

INTERVIEW WITH CAPTAIN ROB GIVENS, USAF OPERATION DESERT STORM A-10 PILOT

00:07 I spent a year in Korea, where we planned to fight at high altitude. And then I came to Myrtle Beach, after my year in Korea, where we were planning to fight the Russians in Western Europe, so we planned to fight that at very low altitude. We got to the desert, and we looked at what the Iraqi threats were. We got there in August of '90. We looked at the Iraqi threats and said, well, we'll have to fight at low altitude in the desert. And after about 2 to 3 weeks, and a lot of meeting of the minds, we realized that we needed to go up to high altitude. And that's when in September we went to high altitude and we went to nighttime. And that's when we really started to practice and develop our tactics, through September, October, November, December. Until January, we were very proficient at night warfare from a high altitude. And high altitude for an A-10 is 10,000 feet. It's not the 30,000 feet that some of the other fighters were going in at. We'd go in at about 20, and after a couple passes we would end at 10,000 feet. And at night we were even allowed to go lower, despite the daytime rules. There were night rules for guides. And we'd have guys get down as low as 4500 feet at night. So that was very close to the targets in the Operation DESERT STORM environment anyway.

02:25 And so we spent all of DESERT SHIELD preparing for Operation DESERT STORM. And we essentially learned a whole new tactical way of flying, especially for the guys at night. Because the A-10 had flown at night in peacetime in South Carolina, but it was kind of, well, we have to do this to be proficient to fly, but we didn't ever anticipate fighting at night. We were able to spin up in those 4 months some lethal tactics, obviously.

03:16 You learn the arrogance of peace, I think, is my impression of it. Peacetime, you look where is the next war going to happen. Is it going to happen? And that war, to the guys on the line, I know there's a lot of stuff about what headquarters had been doing, but to the guys on the line, that war came as a surprise. And all the way up until the day that shots were actually exchanged, depending on who you talked to, at what time, everybody had a different outcome. In August, when Iraq invaded Kuwait, we were all buzzing around, what's this going to mean for us. And you'd get a thousand different answers on base. Some guys thought there was no way the United States would do anything. Some guys thought there was no way we'd go even if we did. They'd never take an A-10. And then some people thought for sure we're going. And then when we got over there, DESERT SHIELD, which historically people will never be able to truly represent, the entire DESERT SHIELD portion was sitting with guys in the desert wondering what's going to happen next. Everyone was convinced that he would pull out, we'd rotate home, we'd sit in the desert for forever watching Iraq, that nothing would ever happen. And it was a very sobering thought, on the night of the 16th, when all the strikes started taking off to go. And it was evident that nothing was stopping it now. We were going.

08:26 A lot of our guys, since we flew at night, got to see the SCUDs at night, coming

in. And we saw Patriots launch, at night. In fact one night, my wingman and I were sitting holding number one, getting ready to take off, and they go alarm red. We're already armed, so I do...a rolling takeoff is something you do in pilot training, where you hit the runway and just keep rolling. All operational Air Force aircraft, fighters, stop and run up the engines and then take off. So, I did my first rolling takeoff since pilot training, because we just went ahead and rolled and took off. And as soon as I got airborne I realized that may not have been the smartest thing, because I wasn't sure that the Patriots there at the base we were at, you know, they're just going to see airborne moving target. But obviously it's a lot more sophisticated than that. But we stayed low altitude and turned out to the open desert, and looked over our shoulder, and watched the Patriots from Dhahran launched to intercept the SCUDs coming in from Iraq. And it's big flares at night. The Patriot looked an awful lot like a roman candle going up. It just kind of wound its way up. And the SCUD looked more like a shooting star coming in, real bright, orange, coming in. And you'd see the big explosion, in the clouds, or in the clear air.

13:00 [Do you remember Khafji?] Yeah. I remember that rather well, actually. Well the first thing that sticks out is we had been sitting in the desert since August waiting for the Iraqi attack, essentially, postulating on when they would attack and how they would attack. We'd already begun the air war on the 17th of January, and then on the 29th, when they first came across, we thought, OK, this is it. This is their attempt to spoil our offensive and attacks. That became rather apparent to us that as A-10 guys, we were going to be used quite a bit in that battle.

13:38 [What was your mission during the battle?] Well, we didn't really do close air support because we weren't necessarily working directly with friendlies, at least in my missions. So, we did night, sort of, interdiction while working with the Marine forward air controller against Iraqi armored units that were moving near the town of Al Wafra, just on the other side of the border with Kuwait.

13:58 [What sort of targets did you come across?] Well, the night in question, that I really remember on the 31st of January, we came across an armored column that stretched a good couple miles long, probably, we could count between 20 and 30 armored vehicles on the road. But there were obvious additional vehicles to the north along the roads.

14:20 [What were some of the vehicles that you remember seeing?] Well, it was difficult to tell with our missile. You could tell if it was armor or a truck, a lot of the time if you got close enough. But essentially these were armored vehicles, either armored personnel carriers, the BMPs, or tanks, which intel said were either T-55's, or T-62's, I think.

14:43 [What sort of weapons did you have on your aircraft?] On the particular mission where we engaged the Iraqi column, both my wingman and I had 4 cans of Mark-20 Rockeye bomblets, 2 infrared maverick missiles, then a full gun, which was 1150 rounds of combat mix, armor piercing 30 mm ammunition. Then we had 8 Sue-25 flares apiece,

and 2 A-9 air-to-air missiles for self defense.

15:28 Our squadron had been working the target area for about an hour prior. And Major Mike Edwards, captain at that time, was flying the mission ahead of us, and was able to give us a fighter-to-fighter brief in the air. Through him, through the forward air controller, and through the information we got from both ABCCC and the Marine version of ABCCC on the ground, we were able to build a battle picture, and then get our way into the target area.

16:09 The adrenaline obviously was very high. We understood the significance of an Iraqi attack. And this was what the A-10 was built for. It was something straight out of a textbook. We have a column of armor on the road, and we need you to go take out that column. I went in at probably around 15,000 feet, and my wingman and I left on the Saudi Arabian side, holding high for cover. And as I proceeded in I was breaking out targets, and I couldn't really believe what I was seeing because it's something that you're taught from A-10 school -- what you want to see. And there they were, no kidding, a column of vehicles on the road. And I had the weapons discipline not to lock up on the first hot target I saw, which would have been a destroyed vehicle, since it was already on fire. Picked a vehicle on the road and shot and came back around and continued to shoot the other maverick missile. And then went in to drop my freefall weapons, the Mark-20, and strafe with the gun. And the thing that made it very significant to me was the fact that there was a full moon that night. So you could see the outline of the road on the desert floor. The desert was very white and the road was darker. You could also see some of the crop circles, I suppose they were crop circles, near the town of Al Wafra. And apparently, the Iraqi troops had abandoned their vehicles and had run into the, I guess what they thought would be the safety of the crop circles. But what they were doing, as we would make passes, they would be shooting at sound, and you would see the small arms fire, from their muzzle flashes, essentially, coming up at you from the ground. And the Marine OV-10 pilot called a surface-to-air missile, which I never saw, but he claimed was shot in my vicinity. And again, we're operating lights out, so we're procedurally de-conflicting ourselves from the other aircraft, either with altitude or with the air-to-air TACAN. So you never really see another airplane. You're talking to them on the radio, you know they're out there, but you never see them, because everyone's lights are off. So, he saw the missile launch and called a missile launch, but I never saw it. But there was a lot of small arms fire and some light anti-aircraft artillery.

18:06 [When you hit this Iraqi column, was it the first one, was it the last one?] Well I hit pretty much in the middle. It looked like the first vehicle, and then again, the first vehicle was my perception only, because the maverick missile itself only sees a small section of ground at any one time, so we could have been somewhere in the middle of the main column and just looking at the lead vehicle of that group. But I picked out a vehicle in the middle, since there was a vehicle burning on either end of the column.

18:51 At that point in time, we were the only 2 aircraft in that local vicinity. Now, I'm sure that there were other aircraft further north in Kuwait. And when you think, an armored division on the road is going to eat up several miles of road. They're not going

to be in a concentrated area. But in our one section, we were the only airplanes, other than the Marine OV-10, who was holding on the Saudi side of the border, not out of harm's way completely, but in a position where he could control what we were doing. And once he was positive that we had acquired the targets he wanted us to see, he essentially turned it over to us, and the 2 of us sat there and worked that target for about 45 minutes. That's one of the advantages of the A-10. It has a battlefield presence. Everyone talks about loiter time, where it can go to a place, loiter until it's called in to attack a target. Well, if the environment is permissive enough, as southern Kuwait was at that time, you could now provide a battlefield presence by orbiting over the enemy for 45 minutes, and essentially directing fires at them as you see targets of opportunity pop up. In other words, almost fighting a ground battle from the air.

20:08 Given the fact that gas was not a factor for us that night, and we were going to be able to hold there for a while, I had the wingman hold high, to watch out for any threats that would come up, and I would make an attack and then circle around to make another attack. And then I got into almost wheeling over top of the enemy. And I would drop bombs and then sat there and strafed with the gun for an extended period of time until the gun was empty.

20:36 [How successful were you in stopping the advancing Iraqi armor?] Well, personally, I feel we were very successful. And I don't have numbers, one of the bad parts about being in an operational units you go out and you do a job, but you never really know how it fit in the overall picture of things. But personally I can say, that night when we left, and it's a sight I will remember for forever, there was at least a couple miles of road on fire with vehicle hulks. And a vehicle burning at night really has an image that you'll never forget, with the secondaries. If an armored vehicle has ammunition on board, which they all did, and it is blown up or catches fire, then that ammunition starts going off. So it was continuing explosions after the initial explosion of our weapons. And you could see the entire road outlined for 50 to 60 miles away, as we were going back home into Saudi Arabia.

21:35 [What were some of the objects that you hit?] Even the gun camera itself, really, if you launch a missile from two miles away, the optics just aren't good enough to determine whether or not it is specifically a T-55 or a BMP. Sometimes, when you get in a lot closer, you can tell. So that night we really didn't know. But what we did get after the war were people that drove along that stretch of the road. We had a ground liaison officer that was assigned to our A-10 unit. He was an Army officer from the 82nd Airborne assigned to an Air Force unit, that took a trip up into Kuwait. And of course we were interested in that section of road, and he talked about both T-55's and BMPs that were destroyed along the side of the road.

22:26 [When you hit one of those moving vehicles, what happened to the other vehicles, in front or behind?] They would tend to stop and get out. The troops would dismount and get off the road. They realized that it was easier to see a vehicle than it is a human with our infrared devices. So we would just pound the vehicles, and essentially that's what our objective was, was to destroy their war making capability. And going after the

infantry themselves was normally not done unless, of course, they started coming up with an air defense, either hand-held missiles, or small arms fire. And then we would target the infantry.

23:13 This had been two weeks into the war. And we were really starting to get a feeling of invincibility, to some degree. We were naive about that. So, the threat of being shot down was not as much in your brain as you might think. Two things really run through your mind. The first one is, is I don't want to come anywhere near to hitting friendly troops. A night battle is very confusing, and you just wanted to make sure that you weren't doing anything wrong, in the proximity to friendly troops. And the second thing is, I want to prosecute the target. I want to see that target. We, as Americans, were angry that we'd been sitting in the desert since August, and let's finish it -- let's end it -- and let's do what we can -- and the audacity of the Iraqis to launch an offensive against our troops. So, we really had a bone to pick with them at that time.

24:04 [So what were your thoughts as you were striking against this first Iraqi offensive?] Well, that we must stop it. This is what the A-10 was built for. This is what we've trained for our whole live, and if there was going to be a time in this was when our aircraft would shine, it would be here.

24:16 [What was the most difficult aspect of your mission during the battle of Khafji?] Well, during the initial stages of the battle, a couple nights before we found the major columns moving on the road, it was just target identification. On the very first night, I was around Khafji itself, and we were trying to work with the Marine ground controller, who could not identify targets, but said, "Hey, we have targets in the vicinity." And we spent a very frustrating night of putting out parachute flares looking for targets. And it was a very difficult, very trying time. You didn't want to make any mistakes when friendlies were that close. So, target identification, initially, was the most difficult thing. Until the Iraqis were really on the highway moving, and then they were very easy to see.

25:00 [So, were there any threats in the area during the battle to you?] Yes. The coast of Kuwait itself, depending on how you approached the target area, if you came from across the coast, in other words, from the Gulf in, it was loaded with 57 mm anti-aircraft guns. And there was quite a bit of lively AAA fire along the coast. Around the town of Wafra itself, there were reported to be some heavier AAA guns, but I can't ever really remember seeing them go off. But what I did see was a lot of small arms fire, light stuff -- somewhere in the 37 mm to 23 mm category, and then the occasional missile trail that was reported. I did not see it personally, but other aircraft were calling them out.

25:43 I specifically know that I was shot at by small arms fire, because as I would come off from a bomb pass, and of course do the one cardinal sin that pilots aren't supposed to do, look over their shoulder to see where the bomb hit, I'd see the muzzle flashes from the infantry on the sides of the road. And I know there is no way that they could have seen me, specifically, even though the moon was full, for them to actually acquire my aircraft would have been very difficult. But they were shooting at sound, and probably a lot out of frustration, too -- feeling very defenseless and trying to shoot up.

26:29 The funny thing about it is, is that to say you're scared is a lie, obviously. But you're scared before and you're scared after. During, you're not all that scared. It was very fast paced, very adrenaline rush, to have those kind of targets and to be maneuvering the airplane, and essentially, I, myself, one captain in one airplane, was engaging up to a battalion size worth of armor, at least, on the ground, and one man was keeping these guys pinned for a little bit. So the adrenaline rush of that was significant, and pretty much would override fear at that time. And then on the flight home I remember very well, because we'd come home with completely clean airplanes. We'd use every bit of ordinance that we could against ground targets. And as we were flying home, we both were commenting, chatting back and forth on the radio, about what we had seen and what we had done, and we were feeling very proud of ourselves at that point in time for the battle we had just fought.

27:27 [Geographically, where were you located? Where did this happen?] Near the town of Al Wafra, which if you're standing in Khafji in town center and you go to the northwest, probably about 15 miles, I'm guessing, on the other side of the border, into Kuwait from Saudi Arabia.

27:53 [Where were these Iraqi columns?] In the town of Al Wafra. On the roads leading into and out of the town.

28:52 Our squadron commander was very specific, saying, "If you don't know 100% sure that you destroyed it, don't write it down." He would explain to us the fact that decisions way above our head would be based off of what we reported. So we would come back and we would report things. And most of the guys would report unknown damage, unknown BDA. Yeah, I engaged with this, this, and this, but I'm not really sure of what all happened. The one time a guy would say, no kidding, hard and fast, yes, a vehicle was destroyed, was if he'd seen secondary explosions, and if the wingman confirmed secondary explosions. And then if you had videotape confirming. Like if you'd make one pass in an area and you see nothing on fire, and then you make another pass in the exact same area, and you see the vehicle from the first missile on fire, then you definitely would count that. Now there was some discussion then whether you'd call it a tank or an armored personnel carrier, because the Army wanted to differentiate between the two, and that's understandable. So a lot of the time guys would go armor, unknown type, whether it was a tank or an APC. The only time you'd give known is if you were close enough to break out turrets on the vehicles, and the tracks versus wheels, and everything else. Or, if you were going after artillery, the artillery had a very specific signature in the infrared missile screen. So, we would make our statements, and we wouldn't give anything even remotely false. And anytime a guy would start to say, "Hey, I shot this, this, and this," the critique from the other pilots that would look at the film was very heavy. Hey, how can you tell that's a tank? Well, I guess I'm not really sure it's a tank. OK. Then don't put down that it's a tank. So we took a little bit of issue with the fact that they would take the BDA then we did pass up and half it, or whatever. Because we weren't fudging it, by any stretch of the imagination.

30:53 The thing that I will always really remember about the battle is that we created a presence in the air for over a couple hours, where airplanes alone, at that point in time -- and there were Navy aircraft involved, Marines, and obviously other Air Force aircraft -- where we pinned them, and that was done from the air. They tried to move and I guess the biggest critique, regardless of the BDA, regardless of the after-the-fact historians that will say whatever, that we can take away from that was that after that night, after the 31st of January, they never moved in a large force at night again, until the end of the war. And that validated the tactics that we had developed in the A-10 to fight at night. That validated the way our squadron worked together, and really validated the way the Air Force could work with Marines, could work with Navy, and all those assets to get in to destroy those vehicles.

32:16 It's such second nature to us. It only seems to be common sense. If you take a tank and hide it in the sand, or hide it in the woods, and you put camouflaged netting over top of it, and then you cover up the tracks that it took to get it there, it's a very difficult target to see from the air, regardless of the sensor platform that you're looking with. However, if you take that tank, put it in line 20 meters from another tank, 20 meters from another hundred tanks, you cannot hide that from the air. And when you're allowed freedom of action over top of such a unit, you can see everything they're doing. And the only way to ever explain that to a lot of our other service counterparts that aren't as familiar with aviation as we are, is to take them to National Training Center at Fort Irwin, California, let them fight the ground battle, and ask them what kind of picture they saw, and then put them in the back of an airplane. Stick them at 20,000 feet, and then let them see how that battle was fought. And they'll realize that you can see forever, especially in the desert. And if they're moving, they kick up dust. There's no hiding a moving column, especially of that size. And I guess we've taken that for granted. We've never thought that to be an issue. It's only common sense. But I guess that there are those people that wonder about that. You can't hide a moving unit.

33:31 [What did you learn during this war that they didn't train you in training school?] The value of intelligence, the limitations of intelligence, and then exactly what the threats would look like. Growing up in the fighter pilot community, you always are taught missiles look this way, anti-aircraft artillery looks this way. And my squadron commander, at the time of the war, was a Vietnam veteran, and we'd always ask him, "What does the AAA look like?" "What do the SAMs look like?" And he'd sit there and go, I can't describe it to you, but when it's important to you you'll know. And of course we always thought that that was a completely ridiculous answer, until, the first time we saw the anti-aircraft artillery that was close to you, where you knew that it was coming for you, you knew. And now, of course, we can't translate that to well, this is what it looked like. And you can train all you want, but really, until you see it for the first time, you can't imagine what that looks like.

APPENDIX G

INTERVIEW WITH MAJOR PAUL HAVEL, USAF OPERATION DESERT STORM AC-130 AIRCRAFT COMMANDER

01:02 [What was your mission during the battle of Khafji?] Well, actually, we didn't know at the time. We go to a normal hold point during our mission, and when we showed up for that evening's mission, the squadron commander said, Hey, you've got to get airborne immediately. You've got some on-call tasking. And when you get airborne, contact ABCCC and they'll give you the words and the numbers. We originally heard when I was on the ground, getting ready to get out of there, that it was for some kind of SEAL team that was pinned down in Khafji. That's what we heard first. Other than that we didn't know anything. So we were told to expedite. Don't even tweak you guns, do a sensor alignment, which for a gunship is real important to do to make sure everything is sighted in correctly before you start putting rounds down. And they said it was so urgent that you need to get up there immediately. So we took off, headed to Khafji, to that AO up there, and as soon as we approached we contacted ABCCC who in turn passed us on to a Marine airborne FAC, who was flying OV-10. He told us, hey, we've got a bunch of Iraqis coming into Khafji, a bunch of armored vehicles, and for your tasking this evening he told us to take out anything north of the town. He said that some of the threats were AAA and some infrared surface-to-air missiles that were coming up on him. But other than that he wasn't getting anything else. That's what we heard was our original mission, was to support the SEALs, and as we got there we found out it was basically an interdiction mission.

03:05 We got there first, and the first thing I saw looking out of the cockpit is I'm seeing all kinds of artillery flares all over the place. And I saw the OV-10 dispensing decoy flares, and saw AAA on the north side of town, going in all directions. It wasn't really aimed. It was all just spray or pray barrage type fire. The first thing he said, Hey, I need your big gun. I need you to take out any targets north of town, and you're cleared in hot. So we went in. We started out over the Gulf, so we didn't have to highlight our signature as far as where we're coming from, who we are. And we know there wasn't anybody over the Gulf, so that would give us the biggest element of surprise. Came in about 9000 feet. And we're unpressurized, so we wanted to stay below 10 for oxygen considerations, and also stay as high as we could at that point to stay away from the smaller AAA, which was more plentiful. We rolled in on 8 armored personnel carriers. Actually, what they were BRDMs. They were, the best I could describe, is probably lead elements of an armored reconnaissance unit. They were lightly armored, so we knew we could take them out, as opposed to main battle tanks. They were all lined up so we thought we've got a big juicy target here. So we roll in. First thing that happens is all this AAA starts coming up at us. I make the decision at that point, since it seemed to be coming from one particular position that was going to give us some problems in that particular target area. Figured, well, we're going to take on the AAA first, knock it out, then we'll go ahead and clean up on these targets. We roll in. I decide to use the number 6 gun, which is a 105 mm howitzer, otherwise known as a "crowd pleaser." We go ahead and try to take out the AAA. As soon as we rolled in, we had gun malfunction. And as we were rushing to fix

the gun problem, the load master calls up, Stella, Stella. Break right, break right, which basically is a jargon for infrared surface-to-air missile, that he was calling a defensive maneuver to get out of Dodge and as soon as we got out of there, we figured out our gun problem and were getting ready to go back in when the Marine air FAC said, "Hey, I'm calling in artillery." Stay clear. Just stay out of the area until I call you back in. So we went out. And now we did a proper sensor alignment tweak to make sure everything was right. We had multiple problems with the airplane that night. These are older airplanes, by the way. They're not the current gunships we have in inventory. Even though the same tail numbers are out there and they're still AC-130H models. H models that are on the flat line today are SOF-I which are improved. The ones we were flying were older ones -- Vietnam vintage, and they were not up to par, as far as reliability. So we roll back in, and after the AAA barrage hits, and this time we only see 2 BRDMs that are north of town. Apparently the rest of them had moved on. And we still found a AAA site. It was still active. We went and took the AAA site out with the 105, and then we worked over the vehicles with the 40 mm (the 40 mm is a rapid fire gun). In 4 round clips, we can shoot about 100 rounds per minute. And that worked quite nicely. We got the 2 BRDMs. And we put down a whole bunch of extra rounds to suppress the area, in case there were any extra personnel. And after that, we were really low on fuel and we had to depart the area. And basically, we caught a tanker and got home.

06:40 [And that was your mission, in a nutshell?] Yeah, we had a second mission. As soon as we landed, we were told to go back up. But at that time it was beyond daylight, and when we got back to the AO, we asked for any tasking, and it wasn't high priority at that time. There were no troops in contact, no one was in imminent danger of overrunning, and then we returned again. But the first mission was the one where we employed ordinance.

07:20 BRDMs are scout reconnaissance vehicles. And they're not really used to hold an infantry squad, like an APC would be, like a BMP, or something of that nature. They're more used for scouts and stuff like that. And they have a turret on top with a 14.5 mm machine gun.

08:07 When we rolled in, we were at 9000 feet. First we took out the AAA with the 105 howitzer. Then the IR was our primary kill sensor, because he had better imagery. The TV didn't do very good because of the desert conditions. And the IR spotted the vehicles. And then we started working over one with the 40 mm. We put a bunch of 40 mm down. We hit it a few times. The IR said we got it. He considered it destroyed, because we were getting sparks and some smoke from it. So we moved on over to the second BRDM and we put maybe several clips of 40 mm down, maybe 16 rounds or so. We hit that and destroyed that. There were only two left on the road when we came down the second time. There were 8 there originally. And what had happened was by the time we had to leave the area because of the artillery barrage and we returned, there was only 2 more left north of town. The remainder had gotten into the town before then. Actually, I can't say if they went into the town. They were no longer on the road. And there were 2 left on the road when we got back, and those were the 2 that we destroyed.

09:40 This was north of the town of Khafji. We were not cleared within the city limits, and I believe that was because they knew at the time there was the possibility of US personnel in there. At the time they did not tell us that there were, but they had told us that our rules of engagement were such that we could not engage any target inside town.

10:14 The 40 mm is not a really great round for armor penetration, but for a BRDM, and armored reconnaissance vehicle, it's very light armor, and it works very well against something of that nature. So once we hit them, we knew they were gone. If it was an armored personnel carrier or a tank, it would have required quite a few more and heavier rounds, probably the 105 would be the only one to stop them. But the BRDMs, they were out of commission.

10:44 The airborne FAC said anything north of town, and we did all our finding of targets, our BDA, everything internally. That's the beauty of the airplane. Because we have the sensor sweep, we have the ability to identify targets, and to sort, to destroy, and to get BDA.

11:03 [Was this your first time in battle?] It was my first time in battle and I was a fairly new aircraft commander, so I wasn't one of the old heads.

11:25 During the battle, I think the biggest thing that works for me is you're afraid to fail. You don't want to screw up. You're more afraid of failure than you are of the enemy. At least that's the way I looked at it. And I was really concentrating on doing my job. That was the thing I was more interested in than anything else. Also, I was really concerned about my crew. Wanted to make sure I made the right decisions for them. So I was busy. I didn't really have time to be really, really scared, or even think about what I was facing until I got back down. I think after I got back down from the flight I realized, my flight suit's soaking wet. It didn't even hit me that I was even sweating, until I got back down. And then I realized, Holy cow, we must have really been under some pressure there. But you're really busy up there, and you're trying to make the right decisions. I had an excellent crew, and you're keeping them at the forefront of what you're doing, and it's just busy. You stay with your job, you stick to it, and you don't have time to really worry about it.

12:35 [What kept you from getting shot out of the sky?] Well, there were several things. A lot of the tactics that I was trained from the Vietnam era pilots were 3 orbits, no more. And it seemed like theoretically, or historically actually, that pretty much holds true. As long as you keep mixing it up and doing different things, you're fine. There are certain rules line 1) Definitely do not fly in periods of daylight, don't fly more than 3 hours, don't duel AAA. What they meant by don't duel AAA: just don't stay there for no reason, just to blow up a AAA piece. If you have to take it out like we did, you take it out. But not if it's not for a good reason. And another thing I learned was you got to weigh the consequences of what you're doing to the risk to the crew. And I think what kept me alive and the crew alive was first of all I had a good crew, they made timely inputs, were very well disciplined, can't say enough about them. Secondly, we employed the proper tactics at the time for the type of aircraft and the situation. We limited our exposure to 3

orbits. We came out from the ocean, or actually from the Gulf, so we didn't telecast who we were, where we were coming from. I think initially when we went after the AAA, and maybe I should have gone into detail on this, they didn't realize we were an airplane at first. And I think they thought we were part of the artillery barrage, because we were putting down 105 mm, which is just like the artillery apparently they were taking, and we didn't make a signature like a jet fighter. And we were the first gunship in the area, of all the gunships that did fly in the battle of Khafji. So they weren't familiar with us yet, our profile. I think that worked rather well. And we put down maximum ordinance in the shortest period of time. And we left when we put our ordinance down. We didn't hang around to give them any extra shots.

14:36 [What was the gun that you shot that you said the Iraqis thought was artillery?] It's the 105 mm howitzer, the standard 105 that the Army has had for many, many years. It's just a field gun and low velocity weapon, but it works very well.

14:54 [What happens to the plane when that gets shot?] You get a little bit of a jerk, or a push or a jolt. Probably a jolt is a better way to describe it. And it pushes the tail out a little bit and that's about it, though. It's really not as bad as you might think, but it's noticeable.

15:13 [How would you compare that to a car?] It would be like maybe experiencing a little bit of a fender bender.

15:39 There was a whole lot of AAA coming up at us, but the good thing for us was, when we had gotten there, this was the first night of the assault that the Iraqis made. So they didn't really get the real heavy stuff in yet. It was more of their lighter equipment was in place. Most of it was probably 14.5, which we saw a lot of that, which really can't touch us at 9000 feet, so we didn't worry about that too much. I think we saw a little bit of 23, but the thing we saw in Khafji itself that really got our attention a little bit, besides the surface-to-air missiles, was we saw a little bit of 37 going out. It was inaccurate. We didn't have to make any changes in our tactics due to the 37. But we saw lots of 14.5, which like I said, was not much of a factor. The biggest thing that got our attention, though, with the artillery flares that they were using to try to find us, I think, was the surface-to-air missiles. The manned, portable, infrared type.

16:32 [How many were shot at you?] We made a defensive maneuver for one, for sure. And my load master called that one out. No one saw it except for him, because he sits in the big bubble in the back of the airplane, which has a god's eye view of the battlefield, which is a good thing, because he keeps us safe. The Marine airborne FAC said he was taking some also. But we basically got out of there for the surface-to-air missiles and then we returned again later. We didn't get any surface-to-air missiles the second time we were in.

17:07 [What kind of maneuvers did you have to do in order to get away from the surface-to-air missile?] We performed just a break maneuver and pumped out some decoy flares. And that seemed to work fine.

17:35 When we were engaging the AAA piece, like I said earlier, these are pre-SOF-I gunships, which means that they were older vintage, Vietnam vintage. The fire control was not that reliable. When it's accurate, it's accurate. But it wasn't consistently accurate, because it would lose its tweak. We were trying to hit this AAA piece, the second time we came in. We were still having a little difficulty. The Iraqis were running away from their gun, and we were still trying to hammer the gun, and I guess it wasn't their night, because they ran right into one of our rounds that missed the gun. So I don't know if that's humorous or it's interesting, but it wasn't their night. And for us it was good because we no longer had any AAA come up at us from those positions. But it was the end for them.

18:40 Believe it or not, I had an excellent crew, and I can't say enough about them. I had some of the most experienced sensor operators, load master, and gunners. And they knew when to shut up and they knew when to chime in. And everything was timely. I mean, I can't say enough about that. Had I been with a mediocre crew, or something like that, they would have probably been all chiming in at the wrong time, making it almost impossible for me to make a decision. The best example of that was when we had to go back the second time. We were ordered to go back, because they said they still needed us up there even though it was daylight. And I said, OK, we'll take this into account. So we took off, and we held over the Gulf. We didn't go over Khafji because I wasn't sure what the situation was. I called the airborne FAC. I said, OK, were up here. Obviously this must be pretty urgent, what do you have? Are there troops getting overrun, or what's the situation? And the airborne FAC said, No, no, just targets of opportunity again, north of town. And I thought about that. And I looked over there and it looked very peaceful, and I said, You know, I could make a decision, but first before I do, I want to get my crew input. Now this was not a crew vote, by any means. But I said OK, from crew position to crew position, I said, I want your inputs. You've been doing this for a while. Tell me what the pros and cons are. And I got pros and cons from each crew member. I got some really good ones, got some ones that I didn't think were appropriate, and I got some ones that I thought were very appropriate. I weighed them and I said, Look, my decision is this. We're not going to go in. The targets don't justify the risk. And because it's daylight, the risk is very high to us because now AAA, you can't fool it, you can't spoof it. They see you. Can't fool those surface-to-air missile gunners, even though you might be able to fool the missile, because now they can acquire you quite easily. So I decided, better part of valor that day, and I decided to go home after that. And it turned out to be a good decision because the next day, the following day, we lost one of our gunships, same area, same time of day, approximately, early in the morning. And we were definitely visible to the Iraqis, even though it looked very peaceful.

22:10 [How did the AAA relate to the CNN footage over Baghdad?] We saw a lot of AAA in Khafji. A lot of it came up on us. I think the only difference is our perspective. Instead of seeing a picture from the ground looking up at sky, we're in the sky looking down seeing all this stuff come up at us. So the perspective is different. There was a heck of a lot out there. And I think it got progressively worse every night. But for us there was a lot of AAA out there. And I think it started out to be more of the light stuff at

first, because that's the stuff they got there first, and it followed up later with a lot more 57 mm, which is the stuff we fear the most. It's the most dangerous to the gunship.

24:25 The 105 mm is what we affectionately call the "crowd pleaser." It's the biggest gun ever put in an aircraft, and it's the same as the Army 105 mm M102 howitzer. It's pretty much our weapon of choice for most engagements, depending on situations, and it's what I used to deal with the Iraqi AAA. It gives us a longer standoff range. We just have to get close. If you get close, the shrapnel takes care of the rest. So it's a good round. It does a lot of good general purpose damage, and we like it.

25:05 [Did you get a chance to see your BDA tapes after the battle, and could you give me your comments on it?] It was a little frustrating at the time because our mission because of our fire control system degraded on us. Just made me wish I had a SOF-I or new model gunship because I could have rolled in those 8 targets right away and destroyed them right off the bat, no problem. The airplanes we have now are so much better than what we had back then. But, we did our job with what we had, and that's a testament to the crew, that made the most out of it, and we still were able to accomplish our mission.

25:55 [What were your lessons learned from that engagement?] First of all, you can substitute training for equipment, because equipment will let you down. Based on training, our crew was able to deal with the situations as they were all falling apart, and we were able to keep together as a crew and make the aircraft perform to maximum capabilities it could. Another lesson learned is, I would say, we can't afford to fly during hours of daylight in a situation like that. And I think the last thing would be, it would have been nice to know a little bit sooner what we were going up against, because then we could have maybe prepared accordingly, I guess, with intelligence. But as warfare is, it is a fluid environment, so you can't always plan on that.

27:21 I came back and I was totally drenched, head to foot. And I didn't even know it until I took my gear off. And the crew was all pumped up, and not until the day after did it even sink in to what we had just done.

28:03 This is not the battle of Khafji, but it's prior to it, and they had overcast deck. This was the first time we actually crossed the fence into Iraqi territory, actually into Kuwait. And we had crossed the fence, there were clouds, and I was noticing muzzle flashes through the clouds. And the engineer stands in the right hand window because usually the pilot gets focused on the heads-up display looking at targets, and he looks out of the aircraft to get the bigger view of it. And I'm looking out of the nose, and I say, Engineer, do you see that? He goes, Yeah, I see that, pilot. What I'm seeing is muzzle flashes of 57 mm going off. They hear us and they're trying to shoot through the clouds to hit us. We all said Yeah, we thought we communicated, and we got back down on the ground and we found out we weren't communicating at all. When he said Yeah, I see that, pilot, he was seeing the AAA bursting above the aircraft, and I'm seeing the muzzle flash. And the gunners in the back are saying, Yeah, we're smelling cordite through the airplane.

29:29 When you're doing your job and everything, it just doesn't sink in until after it's over. It really doesn't. It's almost like, your training takes over, and you just do it, and you get focused on your mission. That's how it works.

APPENDIX H

INTERVIEW WITH CAPTAIN CHARLES STONER, USAF OPERATION DESERT STORM AC-130 COMBAT COPILOT

00:40 [What was your mission during the battle of Khafji?] For the battle of Khafji, we were sitting in an alert status, and then we got an alert call. We went out to our airplane and were quickly briefed at the airplane, and launched up towards Kuwait. At the time we weren't even informed what was going on with Khafji, so when we took off we weren't aware of the status of Khafji at that time, or even told about that. So we were cleared in on an armed reconnaissance mission, where we went up, and any movement of vehicles or troops that we saw in the southern part of Kuwait, we were cleared in on those targets. And we were restricted on firing anything south of the Kuwaiti border. And if I remember right, I think it was the 2030' line, the north line. Anything farther south than that, we couldn't fire on. So what resulted with that, we got a lot of vehicles and personnel carriers that were moving south down towards the southern part of Kuwait. There was a major north-south running road where we interdicted some vehicles coming south. And then later on in the mission, we also identified what looked like a convoy of probably somewhere around 25 to 30 vehicles that were running east-west along the border. And once we got clearance that we were able to fire on those also, we started to take out some of those vehicles in that convoy.

02:43 [What kind of vehicles were they?] I believe most of them were personnel carriers. There was a lot of AAA also in and around those vehicles.

02:56 [What's your standard operating procedure when you see a column like that?]

03:48 When we started at first we were working the north-south road. And I believe there were somewhere around 3 vehicles that were coming down that area. And they were moving at a decent rate of speed. So with the moving targets you have to locate them and move out in front of them, lead them a little bit. The first vehicle in that group, though, did get past the southern border, so we weren't able to fire on that one. The other vehicles then, our tactic, what we like to do, is to put rounds down in front of them. A lot of the times the vehicles will slow down, or they'll move into the rounds. And what we did there, we put rounds down in front of them, then slowly walked around towards the vehicles. The vehicles actually did stop at that point, and the personnel in the vehicles left the vehicles, and the vehicles were sitting there. We were able to take out the vehicles and the personnel also, on that line. When we found the other line of vehicles, they were not moving, the ones that were on the east-west road. And, the border on the southern part of Kuwait there is not very defined, to actually see where it was. So, initially, we had to get clarification to see if those vehicles were targets that we could actually strike. There was an OA-10 that we did call in, and we talked to him to confirm if those were actually Iraqi vehicles. And after he did a few passes on that, then he confirmed the targets for us, and we began attacking them. The reason we really needed him was that the border is not a straight line at that point and we had to confirm. Some of those vehicles were actually a little bit south of that 2830' line. They all were within our rules of engagement then, once we got it confirmed. The way we took those

out, we started with the lead vehicle. When you get a convoy of that size, you try to take the lead vehicle, and then the end vehicle also, and kind of keep everybody trapped in the middle. And so we worked on the first vehicle. They weren't moving. It looked like they were staging. So we attacked the first few vehicles, got the end vehicle, and then started to move within that convoy. I don't remember exactly how many we took out. There was a lot of AAA around the area also. Everything from, I think they had 14.5's. And most of those, I believe, were just ground-to-ground fire. The 23 mm and the 37 and also 57 mm were actually aimed in our direction. And at several times, the AAA became a threat to us and we moved out of the area until the threat went down a little bit. And then we could come back in. They were also using, when we were working in that convoy, the east-west convoy, it appeared to us that the Iraqis were trying to use artillery flares to spot our aircraft. And what they would do was they would launch a series of 3 flares to try to highlight us for their AAA, because all the AAA that was being fired at us that night was optical AAA, so the gunners on the ground actually had to see us. But what actually happened for them, on their first several attempts to launch their flares, we were flying somewhere around 9 to 10 thousand feet, and they were only getting their flares up to about 3 to 4 thousand feet. So, it worked out perfect for us. We could see their entire column and their movement. It was just highlighted with their illumination flares. Later on, when we were still in that attack, they did finally get some flares up to our altitude. One illuminated very close to our left wing, and at that time we egressed out over the water, let the flares go down, and then finished the rest of the attack until we were out of ammunition, and returned. Basically, that's what we tried to do the whole night, take out as many of those targets as we could. And we used both the 40 mm and the 105 mm howitzer on those vehicles. And also, within that attack, when we were taking out the column, when the AAA would become a factor, we would also target the AAA sites. And we cleared several AAA sites on the ground. And sometimes then the AAA fire became very concentrated, and then we'd leave the area, or move away from it. And then go back in once it died down a little bit.

09:06 [Was this your first time in battle?] No. We had several other missions when we went actually into Iraq on radar sites.

09:16 [And you were fired on?] Yes.

09:19 [During the battle of Khafji, while you were being fired on, what were you feeling?] Initially, we pretty much came to expect that, especially when we're firing on them, and with that concentration of vehicles, we knew we were going to have return fire. Because it was all optical, it allowed us the opportunity to stay in there and maneuver away from it. If it would have been radar AAA in that area, it would have been much more serious threat to us. But we were able to counter it by taking out their AAA sites. When we would target some of the sites, the gunners would also clear sites very close to that, so we could neutralize their threat for a time period.

10:11 [How successful were you in stopping the advancing Iraqi armor?] I think we were very successful that night, because only one vehicle, I believe, actually got south and was able to head down into Khafji. That was the one on the north-south road that we

saw initially. And he was out in front and we weren't able to get him before he got south.

10:38 [What kind of vehicles were there?] I believe that was an armored personnel carrier at that time. And I believe there were also, it looked something like, communications vans along with... [So there weren't any tanks?] Not in that area. They were armored personnel carriers. It's a light armor vehicle. I don't remember seeing or remembering targeting the tanks there.

11:18 [You mentioned the 2030' line. What's that?] It's the latitude line. If my memory is still good, it was the line right along the border, that actually gave us a better definition of where we could fire and not fire, because the border was very erratic in that area.

11:45 [What time of the evening was that?] This was late evening. When we were working in that area it was complete darkness the entire time that we were up there.

11:55 [Do you know the time?] Probably somewhere between 10 and 1 o'clock in the morning, the whole time we were working there.

12:09 [How long was that mission, fighting during the battle of Khafji?] Actually, over the area, I think we were in the target area for over an hour, but at different times we would egress, let the flares burn down, the AAA, and then come back in, target them again.

12:50 Ours that night was only one sortie. We took off and went up there, expended our ammunition, and then came back.

13:01 [Do you know what day that was?] That was the 30th. And we actually, I believe, landed back at the base, early morning of the 31st.

13:21 [What was the difficult aspect of your mission during the battle of Khafji?] One of the difficult aspects was we didn't really know the whole scenario of what was occurring with Khafji. One of the times we were actually being fired upon, to get away from that threat, we actually went south, over Saudi Arabia, to get away from the AAA, and we had an orbit very close, if not right over Khafji. And we weren't aware that the Iraqis were in control, or trying to be in control, of Khafji, and we came under a lot of AAA in that area. At that time I called up the air defense, and asked them what the situation was, and that was when we actually were informed that Khafji was being held by the Iraqis at that time. So up to that point, we had no idea exactly what was going on, or that they were in control of Khafji. Obviously if we had known that, we wouldn't have egressed to the south and held over their position. We would have moved either farther to the west or gone out over the water again. So that added some excitement there. Another problem we were having was with the particular gunship that we were flying, the H-model gunship. It was not the SOF-I, improved gunship. We were having problems with the computers actually holding the tweaks, the accuracy of the firing of the different weapons. We'd take off, and we'd always tweak and align our guns in Saudi Arabia over one of their firing ranges, and then proceed north. When we initially started firing, the

tweak values in there were no longer good, and we had to re-tweak the guns to get accurate fire. And that's frustrating when we actually would have a lot of vehicles in the sights ready to fire, and we'd have to refine our solution again to fire accurately.

15:40 [How did you come across your targets and did you have any external help to point you in the right direction?] When we got our briefing, we were assigned the area that we were going to search and look for vehicles. So that initially led us in the direction, and we planned where we were going to look, based on the lines of communication, the roads and things in that area. Then, with the sensors on board the aircraft, the infrared detection set, and also the low light level television that we had, that's how we actually located and identified those targets. We did also use the OA-10 to confirm that the targets we had spotted were actually valid targets.

16:32 [Did you watch the BDA television film after your battle?] Some of our planners that were working on the staff over there showed some of the tape, and they actually spotted a ZSU-23/4 that was in along with that column. And it's a radar guided AAA gun, and he never did fire on us or bring up his radar. We had no indications of that. But it was kind of interesting to see that after the fact that we were right over his position. He never fired on us, because we would have been right in his lethal threat envelope. So, fortunately, he never came up on us.

17:30 [How many years have you been flying?] I think I was checked out about almost 3 years in the airplane, or 2 1/2.

17:47 [And until Operation DESERT STORM this was the first time you were being fired upon?] Yes. We did some of the work in Panama, when I was preparing for that, but we didn't have any serious threats when we were practicing for that or some of the other missions we were doing down there. Those were pretty much small arms or much lighter AAA.

18:25 [What went through your mind, being shot at by the Iraqis?] You pretty much take care of the duties that you have on the plane at that time and just go ahead about what you're trained to do. There are times when you do think about it, when it gets a little bit close, and things like that. For me, I really didn't think about it too much at the time. It was more afterwards when you get back, and on the ground, and the adrenaline stops, and you think that was kind of close at times.

19:40 What was going through our minds was we were a little bit upset about the briefing we had got ahead of time, that we weren't informed that Khafji was actually held by the Iraqis. There were several comments on the airplane that we were a little disgusted with that. With the beginning of the ground war, I don't know that we were really concerned that the whole ground war was kicking off. We were more concerned with the targets that we had and persecuting the attack on them. We did have other gunships that did come into that area. There were 3 gunships up that night. The area that we were working, in that border area around Kuwait, after we had left and expended all our ammunition when we were egressing the area, we were also talking to some

controllers there, and they informed us they launched an artillery strike into that area after we left. Also, with the volume of AAA that was coming up at the end of that mission, we passed on to the other gunship that was coming up next to work in the area, the actual coordinates of the larger AAA sites, the 57 mm's that were in the area, because they were one of the most serious threats to us, probably the most serious threat that night. We passed those coordinates to them, and we also advised them too. We recommended that they work farther to the west. We had gone back in and worked that area. Threats would come up, we'd egress, then come back in. Towards the end, also, with the Iraqis, once they finally got the illumination flares pretty much right on our position, at our altitude, we had pushed it enough in that area that night. And we didn't want someone else going back in there after we had shown them what we were going to do in the area. They would have been very predictable, as far as their attack. So they moved out farther to the west, and found an area that they were attacking, not directly supporting Khafji. They worked that area, and then we had landed at that time. And we didn't have clearance to work in Saudi at that time. And that was the gunship that was then lost that morning, that next morning.

23:02 The AAA in the area, I remember seeing everything from the 14.5's, the 23 mm, 37 mm, and also 57. And then later we saw some other flashes on the ground, and with intel, we pieced it together that it was probably 85 mm on the ground there also. With the 57 and the 85 mm, they were shooting it without tracers. So we'd see a flash on the ground, the distinctive flash for those types of guns, and then we would see airbursts up above us. And most of the 57 was going off above us at the time, so we would have airbursts above us. And at first, we didn't recognize this because we were trying to pick up the AAA coming up that had the tracers. That was kind of drawing our attention. The 14.5 has a really high rate of fire. It looks like a bunch of little BB's coming out at you. And most of those, really, we weren't concerned with, because they were kind of just spraying the area, and they never really got up to our altitude or got anywhere close to being accurate. The 23 mm is not quite as high rate of fire, and its tracers are spaced a little more. It looks a little more like baseballs or that type of thing coming up at you. Those really weren't all that accurate either. The 37 mm and then the 57 was what really started to concern us later, as the mission went on. The 37 mm, the way the tracers are spread out on that AAA, kind of looks like a tower, if you see the lights on a lit-up tower, with the red lights spaced about every 50 or 100 feet. If that tower was pointing at you, or starting to be inclined towards you, that's what it looks like, the 37 mm AAA coming at you. We would move out of the area when it would become accurate on us. As we did our egress out of the area we did have a site that came up, a 37 mm site, that did come up on us. And actually, that might have been south of the border, and we're not really sure who exactly fired that on us. But we were able to move out of the area and avoid that threat. One thing we did realize, there was a lot of AAA and a lot of tracers coming up at the aircraft, and everybody's calling a different AAA. Then there was so much of it that you could only call the AAA that was actually a threat or becoming accurate against you and you had to move away from. And then later on, as it progresses, we realized that the airbursts were going off above us. Before that, we were a little more comfortable in the area because we didn't actually see the 57 going off and airbursting above our altitude. Once we realized how much airburst there were above us, then we had a better

understanding of what was going on, and treated the threats a little bit more seriously -- we had to move out of the area more often, and counter those threats.

27:02 When we came back from the flight, the crew was very excited and felt very good about the mission, because we were able to take out a lot of vehicles. And we felt like we did a good job that night, and were able to keep anybody from moving south. So we were very pleased with the mission and how it went. We passed on the threats so they could be briefed to the other crews, while we were airborne. And then also once we debriefed intel on the ground, and passed that information on.

27:45 [What was the consensus?] Once they were able to view the tapes and see the battle damage that we did inflict on them, they were very pleased also, and excited about the results of the mission. We felt real good about it until we heard about the other guys.

APPENDIX I

INTERVIEW WITH TSGT WILLIAM ALEX, USAF OPERATION DESERT STORM AC-130 COMBAT GUNNER

01:20 I'm an airborne lead gunner on AC-130H gunships.

01:39 We were scheduled to fly an alert line that night, where we were holding below the border for on-call interdiction or close air support, whichever was needed. We had gone down to the range. In the airplane we were flying at the time, we had a lot of trouble getting it to tweak -- where the bullets would hit where we wanted them to hit. So we landed back at King Fahd, where we were stationed out of. And as soon as we landed, our commander, Lt Col Kegel, met us at the airplane, told us to swap to the spare and get airborne, that the Iraqis had got over the border into the town of Khafji, and that there were some SEALs in trouble. So we hurried up, got on the other airplane. We went north without doing any tweak, which is where we align our guns and shoot to make sure the guns are shooting where the sensors are looking. And we rolled in over Khafji, and at that time we picked up 7 armored vehicles along a north-south road just off of the ocean itself. We attempted to shoot them. We couldn't get any of our guns to shoot. At about that time, we tried swapping various weapons, couldn't get any of them to shoot, and we had an engagement with a surface-to-air missile. We did defensive maneuvers, got some flares out, defeated the threat, rolled out over the water, and basically got our guns working. So we went back in, possibly within a half hour after the initial one, found 3 of the 7 armored vehicles still along that road, and shot approximately 50 rounds of 40 mm at these vehicles and destroyed them. At that time, our TV operator had picked up a 57 mm anti-aircraft site that was starting to come alive and look at us, so we went into an orbit around it. We never destroyed the gun, but we shot 20 rounds of 105 mm high explosive. The 6 individuals that manned the gun had been in the back in a bunker. They came out of the bunker. We put a round down, probably our 4th or 5th round, maybe within 100 meters of where that gun was. They took off across the desert. And I can distinctly remember seeing our tapes afterwards as the last guy, the 6th guy, dove into this oasis-type area that they had, a bunch of palm trees and stuff. We had a round impact directly in the thing, so we know we destroyed the crew. The gun never came up at us. At about that time we were starting to run low on fuel. We took off to try to catch a tanker so we would still have time to shoot up there if we could go back in. We missed the tanker, landed back at King Fahd, and our commander met us again, informed us he wanted us to get gas and get back up there. So we took back off, went back up to Khafji, and by the time we got up there, I can remember looking out of the port hole, over the right paratroop door, watching the sun come up. Sun is an enemy of ours. We try not to fly in the daytime. It would have been death for us to go in there, which was proven the next day, I believe. And you could look out the window and there were just coalition aircraft everywhere. I remember we had 2 F-18's fly echelon to wing on us. One went over the top of us, one went under the bottom of us. And I remember hearing over the radio, one of them saying, "You need to look at the size of the gun on this thing." And they both pulled in on us. We had the 105 sticking out the side. Basically we couldn't do anything there. We couldn't get the support we needed to go back in. So we turned

around and went back home to King Fahd again.

04:59 [Geographically, where were you?] We were north of the city, right off the coast. I would say no more than half a mile inland from the coast. North side of the city, the northeast side of the city, up in that area.

05:20 [What did you see in the city?] I actually didn't see a lot in the city other than the tapes afterwards. I can remember we first went in, and in the northwest of the city there was a 37 mm gun that shot at us. It was a couple miles off. He was just shooting at sound. There seemed to be a lot of traffic on the roads coming down, which I believe was probably the Iraqis. There were lights on in the western part of the city. Now in the northeastern part there weren't any lights on at all. I can remember artillery flares being launched at us, because I remember looking out of the port hole over the 105 and there would be one hanging right off our wind that just seemed to float with us. A lot of those were launched. Like I said before, we had the surface-to-air missile launched at us. A lot of small arms fire you could see on the ground, and that was really all I saw.

06:05 [Tell me the different weapons systems that are on the AC-130.] On the H-model, we had a 105 mm canon. We carry 2 different types of rounds for it: A HE round, high explosive, and a "willy pete," or white phosphorous round. We had the 40 mm Bofors canon, that we were carrying mainly what we call "mish," it's HEIP, a high explosive incendiary, and an HE round for it. We probably had a little bit of armor piercing, I believe, also, armor piercing tracer. We also had the 20's on board, and we were carrying about 3000 rounds of high explosive for the 20 mm. We had two of those. They're the 6-barrel gatling type guns.

06:45 [How effective were those weapons in completing you mission?] Very effective. The 105 especially. It's the weapon of choice for anybody. We like to look at it [the AC-130 weapons] as a sniper weapon, any of our weapons, because we're so accurate. And if you can picture a sniper with a 105 mm, shooting directly at something, it's that accurate. I'd say both it and the 40 were very effective that night.

07:09 [And what kind of targets do those two weapons hit?] We shot 3 armored personnel carriers, the 8-wheel, I think they're BRDMs, with the 40 mm, and destroyed them. And we shot 20 rounds of 105 at the personnel that were going to man that gun. And between the shrapnel damage from it, and like I said, we put a round right in the middle of where they were at, and they weren't in a dug-in position, so we know we destroyed them.

08:00 [Had you seen combat before?] No. Well, I was involved in El Dorado Canyon. I was at Lakenheath, and loaded 2 of the airplanes that bombed it, but not in actual combat.

08:10 [What was it like? Describe that.] The adrenaline rush is great -- the initial adrenaline rush -- scared -- very much so. This was my first time, or actually second time, in combat. We had had one other mission over there before that. I didn't have time to really think about it. We were so busy. You have a 14 man crew. You have a lot of

radio chatter. You're listening for keywords and phrases. You're trying to do your job, since this is really the first time I had shot in combat. We were just too busy really to think about it until afterwards. I remember 2 weeks after, it hit me that I had actually killed somebody. And it bothered me a little bit, but I figured that's just human nature. And it was either them or me.

08:32 [What were the keywords?] You're listening for keywords like a gun ready call, whether the gun's armed. Various radio calls. You're listening for bail out bells if we take a hit. You're listening for a bail out call if you would take a hit. You're listening if there would be a problem with the gun like we had that night. You're talking directly to the pilot or the engineer. And you have to really listen up. You have the navigator talking on radio. You have the fire control officer talking to the sensors; electronic warfare officer talking to the whole crew when something comes up. So there's a lot of chatter going on in the airplane.

09:26 [Tell me about what happened when the gun jammed on you.] We didn't get the tweak, and as I said, tweak is where we align our guns and our sensors to look at the same place. We didn't get to shoot the guns before we rolled in over Khafji because we were in a hurry to get there. We had a fire control problem. Our fire control computers program everything, and we had a computer problem, is basically what we had. The guns just wouldn't shoot because it wasn't passing what we call a pulse, electricity, to shoot the guns. We had done probably 3 or 4 orbits, and an orbit at that time was about 2 minutes. So I'm looking maybe 6 to 8 minutes. And we had the stella engagement, or the missile that was launched at us. So we got out of there, went out over the water. And it took us about a half hour to figure out what was wrong. It was just some fire control problems.

10:33 [How successful were you in stopping the advancing Iraqi armor?] Everything we shot at we killed, so we were successful. We didn't shoot that much compared to crews the next 2 nights. From what I understand from the intel debriefs and stuff, we caught the initial company coming into the town itself. Yeah, we stopped them -- the ones that were still out on the road. Now, the ones that were in the town by then, we didn't see them. But we caught everything that was on the road and we destroyed everything we saw.

11:12 [What was the difficult part of the mission?] Getting shot at by the missile. That and not having guns that worked when we originally rolled in. Because when you go into a situation like that, you're pumped up. And when you find targets, actual real live targets, like we did when we originally went in, there were 7 armored vehicles there, the whole crew's pumped. And it's such a let down when the guns wouldn't shoot. And then to have the missile engagement right after that, really was probably the most exciting part of it for me.

11:54 We didn't get hit. We defeated the system. Our system worked. We shot flares out of the airplane, and the missile went and took the flares. It went off right underneath the tail of the airplane. I was standing holding a 105 round out when we were engaged. And I had to grab the railings that are right in front of me and roll the missile up. And we pulled negative G's, which cause you to lose body weight, your body goes weightless. I

remember I was rolled up on the missile, or the shell, and my feet were up above my head. I remember looking back, because we fly totally dark, blacked out in the back of the airplane, to where you have no light, you don't want any light showing. It would just give you away. When the missile went off it was like daylight in the back of the airplane. And I remember our load master, TSGT Wood, fell into the scanner's bubble that's back there. And I can remember his legs sticking out. And I thought they'd blown the scanner's bubble out and he had fallen through. Because I got right onto the intercom calling him. Well, he had lost his intercom button. He couldn't answer me. And I was really concerned about his welfare at that time. Because it had literally picked up the back of the airplane, the explosion.

13:00 You go weightless. I've been pinned to the walls of the airplane before doing a defensive maneuver. I've pulled negative G's where we've hit an air pocket somewhere, where you float up.

13:11 [During the battle, what had happened?] I went vertical. My feet went vertical.

13:15 [How about other members of your crew?] Pinned against a wall. One guy ended up in the roof of the airplane. Basically, I didn't have time to watch what they did, this is all from what they told me happened to them. I can remember thinking as soon as the maneuver was over, we thought we might have taken a hit. We had a little bit of a control problem with the airplane. Solved it within 5 seconds. But at that time I remember the pilot coming over the intercom and calling the engineer and saying, I don't have any flight controls. Well that's when I tried to find where I had pulled the 105 round out of the racks that we had. Couldn't find it because I had no light. So I was screaming over the intercom. And the gunners have a separate system, so one of the other gunners could give me some light. In the meantime, trying to talk to SGT Wood. It got a little hectic there for a while. And trying to remember where I'd left my parachute, because I figured, OK, we have no flight controls. We just took a hit. It's more serious than we thought. And actually nothing had really happened other than he didn't get the auto pilot completely off when he did his defensive maneuver. It was real hectic. And that feeling of weightlessness, when you're holding a 40 pound 105 mm shell in your arms, and you know if you drop it you're going to blow the tail off the airplane. It gets hectic, real hectic.

14:27 [What about the tapes?] Whenever we shoot like that, we have VCRs inside the airplane, standard VCR tape. We were using a little, I think, 1 inch tape at that time. And anything that our sensors see, we make a tape of. So all the combat that we did, any targets that we shot at, we would have tapes of that we could go back and review, and use it for intel purposes, use it for bomb damage assessment, stuff like that.

14:50 [What was on the tapes during the battle of Khafji?] I can remember seeing the vehicles that we shot, the hits on them, because you get a lot of sparking and stuff. Pretty much knew they were destroyed. They were smoking. On the gun that we shot at, I remember seeing, the way the emplacement was, they had the emplacement, they had a trench-line behind it, and then they had their ammo carrier. And they were back in the

ammo carrier when we started shooting at them. They had about a 25 foot run up the trench-line to get to the gun to start shooting back at us. They got about halfway, and we put a round maybe 50 to 75 to 100 meters away from them. And the guys jumped out of their trench and ran for a little oasis-type area. At about that time, we were scattering the rounds around pretty good. We put a round, there's the last guy, you could see him, a little white blob -- it was infrared. You could see him floating through the air, diving into what they thought was cover. As soon as he hit it, it was all whited out where we hit it with an HE round. So we know we killed the guys. You could see, the town of Khafji and the roads real well. You could see where other coalition aircraft had bombed maybe ahead of us, or at the same time. And that's basically what was on the tapes.

16:38 [When you were in the air, you didn't know what was in store for you, did you?] You don't the first time. I've been all over the world now. I've been shot at a lot more since that time. The initial one you remember. I remember almost everything that happened. Since then, I've been to Bosnia many, many times. I've been shot at many times from Bosnia, and it's nothing like that first time. Now I'm more scared than when I was that first time. You're trained to do a job. We're highly trained, we're very well trained. I was very prepared. This was my first operational deployment with the 16th, was Operation DESERT STORM. I was the new guy on the block. The whole crew took me like I was one of the old guys, made me feel right at home, like I was part of the crew. And the older guys took me and trained me. We had flown a mission before that, where we saw quite a lot of AAA, and my lead gun at that time, MSGT Betterelli, actually called me to the window a couple times, and was pointing it out by caliber what it was that was shooting at us. That was so I would have the experience when my day would come to have to sit in the window. And that's the way we train people. We're very highly trained.

APPENDIX J

INTERVIEW WITH TSGT RON JOHNSON, USAF OPERATION DESERT STORM AC-130 SENSOR OPERATOR

00:31 I fly a AC-138 Specter gunship. It's a modified C-130 with a 105 mm Howitzer, a 40 mm Bofors, two 20 mm Vulcan canons, infrared, low-light television.

01:01 [What was your mission during the battle of Khafji?] Basically, our crew was launched from ground alert status to go repel the Iraqi invasion. We knew they were coming. That was something we had worried about from the beginning, from the buildup -- was an Iraqi invasion. We had several different plans for that, and here it was. It finally happened, and so we were just going north to take out as many of those guys as we could.

01:48 Most of our targets were just inside the Kuwaiti border, northwest of Khafji. Because when we got up there, after we got launched, there was already another aircraft in the air over Khafji that were working targets there. We talked to them for a little while. They told us that forces was in Khafji and south of Khafji. They pointed out where some of the AAA pieces were that were brought down into Saudi, and so we decided to work north of there, northwest.

02:13 [What were your most effective weapons that you had on the plane to take out your targets?] Well, it depended on the target. The 40 and the 105. That was the only two we used. We didn't use any 20's that night.

02:31 [What night was that?] That would be the night of the 30th, day 31st. We were actually the last gunship, well, the next to the last over Khafji. The last one was shot down.

02:41 [What kind of targets did you strike?] Vehicles, APCs, border posts, I remember, and some type of large command building.

[Were they easy targets?] Yeah, they were pretty easy targets, I thought. There was more or less a free fire zone north of a certain latitude. There was a lot of stuff moving up there too. Pretty easy to find.

[So was it a target rich area?] Yes, definitely.

[How would you compare it against anything else you had done before?] It was pretty strange. There was a lot of things flying, a lot of aircraft in the air, I should say. A lot of targets, a lot of movement, oil fields on fire. It was surreal up there -- a lot of AAA.

[What was it like seeing that AAA fired at you?] Well from my perspective as a television operator, it looked like fireworks on a TV screen to me. But you knew it was intense by the maneuvers of the aircraft, and actually smell the shells exploding around

the airplane.

[What do you do as a TV operator?] Basically, since we fly at night, we use the sensors as the eyes of the gunship, and we go out and find the targets, track them, and fire on them.

04:22 [How many cameras do you have?] Well, there's a low-light television on the aircraft and an infrared sensor. There's two separate systems, two operators working in conjunction with each other.

[Do you videotape these things?] Yes.

[When you saw that footage, what do you remember?] We always go back and review our BDA after an action. You see things in the tape that you didn't see in the heat of the battle. Your adrenaline's pumping. Like this one target, the building I had mentioned earlier. There was actually an APC parked outside of it. We didn't even realize it at the time, we were so fixated on firing on the building. One of the rounds actually hit the APC.

[How did you acquire the targets? Was there any external help to help you get in the right direction?] Of course everything was north, so it was pretty simple. I believe initially when we were flying north there was a marine FAC that had kind of guided us up toward the northwest. Al Wafra was the area of Kuwait we were working in. Also, there was AWACS overhead.

[What's the Marine FAC?] Forward air controller. Just a guy flying around in a little spotter aircraft. I don't know what kind of aircraft he was in.

06:17 It was basically a free fire zone north of a certain latitude. We had hold points inside of Saudi, and what we would do is: we'd go up, find a target, engage it. Of course they would shoot back at us. We would evade, either roll back in on the target or go back south, kind of in a safe area and catch our breath and go back north again. So it was just back and forth all night. The other crew over Khafji, they were basically doing the same thing. Except they were rolling out over the Persian Gulf, to get away from flak, and then coming back into the target.

06:47 [Moving targets, what were they?] We didn't fire on any moving targets that I remember that night. All ours were stationary. We did find a convoy, I want to say, from east to west, initially, with the IR picked it up right before we crossed the border, but the IR had a malfunction. It locked up. So, we were blind basically in front of the aircraft since the TV can't see that far forward. We never found those again. We got engaged by AAA, we moved, and we just rolled in on another set of vehicles.

07:22 [What kind of thoughts did you have as you were striking against the first Iraqi offensive?] Basically, to kill as many of those guys as fast as possible, because like I said, we had been contemplating this massive army just rolling to the south and

overrunning us. And so we were just up there giving it everything we had to repel.

07:44 [What was the most difficult part of your mission?] AAA threats.

[As the AAA was being fired upon you, what would I see if I was up there with you?] Depends on if you had a place where you could look out of the aircraft or not. I was basically back in the booth, watching my EDI, the airspeed indicator, and the altimeter, trying to help back up the nav, and watching my wide television with all this AAA going off around us and listening to the scanners and the gunners making calls to threat avoidance, breaks left, right. We knew we also had a SAM threat to the north. There was a SA-2 ring we were kind of skirting, and at one point we got caught in this massive AAA barrage, and they actually had us driving north toward that SAM ring, which would have been fatal for us. But, we caught it in time, and basically had to come back belly up, and just fly back through the barrage to get back south of the border.

08:53 [What was the most difficult part of you mission, during Khafji?] The threats. There was so much of it.

09:23 I think probably from our point of view as a gunship crew, Khafji was the most effective employment of the gunship throughout the war. We had done some interdiction and SCUD hunting which was kind of dangerous for a gunship to be flying out there in a radar SAM environment. But at Khafji we knew there were GI's on the ground that needed us. That's basically our forte, close air support, even though it wasn't the traditional close air support that we're used to, say in the Panama invasion.

[Tell me a little bit about your crew.] We had a pretty good team. We had been on another excursion before the war started, and we had not long gotten back from that. The IR operator, one of the other sensors, a fairly new guy, he had moved to another crew, the crew that got shot down, as a matter of fact. So, that's kind of -- if he had stayed with us he'd still be alive.

11:08 The vehicles we shot, there was a bermed up area north of the border, and there were probably about 24, 25 vehicles actually parked in there. It was more or less a truck park, and apparently they thought they were hiding because they were in this bermed up area, but it was actually a trap for them, and we had them in this enclosed area and we just pounded them. Before we left they were all burning. They never really had a chance to run.

11:46 The IR at that time, it was a new system, and it was mounted where the old one was. It's not where the current one's at. It would have a tendency when you would look forward for too long that it would just freeze up. But you'd have to reset it and you would get it back in about a minute. But a minute, when you're getting shot at, is a long time. It's a long time to be blind.

12:37 We used to have 3/4 inch tapes, which is what it's on, and now we have VHS tapes. The 3/4 inch tapes, they were only 20 minutes, so our tape ran out at a point where

I would have liked to have gotten more of the AAA, because I was sitting back there watching it on the TV camera as we were jinking left and right, watching the horizon pan up, and then the ground and tracer fire, and I was like, Man, I hope we're getting this on tape. And we did get a lot of that, right when we first got into the barrage, we got some of that, and then the tape ended, so the belly up flying through it wasn't on it. My biggest pet peeve was I wanted to fire on the AAA site too. Kind of ironic there. My father was in the Korean war. He was a AAA gunner in Korea, and he used the same 40 mm that we used on the aircraft, and used to shoot at aircraft with this gun, and now I'm in an aircraft shooting back at AAA gunners. I had tracked one at one point, and we were getting ready to roll in on it when he became accurate on the aircraft and we had to break away from it.

13:48 [Was it easy to track your targets during that battle?] We were flying fairly low at that time, we flew below 10,000 feet, which is considered low for us now for the threats. I remember, the first target we rolled in and the first time we started breaking for AAA we had lost like 500 feet. And we stayed at 9500 for the rest of the night. I believe that 500 foot loss in altitude is what kept us from getting shot down, because they seemed to have our altitude pegged at 10,000. They were firing artillery flares up at 10,000 feet to illuminate us.

APPENDIX K

INTERVIEW WITH TSGT KEN TAYLOR, USAF OPERATION DESERT STORM AC-130 LOADMASTER

00:00 ... It's something that you don't ever want to have to be, once you're there, but you've trained for it all your life, and once you're there it's like, this is it. So, once you find yourself in that position, you immediately fall back on your training. The first time you're getting shot at you're sitting there saying, Wow, that's pretty. That's nice fireworks. That's real. That could kill me. And instantaneously, you dive right into mode of training and you start performing like you were trained to do. But definitely, it was nothing that you want to be in. You don't want to strive to go out and kill, and always fight back the aggressor. But if he comes, and you've got to be ready for him, and that's basically what we train to do here at Special Ops, and we were ready for him at that point in time.

00:51 Well, I closed the door because I planted friends from there. Before we got the call we were playing Axis and Allies, which is a war game -- guys at war playing war. So we were there and we got up and got ready to leave and Mark Smaussen, a very good friend of mine, and Damion Kinvah, were sitting there. We were playing the game, and we left to go do our mission, and, well, I never saw them again after that point, because they were shot down, they were on Spirit 03 the night that they went down. The night that we were up there we were Spirit 01, and they went up there and they didn't come back. It is just a painful thing, to have to plant your friends, and since then to plant more, and then, you try to maintain your sanity, or keep going out and doing what you're doing, what you're trained to do. You have to, at some point in time, let things go., and put yourself on another plane, and that's basically what I had done. So if I appear a little nervous, or appear antsy, it's just because of that.

01:59 [Tell me about the first mission on the battle of Khafji.] We got the call. We were the first in the chute that night to go up and have our own alert. When we got the call, we came down, went out, did some planning real quick like. We went out, prepared the airplane, and got ready to go. Then the rest of the mission planners came out and told us where we were going -- we were going up north, to basically a kill zone north of the border, and we were going to start working targets, armed interdiction, armed reconnaissance type mission. Our hold point was going to be the town of Khafji. Well, we rolled into our hold point, which is an area where you pull into, you feel pretty safe at, and you can establish your contacts with ABCCC and people that are controlling you, and get in touch with any forward air controllers that are in the area, and proceed with your mission. Well, when we got there, we started receiving AAA from the town of Khafji. So initially we thought we were real far north of the border. And so we contacted ABCCC, and we said, "Hey, we're getting shot at," and we reconfirmed our position, and we were south of the border, we were over Khafji, and at that point in time, we were clued in that Khafji had been overrun. When we first went to the town, we did not know that it had been overrun. But we were very well aware of it immediately. So, I'd say we walked in there a little unprepared, unprepared to start engaging targets, I

should say. But we were immediately ready, at that point in time. We got in contact with the forward air controller, Marine forward air controller, and he let us know what had taken place. And he directed us to some columns of APCs, armored personnel carriers, coming down from the north, that were re-supplying Khafji, and their scouts and so forth. So we immediately went to work and we acquired them by our optical sensors, or electro-optical sensors, and started engaging them with a 40 and 105 howitzer, and we got some real good work done. They were small, about 5 or 6 groups of 3 or 4 vehicles, scattered. They were in a southerly heading, coming down toward Khafji. And we started to work on them, the lead group, and we got about 8 of them, either partially destroyed or destroyed, and the rest of them started bugging out, and dispersing through the desert, and heading back in a northerly direction. But I would say, leaving Khafji to go up to engaging these guys, our first threat was encountered that we had to perform an evasive maneuver against. It was either an SA-8 or a SA-6 that was launched at us, and we ran away from it successfully, defeated it, and then continued on. And that was really the first SAM that had ever been launched at myself. I lay in the back of the airplane, and I'm the aft scanner. And my responsibility is basically to direct evasive maneuvers against any threats that are directed toward the aircraft, and tell the pilot which way to maneuver, in coordination with the electronic warfare officer. And whenever I saw that, it was amazing. And the defensive posturing that we provided that night definitely helped us to survive that engagement. So we continued on up and worked the APCs, like I said, they were first up north. And we ran them up to a ring, an SA-2 ring, and as soon as they got under cover of that, we skirted the edge of the SA-2 ring. We decided it probably wouldn't be a good idea to pursue them any further. We had done what we had set out to do, and that was run them back north. However, the entire time we were engaging the APCs, we were receiving some intense AAA fire, from some 23, 37, 57, 85, and 100 mm. And we were very busy during that time trying to hit the targets and perform evasive maneuvers to keep ourselves from getting hit. So it was a very busy night, a very awakening night, if you will.

06:48 [What's an SA-2?] SA-2 is a surface-to-air missile. It looks like a telephone pole coming toward you whenever it comes up, and it's been responsible for knocking down quite a few airplanes in the past.

07:15 I'm looking at real time. There's a bubble inside the door that's back on the model. I lay in that bubble, and I have basically 360 degrees of scanning, but I'm limited to the forward side of the airplane, basically by the fuselage. But I can see the world, and, my responsibility is 14 lives that I'm flying with, 13 or 14 lives that's with me. And they count on me, and the right scanner, and the EWO, basically for defensive posturing.

08:00 I saw the SAM coming, and we dispensed chaff, and it impacted with the chaff. The chaff did what it was supposed to do and the SAM when down.

08:35 We were basically in our orbit, and we had just rolled out to head up to engage the APCs, and the electronic warfare officer called out an evasive maneuver to start because he picked up the radar tracking us. At that point in time, the missile did start coming up toward us. It came up from basically our 4 or 5 o'clock position, and I continued the

evasive maneuver. I said, I have a visual. And once the chaff was being dispensed, I called a last second evasive maneuver from it, and it went for the chaff instead of us at that point in time.

10:45 [What do you mean, you were working the APCs?] We were engaging them with direct fire from the 40 and 105 howitzer. Basically, the 40 was doing most of the work that night, the 40 mm Bofors canon that we have, which is a trainable weapon in the back of the airplane, it's connected to our sensors and we can track and provide direct fire. Like I said, we had engaged them with the direct fire from the 40, and either destroyed or knocked out 8 of them. But during engagements, we were receiving some very, very intense AAA fire, ranging from the 23 up to 100 mm anti-aircraft weaponry. They were basically lined up on an east to west running road, running from the coast, the Persian Gulf, all the way over until infinity, it seemed like. Because one time I counted anywhere between 40 and 50 AAA pieces that were shooting. It was basically optical type AAA, and it was real intense, I'll have to say. Like I said, we had to perform 22 evasive maneuvers in order to accomplish our mission. But once we had accomplished running the APCs back north, we decided to start engaging the AAA pieces. And we started engaging them from the east, running west along that road. And the gunners on the ground got smart and they started sending up artillery flares. The first artillery flare that I did see come up, it looked like a stella, what I had always been told, a stella being an IR-guided SAM. It was very characteristic of it. And I knew, with us operating over all these AAA pieces, if I had launched our counter tactics for a stella, that we would be silhouetting ourselves, and all the optical AAA pieces at that point in time would train directly toward us, and we'd be in deep shit. But God was with me that night and I didn't launch any flares. I had folded back onto a point in time, which was another characteristic of an IR-guided SAM, and it didn't meet the criteria for that training, that I had been told that this is what it would do -- specifically, engagement times. And once that time had passed by, it wasn't on us yet, so therefore I realized that it wasn't a SAM, and that it was an artillery flare. And it wasn't a couple seconds after that, the artillery flare lit off our wing tip, and did silhouette us, after all. The flare was launched toward us, and it lit. The flare, it's an illumination flare, and what they were using it for was trying to find us. We were blacked out. They were trying to shoot up into the sky, get a light off above us, then they would see us against the sky and they could train all their weapons toward us. Well, as soon as it lit off, we realized what they were doing. We went back out over the Gulf and let it burn out. And then we re-engaged again after it burnt out. We came back in and started working the AAA pieces. We really didn't want to be run off the targets by an artillery flare. So we went back in and continued on with what we were doing. Didn't want anybody else to have to come back up there and do the same thing that night, or any other day.

14:30 If it lit off above the plane, the guy on the ground looking would see our shadow and all the guns down below us would train toward it, toward us to shoot us. But lighting off below us, we were pretty much safe. These were parachute-type flares.

15:00 So, like I said, we disengaged the AAA pieces at that time. And we went back in and started engaging AAA pieces. We did that 3 different times. We went out over the

Gulf and let them burn out and we came back in. And we did that 3 different times. They were also using the tactic of different colored flares. And they were communicating with each other. Because when we knocked out their communication, they were using different colored flares, as what we found out later on, to do their communication with. And where to direct their fire. All the other optical AAA pieces on the ground that were shooting, they were shooting a specific type of flare into the sky, or a specific color. And we soon realized, once that flare was shot into the sky, that's pretty much in the direction that the AAA would be focused to. And then they would switch from barrage type fire to sector fire at that point in time, in hopes that we would fly into that pattern of where they were putting all their fire at.

16:07 [You talked about APCs. What other targets did you strike?] We hit some radar sites and some comm sites pretty much close to the east of Khafji, and east of the border, just north of the border. We actually didn't know they were there until on the way out. Like I said, whenever we got engaged by the AAA and the artillery flares, we were going out over the Gulf. One of our sensors picked it up and said, Hey, this is a radar site. On Clack, who was a very knowledgeable individual, from looking at dots on a screen. He annotated that there were some radar sites, and when we came back in, we went to work on those.

16:55 [What did you hit them with?] I do believe it was the 40 and the 105, a combination of those weapons systems. I think we used more so the 40 for direct firepower, and the 105 to finish it off. It was a building and an antenna, going off from not my own eyesight, but what I was hearing over the radio, talking between the sensors and the fire control officer and the pilot and the decision process that was going on at that time.

17:28 [What were the Iraqis doing when you were hitting the APCs?] Like I said initially, they were coming from the north, coming south. We got cleared in on them by the forward air controller. When we would engage them, I can't see what they were doing. I do not know what they're doing. All I can see is an explosion on the ground. I do not have a sensor to where I can see from 10 or 9 thousand feet, which was our altitude down to the ground, and in the middle of the night, and see what they are specifically doing. All I'm hearing is over the communication between the crew on what they're doing. As I said, once we hit or destroyed 8 of them, the rest of them were basically dispersing. I never did hear anything about people getting out of the APCs. What I heard was people, or the APCs, were dispersing through the desert and they're going back north. Like I said, at that point in time we chased them, and I think we got a partial kill on another one at that point in time, until we got into the SA-2 ring, and I guess the bastards got away. So we disengaged them at that time, because we didn't want to jeopardize ourselves any further with that SA-2.

18:55 [What was the size of the vehicle column?] The size, I would say, it wasn't one column. There would be 3 or 4 in a group, and there was about 5 groups or so, 5 or 6 groups, from what I can remember hearing over the communication with the sensors and the fire control officer in the pod.

19:19 [And what kind of thoughts did you have as you were striking against the first Iraqi offensive?] Well, I realized that this was the only insurgency that the Iraqis had made into Saudi Arabia. And I felt very proud to be a part of turning them around, and engaging the enemy head on at that point in time. I felt that the gunship had made a name for themselves in the desert that night, and I felt like we made a lot of money that night, as far as gaining territory, or taking territory back. I'll have to say, I was afraid some of them were going to get away, when we started engaging the APCs, and that somebody else would have to fight them again another day.

20:20 [What was the most difficult aspect of your mission?] I can't say that there was one specific most difficult aspect. There were several. I'll have to say pulling into that hold point, expecting to be in a safe area and setting yourself up, and coming to find out it is a hostile environment now. That was a factor, not in us being able to accomplish the mission, but it's just an uncomfortable feeling when you find yourself behind the power curve. And realizing that the entire environment was hostile. We were told when we left the ground that that was a safe environment for us to get up and hold at and do our communications with big brother. But that was a difficult thing to deal with. However, the battlefield is ever-changing, and we adapted and overcame, and smartly went to work. The second thing, I'll have to say, was the intense AAA and threats in that area that night that we encountered. It's like we walked up to the beehive and shook it. And we were able to come out unscathed, and be able to accomplish something at the same time. And we felt very important, I'll have to say, that the good lord was with every one of us because there was continuous prayer once we opened up that beehive. We pretty much knew from what I was seeing, that our golden BB was down there somewhere. But we were able to work and pull it off, despite the evasive maneuvers that we were having to continually perform in order to strike the targets, or to keep from getting hit. And then to roll back in on the targets and picked them up. I'd have to give 110% of the credit to the sensors for being able to re-acquire the targets after disengaging from the target due to the threats. I'd have to say another difficult aspect was we asked for some cold weather here, and basically we got laughed at. Cold weather in the desert. What do you mean? Well, at our altitude we were flying at, if you see that airplane, we've got a lot of holes in it, and there's basically at any given point in the airplane, a 40 to 50 mile an hour wind whipping through there. It's very cold. And at one point in time, I'm rolled up in a sleeping bag with the sleeping bag over me, and my canteen's on my side, and my web gear. And as we pulled out of the area, I wanted to get a drink and it was frozen solid. Of course my adrenaline was kicking in so much at that point that in time, I didn't realize how cold I was, but I couldn't walk down the ramp. My feet had pretty much frozen up on me to the point where they wouldn't move. But at that point in time I wasn't really focusing on the cold. But if I had had to get out of the airplane in an emergency situation and bail out, I don't know if I would have been able to do it, because, like I said, my feet didn't work very well.

23:33 I would like to add one more thing about one of the most difficult things about the mission. One of the 57 mm pieces we were engaging, we were targeting, working it over pretty good, or trying to work it over pretty good. But our fire control system kept

dumping its trainable weapons alignment check, so we were basically having to re-sight our gun over the 57 mm while engaging it. We could have rolled off of it, but there was so much threat in the area at that point in time that we probably would have put ourselves in more jeopardy, so we chose to stay there. And we wound up having to do -- we did 10 orbits around this -- dueling with this 57 mm, and we only got a partial kill out of it. And at that point in time, I think that was our last target that we engaged. And we winchestered [used it all up] all of our ammunition trying to hit it and take it out. And our fuel was running low at that point in time too, and we had to RTB.

24:32 [Looking back, what would you do differently?] Our specific mission, there's not really anything that I would have done differently.

25:10 I would like to say a gunship was never meant to be flown in the daytime and if you ever find yourself in a hostile environment, it's a good monkey to keep in your pocket. Stay out of the daylight. It'll kill you.

25:32 I was an evaluator in the 16th on the H-model gunship. And then the 4th came in, the U-model gunship. There were a lot of people that hadn't been in combat environments and hadn't been in the situations that I found myself in, and I felt it my responsibility to pass on the knowledge to the new guys coming into the U-model gunship, because they really don't know what they're getting into. I've always tried to, for these new guys, to put the realism into the job and to definitely let them know that we're in the business to kill, and we can be killed in the process. So, this is not a game, and there's no cowboys here. You take your training seriously, and you know your emergency procedure because the environments we get into lend us to being in the situation where you are going to need your emergency procedures. I used to evaluate guys on an annual basis for that, but now I've decided to go over to the central training flight, which is the new 19th SOS, and be an instructor over there, both academically and flying.

27:12 I was on Jet Flanders' crew, MAJ Jet Flanders. And I credit my life, in part, to his decision making during that time.

27:35 [Could you touch on the different weapons on the AC-130.] Well, we have an AC-130H, we have two 20 mm gatling guns, which provide 2500 rounds per minute, and they can be tweaked up to provide more than that, if so desired. We have a 40 mm Bofors canon, which is hydraulically-trained, and it can provide 100 rounds per minute. Again, it can be tweaked up or down. Down to provide more life in the gun, or tweaked up to provide more rapid fire. But then you do get into a dangerous zone whenever you tweak that guy up. And the 105 howitzer is a manually fired artillery piece put inside of an airplane, basically on a hydraulic platform. It's a very respected gun because it recoils inside the plane quite a bit. And it does shift the airplane 6 feet sideways when we fire it. So here we have a big safety cage in the back where whenever we fire it, you stay away from the safety cage, basically, because that's just travel motion. And basically, you can fire it just as fast as you can load it. A good gun crew in a rapid fire drill can put about 3 rounds in it -- one impact, one in the air, and one leaving the barrel, depending on the

altitude. Very low, very slow flying airplane, very cold airplane. It's an old lady. She's tired. She's been through a lot of conflicts. Been right there with her.

29:44 [Did you ever see any of the videotapes from the aircraft?] I did see the 57 mm piece that we were engaging. And one thing that rings out in my head as a lesson learned is target fixation. You never figured it can happen. You hear of fighter pilots on target fixation flying into the ground. It also stands true for a gunship. You can find yourself at a target fixation, where you can't hit the target, and so therefore you strive more vigorously to engage a target and get a direct hit, and the entire time you probably shouldn't be doing that. If you can't hit it, you should probably leave and come back and try to re-acquire it.

30:44 When we pulled up into the area, we were watching something unfold. The sensors were sitting there looking around for targets of opportunity, trying to gain their battlefield situational awareness, and we were listening to radio transmissions from a warthog engaging the enemy, and we watched him come down from his safe altitude above 10. So he gets a bulls eye on the target, he rolls in on it, hits it, doesn't get a single round fired off at him, comes up, does a barrel roll, comes back down, hits another target, and escapes, climbs back up to the moon. And not a single round got fired at him. And when we came in, so here we go now, we're coming in below 10,000, around 9 to 10 thousand feet, and they open up on us pretty intensely. But it was as if they had heard, they had gotten accustomed to knowing the sound of the warthog's turbofan engines, and as soon as they heard that screaming hog come at them, they'd shut up and basically keep their feet off the seat as he was coming down to try to keep from getting hit by him. But the warthog definitely put the fear -- I would have to say -- close air support definitely put the fear in the Iraqis. They weren't ready for the coordinated air attack they had coming to them. We worked with the A-10's quite a bit while we were there. And we had practiced a scenario to where basically we would fly in an orbit and they would fly at a perch position back here at out 4 o'clock. For instance, we would be in an orbit and I lay in the bubble here and watched them, and they were back here. There were two of them flying the orbit with us. We marked the targets. Our sensors are much better than their eyeballs are, as far as acquiring targets during the nighttime. So our sensors would acquire a target, and we'd put a marking round down with the 40. They're sitting here watching for impact, and they say bullseye. And then one guy would peel off the perch. He'd go down and we'd cease-fire. I called the cease-fire whenever he called bullseye and I see him come down below us. He'll hit the target, roll out, and the other guy will come down right after. As soon as they call pickle, they've wasted their ammunition, and they roll out, and we go back to firing again. So it's a continuous loop of hell on whatever it is down there. However it really didn't pan out for us in the desert to actually use that, because the level of the threat was -- you'd hate to get this guy hit and then take out these two guys at the same time. So it was more feasible not to use that option.

34:07 I try to shut the book because I wind up being a different person. Whenever I realized, after Wadi Al Kir airfield, there was an airfield we rolled over, were going to strike it. B-52's were supposed to have hit it, and we were supposed to take film of anything crawling away, basically, and check out the battle damage that they had put on

the airfield. Well, when we got there it hadn't been hit. And I kept seeing these t-plumes on the ground and white flashes. I said I've got AAA down here, tracerless AAA, and at this time I'm hearing the sensors say, "There's no damage here." We realized this was a fully operational airfield that we were flying over at 9000 to 10,000 foot, and we have no cap, we have no fighter escort, we have nothing in the area to help us out. So what do we do. We pulled up northwest, I believe, of the area. Later on we found out, as the war unfolded, that this was the last lookout post and comm site that there was out there to clear up the western flank, for the Army to get in there and cut off the infantry division. Well, we started working on it, and there was no tracers, as far as I could see, but at one time we screwed out -- if you're flying an orbit, you have a cone that you shoot in. If you get too far out, you have to roll back in tight and pick up your geometry again. We did that one time, and we rolled our wings high enough to where I could actually see the altitude of where the 57 mm was exploding at, or self-destructing the rounds. And there was a blanket of about a half mile wide and long, about a half mile behind us, that was exploding continuously in the sky. And it was following us our entire orbit, so I started yelling quite a bit at that point in time, Hey, we've got intense AAA out here. Because before, if they had been using tracers, I would have been able to perform evasive maneuvers.

36:36 Self-destructing rounds. When they get to a certain altitude they'll explode and have an airburst. And you can determine the type of AAA system that they're using based upon the color of the airburst, and the ground burst, or the muzzle flash on the ground.

APPENDIX L

INTERVIEW WITH TSGT CLAY WATSON, USAF

OPERATION DESERT STORM AC-130 SENSOR OPERATOR

01:00 [Do you remember the battle of Khafji and what your mission was?] Yes. I don't think I'll ever forget that night. When we launched out it was an alert launch. We had very little planning time. But it was basically armed reconnaissance mission in the area of Khafji, over the coast.

01:24 [Was it the first battle you were involved in?] No. We had already flown one mission out west, just to some spot in the desert where there was supposed to be some radar equipment, and we had already been to Wadi Al Kir.

02:09 That was a fairly long and eventful night. It was kind of a mixture of things. It was a good night, as far as the work, but it was also kind of a long night, because they kept us engaged for probably 2 hours. The AAA started to get a little bit heavy.

02:28 [Whose team were you with?] I was with Maj. Flanders, in Spirit 01.

02:36 [You said it was a long night. When did it start?] The exact time I can't remember, but the way it started back in the compound, if I'm not mistaken that could have been the night when there were SCUD alerts, and they called us to launch the alert crew, and then we got on the bus and an alarm red sounded and went back and forth to the bunker and everything. It got a little bit confused. And we finally got to the WOC, and did a little bit of planning. We had just a little bit of time to get a thumbnail sketch of what was going on. And they took us straight to the airplane and we took off. It was probably either very late evening, or very early morning.

03:24 [What was your air base?] At King Fahd International Airport.

04:05 [How long was it from the time you guys took off until you got into the area of Khafji?] It was probably a few hours, because we took off, we did our sensor alignment, that's 20 or 30 minutes, and then we flew over to our live fire range and did the tweak on the guns, and that's not very far from King Fahd, it was OAD-43. That's the same one we had used the whole time. And I believe we went and hit a tanker. And then when we got off the tanker, then we went up and headed toward Khafji.

05:00 [When you got there, what happened?] It started out, about like you might expect any other mission to start out. They gave us a hold point, which is normal, like an IP, or initial point. We went there, and right after we rolled out to go up to the actual working area, where we were supposed to start looking for anything, the EWO got a hit from an SA-8 radar. I mean just a search radar. I don't believe there was any tracker lock on or launch or anything. But we went ahead and broke away from it and popped some chaff and that was the last we saw of that. I don't know if they knew we were there and were

scared there were going to be some wild weasels or what, but they never showed up again. And then we got up and started checking out the area, getting familiar with it. There were wrecked vehicles everywhere. We went up to the border post, looks like a big toll booth set up right at the border. And from there north, there were just hundreds of derelict vehicles that had been abandoned. And we were trying to look over those pretty close to see if anybody might be hiding in and amongst them. Pretty soon after that, we started picking up some movers, some vehicular traffic coming south, on the coast road.

06:37 [What kind of traffic was it?] It was mostly scout cars, BRDM 3's type, small, very light armor. I believe there was one or two equivalent of about a ton and a half truck pulling small trailers.

07:00 The first one we saw was pretty much right after we got there, kind of got away from us, because we were told not to fire basically south of the border. I don't know if that was the actual line, but it was in that area. It was either a parallel, or there was some division, that we were not to shoot past, for fear of hitting friendly forces. And by the time we picked them up and got to him and rolled in, he was well south of the line, so we decided to write him off and call it in and continue looking. Within, probably, the next 30 or 45 minutes, we saw a couple of others, got some shots off at them, stopped a couple of them, at least got mobility kills.

07:46 [What are your tactics when you shoot them?] Basically, roll in like we would for a stationary target. You roll in to the old fashioned pylon turn, only the sensors are talking to the pilot letting him know what the vehicle is doing, which way he is traveling, so he can correct his orbit for the movement. And then, as soon as he gets into the proper position, he goes ahead and lays on with the guns to hit them.

08:17 [How successful were you in stopping the Iraqi army?] I believe what we were seeing were advanced recon elements. There were no huge groups of armor coming south or anything like that. I believe we were fairly successful. We stopped at least 3 or 4 vehicles cold, and pretty much totally destroyed them, at least. I don't want to exaggerate or anything, due to the lack of memory, because it has been 5 1/2 years, but as far as I know, we only had the one get away from us, as far as I can remember. And pretty much everything else that came through there, we at least stopped, if not destroyed.

09:15 (continued to talk about the number of vehicles targeted) It was a bit sporadic. Occasional groups anywhere from 2 or 3 or 4 or 5. It was just varying numbers, but never any very large groups.

09:37 That's pretty much of a standard tactic. You always hit the first one. Then you go for the tail end. And you try to pin in everybody in between. So you kill the front one, kill the back one, and then, before the other ones get away, you work on them, the ones in the middle.

10:06 It was a pretty wide highway. That tactic, it's kind of standard for us. We

basically do it out of habit. But that really works better if you're on a skinny road and they have a hard time turning around. And, like I said, it was just smaller groups, kind of sporadic. So we just took the shots at the ones we could get to and just worked our way through them as we could get to them. It wasn't as organized as it may have been if it had been a larger convoy.

10:45 [What would happen to the vehicles in the middle. Would they drive off into the desert?] Some of them I believe did probably try that. Some of them turned around and ran. Pretty much everything we saw was at least stopped. We set a couple on fire. I heard later from some people who went through there that one that we had thought was just a mobility kill, had actually killed a couple crew members inside. From what we saw from our end I got a round close to it with the 40 mm, and it just coasted off the side of the road and stopped.

11:33 [What was your job?] Sensor operator. I was in the TV seat that night, the low light level TV system.

11:43 [What were your thoughts while you guys were striking against the Iraqis?] Personally, I was a little bit nervous. I had only been checked out maybe 2 years. And this was the first real combat experience I had had, at least in the desert. This wasn't the first night I had seen any kind of combat, but it was maybe the second time that I had gotten the chance to actually shoot at anything. So I was a little bit anxious, apprehensive. But other than that, it's, like I said, we didn't really get a chance to plan and find out exactly what the situation was. I think overall it was maybe a little hectic. But it was wanting to do my job, basically, not mess it up.

12:40 [What was the toughest part of your mission?] Trying to stay away from the threat, and still make sure nothing got through. The AAA started up, a little bit light at first, but it got heavy real quick. From what I remember, I think they said there were maybe 40 or 50 guns over the whole area around there. And they started figuring out where we were. So we'd have to break out over the water. At least we did have the water, to give us a place where we could go catch our breath a little bit. And then work our way back in.

13:27 [What kind of targets did you have?] Well, there were no pre-brief targets. Like I said, it was strictly armed reconnaissance, which is, you're given an assigned area and you go in, and whatever you find, if it's enemy, you kill it. We found the vehicles, the BRDM's, scout cars, a couple of trucks with trailers. It was an artillery site, AAA sites. I believe the artillery site was at least 85 [mm]. The guns looked pretty big on the sensors, even from the altitude that we were flying. Maybe a 6, 8 gun battery. There was at least one comm site, as far north as we went. We had to be careful. There was an SA-2 ring not far from where we were. It's a very large surface-to-air missile, anti-aircraft type. They call it a flying telephone pole. We don't go near them, period. They're pretty nasty. But the outer edge of its ring was not far from where we were, so we had to be real careful about how far north we went. It was either a radar site or a comm site. We never got a read exactly what it was, but we went ahead and shot at it. And then later on we got back down toward the border. The ground action started heating up a little bit. It was

just west of that border post where we started, there was, right along the border line, of BMP's, heavier tracked light armor, firing south across the desert, apparently at other ground targets. Then we started working on those. That was pretty much the extent of what we fired at, as far as the type of targets.

16:03 The battle of Khafji, as far as the 16th SOS gunship missions, was one of the most doable ones we had the whole time we were there -- as far as being a good, proper, valid gunship mission. We were really having a good night. We were able to find targets, we were hitting them. The fire control system was working better than it had in the past. We were really having a good night. Like I said, other than getting shot at, it was probably slightly boring. It was just finding stuff and shooting at it. That's what we've trained to do for years.

16:47 [But you don't train with AAA fire firing at you. Does that have a bearing on you?] From a personal level, I'm glad I sit in the booth without any outside windows. I couldn't see it. The only indications I had were the calls coming over the interphone. I think, to be totally honest, I was so scared then I didn't want to hear it. So I just toned that out and concentrated on doing my job. Like I said I wasn't the most experienced in the world. So I was really trying to stay focused on what I was doing. And I tried to tone out, because, like I said, that was the only indication I had of the AAA. I think once or twice I would pick it up on the TV, just the tracer fire coming through the edges of the picture. Even that, you just automatically ignore it. I think the guys that say when you get into a little bit of stress, you tend to automatically go into what you're trained to do, I think they pretty much got it right. Because if I had had time to sit back and think about it, I don't know what I would have done.

APPENDIX M

INTERVIEW WITH SSGT BRAD SIMS, USAF

OPERATION DESERT STORM AC-130 GUNNER

00:27 On January 30 of 1991, I was on an aircraft, our call sign was Spirit 01, we were the first to go in over Khafji. Our basic mission was to go in for armed reconnaissance and to have targets of opportunity, anything north of the border.

01:08 [When you were heading in to the battle, what was going on?] As with every mission, we made sure we're fully prepared. We made sure we had all of our evasive charts, all of our safety equipment, and survival equipment together.

01:27 [What was your job?] I was the gunner. Actually, I was sitting at right scanner. And that position is to scan the right side of the airplane for threats, any kind of AAA or missiles coming up, and warn the crew, and take evasive maneuvers from there.

01:50 [How long was it from the time you guys took off until you guys hit Khafji and started seeing some stuff?] I can't remember how long the flight was from where we were stationed to Khafji. But it wasn't long after we rolled in that we immediately started finding targets and started delivering ordinance. And it wasn't long after that, they started responding in kind, as far as shooting AAA and stuff like that.

02:15 [What sort of targets were you hitting?] We had several APCs, AAA locations, some ammo storage trucks, a few tanks. There were some comm sites, a couple radar sites, just an enormous amount of vehicles and stuff like that.

02:42 Without a doubt, that's the most targets in one concentration that I've ever fired on.

02:48 [What went through you mind when you saw all this?] I believe that was the first time during the Gulf War that the AC-130H had been properly employed, that we had a mission to do, and I felt that we could do it. And I believe we did do it.

03:03 [What weapon were you using and what targets were you hitting?] We were shooting the 40 and 105 mm guns. When we first rolled in we started in on some AAA pieces. They had a string of what looked to be approximately 23 guns that stretched about a half a mile, from east to west, along the border, that were dug in.

03:43 We were shooting the 40 and 105 mm guns, and as soon as we rolled in, we noticed a string of AAA guns that were dug in. They looked to be approximately 23 mm and they were strung from the east to west. We rolled in over them. In between the AAA guns, they would have a truck that was full of ammo, to feed them by. And we were just walking up and down them, shooting them, until AAA got too intense. Then we'd have to go off to the other location where the AAA was coming from, and suppress that fire, and just basically move all about.

04:13 [What do you mean by "walking up and down"?] Just going from one end to the other. For instance, like putting the 40 mm on rapid fire, which shoots approximately 100 rounds per minute, and just firing as fast as it would go, walking from one end to the other.

04:27 [And what would happen to your targets?] They were definitely getting big secondaries. You could see people running from them, and they were definitely being destroyed.

04:38 [What was the feeling while this was going on?] To get them before they got us. There was a lot of AAA coming up from all over. They were using artillery flares to light our airplane up. And it hurt them more than it hurt us, because it would light their location on the ground, and we could see them. But there were several thousand rounds of AAA that came up at us. And none of it was accurate. The artillery flares were more accurate than what the AAA was. And it would just push us from one location to the other. And when it got too hot we would roll out over the water, let things die down, and then come back in.

05:20 [Which weapon was the most effective?] It depends on which targets. They were both very effective. It just depends on which target. The 40 and the 105, both guns were very effective. It just depends on which target. Such as the APC, the armored personnel carrier, the 105 is more effective than the 40 is. It has a whole lot more ordinance explosive to it, and it's more effective for that. Whereas, like a small vehicle or something like that, the 40 mm is just as effective.

06:00 [Were you in the town? Where were you exactly located?] We were north of the town, north to northwest, about 7 to 8 miles. Just about approximately 7 to 8 miles there was a SA-2 ring that kept us from going any farther north. We had to stay away from that threat because we definitely couldn't encounter anything as large as that. So we were I'd say in a 7 to 8 mile radius around the town of Khafji, to the north and northwest.

06:28 [Was it anything that you had experienced before?] Nothing to that extent, no.

06:35 [How would you characterize it?] I really don't know how to explain it. It was frightening. It was an adrenaline high. Kind of like all that combined together. I don't know of any words to really describe it.

07:13 Anytime you're shot at, of course you're frightened. It will give you the pucker factor. I can't really say I was scared shitless or anything like that. But it was an adrenaline high because you're there to do a job, you're doing it, and you want to get it done and get out before things get too hot.

07:37 [You went there and you did it and you came out of it alive -- because of your training?] Definitely. That plays a big part of it. The training of the whole crew. It's a crew airplane. There was 14 people on board that airplane at that time, and it was

because of all 14 people that we made it back alive. If one person slipped up, it could just as easily have gone the other way.

08:02 [So you guys were a good team?] Definitely. We had been flying together through DESERT SHIELD and Operation DESERT STORM. We deployed over there in October. And through the whole time we had been flying 2 to 3 times a week. So it was like clockwork. Everybody knew exactly what each other was going to do. Everything just went part by part.

08:26 [What was the most difficult part of that mission?] It was probably trying to figure out if something happened, where we were going to go. Because when we had taken off, we were briefed that Khafji was still a safe area. And we did not know that it had been overrun. And all of our evasive plan of actions, and "E and E" [Escape and Evasion] plans, they were based on us going to Khafji and meet up with friendly forces to get rescued and go back south. But once we were in the air, we got notified that Khafji had been overtaken. So therefor, all of our plans were out the window. We had to make something up from scratch if that happened.

09:05 [You were shot at?] We got shot at by multiple thousands of rounds of AAA. We had also got locked up by a SA-8. That was hair raising. It's a radar guided missile. We were on target, and the electronic warfare officer started screaming to break right, break right, because we had a radar lock on us. And we had broke towards the water. He had got a launch indication, but we had seen no missile. So whether something went wrong with their system, or whether they were just trying to scare us off, or what, we really don't know. But we had went over the water, and after we had done our evasive maneuver, the threat went down, and we had rolled back in.

09:56 [How numerous were those threats?] A lot of them. We had multiples of evasive maneuvers. I believe the count was something like in the 20's. Everything from artillery flares, to AAA, to the SA-8. When I was sitting in the right scanner's window, the artillery flares were getting so close that you could actually feel the heat coming off of them through the window. You would lose your night vision and you'd have to close your eyes and let it burn out and try to regain it.

10:30 Artillery flare. It's a flare that they put in the high caliber AAA guns.

10:48 The enemy would shoot the artillery flares and when they came up, they came so close to the airplane that you could actually feel the heat coming through the windows. And you'd lose your night vision. You just have to close you eyes for a few seconds, let the flare burn down, and then regain your night vision.

11:12 [What were your thoughts when you were going through this first Iraqi offensive?] That we had a mission to do, and we were definitely able to do it, and we were ready to get it done. No regrets, or no bad feelings. We were there to do a mission and we did it.

11:34 [How successful were you in stopping the advancing Iraqis?] All as a team we

were very effective. Because we did get the job done. We definitely pushed them back north. Us as the first aircraft in, we definitely opened a can, opened a can and started pushing them back up.

11:57 [What was happening to the vehicles?] They would come down the main road, down towards the border post, and there would be 3 to 4 vehicles in a column. And as we would shoot one, the others would run off in the ditch, turn around and try to head back north. The people would run from them, just abandon them, and just try to get out of the way of fire.

12:45 [So when they abandoned their vehicles, would you hit those vehicles?] Definitely. Keep from them any kind of assets that could push farther south.

12:58 [So you said a lot of people would abandon their vehicles. What would happen then?] We would shoot their vehicles, blow their vehicles up. Keep them from having any kind of assets to push farther south. We didn't actually pursue the people themselves, but any kind of vehicle that was on the road, we definitely took out.

13:20 [Would you say that that first night was a very target rich environment?] Very target rich environment. I couldn't even begin to recall how many targets there were, because every time we turned around, there was another target. It got so bad that when the AAA got so intense that it pushed us out over the water, well we started looking up towards the north, and we would find comm sites on the water, radar sites, that kind of thing. So we would roll up there, hit those, and then when it cooled back down, we would come back down south.

14:00 [You guys were videotaping this thing?] What we have is a video cassette recorder. It records everything that the electrical-optical sensors record. And all the targets, all the shot placements, stuff like that.

14:40 [Is there anything that future AC-130 crew members should know, going into their first battle?] Nothing that doesn't already get taught to them. We have a very competent school here that teaches everything that they need to know. And the best way to learn is to be thrown into the frying pan, because we don't send new guys out there by themselves. It's a crew airplane, and everybody's there to take them by the hand and help them through it.

15:19 [What was the crew like?] We were like a family. We'd fight like cats and dogs until it came down to business, and it was all business. We could read each other's minds. Somebody could say something over the airplane and not even address who they were, and we'd know exactly who they were by the way they talked, their voice, and stuff like that.

16:10 I think really they had expected a large air asset coming in, and they were heavily defended by AAA and stuff like that. So I think that very well could have been part of it. More so of defending the air more so than the ground. I think really they expected a lot

of air power to come in.

APPENDIX N

INTERVIEW WITH MAJOR JIM BRADEN, USMC

OPERATION DESERT STORM ANGLICO ATTACHED TO 2ND SANG

14:03 [What was your duty title during Desert Storm?] I was Supporting Arms Liaison Team Leader, or SALT Leader, for first ANGLICO, Air Naval Gunfire Liaison Company, and I was attached to 2nd SANG with the Saudi Arabian National Guard with Joint Forces coalition East.

14:28 [Can you briefly explain your ANGLICO duties?] Sure. We're there with foreign nationals to provide liaison with US forces, but our primary function is to provide fire support and fire support coordination. We bring them naval air, navy and marine tac air and naval gunfire, and help them plan their fire support plan to best support their scheme of maneuver.

14:50 [How do you spot targets? Eyes? Other Sensors?] Basically we use whatever is available to us. We do have, as far as optics, the best optics we have is a TOW night sight that we link up with our "mule," our laser designator. Other than that some gyro-stabilized binoculars, some laser range finders, and then you depend on whatever else you have available -- the OV-10 was invaluable to us over there in the desert. OV-10 Bronco was a 2-place observation plane, Vietnam era, that had been modified into a basically a FLIR aircraft that gave them a very good high mag optics, to look forward and give us what was out there. Slow aircraft, like I said Vietnam era, twin propeller driven, but the FLIR allowed them to look out from altitude and see what was in front of us, and they would relay that back to us. We worked with them all the time. Since that time they have phased out that aircraft.

16:05 [Could you tell us a little about Khafji and when things started to happen?] We actually got up into Khafji in late August. As we arrived, as the US forces were arriving in country we immediately attached up there to then the Ministry of Defense army of the Saudis, as they were the first people able to sprint across the country and get into position there. They were shortly thereafter replaced by the Saudi Arabian National Guard, the 2nd SANG, who I ended up spending most of my time with. Basically from the border, there we were the eyes forward for the coalition and initially the eyes forward for the US forces as well as forces built in country. Throughout the time frame going from late August until about November, slowly the civilians who were inside Khafji started phasing out and going south, and by the December time frame the city was basically empty. In the end of December to the beginning of January, the king sent a message asking the people to please go visit relatives, and they did. Nicely enough they left on the power, the phones, the water. So there were facilities the Saudi forces ended up using, and we often got to use them as well, being attached. In January, as the air war kicked off on the seventeenth, a couple days later there was an apparent change. Up until then

we were raiding the border forts with eyes forward, watching in a laydown where we had a US team of ANGLICO, and attached Army special forces, Marine force reconnaissance and Navy SEALs, as well as the border guards who were basically like our INS people, and then a platoon from which ever coalition force you were attached to, in our case the SANG. So there was a platoon of SANG with us, and then a company within about ten kilometers of the border that supported us. And then arrayed behind a battalion/brigade were about 20 klicks [kilometers] of the border where we were. So that way the eyes forward, as the air war started, we started taking fairly accurate rocket attacks on a nightly basis after a couple nights. The Iraqis were firing FROG missiles each night, or rockets is the more correct term, from a position along the coastline to where they thought the Saudi forces were arrayed. It would be a sporadic burst of anywhere from 3 to 6 rockets, and then nothing. I think it was there to demoralize us and scare us.

19:04 [What are the rockets like?] It's anything up to 540 mm, so the crater out of the rocket, you could easily drive a bus into the crater it would make from a 540 mm. So it's a high explosive rocket, and it's anti-personnel is the primary use for it. On several nights they came within a kilometer of our position, which lead us to believe they had fairly accurate information about where we were. Which was completely understandable, as even though the border was closed, it was not restricted. The Bedouins and people like that were able to move fairly easily, so it's an easy possibility the Iraqis could have come over and had a look at what we had. Although that was fairly tightly controlled by the border guards, there were very definitely gaps. As those rocket attacks would happen we would run air on the position that would fire the rockets, and the air would take out the rocket launchers. When we did go on the ground offensive, we found a junkyard that was fairly sizable of destroyed rocket launchers that we figured was a result of our nightly air attacks after their rockets.

20:20 [When did the rocket attacks occur?] That went on for about ten days. The complexion changed on the night of the twenty eighth. The Wafra forest, which is about 20 kilometers inland from Khafji, and happened to be the only area of green you could see across the border, an agricultural area that was sort of an experiment out in the desert, which worked out fairly well for the Kuwaitis, and also gave them the best chance for camouflage for any enemy forces that were there. On the night of the twenty eighth, approximately two battalions of mechanized force came out of the Wafra forest, one headed east and one headed west. East being towards Khafji, and west being out towards the elbow. As those forces unmasked, the OV-10 that we talked about earlier quickly picked up the forces on his FLIR. Being an infrared sensor he picked up the heat from quite a distance, and then got in closer to get a better visual look at it. The air that was on station at that time were four A-10s and four A-6s. They immediately ran, the A-10s went west and the A-6s came east, and put down a lot of Rockeye, and the A-10s made multiple strafing runs. Of course the A-6 doesn't carry a gun, so it didn't do any strafing, but it carries more bombs. It had good effect. More air started going up that way. I know there were AV-8s, F-18s [F/A-18s], some more A-10s, and the forces that came out of the forest quickly re-masked into their hidden positions. Throughout the rest of that night there were sporadic small bands of Iraqis that came across to surrender. They came across without their weapons. Generally looked pretty good, their comment, and most

were not native Iraqi, they were whomever happened to be there and conscripted, and their comment was "It is Saddam's war, not ours. We are done. Please take care of us."

22:23 [Did they have the leaflets?] The leaflets actually didn't start until after the battle of Khafji. They started in the early February time frame, because we did see leaflets later on. And we saw almost to a man in the ground war, we did see leaflets on the people as they would surrender.

22:50 [Did you get leaflets from the Iraqis?] They didn't have a counter psyops for us. The only thing they did, I guess it was a sort of a psyop, was, I had friends on the elbow with reconnaissance. They had a small unit of about 50 people come over to surrender in the mid-February time frame, and that point fairly sizable bands had come across on different nights. These people once they got within about 50 meters, dropped to their stomachs, they had weapons on their backs, and they opened fire. Their intention, it appeared, was to take prisoners, and get American prisoners back to Iraq. Luckily they were unsuccessful, a couple of Marines were wounded, but they were taken care of.

23:35[Getting back to the 28th] On the 28th as we saw that unmasking, things quieted down for the rest of the night. I had a forward team at OP7, which was about ten kilometers to the west of Khafji. They actually took some direct artillery fires. There were A-10s on station, and the A-10s went in and appeared to take out a couple of the artillery, it was a self-propelled artillery, appeared to take them out and there was no further artillery fire on them that night. Quiet for the rest of that night. Throughout the next day teams that were in the border forts would occasionally report that they saw vehicle movement or whatever. By the time air came up, because we didn't have any that was routinely there, there was nothing to be found, and so pretty much a quiet day. About 1900 on the night of the twenty ninth, the border forts, particularly OP7 and OP8 which were two that were over to the west of Khafji, started taking artillery fire and rockets. We also took a rocket attack about the same time 20 clicks back in a brigade position. As those attacks happened, there was noticeable, they could hear vehicles moving, they couldn't yet see anything visually but they could hear a large amount of vehicles moving. Air went up and they started, the first flight up there was A-6s. They went after the artillery that they had marked a couple of times. Quieted the artillery temporarily. As the air got up there they could see vehicles coming down. There was a blind spot in front of the OP that you could see at 3 kilometers, and you could see at ten kilometers, but between that you couldn't see anything. There was obviously a depression in the ground. In that depression, the first aircraft up there saw about a company sized unit and attacked it, apparently with good results. At that point almost simultaneously the OP that was right over in Khafji, got hit and overrun. And as they were overrun, there was another ANGLICO team that was up there, and they had been depending on the border fort to give them warning because they had set up on some slightly higher ground, there was a series of sand berms, or sand dunes is the best way to describe them. It gave a slightly higher view of the coastline and things that would approach on the main road. And they were depending on the border fort to tell them if anyone was coming, because there was literally a blind spot when you looked just to your forward right towards the sea. The border fort pulled out without anybody saying anything to the ANGLICO team, and

actually moved behind them. And the first indication they got of anything unusual, was as the last vehicle was going by from the border fort, they said, "We pulled back, there's APCs out here." As soon as that was said an APC came up over the berm into their position. So they had to do a hasty retreat, they were basically overrun, and they had to get out of there. The only radio call is, "We have been overrun," and the next radio call that we got from them was 45 minutes later and they said that they were OK, they lost some gear, and they were moving back to the south.

27:38 [Who had to pull back?] This was my ANGLICO firepower control team. Working for Supporting Arms Liaison Team is what we call a firepower control team, or "FIC" team. That's a five man team that would normally be with the forward company, in this case was with the forward battalion. They're designed to operate, because the other people we operate with very regularly with is the US Army, and they're are designed to work within a U. S. Army company. And they are not designed to provide their own security or our own organic direct fire back. We are there to provide supporting arms. We have M-16s. We have grenade launchers and we have the anti-tank missiles, the AT-4s, but not designed to take on a mechanized force or anything like that, or even a significant un-mechanized force, or dismounted force. So the five man team that was up there, one of my lieutenants, Lt Lange, was overrun literally because an APC rolled on his position and basically they could fight back with what they had in their hands. The heaviest weapon they had in their hands right then was a grenade launcher, so they fired 203 grenades at them and egressed back to the south to join with another of our ANGLICO teams, that was back at the desalinization plant which was called the FOB forward, Forward Operating Base. It was a joint special forces Marine base up there. ANGLICO belongs to what we call the Surveillance, Reconnaissance, Intelligence Groups, the SRIG. So it was SRIG forward and the special forces. At that point the colonel that was in charge up there had decided to pull completely out from the city. He could tell there were mechanized and armored forces in and around, and they didn't have anything to fight in a direct fight, so they would have to deal it with air. So they were pulling out, and it took 45 minutes to get any kind of comm and that yes they were up and OK. At that same time the people in OP7, the order had been given to pull back by the SRIG folks, did not get out to them. They stayed in place while everybody else came off the border. So from about sometime around 2100 until 0100 they were up there all by themselves. The Saudis that had been attached to them had already departed, and it was the special forces force reconnaissance and ANGLICO, so it was about 20 Americans up there in that border fort. At 0100 they started taking heavy mortar fire and heavy artillery fire, and there were four Cobras that were on station or coming up on station with them. The Cobras went out and they put out, they had the illum [illumination], rockets, so they put out illumination and started going after the mortar positions. They were carrying Hellfire missiles, so they needed a laser spot but they did not have a designator capability, so they could basically fire their rockets and 20 mm. That slowed things down and as they were running low on ammunition, another four Cobras and a single Huey that had a laser designator came up and relieved them. As that happened, they put more illum in the air, but now they had a laser designator so they could reach out and use their Hellfire. They used that on some APCs out there, and the team that was in the border fort pulled out. That's when the team, by now they had gotten the word that it

was time to pull out and move back. So the team moved out of there with the cover of the Cobras and came back towards the south. We made contact again with them first thing in the morning. They basically got to a position in the middle of what was called the "sabka," or basically an area of "Martian-type" ground out in the desert. They felt safe in there, the armor wouldn't be able to get them. The Humvees could transit it in most cases. So they kind of bedded down there and stopped moving because they couldn't sort out who was who at that point. First thing in the morning, just before sunrise, three Iraqi tanks came by their position. At that point they started moving rapidly again to the south. An OV-10 showed up on station, but by that time the tanks had moved away so they were no longer in anybody's sight. That morning, the morning of the 30th, the Marines who were over at Ras al Mishab, Col Admire 3rd Marines came over to have a conference with Col Turki, because the way it was arrayed, Khafji and the area just south of Khafji was within the SANG position and right behind the SANG, the next unit was the 3rd Marines. The SANG had attached to them about a brigades' strength of Qataris and to our west we had about two brigades of Ministry of Defense and Aviation, the MODA. The MODA was a mechanized force. They had tanks and mobile artillery, self propelled. We [SANG] were basically a cavalry force, we had armored cars, towed artillery and that was about it. The conference between Col Turki and Col Admire, Col Admire basically offered up any support, and Col Turki asked for the Marines to be integrated within the SANG, so that the Marines would work for the Saudis, which they saw as what ANGLICO was doing -- which wasn't a hundred percent true. But Col Admire said the best way he could provide support was to keep his units together, and fight along side. It was decided at that meeting that the best thing to do is the Marines would provide a blocking force south of the city so the Iraqis could not move south at all, and they set that up about 10 kilometers south of Khafji, and they also gave us their artillery. 3rd Marines was a light force, it was basic Marine infantry, so they didn't have mech. What they did have was Humvees with heavy machine guns and TOW missiles. They set up about 10 kilometers south, but they did give us use of their artillery. So they had M198 artillery the 155, and that deployed into position where we could use it for fire support within the city, and we used it for the next two days until the Saudi self propelled artillery came up into the fight. At that point 12th Marines stopped firing for us because the Saudis wanted to take over. The plan out of there, Col Turki talked in very broad terms, this battalion would go here, that battalion would go there, and the battalion commanders said they will do something, but they were not quite sure what. Ended up they put a battalion reinforced with many of the Qataris south of the city, and they moved up another battalion that would move up to the west and north around the city to cut it off, and the plan was to cut it off so the Iraqis could not get out and no more could come in. And a second battalion went up to actually cover the western side of the city. So there were three Saudi battalions reinforced with the Qataris. That morning we had gotten track of all our people, knew exactly where we were at and wanted to move deliberately back in to cut off the city. As we moved up we got five Cobras from HMLA 367, Scarface. They came up. And for the rest of the battle, they were basically ours. They provided direct support to the battle. As we moved in that day, the first mission was to seal the city, or to take the northern end out and that's when we ran into the tanks again, up to the north. Initially the first time we ran into the tanks we hit them with the TOW missiles from the Cobra, and killed three tanks. Two others escaped over the berm,

and a couple of APCs. This is north of the city, but within Saudi Arabia. The city is arrayed. There is about a two to three kilometer area that's kind of barren. It's kind of sand dunes and that kind of thing. As you actually get out to the beach it's a fairly nice beach there, or was before everything got started, and then you hit into the urban part of the city. As soon as we had started engaging those units, we started getting more air to come up. Initially we got a flight AV-8s, and ran those against some more tanks and APCs. It looked like the unit was going to be able to move around the north end of the city and cut it off. Throughout the day that's basically what happened. The Cobras continued to cycle up so there were always two with us. They often acted as our eyes forward. The FAC was working with them, and we rotated which FAC they would work with -- for whomever had the threat at that time. We were in the situation where I was moving throughout with my team, so I would leave the team with somebody and move to the next to make sure that we always had communication, and that everyone knew what was going on. It was very deliberate, because the Saudis didn't have very good comm. Their radios were not used very often, they weren't good at them, and they weren't used to them, so they weren't using them, they were using us to communicate. We did that. We used some A-10s and some more AV-8s and the Cobras to basically cut off the northern part. At that part we moved back to the main road, which was still about a kilometer from the water. But up to that road I felt fairly confident. Then we got into an area, it was a refugee camp, some white tents out in the desert. We had teams to the north, the west and southwest, correction the east and southeast, around this refugee camp but no team in the camp. We thought the Saudis were consolidating in there and cleaning it out, and that there weren't any Iraqis. All of the sudden there were several shots in there, of tanks, which at that point we didn't have any Saudi tanks there, so we knew it to be Iraqis. There were two Cobras on station, and we cleared the Cobras in to hit tanks. The Cobras went in and they engaged one tank, and they engaged the second tank, and as soon as they started firing on the second tank our team that was to the north, our ANGLICO team said, "You're shooting friendlies. Abort, abort, abort." As soon as that call was made, Cobras came off, moved back into supporting position to sort things out. We regrouped and we could see a couple of APCs and everything get over a berm to the west of us, and went back and very deliberately, which took the rest of the day like that day, and ended up where we had been at the road but actually had moved two kilometers back to the west of the city. As people moved it became very clear that no friendlies had been fired on by the Cobras. But what had happened was the Saudis blew out, and the team that was to the north could only see the APCs, the armored cars blowing up and they could see, they couldn't see the tanks from where they were at. So they thought the Cobras were blowing up the Saudi armored cars. Where I was at, to the southeast, you could see very clearly there were tanks in there, and as the tanks started going over the berm with the APCs, that's when the team to the north saw that was the threat. But at that time they were kind of a little gun-shy. Because they had called the abort, they went after those tanks and APCs, because they felt like they had made a mistake -- which they really hadn't, they made a good call. At that point they got a couple of A-10s on station. They were able to get one of the tanks and two of the APCs. The other tank and a couple of APCs got away. That pretty much ended the first full day. Again, we consolidated to the west. It took a lot of time to get everything straightened out and make sure everyone knew what everyone else was doing, that there hadn't been any fratricide. Everyone

talked about that and made sure. The Saudis agreed that they got hit by tanks, that Cobras were good and they liked them, and that was really an effective way to do it. At the end of that day is when the Saudis started getting confident that their weapons could start out-ranging the Iraqi weapons. They were never trained for this kind of warfare. They were basically a “king’s guard” type unit. They were trained for urban warfare, for like riot control, although the same Saudis had retaken the mosque that had been taken by terrorists a couple years prior. So they were definitely brave men, they just weren’t trained to do what they were doing. That night, for whatever reason, as soon as it got dark, the Iraqis just stopped fighting. They fought through the first night, but it got dark and they stopped the second night. Which was very good for us. Just before dark we had F-18s come up, and they just started stacking. It ended up being nine sections of F-18s. It was just as we were consolidating, getting everything, setting them up in an orbit up above us. We wanted to make sure everything was straightened out, we weren’t going to have any fratricide problems, we knew where all the friendlies were at, and so we knew we wanted to use the Hornets because there was an enemy force there, but we wanted to make sure we were going to use them in the right place. We had an OV-10. Like I told you, they acted as our eyes most of the time. OV-10 was on station, and one of the last things they would do when they were at the end of their station time, they would make a sprint across the border. They would go up to altitude and dive down, get all the speed they could, get a quick look about ten kilometers across the border, break out to the water and go “feet wet,” and then proceed back south to home station. If there was anything they could see in that sprint, they would relay it back to us. A friend of mine was in the OV-10, went up to altitude, everything was worked out, and there were still people a little bit shaken on the ground because of the frat call which hadn’t happened, we had just gotten that sorted out. As he went across the border we got one call of, “Oh shit,” a few more excited calls like that, and then nothing. We made the call to him, “Redman say status,” and nothing, and thought we might have lost a guy. Then I got a quick, “Stand by,” so O.K. he’s up there still, and then, “Stand by to copy grids.” He sent us some GPS grids, and said he had a tank column that was moving to the south towards the city. Said O.K. talk to the F-18s and sent them after it, and he sent the, basically eighteen F-18s at the tank column heading south at us, and as they were coming down it appeared to reinforce that night. The first section took out the lead tanks, the second section took out the back tanks. Talking to the pilots after the battle, what appeared to happen is as soon as they got hit, they stopped moving, which the Iraqis had been doing fairly regularly within the city, and when they stopped moving it was a much easier target, so the F-18s ran against them, and most of the people were jumping out of the tanks and leaving them. But the column of tanks was destroyed with “Rockeye,” and they had some pretty good video of that afterwards. The F-18s then departed and for the rest of the night it was very quiet. The Cobras talked to us again, and they had been flying, at that point, for probably twelve hours, so we sent them home. They had one of our radios with them so if we needed them they could be back up and on station in twenty minutes. We felt pretty confident with that, and any air that was going over the area that night talked to us also, as they were going by. [43:02] At that point the A-6s had been working with us because of the rocket attacks we had been getting before. On a very regular basis they would quote, “save a bomb for us.” They’d do their deep mission and they’d come back and if there was anything to work for us, they’d work it. A-10s same way, and the F-18s

exactly alike. The AV-8s did the same thing for us. We had a pretty good comfort level that air was there if we needed it, and there was nothing going on that night. The next morning, morning prayer went at normal time shortly after sunrise and then the fight picked back up. It was unusual but that was the way it went. That day we had decided that our mistake of the day before was that we had been too spread out trying to consolidate. During the night the Saudi tanks from the MODA, from the army, had moved up. So we now had Saudi tanks to the north, Saudi self-propelled artillery, and we had greatly reinforced the strength of the force, so we decided to cut the northern side of the city off. We felt very confident that the air could protect us if anything came down from the north, so we moved around and cut off the north end. The goal was to get into the desalinization plant. That's where the Saudi artillery was trying to fire. It took them a little while to get their legs under them. We initially got fires on the desal plant, and moved in and deliberately took that. At that point one of the teams actually moved through the eastern side of the city and came down south towards the forces that were to the south. When they moved down there in pursuit of some APCs, they ended up engaging those APCs with Cobras and the second fratricide call of the battle came up -- that the Cobras were shooting friendlies. So we aborted the Cobras to sort that one out. What happened is the force that had actually moved so far south and pointed in towards the west, that the forces that were to the west could see the ricochetes as the Cobra 20 mm was fired at the APCs. The ricochetes were going towards them. They could see Cobras in the air, so they thought the Cobras were shooting at them. Nobody was even close to being hurt. At that point the APCs had disappeared to within a fairly dense urban area, and they had taken out five of the APCs, and that was starting to end the day. It was almost for what we called the evening break. And sure enough again, as it started getting dark, everything stopped. [45:27] Same Cobras had supported us all day, and what we found during that day, we couldn't use the fast movers very well within the city anymore, because we had now closed in to fairly close quarters. We had probably ringed the entire city by darkness, with the exception of one compound that was just south of the city. But we had good eyes on it, and we felt pretty confident that if anything happened in there we could control it. We ran about five sorties during the day within the city, and those were AV-8 and one A-10 sortie. All the other stuff was Cobras, and the Cobras again cycled throughout the day, so we always had the support, and we were using primarily the TOW missiles. What we would do, is the Cobra would stay with us. He would move up on our shoulder or actually sometimes land and we would run back and hand him an updated map and talk to the pilots, and give them a situation update and then they'd get back and get into the cockpit and go again. We were primarily using the TOW missile because that was a very good close quarter missile, and we didn't need to get a laser spot up for them which was truly difficult in the urban sprawl. Got dark, sent them home again, it was the same five crews, so they were getting fairly tired. They rested for the night. Again had the fixed wings checking in with us all night to see if we needed anything, and it was a very quiet night. [46:57] The third day, as it dawned there on the first, at that point we felt like we had retaken the city. Nothing had come down during the night from the north. Nobody else had tried to get out of the city, so we just began a deliberate clearance of the city. By noon the second day, the Saudis were doing well. They were willing to go "toe to toe." They were willing to get in there and get into a ground fight. Initially, they were very hesitant to take on the Iraqi tanks and the Iraqi APCs. As they

got more confident, they were using American M-60 tanks, French AMX-30 tanks, and American TOW missiles, and all these systems out-ranged the “sagger” missiles that the Iraqis were using, and the T54/55, type 59 tanks. Because we could out-range them, and again we had gone through many live fire training’s out at Twenty-nine Palms and our CAXs, they had never, most of them had never fired their weapon -- their main weapon -- like a TOW missile prior to the war. So the first time they were pulling the trigger, they were shooting at somebody. They had a pretty steep learning curve. I mean if they made a mistake, people got killed, and they lost some people that did make mistakes. But they got to the point where they got very confident that they could fight a ground fight against the Iraqis. Mainly because if anything went they always felt air was there to help them. And they were completely confident that we could bring them air anytime we wanted it. Which during the battle proved true. [48:40] Prior to the battle we were sometimes frustrated since they were pursuing a deeper war, and there were some things close to us we wanted to hit, and we couldn’t hit them, which only makes sense in the bigger scheme of things. We could always bring them air and they were very happy with that. So by the second night their confidence level had risen, and as I went around to each of the positions to consolidate them and see how everybody was doing, re-supply batteries and those kind of things, there was just a kind of an upsurge that tomorrow we will go in and take back our city, that was the Saudi feeling. That was the end of the day on the thirty first. [49:20] So on the first, that morning, everybody got up and did their morning prayer, and after the morning prayer we went in for the deliberate retaking of the city. That day we probably had ten or fifteen sections of fixed wing check-in, and there was nothing, we couldn’t use them at that point. The Cobras came back and supported us throughout the day. The thing that garnered a CNN look and everything was probably retaking the observation tower to the south of the city. We started getting some fairly accurate mortar fires on us. It was apparent they had observers somewhere adjusting. Because of that, felt it was the highest point, it must be there. Later after the battle the Saudis said there were five bodies, but we fired Hellfire missiles into it, TOW missiles into it, 2.75 inch rockets fairly close up to it, and 20 mm, as well as ground weapons. So we probably overkilled the observation post, but it worked, and the accurate fire stopped. Throughout that day it was urban kind of street to street. We think of house to house, when you talk Marine Corps or Army, the Saudis think more, they take a block and if they don’t get shot at then it’s O.K., if they do get shot at, then they reduce the building to rubble. So there are real minuses to that.

50:51 [So are you going through each building?] No, that’s what I mean, they were just going through a block very casually, we US forces would go in and check every room, but they were not. No, that’s not what, we’re not equipped to do that. So at that point all the forces within the city were Saudi forces. We were there with them and we were advising them, that you know you ought to go room to room and clear that. But because they didn’t do that we took sniper fire for the next two days, and sporadic mortar fire as they had some small mortars they used on us. By the end of that day we had basically retaken the city and re-occupied it.

51:40 [Air power was very important?] Absolutely, as the fight began, we were hit by a much stronger force that was trying. It was obvious to us that the Iraqis that came after

us, while not Republican Guard, were probably their second string. They were people that had probably fought in another war, they were familiar with their weapons, they knew how to employ them, and they were using night vision. They had some type of night vision to guide themselves through lanes, to get through the mine fields, to do those kind of things. They used some illumination a couple times. So these were trained, coordinated forces, they did a deliberate attack at night, which is a hard thing to do. They were well equipped for what they were doing. It wasn't the state of the art, it wasn't T-72s, but the vehicles looked good. The one thing we noticed, there were spectacular explosions as we were hitting these vehicles with TOW missiles, or with Hellfire, or with bombs, much bigger explosion than you would expect when you would blow up a tank or something. The APCs were going up like they were munitions boxes. And as we got to some of the abandoned ones we found that's exactly what they were. They were overloaded with ordinance. Talking to the Saudis, who talked to the Iraqis, because we got at least 500 hundred prisoners and probably close to 900 prisoners, by the end of the battle, and initially some of them were surrendering to some of our four man ANGLICO teams. Which is kind of interesting when fifty people come at you, and their carrying rifles, and you have rifles but that's it. That's a bad thing to happen, but you get them to put down their weapons. The vehicles were full of ordinance. The Iraqis that the Saudis talked to said that they were coming to stay, they had a lot of food, that had a lot of ordinance and that they were to set up basically a "flak trap," to set up a place to shoot at our coalition air going up the coast. They had a lot of anti-aircraft guns. We found two partially assembled 23 millimeters they were moving up to rooftops, and a lot of shoulder launched SAMs. Particularly, which was surprising to us SA-16s, in the box, which up to that point we didn't know they were in theater.

54:20 [What would your situation have been had you not had air support?] We would have had to pull back to at least Mishab which was 30 miles from the border, and probably further than that. The initial attack, trained against untrained, equipped against probably not the best equipped, we were in an area of vulnerability. That's why 3rd Marines was there as a fall back position, and that's why the brigade, the Saudi brigade was arrayed there. They were in a fall back position. They were willing to give up some ground, and that 20 kilometers was probably enough. We saw the Iraqis could only go so far before they had to stop and re-supply. They're not like us in that we re-supply on the move. So we would have had to fall back, and without the air I'm not sure we would have got all our people back. It took awhile to pull all the teams out, communications is always the hardest thing to do, we're particularly adept at it at ANGLICO, and our guys were good. I think the only reason my one team on the border didn't get the call to move is because nobody really sent it out. I didn't tell them to move, so they didn't move. So we would have lost some people, and the Saudis would have lost some more territory.

55:45 [Anymore about coalition air power?] We thought things going into the war, from the training we have had here in the United States, one of the things we learned is that our training works. There were a lot of questions, I went into the battle with fairly young troops, and they were wondering how they would perform when it came down to the fighting. Across the board they did a great job. Our equipment, we always want something better, that's kind of the nature of it. And there is a real reason to have

something better. Over the years it's got less and less acceptable to have any casualties, and one of the realities of fighting is that people die, but the weapons we had were good for the time, they could have been better, we've improved them since. The Cobra was particularly effective in any kind of urban environment, they were great for their station time, being right there. They had the capability to land and talk to you if you needed to update them. They carried enough of a punch that they could blunt just about anything that came at them. But they couldn't take on the huge numbers we could take on with the fixed wing aircraft. The AV-8, you know it proved it's worth. It's a small aircraft, so it's very hard for anyone to pickup. They got shot at, both the Cobras and the AV-8s that ground teams could see and they didn't get taken out with surface-to-air missiles. It was hard for us to see, even to pick it up, so it was good. The 25 mm gun on it was effective. The A-10, which the Saudis hated, because it was big and it was ugly as far as they were concerned. They liked small and sleek, they really liked the AV-8 and they really liked the F-16. But they got to like the A-10 because it was there. We took a fairly old airplane, spun it into it's mission that it was originally intended to, but certainly not the environment it was, and it performed well. Talking to their pilots, those guys were tasked loaded, at night they were depending on a seeker on a missile to see something. That's sure not the best way to go into battle, but they did a good job. I felt there was a difference in the level of training of different units. The initial A-10 drivers we had were the regular active guys. Later on we got the reservists, and there was a quality spread among the reservists. Some of them were better than others. That's just the nature of the beast. The A-6 was an invaluable aircraft. It brought such a Sunday punch to us with all the bombs. It was actually more impressive than later B-52 strikes, just because it was so consolidated in one place, with the laser it had and its optics, it had the capability to really see someplace far out ahead put a laser spot on it and hit it. The F-18, it was incredible, day or night, those guys were in there doing whatever was needed. Everybody wondered before the war, hey these guys think they're fighter guys -- are they going to do the ground attack mission. Their purpose in life was to come up and support us and they did a great job. I got the added "benne" [benefit] after the battle, I went down and debriefed at Bahrain. Those guys were fired up, they were pleased. They did a good job and they knew it, and they wanted to talk to a customer.

59:28 [Why do you think the Iraqis attacked Khafji?] There's only one place on the entire border, on the eastern side of the country there, that's a point on the map. And that only place is Khafji. So Saddam could have gone anywhere in the desert, I mean he went out to the elbow, but the elbow doesn't exist, it is sort of a vague line in the sand, but Khafji is a city, it's a city that could make it on CNN. As long as he was there he had a piece of Saudi Arabia, and I think he came down to get a piece of Saudi Arabia. He wanted to say, hey king you better think about this before you do it because you're going to pay some price.

00:07 [How did the Iraqis react to the presence of air power?] The first day, it seemed like they were willing to go "toe to toe." They were willing to fight, although they very quickly started stopping. I don't think they realized that one of the best ways to fight air is to keep moving and make it a harder targeting solution. So they would stop their vehicles and they would fire, and there was a mis-impression that they didn't shoot back -

- which they were fighting back -- they weren't particularly good shots, thank god, but they were fighting back. When air came, they seemed to think that the more rounds they put out in the more directions the better. So it was almost like they were firing a 360 degree dome around them to put something in the way of the air. They didn't seem to want to do revenge kills, to shoot at retreating air -- which later in the ground war that's the only way they shot at air was revenge kills, they tried to shoot as you were going away. But coming they'd shoot at you so there was no hesitation there. But there was definitely, they were stopping them. By the second day they were not only stopping them -- they were getting out of an armored vehicle and running. That doesn't make a whole lot of sense when people are putting bombs and 20 mm, 30 mm, 25 mm, it's a bad thing to do.

01:45 [Did they react any differently during the ground war?] Sure, during the ground war, at that point it seemed that it had sunk into them that it was a losing proposition. I think when they came into Khafji they still thought that they that they could win something. I don't know that they thought that they could win the war, but maybe some kind of armistice or something. In the ground war, like I was saying, when the air came, they hunkered down. When they would shoot at the air they, and I mean these are people with lots of shoulder fired missiles, they would not shoot at the air that was coming at them. When the air was leaving, and in most cases the reason the missiles were ineffective they would wait too long after the air left, guy would be two miles away and they'd pull the trigger on the missile, and you're not going to catch-up. so it was really a revenge kill thing. As we talked to them, and we didn't talk to them very much as far as the American to the Iraqi, although we were around the Saudis sometimes as they talked to them, although there was an understood privacy that the Arabs would speak with the Arabs. They kept repeating a phrase which the Saudis roughly translated as, "No more air, no more air." When they saw the air they would hunker down by the vehicles, they would try to get under something. Even though they were our prisoners, they were still frightened by the sound of the tac air coming by them. The other thing they were saying, and at first the Saudis weren't translating it right, but it finally got across as, "No more big guns." The battleships scared the hell out of them. Unfortunately, during Khafji we didn't have the battleship up. Because at that point, the battleships weren't afraid of mines, but they had made a decision that they didn't want them into the mines that might be out there. Now if a battleship hits a mine, they might have to repaint that section because it won't hurt it, but they didn't let them come up at that point. After Khafji, from then until the ground offensive, the battleship came up just off the coast of Khafji, mines be dammed, and they fired naval gunfire into the whole sphere that they could influence - - which, up to 30 miles with those things. And that just scared the hell out of the Iraqis. As the Saudis asked why, I mean it was pretty apparent, we were right there in the city adjacent, there is a sonic boom as the round comes out of the turret, and that keeps going as long as the round keeps going. You're firing a 2000 pound plus projectile. The shockwaves, the first time it fired, the Saudis thought we were getting shot at, because it shook the whole building and everything. Then we convinced them that no it was going the other way, and that was a good thing. That just scared the Iraqis. I think they took out such large numbers with these huge projectiles of high explosive, they were definitely beat. The Iraqis in Khafji looked better than we did. I hadn't had a shower in a couple of

months at that point. These guys were well groomed. They had clean uniforms. They were freshly shaved. By the end of the battle they weren't taking care of themselves as at the beginning, but the first guys that we got, and by the ground war, they didn't look that good. It wasn't that they necessarily looked hungry or they that looked thirsty or tired. They just looked kind of stressed out. It looked like you were going, kind of just like college campus right after finals, everybody, there was no relief from it, and the kind of dark circles and just sort of a general irritability that it's probably explained by how much, it was constant for them -- there was always air up there doing something to them. [5:51] These guys, they surrender to UAVs, they surrendered to Cobras. A couple of my friends [Cobra aircrewmembers] rolled into the ground war, as they went across, about 500 Iraqis came out arms up surrendering to them. It's like, "What do we do?" So they radioed back to the next unit back and said, "Hey, there's 500 of these guys with their hands up surrendering here."

[6:30] The effects of air power were certainly, I think, what turned the tide initially. The Iraqis had the upper hand without it; with it, it took a little bit to adjust -- to get all of the air in the right place at the right time -- and as soon as we did, it was an overwhelming force. We couldn't have retaken the city without the ground forces, because you can't physically occupy it without them, but what gave those ground forces the absolute confidence to go in and do their job was the air, and it gave them that warm fuzzy that -- they were literally convinced that because we could bring them air we could do anything. By the end of the battle, the Saudis who didn't think that there would be a war -- there were many a night over a cup of tea in the tent and that discussion was that it would never go to war -- after the battle they basically said, "Hey it's over, we beat them, we bad, we bad, we won." Prior to the battle they were kind of just average guys getting tired of living in the desert. After it, they were walking tall, feeling good. When it came to the ground offensive, they weren't quite sure why we were going to do that. When the plan came out and it was time to go, we went. Again, they went a little slower probably than most of the forces, because they were confident that the air could do most of it for them and they'd mop it up, and everything would be O.K. when we got to Kuwait City. When we got into Kuwait City, we ran into several stiff pockets of resistance. We fought it sometimes with air, sometimes with artillery, a couple times with naval gunfire, but generally, they were right it got us up there and into Kuwait City. There was real concern as we rolled into the ground war that they wouldn't have enough air for the coalition. The feeling was that air would go to the Marines and to the Army, and how much air are we [Saudis] going to get, because they wanted to see specifically on an ATO that this is our piece of the air. That's not the way the ATO ran. The ATO ran another sortie every seven and a half minutes, and it was hard to get the concept across to them that, that's enough. If something is happening we can grab those guys and they will support us. They weren't at all confident. Finally we actually dedicated some sorties to them, which we didn't need and we kept pushing them off, because we had our two-seat F-18s, the "Ds," up kind of quarterbacking everything up front and we had some AV-8s that would literally come in to check with us and some F-18s, but mostly AV-8s. They'd check in and we would have to check them forward because usually we didn't have any business for them. The Cobras, because it was such a good close-in weapon, the Cobras stayed out with the First and Second Marine Divisions. So during the ground war our primary

support was the AV-8, and when we needed it, it was there.

9:30 [Could you comment on the fog of war and how it effected the battle at Khafji?] I think the fog of war is usually the mis-communication, it's not knowing where the other guy is. Wondering if one of your other teams is out there when something is happening. In the case, at least initially I think, when it should have really hit us and it didn't, because we were spread out enough that you weren't worried about where the other guy was at. It was more, "Am I running all the procedures right? Am I getting all the right people?" As it first started I was back at brigade headquarters, and I was making the decision who got the next sortie that came up. It was kind of that feeling like, "Hope I'm sending it to the right guys that need it right now, because if I don't." Of course it always worked -- three teams up there, you send it to the wrong team, the team that needs it, gets it. The fog of war was heaviest, I think, in trying to coordinate so many different units. It was almost I was stepped back to a higher level of command than I would normally be used to. That was the thing that was the frustration, is breaking the inertia. I wanted to be an action guy and sometimes I was a planning guy instead. It was strictly communication, getting across what you needed, when you needed it, where you needed it.

ACRONYMS

AAA Anti-Aircraft Artillery
ABCCC AirBorne Command, Control and Communications
ADA Air Defense Artillery
AF Air Force
AFB Air Force Base
AFSAA Air Force Studies and Analyses Agency
AF/XOM Director of Modeling, Simulation and Analysis
ANGLICO Air Naval Gunfire Liaison Company Officer
AO Area of Operations
APC Armored Personnel Carrier
ARCENT ARmy CENTral (command)
ATACM Army Tactical AttaCk Missile
ATO Air Tasking Order
AWACS Airborne Warning and Control System
BDA Bomb (sometimes Battle) Damage Assessment
BMP [infantry combat, or fighting, vehicle]
BRDM[amphibious combat vehicle]
C³I Command, Control, Communications and Intelligence
CAS Close Air Support
CAX Combined Arms Exercise (USMC)
CENTAF CENTral Air Force
CENTCOM CENTral COMand
CIA Central Intelligence Agency
CINC Chief IN Charge
CNN Cable News Network
CSAF Chief of Staff of the Air Force
DIA Defense Intelligence Agency
DIS Distributed Interactive Simulation
DSC Direct Support Center
ECM Electronic Counter Measures
EPW Enemy Prisoner of War
EW Electronic Warfare
EWO Electronic Warfare Officer
FAC Forward Air Controller
FG Fighter Group
FLIR Forward Looking InfraRed
FSCL Fire Support Coordination Line
GAO Government Accounting Office
GBU Guided Bomb Unit
GLO Ground Liaison Officer
GPS Global Positioning Satellite
HARM High Speed Anti-Radiation Missile
HE High Explosives

HEI High Explosive Incendiary
HMLA Marine Light Attack Helicopter Squadron
HMMWV High-Mobility Multipurpose Wheeled Vehicle
HUD Heads Up Display
IAF Israeli Air Force
IMINT Image Intelligence
INS Inertial Navigation System
IDF Israeli Defense Force
IP Initial Point
IR InfraRed
JSTARS Joint Surveillance Target Attack Radar System
KKMC King Khaled Military City
KTO Kuwaiti Theater of Operations
LAI Light Armored Infantry (USMC)
LANTIRN Low Altitude Navigation and Targeting InfraRed for Night
LAV Light Armored Vehicles
MANPAD MAN Portable Air Defense
MARCENT MARine CENTral (command)
mm millimeter
MODA [Saudi Arabian] Ministry of Defense and Aviation
NATO North Atlantic Treaty Organization
NKPA North Korean Peoples Army
NVA North Vietnamese Army
OP Observation Post
RAF Royal Air Force
RCS Radar Cross-Section
RTB Return To Base
SALT Supporting Arms Liaison Team
SAM Surface-to-Air Missile
SANG Saudi Arabian National Guard
SEAD Suppression of Enemy Air Defenses
SEALS Sea-Air-Land team (US Navy)
SIGINT SIGnals INTelligence
SOF Special Operations Forces
SOW Special Operations Wing
SRIG Surveillance, Reconnaissance, Intelligence Groups
SWEG Simulated Warfare Environment Generator
TACAN Tactical Air Navigation [navigation equipment]
TACC Tactical Air Control Center
TAF Tactical Air Force
TIBS Tactical Information Broadcast System
TLAM Tomahawk Land Attack Missile
TOW Tube launched-Optically tracked-Wire guided anti tank missile
TRADOC US Army TRaining and DOctrine Command
UAE United Arab Emirates
UAV Unmanned Aerial Vehicle

UN United Nations
US United States
USA United States Army
USAAF United States Army Air Forces
USAF United States Air Force
USMC United States Marine Corps
USN United States Navy
WOC Wing Operations Center
WW I World War I
WW II World War II
ZSU Former Soviet Union self-propelled ant-aircraft gun

BATTLE OF AL KHAFJI(U)

This brings us to the all important battle of Al Khafji. During our research to tell the story of the war as it happened, we were presented with a significant number of problems, one being the amount of data available on the Battle of Al Khafji. (bla bla bla)

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