STRATEGY RESEARCH PROJECT

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AN ANALYSIS OF THE UNITED STATES-LED COALITION AIR CAMPAIGN CONDUCTED DURING THE 1991 WAR WITH IRAQ: DESERT STORM

BY

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ABSTRACT

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Evaluation of the 1991 United States-led coalition Persian Gulf War (DESERT STORM) Air Campaign is performed to measure its adherence to basic principles of war and to determine the potential implications for the future conduct of war. The paper describes the air campaign strategies and processes while analyzing the military strategy of the campaign. The evaluation demonstrates how technological advantage (and the overwhelming strength of a more than 30-nation military coalition) combined with strong adherence to basic principles of war will lead to quick and decisive military victories.

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PREFACE

I wanted to do this paper because I am an airman who was sent to the desert in August of 1990 to support our Nation's objectives and I wanted to know more about what was going on than what I saw first-hand. I wanted to be able to step back and reflect on the events of that year and put the professional military education I have received to use in viewing what actually happened. This will enable me to better understand the political and military implications of what happened and draw conclusions about some of the potential impacts for the future.

This paper evaluates the 1991 United States (US)-led coalition DESERT STORM Air Campaign. The paper begins by describing the geopolitical landscape (i.e., a short background on why and in what environment DESERT STORM occurred). The paper briefly describes political and military leadership and overall military doctrine valid at the time (focusing on air power). The paper also addresses how various factors influenced the development of the air campaign strategy and thus why the strategy was adopted to achieve desired objectives. The analysis shows why political and military leaders settled on the strategy they did and why it was the best way to obtain the desired end-state. The paper provides a clear, complete and concise description of the air campaign--the air campaign plan, air campaign dates, air campaign phases, specific forces and specific target sets--to demonstrate that there was consistency up and down the objective hierarchy.

Analysis of the overall success of the campaign strategy provides the foundation for the strategic and doctrinal implications identified in the conclusion of the paper. By showing how the air campaign contributed to overarching political and military objectives, the paper predicts the campaign fought in the desert landscape of the Middle East during DESERT STORM is but a precursor of a new way of American warfare. The norm of future warfare is likely to depend more heavily on high-technology systems and stand-off, precision guided munitions (PGMs). In addition, ground forces will only be used to "seal a deal" near a conflict's conclusion since the Nation is unlikely to "slug it out" with an opponent. Finally, the increased reliance on PGMs to bring about desired strategic effects adds concern about air power expectations, lowers the threshold on the use of military force and promises progress in the assimilation of air power into the legal norms and moral principles of Just War.

I would like to sincerely thank Dr. Martin Cook, US Army War College for his consistent support and encouragement as research advisor and friend in the development of this paper. His probing questions, guidance and expertise were invaluable in the formulation of my ideas, scaling of research and timely completion of the paper.

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AIR POWER THEORY

Since man first took to flight almost 100 years ago, a handful of visionary officers in Britain, Germany, Italy, Japan, Russia, and the US grappled with the theory of air power's applications. One of the most famous was an Italian, General Guilo Douhet, who proposed the first great "philosophy:" Bomber and attack aircraft will reach far into an enemy's rear to attack its factories, railroads, roads, bridges, etc.[1] It was Douhet's view that air power alone (without armies and navies) could bring victory in war. In other words, if one smashed enough things, he would bring his enemy to a point where he will lay down his arms and "wave the white flag."

Douhet may have been overly optimistic but he has not been alone in his beliefs. Many airmen such as Marshal of the Royal Air Force (RAF) Hugh Trenchard, and US theorists Brigadier General "Billy" Mitchell and Colonel John Warden have followed in his footsteps and professed what many would call extremist views of what air power can accomplish. Conversely, many land warriors still insist the proper role of air power remains in support of surface operations. Surely the truth lies somewhere in the middle and depends on the given situation. In most cases, air power can now do the bulk of the work required to achieve military objectives while enabling other force elements to achieve their goals with minimum loss of life.

Air power advocates agree on the vulnerability of an enemy's economy, its infrastructure and even its fielded forces in the face of relentless aerial bombardment. What has been less clear is air power's effect on civilian morale and political will. Air power enthusiasts focus on the vulnerabilities needed to break the enemy's will. However, their fixation on a particular target set (i.e., population, leadership, etc.) only dilutes the real essence of what air power can now accomplish. With precision and stealth technologies, air power can now seize prompt control of the air and then proceed systematically to destroy, or at the very least neutralize, an enemy's diverse sources of military strength. This enables one's own forces to perform any remaining tasks.[2] There is still no guarantee that an opponent will yield to airmen smashing things and no longer believe the objective is worth the price being paid. And, there is also no guarantee an opponent will yield when his personal survival is threatened. However, air power can certainly affect both and pave the way for "boots on the ground" (as retired General Colin Powell often puts it) who can then take up residency to consummate the deal to ensure the peace endures.

Air power's new found prominence and success on the battlefield raises many interesting questions about its proper application.[3] A specific example where an air campaign played a key

and vital role in the successful accomplishment of the military campaign (if not the national objectives) will now be reviewed. Air power did not win the victory alone in DESERT STORM but it surely paved the way for what can only be considered a convincing military rout in the form of a 100-hour ground offensive.

AIR CAMPAIGN PLANNING

Successful air campaign planning requires the planner understand the combat environment, determine the air objectives and formulate an air strategy to achieve those objectives. One must understand both friendly and enemy centers of gravity (COGs), and then be able to put these elements all together into a comprehensive air campaign plan. This DESERT STORM Air Campaign analysis will demonstrate the consistency of the strategy and processes used with basic military principles. The analysis of the military strategy will also provide a basis on which to evaluate how well that military strategy achieved national objectives. However, before diving into the campaign analysis itself, one must first put things in their proper perspective and understand the strategic environment in which the events occurred.

EVENTS DRIVING US INVOLVEMENT

The Middle East has long been an unstable region frequently rocked by violence and unrest. With its vast oil resources and strategic location, the Middle East became a continuing concern of the US during the Cold War and continues to be to this day. Consequently, the US frequently exercises its national elements of power in the area and, on at least two occasions prior to 1990, intervened militarily.[4] Appendix A chronicles some of the key events leading to US involvement in August 1990.

On 2 Aug 1990, only three years after fighting with Iran at the cost of 120,000 Iraqi casualties and an expenditure of $112 billion, Iraq's military invaded Kuwait. Iraq had a one million-man army, 5,500 tanks, and 500 military aircraft, compared to Kuwait's army of 20,300, 275 tanks, and 36 warplanes. Within five hours, Iraqi forces captured Kuwait's capital city, Kuwait City; they completed the occupation of the entire country within 12 hours.[5] After completing its invasion of Kuwait, Iraq began massing troops along Kuwait's border with Saudi Arabia. Iraq now threatened to dominate most of the world's oil reserves and much of world oil production, giving it the ability to disrupt the world oil supply and hence the economies of advanced industrial nations, including the US. Iraq's presence on the Kuwait-Saudi border put the world's largest concentration of known oil reserves within their reach--especially alarming in view of Iraq's threatening gestures toward Saudi Arabia.[6]

From the very beginning, senior leaders recognized US air power would be key to the successful accomplishment of US, and United Nation (UN) political and military objectives. It would enable the Coalition to deploy forces and subsequently cripple Iraqi military capabilities while paving the way for Baghdad's eventual battlefield defeat.[7]

DECISION TO GO TO WAR

The President, in consultation with his Secretary of Defense (SECDEF), Chairman of the Joint Chiefs of Staff (CJCS), and Commander in Chief (CINC) of the US Central Command (USCENTCOM), decided the vital interests of the US were at stake and that military force should be put into Saudi Arabia to preserve them.[8] The next day the SECDEF, accompanied by the CINC and Commander of US Central Command Air Forces (CENTAF), traveled to Saudi Arabia to meet with King Fahd and persuade him to allow the US to use Saudi Arabia as a base for military operations to counter any Iraqi advance. The President then ordered troops to the Gulf and announced to the Nation that he had deployed US forces to Saudi Arabia to protect that nation from a possible attack by Iraq.[9]

POLITICAL LEADERSHIP

President George Herbert Walker Bush's ability to rally world support is widely regarded as a direct result of the President's emphasis on personal diplomacy.[10] A veteran of World War II (WWII), his management style with regard to the military should serve as a role model for future Presidents. He was clearly in charge but refused to interfere in purely military affairs. His orders were limited to broader stated objectives. He trusted his senior political and military advisors and leaders to provide the right advice and make the right decisions to achieve those objectives.[11]

The President clearly stated national strategic objectives, purposes and limitations in his instructions to the National Command Authority (NCA).[12] The guidance, summarized from the Presidential Directive 54 in Appendix B, directed the military to defend Saudi Arabia and other Gulf states against from any further attacks, preclude Iraqi launch of ballistic missiles against neighboring states and friendly forces, destroy Iraq's nuclear, biological and chemical (NBC) capabilities, destroy Iraq's command, control and communications (C3) capabilities, eliminate the Republican Guard as an effective fighting force and conduct operations designed to drive Iraq's forces from Kuwait. Additional direction provided by the President's directive included gaining maximum participation from coalition partners, encouraging Iraq's neighbors Syria and Turkey to increase forces along their borders with Iraq to draw off Iraqi forces elsewhere in

Kuwait and Iraq, discouraging Israeli participation in any military action, discouraging Jordanian participation in hostilities and maintaining current recognized Iraqi borders. Failure in deterrence of Iraqi use of NBC weapons, terrorism or even destruction of Kuwait's oil fields would result in the added objective of replacing Iraq's leadership.

SECDEF Richard B. Cheney was well respected by his former colleagues in Congress.[13] He ran the Pentagon in a no-nonsense way and canceled several major weapons programs due to cost overruns and mismanagement. He kept in daily contact with the President to report on the status of DESERT STORM activities but, like the President, he did not interfere with military operations.

Secretary of State James Addison Baker III, a trusted friend of the President, was called on often not only for his international expertise but for his own personal feelings on the Gulf crises.[14] He received "high marks" by most world leaders while he served as point man for diplomatic efforts in bringing the UN to support the US position and actions.

MILITARY LEADERSHIP

General Colin L. Powell (CJCS) performed admirably and had considerable leeway to formulate a plan and execute the strategy military professionals believed would accomplish the mission as set forth by the President.[15] His strategic insights and exceptional leadership brought the right military mix together to accomplish the President's objectives.

General H. Norman Schwarzkopf (CINC) was well liked by his troops and the American public and was ideally suited for his role as the Joint Force Commander (JFC) of allied forces.[16] He is considered by many as not only essential to winning the war, but in maintaining the diverse multinational Coalition. He knew Middle Eastern culture, and had spent time in Southwest Asia (Iran) as a child, studied Arab history and the tactics of desert conflict.

As JFC, General Schwarzkopf and his staff translated the mission given to the military by the NCA into an executable campaign plan. The DESERT STORM campaign plan would include four distinctive phases also shown in Appendix B. The first priority (i.e., phase one) was given to gaining command of the air, and was called "Instant Thunder." Planning included a second phase, dedicated to exploiting air supremacy and suppression of air defenses over Kuwait, a third phase devoted to battlefield preparation and attrition of enemy forces by fifty percent, and a fourth phase devoted to ground offensive support and attack that dealt with Iraqi forces in the Kuwait Theater of Operations (KTO).

Of course, there is typically an existing operations plan (OPLAN) and/or operations order (OPORD) providing detailed guidance to all friendly forces as a result of the deliberate or crisis

action planning process. However, there was no OPLAN or OPORD completely capturing the DESERT STORM Campaign Plan since the situation envisioned in OPLAN 1002-90 anticipated 30 days of advanced warning prior to any invasion of Saudi Arabia.[17] Planners took what they could from the existing OPLAN and adjusted it to meet the contingency at hand. Culmination of military actions would occur with the eviction of Iraqi forces from Kuwait by force.

CENTAF/CC, Lieutenant General Charles A. Horner, the 9th Air Force/CC as the Joint Force Air Component Commander (JFACC) and senior Air Force officer in theater, orchestrated the Coalition's massive, well-planned air campaign.[18] As commander of CENTCOM's air forces, he led the staff that would plan and execute the Coalition's air campaign. He translated national military objectives and JFC campaign plan strategies into broad air campaign strategic objectives that were the foundation of the Master Air Attack Plan (MAAP) and joint Air Tasking Order (ATO). The MAAP includes JFACC guidance and other key information elements needed to build the ATO and is sometimes called an air employment plan. The ATO built by air planners is the final product in the planning process and specifies objectives, aircraft sortie allocation, priority and selection.

General Horner's strategic objectives for air planners building the ATO for DESERT STORM were simply stated (detailed in Appendix B). He identified his strategic objectives, giving first priority to gaining control of the air. Destruction of Iraq's other war fighting capabilities came in close behind. The JFACC's MAAP was geared toward achieving guidance provided by the President and JFC.

Brigadier General Buster C. Glosson (CENTAF Director of Campaign Plans) was in charge of the "Black Hole." The "Black Hole" was the area of the CENTAF headquarters where he and his staff of air planners detailed the offensive air campaign to achieve CINC and JFACC military objectives and contributed significantly to achieving the national objectives provided by the President.[19] General Glosson and his staff created daily ATOs that masterfully scheduled available resources against twelve target sets to achieve desired effects and objectives. The air campaign target sets used by air planners in the "Black Hole" during the ATO planning process of the DESERT STORM Air Campaign[20] included command and control, infrastructure, weapons of mass destruction (WMD) and military forces (see Appendix C for details).

Key to the DESERT STORM Air Campaign strategy was the need to minimize casualties and damage, both to Coalition forces and to Iraqi civilians. The JFACC provided such targeting policy and guidance while aircrews made every effort to minimize civilian casualties and collateral damage. Therefore, only PGMs were used to destroy key targets in downtown Baghdad. In addition, planners were aware that each bomb carried a potential moral and

political impact. They scrupulously avoided damage to mosques, religious shrines, and archaeological sites, as well as civilian facilities. Planners developed a joint no-fire target list from a compilation of historical, archaeological, economic, religious and politically sensitive installations in Iraq and Kuwait. Planners also identified areas requiring special care near schools, hospitals and mosques.

No review of political and military leaders involved in the planning of the DESERT STORM Air Campaign would be complete without mentioning Colonel John A. Warden III, a fighter pilot and leading Air Force intellectual on the use of air power.[21] In 1988, then a student at the National War College, Colonel Warden produced a thesis (later published as a book *The Air Campaign*) that would play a vital role in the thinking, planning and execution of the air campaign in the Gulf War. Dissenting from the traditional Air Force approach of simply racking up targets, Colonel Warden encouraged air campaign planners to view the enemy as a system. He makes the point that we need to "begin thinking like architects not just bricklayers." His "Five Ring" strategic targeting model depicts leadership as the ultimate COG; it provides direction to all the other power elements of a state. It is the strategically led state that makes it greater than the sum of its individual parts. Though technically alive without leadership, a state cannot effectively work without its control and direction. Once eliminated (or neutralized), the other elements of the state cannot resist in a coherent way and will either concede or be totally destroyed piece by piece.

Under Colonel Warden's construct, fielded forces on the outer ring of his "Five Ring" model would be last to get attention by air planners. Though the DESERT STORM Air Campaign would strike simultaneously across all five rings except the population ring (due to Just War considerations), Colonel Warden's primary focus would be squarely centered on the leadership ring. As with many other air power theorists, he believed air power would directly influence the outcome of a conflict by attacking the heart of the enemy nation: the will of its political leadership.

Colonel Warden's Air Staff planning group (known as CHECKMATE) devised the initial air campaign plan from the Pentagon. His "Five Ring" strategic targeting model was the very bedrock of the methodology used in designing the air campaign plan.[22] Even though the DESERT STORM plan would undergo numerous modifications and there would be much debate over specific target lists, Colonel Warden's original concept remained the very heart of "Instant Thunder" (or Phase 1) of the DESERT STORM Air Campaign.

PREVAILING DOCTRINE

It is clear from the discussion so far that the formulation of the DESERT STORM Air Campaign Plan is congruent from top to bottom with the President's national objectives, the CINC's theater campaign plan and Joint/Organizational doctrine. The national military objectives, as outlined by the President, were passed to the CINC. The JFC's broad guidance provided the basis for JFACC campaign planning.[23] The JFACC's strategic guidance then provided the basis for air campaign planners in the "Black Hole" who then executed the guidance in the form of the ATO. This entire sequence of events is a great example of adherence to current doctrine and the air power tenet of centralized control and decentralized execution.

DESERT STORM also provides an excellent example of the "indivisible use" of air power along with other forms of military power. Since Iraq's strength lay in its massive ground forces, armor and artillery that were well dug in, Coalition campaign planners devised a plan that would sap Iraq's ability and will to resist. The air campaign would blind Iraq and attrit its forces in the field. Further, it would render its command and control relatively ineffective, destroy war production capability and deny vital supplies from reaching the troops. While accomplishing these goals, it would also provide protective cover of friendly forces.

This was no simple task and encompassed the full range of aerospace roles and missions.[24] Once the air campaign had had a chance to work, however, Coalition ground forces were then able to move in and "seal the deal" by ejecting a thoroughly demoralized and severely weakened enemy.

STRATEGY ANALYSIS

A campaign strategy is an outline of broad concepts designed to achieve desired strategic objectives. This section demonstrates how various factors influenced the development of the DESERT STORM Air Campaign strategy and why the resultant strategy was adopted to achieve desired military and national objectives.

THE SPARK

Iraq invaded Kuwait on 2 August 1990 and began massing troops along Kuwait's border with Saudi Arabia. Iraq threatened to dominate most of the world's oil reserves and production, giving them the ability to disrupt the world's oil supply and hence the economies of advanced industrial nations (including the US'). The US and world leaders decided Iraq's action had to be "checked" immediately. The initial US response to Iraq's aggression was largely political and

economic, but included repositioning forces to protect against further aggression and offered maximum use of aerospace power.[25]

A comparison of US, Allied and Iraqi forces engaged in DESERT STORM (pre-war totals) is made in Table 1. As the DESERT STORM Air Campaign strategy evolved, it would be designed to leverage Coalition strengths against Iraqi weaknesses.[26] Iraq's standing Army ranked fourth in the world while the US ranked seventh.[27] The JFC's theater campaign plan was designed to prepare for offensive ground operations to liberate Kuwait and was also designed to defy any future aggression (i.e., make potential aggressors think twice before launching unprovoked attacks). The strategic goal was to create a more secure environment for llcountriesin the region.[28] To achieve this objective, the air campaign would have to reduce Iraq's offensive military capability (especially its NBC capability) while soundly thwarting a very aggressive and ambitious dictator.

	United States	Allies	Iraq
Troops Army Marines Air Force Navy	500,000 245,000 75,000 45,000 60,000	205,000	545,000
Tanks	1,200	1,285	4,200
APCs	2,700	1,350	2,800
Helicopters	1,700	160	160
Artillery	3,000	442	3,100
Aircraft	1,800	343	550

TABLE 1 – US, ALLIED AND IRAQI FORCES

MILITARY STRATEGY AND NATIONAL POLITICAL OBJECTIVES

National political objectives were clearly defined and simply stated by the President. The military then crafted a detailed strategy that would achieve those objectives. The DESERT STORM military strategy encompassed a four-phased offensive campaign plan. Air campaign objectives were consistent with, and integral to, each of the four phases. The first three phases of the air campaign were designed to reduce Iraq's military forces to half their original fighting effectiveness before launching the fourth and final phase, support to the ground campaign liberating Kuwait.[29]

LIMITS OF MILITARY POWER

There are limitations (political and technical) to what aerospace power can accomplish even when the full spectrum of its capabilities. Political limitations can be seen in the target restrictions placed on aircrews by the President, the JFC and the JFACC. In addition, DESERT STORM also presented airmen with aerospace technical limitations:

Destruction of Mobile Targets

In order to keep Israel out of the war, campaign planners were forced to divert one third of the more than two thousand combat and support missions scheduled each day from strategic targets to "Scud Hunting." [30] The problem was that by the time a Scud launch was detected, its coordinates relayed to pilots, and pilots got to their targets, the targets were gone because a mobile launcher could drive away within six minutes after launching.

Battlefield Preparation

Phase III of the air campaign plan (e.g., designed to reduce Iraq's Army to fifty percent of its pre-war strength while preparing for offensive ground operations) was largely successful.[31] However, it was also designed to support breaching operations by destroying artillery, damaging obstacles and pinning down front-line troops) in Iraq's defenses.[32] Despite extensive bombing to reduce minefields and obstacles, bombing efforts were not always effective. Advancing units had to use their own equipment to breach enemy land mines and other obstacles meant to impede them.[33]

Damage Assessment

Bomb Damage Assessment (BDA) problems date back to at least WWII. Intelligence experts, conservative by nature, do not want to say something is destroyed if it is not. It is reasonable to expect when there is nothing but rubble that the target is destroyed. However, when only one wall is knocked down, or worse yet, when PGMs are used leaving little or no evidence of external damage the problem is much more difficult. [34] Throughout the campaign, pilots claimed "the target is destroyed" while intelligence experts said "no it's not." ATO planners were forced to schedule "unnecessary" revisits wasting sorties and putting pilots in danger again.

Other Limitations

There are many other limitations that air campaign planners dealt with. Tactical reconnaissance and imagery (to determine intentions of enemy forces) improved dramatically with JSTARS, AWACS and other reconnaissance platforms. Ballistic missile defense capability (Patriot batteries) still had a few bugs and did not protect friendly forces to the level hoped for.[35] Navigation and identification capabilities improved with the fielding of Global Positioning Systems (GPS)[36] but there were still cases of friendly fire.[37] The Coalition lacked PGM-capable aircraft, which sometimes required delaying attacks or multiple sorties to get the same effects

that a single timely PGM strike could have achieved. Most Coalition aircraft types were not PGM-capable.

Table 2 depicts selected munitions employed most often in the KTO during DESERT STORM (17 Jan – 28 Feb 1991). Other types of laser-guided bombs and air-to-surface missiles were used in the war, but not, principally, in the KTO. Totals given are those employed on all targets, however, not just those in the KTO. Also, the Navy and Marine Corps fired a total of 283 BGM-71 TOW munitions from helicopters. The main points here are that the majority of bombs dropped during DESERT STORM were "dumb" and, that the USAF had the preponderance of PGM-capable aircraft.

Munitions	USAF	USN	USMC	Total
General-Purpose Bombs				
Mk-82 (500 lb)	59,884	10,941	6,828	77,653
Mk-83 (1,000 lb)		10,125	8,893	19,081
Mk-84 (2,000 lb)	10,467	971	751	12,289
Mk-117 (B-52)	43,435			43,435
CBU-52 (fragmentation)	17,831			17,831
CBU-87 (combined effects)	10,035			10,035
CBU-89/78 (Gator)	1,105	148	61	1,314
Mk-20 (Rockeye)	5,345	6,814	15,828	27,987
Laser-Guided Bombs				
GBU-12 (laser/Mk-82)	4,086	205	202	4,493
Air-to-Surface Missiles				
*AGM-114 Hellfire (AH-64 and AH-1W)	Army=2,876	30	159	3,065
AGM-65 All Models (Maverick)	5,255		41	5,296

TABLE 2. SELECTED MUNITIONS EMPLOYED DURING DESERT STORM

ALTERNATIVES

There are almost always alternatives to a given course of action. However, alternatives should be politically, economically and technically feasible to be considered plausible. From the alternatives discussed below, it sure seems obvious that the air campaign decided on was the best possible choice to achieve the political goals of responding to the Iraqi invasion of Kuwait. Alternatives and objections to them included:

Continue with Economic Sanctions/Diplomatic Actions

The world would have given more time to Iraq. Iraq's plundering of Kuwait would have left very little to liberate.[38] The Coalition was at optimum strength. Delays might have seen the

Coalition unravel. Iraq would have had more time to prepare its defenses, draw Israel into the conflict and even further its NBC capabilities.

Demand Unconditional Surrender

Complete destruction of the Iraqi regime would leave a void in the region that would have invited possible Iranian attacks on Iraq. In addition, it would have been far more costly (both politically and economically). If the US had bombed Baghdad to force complete capitulation, the Coalition would undoubtedly have unraveled and the campaign would lack international legitimacy - not to mention that occupying forces are responsible (under international law) for all costs of maintaining and restoring the government.[39]

Focus on a Single Ring

Either extreme (e.g., Leadership or Military Forces) could have been an option. Strategic bomber advocates would have loved to prove their theories (e.g., air power bringing an enemy to its knees without the need for offensive ground operations). However, had the JFACC focused more air power to either extreme, the overall effect would have been diluted. Fortunately, there were enough forces to strike simultaneously across the full spectrum of targets (e.g., each of the "Five Rings").

Nuke'em?!

Though relatively cheap and technically possible, this alternative cannot likely be considered politically feasible unless, of course, the US had first been provoked by Iraq's use of NBC weapons.

Do Nothing

The world would have let Iraq keep Kuwait and the spoils of its aggression. Iraq would be postured for future military ventures in the Gulf and would likely become the dominant voice in the region. It would have succeeded in gaining control of the majority of the world's oil supply.

STRENGTH OF THE HOME FRONT

Strength of the home front has been proven to be an important aspect of any long-term military success. There are actually two ingredients to consider when looking at the strength of the home front during DESERT STORM: the "global village" and the US home front:

"Global Village"

Rarely has the world community come so close to speaking with a single voice of condemnation of an act of aggression. However, the Coalition was a fragile entity - allies were reluctant only when they doubted American resolve.[40]

US Home Front

American public opinion polls in 1990/91 indicated wide spread support for the President and his policy. News coverage during DESERT STORM did show occasional protests around the country. But as time went on, the numbers of protesters and opinion poll numbers were far different than those experienced during Vietnam: most rallied solidly behind the strategy. The anti-war groups effectively fell silent and was unable to offer another solution to the crises.[41]

SIMILARITIES BETWEEN PAST AND PRESENT

This war, like almost every other, is unique in many ways. The US learned many valuable lessons about the effective use of air power over the last 50 years. However, it was the US' experience in Vietnam that had the most profound effect on planning for the DESERT STORM Air Campaign.[42] Compounding that experience were some well-known failures in the 1980's that combined to shape how air power would be used in the 1990's.[43] It should be noted however, the DESERT STORM Air Campaign strategy also benefited from some unique qualities that may not be repeated again in the future:

Build-Up Period

Coalition forces benefited greatly from the long time interval it had in which to deploy and prepare its forces. There were no submarine or open-water surface threats, which allowed for the fastest possible deployment of forces and supplies. Friendly forces received ample support from their host nations, providing them with the ability to rely on well-developed coastal infrastructures and airports.[44] These conditions combined to provide the time required to mass the stockpiles of weapons needed to prosecute the war as planned. In addition, many in the Coalition used similar platforms/weapon systems, minimizing maintenance and logistic requirements.

Unique Desert Environment

In addition to Iraq's near total international political isolation, their forces were fielded in terrain that was largely uninhabited and ideally suited for armor and air power.[45] Enemy forces could relatively easily be identified, tracked and then destroyed.

Timing

DESERT STORM occurred at a unique moment in time when the US still retained forces and bases of the Cold War build up. Deployments and operations benefited significantly from this worldwide system of bases and resources.[46] Deploying forces would have required greater flying distances and development of support structures in-theater had these forward bases and resources not been in place.

Space Assets

Coalition planners were the first in history to make comprehensive use of space-based systems. DESERT STORM planners and operators had access to Weather, Multi-Spectral Imagery, GPS, Early Warning, Broadcast and Communications satellites. There was no interference with these space-based systems,[47] which allowed Coalition forces to control the "high ground."

In the future, the US needs to refine its planning methods to adapt to unforeseen contingencies as quickly and as effectively as possible. Future enemies are unlikely to repeat the same mistakes Iraq made during DESERT STORM.

AIR CAMPAIGN EXECUTION

AIR CAMPAIGN PLAN

The air campaign was designed to maximize Coalition strengths while taking advantage of Iraqi weaknesses. Campaign planners intended to quickly seize air superiority and paralyze Iraq's Command and Control (C2) infrastructure by striking their most critical COGs.[48]

PHASES AND DATES

Planners realized from the very beginning that the phases were not necessarily discrete or sequential. They could overlap as resources became available or as priorities shifted. The highest initial priority (and one that would remain throughout the conflict) was air supremacy. Coalition airmen would first degrade Iraq's air defenses, thus making their air forces ineffective. Once air supremacy was achieved, Coalition forces could provide continuous air attacks with non-stealth aircraft and cruise missiles.

The strategic air campaign (Phase I) of DESERT STORM attacked Iraq's crucial COGs: NCA, NBC capability and the Republican Guard. It called for near-simultaneous attacks against all twelve interrelated target sets in order to disrupt Iraqi C2, encourage a loss of confidence in the Iraqi government and significantly degrade Iraqi military capabilities. Phase II focused on suppressing and/or eliminating Iraq's ground-based air defenses in the KTO. Phase III began to

shape the battlefield by directly attacking Iraq's fielded ground forces in the KTO (focusing again on its premier Republican Guard). These three phases constitute what is known as the DESERT STORM Air Campaign. Phase IV maintains control of the aerospace environment with the primary focus of supporting the ground campaign in the liberation of Kuwait.[49]

Figure 1 depicts the four-phased offensive campaign plan. Air planners' first priority was gaining command of the air to enable freedom of action in accomplishing their objectives. Planning for the second, third and fourth phases of the plan focused on Iraqi forces in the KTO. With good weather, planners estimated eighteen days to complete Phases I-III. The strategic air campaign (Phase I) about six days, with a lower level of effort toward strategic targets continuing throughout the war. Air Superiority over the KTO (Phase II) was achieved in about a day and, like Phase I, it would be an on-going effort. Battlefield interdiction/preparation (Phase III) was designed to reduce Iraqi combat effectiveness in the KTO by half and was expected to take between 10 to 12 days.[50]

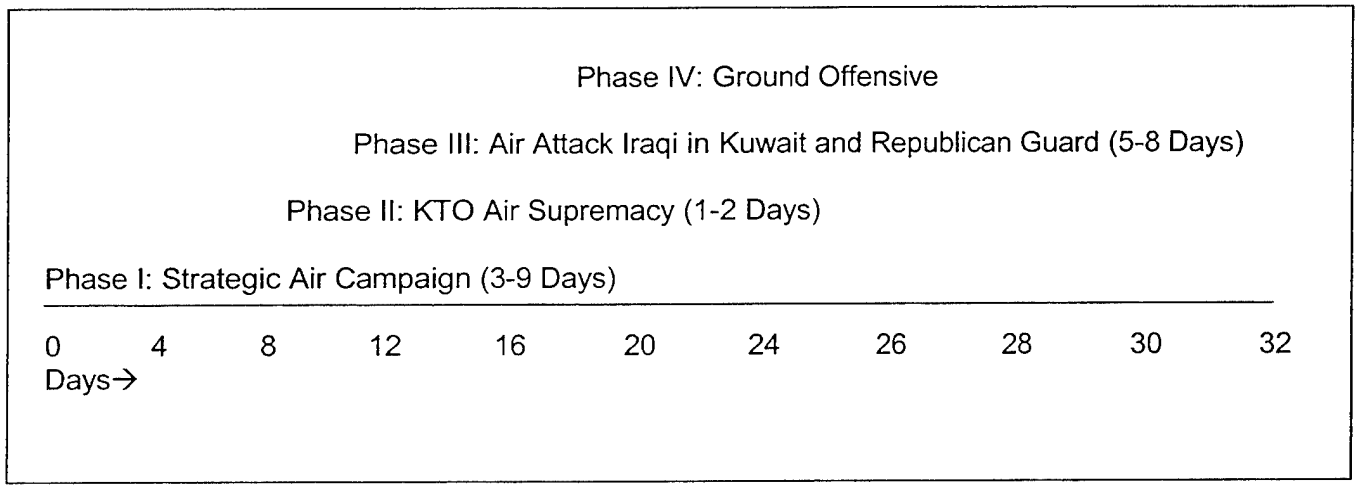

FIGURE 1 – JFC'S FOUR-PHASED CAMPAIGN PLAN (EXPECTED DURATION)

Figure 2 depicts initial combat air attacks. The first irretrievable hostile fire in DESERT STORM began at 0130 on 17 January 1991, when US warships launched Tomahawk Land Attack Missiles (TLAMs) toward Baghdad.[51] At 0238, while the TLAMs were still on their way, Army Apache helicopters attacked early warning radar sites in southern Iraq. Stealth fighters had already passed over these sites enroute to their targets in western Iraq and Baghdad. The helicopters, F-117As, cruise missiles, F-15E Eagle fighters and GR-1 Tornado fighter-bombers created gaps in Iraq's radar coverage and C2 network for other non-stealth aircraft to pass through.

The first night's attacks clearly illustrate the manner in which the Coalition would fight the war. It would be a combined, well-orchestrated campaign thanks to the JFACC and the ATO.

FORCES

Forces and power arrayed against Iraq were unmatched since D-Day during WWII.[52]

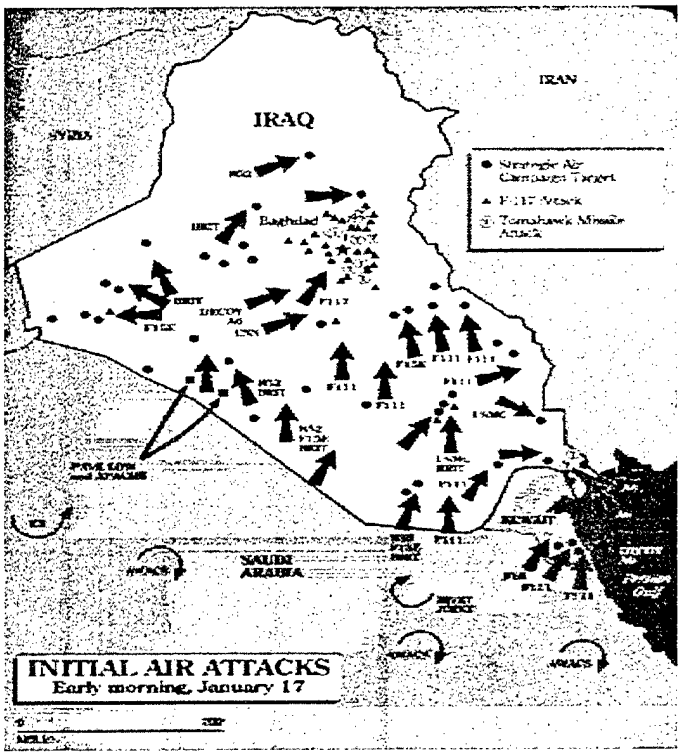

FIGURE 2 - INITIAL AIR STRIKES

There were 2,430 fixed-wing aircraft in theater at the beginning of DESERT STORM. The number grew by another 350 thirty-eight days later when phase IV began. Appendix D lists the sorties flown by all Coalition aircraft by aircraft type.[53] Approximately 60 percent of all aircraft were shooters.[54]

Therefore, it makes sense that the largest air power mission in terms of numbers of sorties flown and of aircraft involved was that of surface target attack. Table 3 lists DESERT STORM attack aircraft (numbers are approximate and include only those aircraft flying at least 100 sorties). Numbers of aircraft varied during the war due to attrition, replacement and routine movements and include attack aircraft based out of the theater (i.e., Incirlik, Moron, Fairford and Diego Garcia).[55]

Organization	Type	Number
USAF	A-10	132
	B-52	66
	F-15E	48
	F-16	244
	F-111E	18
	F-111F	64
	F-117	42
USN	A-6	95
	A-7	24
	F/A-18	89

USMC	A-6	20
	AV-8B	86
	F/A-18A/C/D	84
	AH-1W	50
USA	AH-64	274
USSOCCENT	AC-130	4
Saudi Arabia	Tornado	24
	F-5	87
UK	Tornado	39
	Jaguar	12
	Buccaneer	12
Kuwait	A-4	20
	F-1	15
France	Jaguar	24
Bahrain	F-5	12
Italy	Tornado	10

TABLE 3. DESERT STORM ATTACK AIRCRAFT

Assets involved in the task of surface attack included many types of aircraft and several very different weapon systems. Table 4 lists the missiles employed in DESERT STORM air strikes. ATACMS are included as air strikes simply because its range (over 50 miles) sets it apart from other rocket systems and naval gunfire.[56]

Organization	Type	Number Launched
USN	Tactical Land Attack Missile (TLAM)	282 (last one launched on 1 Feb)
USA	Army Tactical Missile System (ATACMS)	21 missions (some missions had two missiles employed)
USAF	Conventional Air-Launched Cruise Missile (CALCM)	35 (all launched the first day of the air war)

TABLE 4. MISSILES EMPLOYED IN DESERT STORM

Aircraft were bedded down throughout Saudi Arabia and other Gulf States in the region. They were initially placed where they could most easily be received. Subsequent relocations were based on each aircraft's role. In addition, there were six carrier air wings in the Gulf region, along with other Navy and USMC air assets in theater supporting the Coalition. Unique aircraft such as tankers and reconnaissance planes and some specialized combat aircraft (e.g.,

F-117As, EF-111s, and F-111s) were based away from the front line where there was increased security. Air superiority fighters (i.e., F-15Cs) and air-to-ground aircraft (i.e., F-15Es) were based relatively close to the front line where they could maximize combat air patrol (CAP) missions over Iraq.[57] Battlefield attack assets (i.e., A-10s) were based close to the KTO to allow rapid reaction to battlefield events.

It is important to note is the Total Force commitment demonstrated during DESERT STORM. Over forty percent of the USAF's fighter force was made up of Reserve (AFRES) and Guard (ANG) units.[58] AFRES and ANG provided the bulk of the deterrent reserve for Korea, and virtually all air defense of the US, while the active force deployed to Iraq. In addition, a large percentage of the USAF's transporters were comprised of AFRES/ANG crews and aircraft.

TARGETS

The DESERT STORM MAAP consisted of the twelve target sets previously discussed. However, creating each day's ATO was much more complex than just dealing with the target sets individually. Planners first assessed progress toward each of the five military objectives, and how well desired levels of damage/disruption within each target set were being accomplished.[59] Target sets were interrelated and were not targeted individually. Key nodes (COGs) were targeted and destroyed so that the targeted system would suffer cascading, and potentially fatal failures. Planners first had to synthesize available BDA, CINC guidance, weather, target set priorities, any new targets, intelligence and the air campaign objectives. Available aircraft, special operations forces (SOF) and other assets were then assigned based on their ability and the most effective means to create the desired results. Figure 3 depicts the

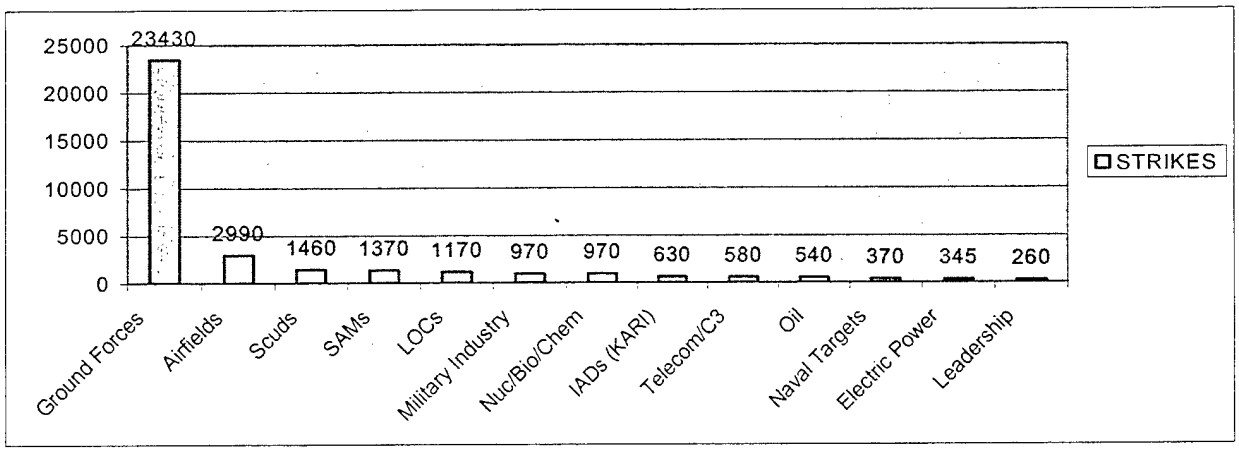

FIGURE 3 - COALITION AIR STRIKES BY TARGET CATEGORY

number of strikes to the target sets identified in the MAAP. By far the greatest weight of the Coalition air effort in the war flew either directly against Iraqi ground forces in the KTO or

against the supply lines to those forces. Iraqi ground forces absorbed the preponderance of the attack sorties of the war and an even larger proportion of bomb tonnage.[60]

RESULTS

The DESERT STORM Air Campaign may well be an example of a new American way of waging war. Rather than going "toe-to-toe" with Iraq in a bloody "slugfest" on the ground, Coalition forces safely prepared for that engagement while air power reduced Iraq's fighting effectiveness. As ground forces deployed and readied themselves, the Coalition conducted a concentrated 43-day air campaign that blinded Iraq's "eyes," attrited its fielded forces and rendered its C2 relatively ineffective. Further, the air campaign destroyed Iraq's war production capability and denied vital supplies from its troops. Once Iraqi defenses were cleared, DESERT STORM air strikes attacked the entire range of target sets nearly simultaneously to produce visible pressure and destructive effects on Iraq's COGs. Iraq was unable to coordinate an effective response to these air attacks nor to the military operations that would soon follow. Air power set the stage and helped offensive ground operations exploit a much-weakened enemy. In the end, the air campaign sapped Iraq's will to resist before the ground offensive even started. The result was a 100-hour ground offensive concluding the Gulf War with negligible casualties--an apparent rout!

AIR CAMPAIGN EVALUATION

Success in warfare requires the proper application of both the art and science of war. The science of war is in constant flux as new technology radically changes the nature of war and is constantly being developed to produce Military Technical Revolutions (MTRs). However, the art of war, which evaluates the proper application of military power, remains a constant. The MTR may be the catalyst needed to uncover new ways of exploiting technological advantage, provide new ways to streamline organizational structures, or just add new capabilities. However, the art of war encompasses the basic principles of warfare proven on battlefields of the past and provides military professionals with an operational framework within which they can analyze strategic and tactical issues. The principles will now be used to evaluate the DESERT STORM Air Campaign strategy that not only defeated Iraqi forces, but their strategy as well.

OBJECTIVE

The US and its Coalition partners had well-developed objectives and resisted any urge to allow "mission creep" (i.e., invade Iraq). The President established national objectives from which a military campaign was designed. An air strategy was then derived to mesh with those

goals and the overall military campaign. Air campaign planners then developed the MAAP and an ATO that would achieve each of the military objectives. Its architects clearly understood the combat environment, their air objectives and the air strategy, the COGs (friend and foe) and how to put a sound plan together. Therefore, sorties were directed toward clearly defined, decisive, and attainable objectives during each phase of the air campaign. Aerospace forces were able to pursue tactical, operational and strategic objectives simultaneously.

The US national interest was predominately that of securing its national economy by reducing the threat of Iraqi domination over the world's oil reserves/production. The successful vilification of Saddam rallied the home front to stop Hussein[61] (i.e., comparisons to Adolf Hitler, numerous reports of babies being thrown out of orphanages and their incubators being brought back to Baghdad, rapes and mutilation of Kuwaiti civilians, etc.). However, this vilification became a double-edged sword when it came time to end the war. Many felt the Coalition had not yet reached their objective of removing Saddam's regime when in fact the true objective of liberating Kuwait never changed. There would have been real problems for the Coalition if the objectives of the war were changed without some additional provocation.

OFFENSIVE

Coalition efforts were directed at a clearly defined common goal--ejecting Iraqi forces from Kuwait. Unlike Iraq's defensive posture once forces were entrenched in Kuwait, Coalition forces seized, retained and exploited the initiative by systematically dismantling Iraq's offensive capabilities. Iraq's defensive strategy left the timing and location of air strikes to the Coalition who then executed four offensive phases to achieve its objectives. By leaving the offensive to the allies, Iraq allowed the Coalition to mass its forces when and where they were needed to attain their objectives and gave them the time to do so. The air campaign was executed with precision against all facets of Iraq's power. PGMs, unrelenting and persistent bombing and night attack were key aspects of the Coalition's success. By day two of the air campaign, control of the aerospace environment was clearly established.

MASS

Colonel Warden states: "The operational commander's duty is to ensure that he masses superior forces at a particular time and place . . . In fact, it is the essence of generalship."[62] However, it should be noted that the timing was such that the US still had the forces of the Cold War available.[63] In November of 1990, the President doubled the size of the forces in-theater to provide an overwhelming offensive capability. Examination of Table 4 demonstrates Coalition air planners had superior numbers and were able to concentrate superior combat power at

particular places and times to ensure objectives would be met. With overwhelming offensive capability and left with the offensive, coalition air planners were able to mass their forces when and where they needed them to attain their objectives.

In addition, it is important to note that PGMs and stealth technology have redefined the concept of mass. In WWII it took 4,500 B-17 Flying Fortress sorties and about 9,000 bombs to destroy a target like a building. In DESERT STORM, one F-117A stealth fighter equipped with a PGM could now perform the same mission.

MANEUVER

DESERT STORM placed the enemy in a position of disadvantage by leveraging one of the key tenets of aerospace power: flexible application of combat power. Between 17 January and 24 February 1991, while Iraqi forces were digging in, nearly 100,000 sorties were flown using this highly mobile air power capability. Iraq placed division after division along the Saudi border, reminiscent of World War I (WWI) trench warfare.[64] Air planners were then able to preposition their forces for the offensive without triggering suspicion because Iraq had grown accustomed to such high levels of air activity. Coalition forces then attacked at the time and place of their choosing and, by exploiting airpower's highly mobile capability, they were also able to attack from the direction of their choosing. Iraqi forces did not know when, where or how the next attack would come. Air power would destroy large amounts of equipment Iraqi forces needed to resist the coming ground attack but, by the time the ground offensive came, the confidence of the Iraqi soldier that the equipment would do them any good was gone. The speed of Coalition aerospace forces in simultaneously employing mass and maneuver into the initial air phases created a tremendous synergy against Iraqi surface forces. Aerospace assets then assisted ground forces with the well-known "left hook" enabling armored and mechanized formations around the flank and to the rear of the Republican Guard, completing their collapse.

SECURITY

Planning by the "Black Hole" and the staffers at CHECKMATE in the Pentagon was accomplished in such secrecy that most of CENTAF Headquarters were denied information on the plan until only a few hours prior to execution. In addition, the Coalition's air supremacy contributed directly to the success of ground commanders by allowing VII Corps and XVIII Airborne Corps freedom of movement such as the shift hundreds of kilometers to the West without detection to perform their "left hook."

Operational security was excellent despite the tremendous real-time news coverage by the media and the breadth of participation by Coalition nations. There were a few breaches of

security (including the Chief of Staff of the United States Air Force (General Michael J. Dugan) referencing the targeting of Saddam, and the British General who had his laptop stolen with the ATO on it!). However, security surrounding DESERT STORM was exceptional. It allowed Coalition forces to operate with impunity and kept the elements of surprise and offensive solidly on the side of the allies.

With its rapid battlefield movements, DESERT STORM highlighted the need to improve capabilities for identification and security of friendly forces. It also identified the absolute necessity of suppression of enemy air defenses and timely use of electronic combat.

SURPRISE

During DESERT SHIELD, the Coalition conditioned the Iraqis to accept a certain amount of air activity as "normal," allowing the air campaign to be launched without alerting them that the attack was imminent.[65] By flying hundreds of training sorties the Iraqi air defenses were desensitized to flight operations near their borders and their guard was down on the first night of DESERT STORM when hundreds of aircraft took to the air. Aircraft prepositioning[66] as part of final preparations were masked. The published reason given for the new positions was as a precaution against preemptive Iraqi strikes. The true reason was to permit mission planning, crew rest and aircraft reconfiguration without revealing the Coalition's true intent.

Stealth technology paid huge dividends during DESERT STORM. Executing a MAAP that strikes at the heart of an enemy's governmental and C2 infrastructure at night with PGMs kept Coalition forces on the initiative and showed that surprise is aerospace power's strongest advantage. In addition, space-based early warning and surveillance systems prevented the enemy from achieving surprise.

UNITY OF COMMAND

General Schwartzkopf led all Coalition forces. Even though parallel international commands were necessary due to cultural differences (one for Western forces and one for Arab-Islamic forces), General Schwartzkopf's skill as a commander and deftness in managing relations with various forces/nations ensured a cohesive fighting force.[67] By appointing a JFACC, General Schwartzkopf achieved unity of effort in all theater air operations. The JFACC arrangement under General Horner worked well as he led CENTAF air forces and had control of aircraft flying in the theater through the ATO.

Joint and Coalition presence in the Tactical Air Control Center (TACC), the air operations command center, ensured intelligence access and coordination was maintained. Building an effective communications system to include Airborne Warning and Control System (AWACS)

datalink was critical to maintaining unity of command. Placing all air forces under the command of the JFACC was successful application of US military doctrine.

ECONOMY OF FORCE

Even though the US committed an overwhelming force to DESERT STORM, it retained sufficient capability to respond to the Korean peninsula or elsewhere, if needed. The US also had to provide resources to "Scud Hunt" to keep Israel out of the war even though it was little more than a "show of effort." Their ability to hide within minutes of launching made the Scuds difficult targets to locate and destroy. Coalition air planners maintained superior numbers and were able to concentrate superior combat power at particular places and times to ensure objectives could be met. Planners had enough forces to attack across all "Five Rings" of Iraq's infrastructure simultaneously while adhering to basic aerospace doctrine and were still able to waste a little on a wild "Scud Hunt." It should also be noted that air planners went to great lengths to avoid hurting the population ring.

SIMPLICITY

There is nothing simple about coordinating attacks from several thousand aircraft a day. Many planners worked together to build a single ATO. The ATO was the daily schedule that provided a single script controlling all aircraft that wanted to fly in the theater.[68] Of course, building the ATO was no simple task in itself. It required support from CHECKMATE planners back in the Pentagon and a staff of some 15-20 people in the "Black Hole."[69] With clear strategic, operational and tactical air objectives, progress toward their attainment was measurable.

Command and Control elements such as the TACC, EC-130, ABCCC, AWACS, and E-2Cs functioned more effectively and efficiently because the ATO provided a single attack script. Again, the ATO reflects the USAF's philosophy and practice for attack planning and allowed for orderly management of the large number of aircraft already described.[70]

SUMMARY AND STRATEGIC/DOCTRINAL IMPLICATIONS

A DESERT STORM Air Campaign case study is used to demonstrate that the air campaign strategy followed the processes necessary to create a successful military strategy. Evaluation of the air campaign also documented the campaign's adherence to basic principles of war. The analysis and evaluation reveal that air planners followed available doctrine and accepted practices in the art and science of campaign planning. The air campaign imposed strategic paralysis on Iraq with over 10,000 sorties and more than 20,000 tons of bombs during

the strategic attack and, during the entire air campaign, Coalition aircraft flew 109,976 sorties, dropped 88,500 tons of bombs and shot down 35 enemy aircraft.[71] By the end of the air campaign, Iraq had completely lost its capability to maintain forces in Kuwait, conduct offensive operations anywhere, restore its prewar strategic position and standard of living for its people, defend itself against Coalition attacks, communicate effectively internally or externally, move significant military units internally or prevent multiple uprisings in long quiescent areas.[72] America's technological advantages, combined with the overwhelming strength of its more than 30-nation military Coalition and strong adherence to basic principles of war, led to a resounding military victory over Iraq.

Decisive Presidential leadership set clear national political objectives. He gave others confidence in America's sense of purpose, and rallied both domestic and international support to reach those objectives.[73] The military crafted a strategy that would meet the objectives and encompassed a four-phased offensive campaign to do it. Air campaign objectives were consistent with and integral to each phase of the military strategy. The first three were designed to reduce Iraqi forces to half their fighting effectiveness before launching the fourth phase (the ground campaign) liberating Kuwait.[74] Therefore, the air campaign plan was closely linked to both political and military objectives. The five air campaign objectives were derived from the President's national objectives and the CINC's military objectives. A planning model, developed by CHECKMATE, was used for planning the strategic air campaign. It looked at COGs and then derived target sets that would achieve desired results. Degrading one target set often had a "cascading effect" (i.e., achieved more than one objective). Therefore, bombs-on-target had a direct link back to national military objectives and often satisfied more than one objective.

IMPLICATIONS FOR THE FUTURE

Future planners must remember that this war benefited from some unique features: a long time interval to prepare for offensive operations, a unique/ideal desert environment, ample host nation support, and an enemy that was suffering from near-total international isolation. To be successful in the future, planners need to plan for less than ideal circumstances. The US continues to research technical solutions to the circumstances it cannot count on (i.e., weather, technical superiority, etc.). However, the implications on the future conduct of warfare as a result of the DESERT STORM Air Campaign should not be ignored.

Doctrinal

Coalition forces faced a sophisticated, battle-proven air threat. However, the Coalition launched DESERT STORM with the distinct advantage (thanks to the 1986 Goldwater-Nichols

Military Reform Act) of unity of command for all air operations and a clear strategy to deny sanctuary to the enemy.[75] Unity of command for air operations led to a coordinated offense and defense that included assets from all components and Coalition members (unlike experience in WWII). The success of the DESERT STORM Air Campaign undoubtedly strengthened joint and coalition doctrine and the role of the JFACC.

Strategic bombing advocates will undoubtedly point to 21 February 1991 when, just days before the ground offensive was to start, Iraq accepted a Soviet plan for a "full and unconditional withdrawal" from Kuwait[76] as proof of their success. Iraq, although not militarily defeated on the battlefield, conceded to one of the Coalition's main demands. However, this was more likely due to the crippling effects air power was having on Iraq as a state, its infrastructure and perhaps more importantly its fielded forces. The US was not satisfied with Iraq's concession since it was not truly an "unconditional" withdrawal and had strings attached (mainly the linkage of ending UN economic sanctions). The US responded with an ultimatum: Iraq must withdraw from Kuwait in seven days and from Kuwait City in two while announcing "publicly and authoritatively" that it planned to do so by 23 February. The US established a deadline for withdrawal that would force Iraq to abandon its heavy conventional forces and would have forced Iraqi leadership to admit defeat publicly--something they were not eager/ready to do.

Few, if any, present day air power enthusiasts would ever advocate the indiscriminant destruction of civilian targets to inflict pain and suffering on a nation's population in hopes of raising them up against the enemy government as Douhet had professed. Not only have legal norms and moral principles come down solidly on the side of protecting "innocents," but DESERT STORM clearly demonstrates that air power in modern warfare now affords attainment of strategic objectives without doing so. Though there is ample historical evidence indicating that bombing the "population-ring" has done little to break civilian morale and may have actually stiffened it. Advocates still argue that given the right circumstances, it could work.

The DESERT STORM Air Campaign erased any line that existed between strategic and tactical air operations. Previously, most air campaigns could largely be categorized as either strategic (going after targets such as factories, power plants and seats of government) to break the enemy's will, or tactical (directly supporting troops on the ground) to destroy their power projection capability. DESERT STORM did both. Technological advantage now enables the USAF to strike with impunity, great accuracy and minimal collateral damage across the full spectrum of target sets.

Technology

Airmen, with the addition of PGM and stealth technology in their tool bags, can lay claim to dramatic accomplishments achieved during DESERT STORM but only dreamed of previously. A vast array of high-technology US systems gave Coalition forces a devastating advantage during DESERT STORM. F-117s, TLAMs and CALCMs delivered conventional warheads with great precision and were unchecked by Iraq's defenses. AWACS monitored Iraqi and Coalition flight activity and JSTARS monitored and targeted Iraqi ground forces. In addition, satellites and airborne platforms provided communications, precise navigation and reconnaissance information to Coalition air and ground forces.[77]

During DESERT STORM, the USAF made the greatest use of PGMs (both missiles and bombs). The USAF flew sixty percent of the attack missions while dropping ninety percent of the PGMs.[78] This is partially explained by the USAF's heavy bombardment of Iraqi aircraft shelters and Iraqi armor in the KTO requiring greater precision. Table 5 depicts DESERT STORM weapons expenditures (and percent of total US expenditure). The USN and USMC used fewer PGMs due to shortages of these weapons in their respective stocks. In addition, the PGM supply was being husbanded for possible use during the ground offensive. As it turned out, PGM employment during the ground war by all fixed-wing aircraft was far less than expected due to weather and the tactical conditions.[79]

Munition Types	Guided Bombs	Anti-Radiation Missiles	Air-to-Surface Missiles
USAF	8,456 (90%)	1,120 (55%)	5,255 (96%)
USN	623 (7%)	679 (33%)	147 (3%)
USMC	263 (3%)	240 (12%)	46 (1%)
Totals	9,342 (100%)	2,039 (100%)	5,448 (100%)
UK	1,126	112	N/A
France	N/A	N/A	60
Grand Totals	10,468 (89% US)	2,151 (95% US)	5,508 (99% US)

TABLE 5. WEAPONS EXPENDITURES (PERCENT OF TOTAL US EXPENDITURE)

USAF success with high-technology weaponry did not go unnoticed by senior leaders, other services or US allies. Future air campaigns would see a proliferation of these weapons (e.g., Balkans and Southwest Asia would see much higher proportions of PGM usage). Admiral James O. Ellis, USN (Commander, Allied Forces Southern Europe during Operation ALLIED FORCE (OAF)) noted after OAF that it was the most precise and lowest collateral damage air campaign in military history. Of the more than 9,400 designated target aim points, over 70 percent would be struck by PGMs with only 20 of the 23,000 weapons going astray.[80] Clearly, the trend is toward increasing use (and greater accuracy) of high-technology weapons.

Force Structure

As technology improves across the services, it is only natural that areas of overlapping capabilities would again spur the debate over service roles and missions (e.g., force structure). Rivalry between the services actually increased as a result of DESERT STORM Air Campaign success.[81] Renewed claims of what air power did/did not accomplish while adding new technologies (e.g., capabilities) to the services only fueled the debate further. No matter how the debate on roles and missions shakes out, the services need to become more "joint." Under the pressure of continued integration of systems and capabilities, traditional service lines are breaking down.[82] Capabilities of all forces (i.e., air, sea, land and space) must be integrated to maximize efficiency and effectiveness while ensuring safety for friendly forces.

Because DESERT STORM air planners had ample resources, they were able to strike at all five rings (minus that of population) simultaneously. The campaign created a paralysis of Iraq's tightly controlled, centralized government making them incapable of seizing the initiative once attacks began. The overwhelming strength of the Coalition enabled it to strike across the spectrum of strategic and tactical targets. However, both strategic air power and theater air power advocates wrongly estimated the potential for forcing Iraq to leave Kuwait.[83] Though the air campaign plan was sound, premature shifting of sorties from strategic bombing to battlefield preparation[84] may have precluded the campaign from fully realizing its full potential (e.g., the complete destruction of Iraq's strategic targets--specifically, NBC weapons). Of course it is doubtful this objective was truly attainable from the air with the limited intelligence available to planners at the time. More than ten years after DESERT STORM, the US and UN intelligence communities are still searching for NBC weapons and production facilities in Iraq.

Ironically, technology brought about a coalescence of the most basic of Army and Air Force objectives. While the air campaign was designed against Iraq's COGs to destroy its ability and will to continue fighting, the Army always set its aim on defeating enemy armies.[85] Attacking Iraq's leadership, population or even infrastructure may have caused Iraq to succumb to Coalition wishes. But destroying Iraq's instruments of power, first and foremost its military, ensured Iraq could not resist when the Coalition chose to strike. By shifting sorties to Iraq's fielded armies and destroying them, Iraqi forces were forced to abandon Kuwait and were unable to prevent the Coalition from reaching their objectives within 100 hours of launching the ground offensive.

CONDUCT OF WARFARE

The DESERT STORM Air Campaign raises many questions centered on air power expectations, lowering the threshold on the use of military force and promising progress in the assimilation of air power into the legal norms and moral principles of Just War.[86]

Many air power theorists worry about the expectations PGMs bring to modern warfare. With target information and precision, airmen require fewer bombs to hit their targets and lower the destruction on civilian life (i.e., during DESERT STORM, it took, on average, 10 bombs to hit a target--far fewer than any previous war). The point of war is to achieve ones' objective, not to have a fireworks display or completely destroy ones' enemy. However, there will almost always be errors, collateral damage and loss of life while conducting warfare. Precision assists military leaders at every level in the discrimination of combatants (*jus in bello* dimension of just war theory) but it is still up to strategic leaders who must weigh potential alternatives, risks and even consequences prior to launching air strikes.

It seems clear from experience over the last ten years that air power's new technologies (i.e., stealth, precision and stand-off) have dramatically lowered the threshold for using military force to achieve national objectives. Therefore, the *jus ad bellum* dimension of just war theory is increasingly a consideration for strategic leaders and should be balanced against alternatives and the risks previously indicated. In addition, some will argue that precision warfare makes warfare far too antiseptic and lowers the threshold on using military force to achieve objectives. They suggest we are losing the sense of struggle and sacrifice that is necessary to wars' pursuit. Surely, if the US can achieve its objectives without placing too many of its own soldiers in harm's way, it would be crazy to do anything else.

Experience from DESERT STORM suggests the prophecies of early air power theorists and visionaries might finally be possible. However, the very success of the DESERT STORM Air Campaign only sets the stage for continued debate on the proper application of air power under international law and the law of nations regarding just conduct in war.[87] In the future, air power is more likely to be limited not by its capabilities, but by the limitations placed on it under the laws of armed conflict.

WORD COUNT = 10,226

APPENDIX A - CHRONOLOGY OF EVENTS LEADING TO DESERT STORM

Date	Event
1968	Baath party coup. Ahmad Hassan al-Bakr installs Saddam Hussein as his chief deputy.
1977	Sheikh Jaber Al-Ahmand Al-Jaber Al Sabah, becomes Amir of Kuwait.
1979	Saddam Hussein succeeds Bakr as president of Iraq.
22 Sep 1980	Iraq invades Iran starting an eight-year war.
7 Jun 1981	Israel launches air attack against Iraqi nuclear facilities.
14 Jun 1982	King Fahd assumes power in Saudi Arabia following the death of King Khalid.
April 1984	Attacks begin on tankers in the Persian Gulf.
17 May 1987	Iraq attacks U.S.S. Stark, killing 37 US sailors.
1988	Hussein orders use of chemical weapons on Kurds.
August 1988	Iran-Iraq war ends.
July 1990	INTERNAL LOOK--war game exercise showing Saudi Arabia could be defended against Iraqi invaders but at a terrible cost (scenario was very similar to the "real-world" events that were unfolding).
17 Jul 1990	Hussein accuses Kuwait of conspiring with US to lower world oil prices (weakening Iraq) by overproduction and theft from Rumaila oil field. He warns that he might have to take direct action.
25 Jul 1990	US Ambassador to Iraq, April Glaspie, tells Hussein Iraqi/Kuwaiti dispute is an Arab matter, not one that affects the US.
29 Jul 1990	US CIA warns White House "Iraqi attack on Kuwait is imminent."
2 Aug 1990	100,000 Iraqi troops invade Kuwait. President Bush freezes Iraqi and Kuwaiti assets. UN calls on Hussein to withdraw immediately.
3 Aug 1990	UN Resolution condemns Iraq invasion and demands immediate and unconditional withdrawal of Iraqi forces.
4 Aug 1990	Bush decides US should put military forces in Saudi Arabia as a warning to Hussein not to invade.
5 Aug 1990	Bush declares the invasion of Kuwait "will not stand."
6 Aug 1990	Saddam announces annexation of Kuwait. Saudi Arabia's King Fahd meets with US SECDEF, Richard Cheney--requests US military assistance. UN Security Council imposes economic sanctions against Iraq and Kuwait.
7 Aug 1990	SECDEF Cheney visits Saudi Arabia; US military assistance requested. 82nd Airborne dispatched, along with several fighter squadrons--Operation DESERT SHIELD begins. Bush declares "a line has been drawn in the sand."
8 Aug 1990	Initial USAF fighter defense forces arrive in Saudi Arabia. Iraq announces annexation of Kuwait.
9 Aug 1990	UN declares Iraq's annexation of Kuwait invalid.
10 Aug 1990	Colonel John Warden first meets with General Schwarzkopf in Tampa, FL to outline proposed air campaign (INSTANT THUNDER).
17 Aug 1990	LG Charles Horner (JFACC) assigned BG Buster Glosson as USAF Central Command (CENTAF) director of campaign plans and directs him to develop a detailed offensive operational air campaign.
22 Aug 1990	President Bush signs authorization for call up of the Reserves.
17 Sep 1990	General Michael Dugan (CSAF) relieved of duties for comments made to the media.
18 Sep 1990	General Schwarzkopf asks four Army planners to begin planning for ground offensive.

31 Oct 1990	President Bush decides to double US forces in Saudi Arabia--kept secret until 8 Nov.
29 Nov 1990	UN Security Council authorizes use of "all means necessary" to eject Iraq from Kuwait after 15 Jan 1991 if Iraq does not withdraw.
20 Dec 1990	Four-phased, 32-day air campaign with 178 strategic targets unveiled by BG Glosson. First time in history of airpower that CINC's ground scheme depends on AF attrition of a significant portion of enemy ground forces.
17 Jan 1991	Operation DESERT SHIELD becomes Operation DESERT STORM.

APPENDIX B – COMPILATION OF GUIDANCE

	President's Direction to NCA and Military
	Purpose
1.	Effect immediate, complete and unconditional withdrawal of all Iraqi forces from Kuwait
2.	Restore Kuwait's legitimate government
3.	Protect the lives of American citizens abroad
4.	Promote the security and the stability of the Persian Gulf
	Objectives
1.	Defend Saudi Arabia and other Gulf Cooperation Council states against attack
2.	Preclude Iraqi launch of ballistic missiles against neighboring states and friendly forces
3.	Destroy Iraq's chemical, biological, and nuclear capabilities
4.	Destroy Iraq's command, control, and communications capabilities
5.	Eliminate the Republican Guards as an effective fighting force
6.	Conduct operations designed to drive Iraq's forces from Kuwait, break the will of Iraqi forces, discourage Iraqi use of chemical, biological or nuclear weapons, encourage defection of Iraqi forces, and weaken Iraqi popular support for the current government
	Limitations
1.	Minimize US and coalition casualties
2.	Reduce collateral damage incident to military attacks, taking special precautions to minimize civilian casualties and damage to non-military economic infrastructure, energy-related facilities, and religious sites

	JFC's Four-Phased Campaign Plan
Phase	Objectives
1.	Instant Thunder (Offensive Air Campaign)--first priority was gaining command of the air
2.	Suppression of air defenses over Kuwait--second, third and fourth phases dealt with Iraqi forces in the KTO while maintaining air supremacy and strikes at strategic COGs
3.	Attrition of enemy force by fifty percent
4.	Ground attack

	JFACC'S Strategic Objectives
	Objectives
1.	Isolate and incapacitate the Iraqi regime (Leadership command facilities, Electric facilities that power military and military-related industrial systems, Telecommunications and C3 systems)
2.	Gain and maintain air supremacy to permit unhindered air operations (Strategic IADS including radar sites, SAMS, IAD control centers, Air forces, and airfields)
3.	Destroy NBC warfare capability (Known NBC research, production, and storage facilities)
4.	Eliminate Iraq's offensive military capability by destroying major parts of key military production, infrastructure, and power production capabilities (Military production and storage sites, Scud missiles and launchers, Scud production and storage facilities, Oil refining and distribution facilities--not the long-term production capabilities, Naval forces and port facilities)
5.	Render the Iraqi army and its mechanized equipment in Kuwait ineffective, causing its collapse (Railroads and bridges connecting military forces to their support, Army units to include the Republican Guard units in the KTO)

APPENDIX C – DESERT STORM TARGET SETS

DESERT STORM Target Sets with Descriptions		
	Target Sets	Descriptions
1.	Leadership Command Facilities	There were 45 targets in Baghdad area and others throughout Iraq. Intent is to fragment/disrupt Iraqi political and military leadership by attacking the C2 of Iraq's military forces, internal security forces, and other key nodes in the government.
2.	Electricity Production Facilities	Electricity is required for the modern military/industrial power, and disruption of the electric power supply makes it unnecessary to destroy other facilities. Without power, key Iraqi facilities were disrupted, from radar sites that warned of air strikes, to refrigeration used to preserve biological weapons, to nuclear weapons production. The entire Iraqi electric grid was targeted to prevent rerouting of power around damaged nodes.
3.	Telecommunications and Command, Control and Communication Nodes	Targeting C3 was vital to interrupting Iraq's ability to issue orders, receive reports, and communicate with senior political/military leaders. This set included: microwave relay towers, telephone exchanges, switching rooms, fiber optic nodes, and bridges that carried coaxial communications cables. More than half Iraq's military landline communications passed through major switching facilities in Baghdad. These sets required constant restrikes since they could be reestablished fairly quickly.
4.	Strategic Integrated Air Defense System	Before air power could exert its full aerial bombardment potential, effectiveness of Iraq's air forces and ground-based air defenses had to be reduced. Targets included mid and upper-level air defense control centers, SAM sites, radar sites, and C3 nodes.
5.	Air Forces and Airfields	Iraq's Air Force posed a defensive threat to air operations and an offensive threat to forces in the region. Since the best way to gain air superiority is to keep the enemy on the ground, initial targeting emphasized suppression of air operations at airfields by cratering/mining runways, bombing aircraft, maintenance and storage facilities, and attacking C3 facilities.
6.	Nuclear, Biological and Chemical Weapons Research, Production, and Storage Facilities	Iraq's NBC program is a serious threat to regional stability. Throughout the planning period, and during the conflict, finding and destroying NBC weapons facilities remained a top priority while Iraq went to extraordinary efforts to hide their program.
7.	Scud Missiles, Launchers, Production and Storage Facilities	Scud missiles presented a military and psychological threat to forces, civilian populations in Israel, Saudi Arabia, and other Gulf countries, and a threat to long-term regional stability. Initial attacks concentrated on fixed sites while plans were developed for hunting/destroying mobile Scud launchers.

8.	Naval Forces and Port Facilities	Iraq's Navy had Silkworm and Exocet antiship missiles and mines which posed a threat to naval and amphibious forces, and sealift. Planners targeted Iraqi naval vessels, including captured Kuwaiti Exocet-equipped patrol boats, port facilities, and antiship missiles to prevent interference.
9.	Oil Refining and Distribution Facilities	Fuel and lubricants are the lifeblood of a modern industrial and military power. Planners targeted Iraq's ability to produce refined oil products that had immediate military use, instead of its long-term crude oil production capability.
10.	Railroads and Bridges	Iraq's forces in the KTO were almost totally dependent for logistical support on the lines of communication that crossed these bridges. Cutting the bridges prevented/reduced restocking, and prevented reinforcements once the air campaign began.
11.	Iraqi Army Units (Including Republican Guard Forces in the KTO)	Although Iraqi forces were dug into strong positions built to defend against ground attack, they were vulnerable to air attack. Planners hoped to reduce the combat effectiveness of the forces in the KTO by fifty percent before the ground offensive (especially its best units, the Republican Guard).
12.	Military Storage and Production Sites	The long-term combat effectiveness of Iraq's large military depended on its military production facilities and support from its logistical base. Planners first targeted the most threatening production facilities and stored material, then methodically proceeded with attacks on other storage/production facilities as time/assets allowed.
	Off-Limit Targets	Descriptions
1.	Civilians and Cities	Key to the DESERT STORM air campaign strategy was the need to minimize casualties and damage, both to the coalition and to Iraqi civilians. Targeting policy and aircrews made every effort to minimize civilian casualties and collateral damage. Therefore, only PGMs were used to destroy key targets in downtown Baghdad.
2.	Politically Sensitive Sites	In addition, planners were aware that each bomb carried a potential moral and political impact. They therefore scrupulously avoided damage to mosques, religious shrines, and archaeological sites, as well as civilian facilities/population. Planners developed a joint no-fire target list from a compilation of historical, archaeological, economic, religious and politically sensitive installations in Iraq and Kuwait. Planners also identified areas requiring special care near schools, hospitals, and mosques.

APPENDIX D - COALITION AIRCRAFT SORTIES

US Aircraft Sorties by Aircraft Type

Organization	Aircraft Type	Sorties Flown
USAF	A-10	8,084
USAF	B-52	1,741
USAF	C-12	8
USAF	C-130	13,971
USAF	C-141	1,766
USAF	C-21	256
USAF	C-29	20
USAF	C-5	740
USAF	C-9	64
USAF	E-3	379
USAF	E-8	42
USAF	EC-130	450
USAF	EC-135	24
USAF	EF-111	1,105
USAF	F-111E	458
USAF	F-111F	2,423
USAF	F-117	1,299
USAF	F-15C	5,685
USAF	F-15E	2,172
USAF	F-16	13,087
USAF	F-4E	4
USAF	F-4G	2,683
USAF	KC-10	1,465
USAF	KC-135	9,559
USAF	OA-10	660
USAF	EP-3	4
USAF	RC-135	197
USAF	RF-4	719
USAF	RF-4C	103
USAF	TR-1	89
USAF	U-2	149
Total		69,406
USMC	A-6	795
USMC	AV-8	3,359
USMC	C-12	9
USMC	EA-6B	504
USMC	F/A-18	4,936
USMC	KC-130	598
USMC	OV-10	482
Total		10,683

US Aircraft Sorties (continued)

Organization	Aircraft Type	Sorties Flown
USSOCCENT	AC-130	104
USSOCCENT	AH-6	3
USSOCCENT	C-130	13
USSOCCENT	CH-47	14
USSOCCENT	EC-130	155
USSOCCENT	HC-130	107
USSOCCENT	HH-3	63
USSOCCENT	HH-3E	112
USSOCCENT	HH-60	9
USSOCCENT	MC-130	84
USSOCCENT	MH-3	19
USSOCCENT	MH-47	2
USSOCCENT	MH-53	282
USSOCCENT	MH-6	1
USSOCCENT	MH-60	284
USSOCCENT	UH-60	10
Total		1,262
USN	A-6	4,824
USN	A-7	737
USN	E-2C	1,183
USN	EA-6B	1,126
USN	F-14	4,005
USN	FA-18	4,449
USN	P-3	23
USN	S-3B	1,674
USN	TLAM	282
Total		18,303
USA	C-12	183
USA	C-23	3
USA	OV-1D	161
USA	RC-12	216
USA	RU-21	242
USA	RV-1D	111
Total		916
CRAF	CRAF	800
Total		800

Allied Aircraft Sorties by Aircraft Type

Organization	Aircraft Type	Sorties Flown
Saudi Arabia	Tornado/ADV	451
Saudi Arabia	BAE-125	110
Saudi Arabia	C-130	1,606
Saudi Arabia	E-3	303
Saudi Arabia	F-15C	2,088
Saudi Arabia	F-5	1,129
Saudi Arabia	H-212	113
Saudi Arabia	Tornado/IDS	667
Saudi Arabia	KC-130	267
Saudi Arabia	RF-5	118
Total		6,852
France	C-130	271
France	C-160	582
France	F1-CR	92
France	Gabriel	4
France	Jaguar	571
France	KC-135	223
France	M-20	2
France	M2000	512
France	SA-330	1
Total		2,258
UK	BN2T	35
UK	BNIS	517
UK	Buccaneer	226
UK	C-130	832
UK	F-3	705
UK	Tornado/GR-1	1,644
UK	Jaguar	600
UK	Nimrod	147
UK	Tristar	75
UK	VC-10	359
UK	VCTR	277
Total		5,417

Allied Aircraft Sorties (continued)

Organization	Aircraft Type	Sorties Flown
Canada	B-707	163
Canada	C-130	124
Canada	CC-144	54
Canada	CF-18	961
Total		1,302
Kuwait	A-4	651
Kuwait	F-1	129
Total		780
Bahrain	F-16	166
Bahrain	F-5	122
Bahrain	H-212	5
Total		293
Italy	G-222	13
Italy	Tornado	224
Total		237
UAE	C-130	35
UAE	C-212	10
UAE	M2000	64
Total		109
Qatar	Alpha	2
Qatar	F-1	41
Total		43

ENDNOTES

[1] Colonel John A. Warden III, USAF, The Air Campaign: Planning for Combat (Washington D.C.: National Defense University Press, 1988), 16. Douhet thought wars could be won by inflicting such casualties on the civilian population that morale would break with subsequent capitulation. Historically, air theorists such as Douhet and Warden would point to the besieged cities of the middle ages as proof where besieged cities normally surrendered when the pain and suffering became too great for the civilians to bear.

[2] Benjamin S. Lambeth, The Transformation of American Air Power (Ithaca NY: Cornell University Press, 2000), 266.

[3] Martin L. Cook, Strategic Theory, Military Practice and the Laws of War: The Case of Strategic Bombing (Carlisle Barracks: U. S. Army War College, 1 October 2001), 4.

[4] Lisa Beyer, "The World Closes In," Time, 20 August 1990, 28. On 5 June 1984, Saudi Arabian jet fighters, aided by intelligence from a US AWACS electronic surveillance aircraft and fueled by a US KC-10 tanker, shot down two Iranian fighters over an area of the Persian Gulf proclaimed as a protected zone for shipping. After the Iran-Iraq War resulted in several military incidents in the Persian Gulf, the United States increased US Navy forces operating in the Gulf and adopted a policy of reflagging and escorting Kuwaiti oil tankers through the Gulf. President Reagan reported that US ships had been fired upon or struck mines or taken other military action on 23 September, 10 October, and 20 October 1987 and 19 April, 4 July, and 14July 1988. The United States gradually reduced its forces after a cease-fire between Iran and Iraq on 20 August 1988.

[5] Ibid.

[6] Dick Cheney, "Overview: The Conduct of the Persian Gulf War," The Persian Gulf War and Air Power Strategy (Air War College Nonresident Studies, Vol. I, LSN 11, 8th Ed.), 166. The US had to first convince Saudi leadership of the threat. Pictures shown to King Fahd were of Iraqi tanks on the border between Kuwait and Saudi Arabia. The disposition of the tanks actually on the border; far forward again (tanks being deployed far forward is an indication of offensive action; tanks in depth is an indication of defensive action). So we showed a picture of these tanks all strewn along the border between Kuwait and Saudi Arabia and, in fact, some of the tanks were across the border in Saudi Arabian territory. This was very significant in the King's ultimate decision to "request" US help. He was infuriated that, in fact, the sovereignty of Saudi Arabia had been violated by these tanks even though it was on a piece of sand in the middle of nowhere.

[7] Thomas A. Keaney and Eliot A. Cohen, Gulf War Air Power Survey Summary Report (Washington D.C.: U.S. Government Printing Office, 1993), 1.

[8] General H. Norman Schwarzkopf, USA, It Doesn't Take a Hero (New York NY: Bantam Books, 1992), 350.

[9] Ibid, 351. Endnote 3 describes how US leaders convinced King Fahd to "request" help.

[10] Cheney, 169.

[11] Andrew Leyden, Gulf War Debriefing Book (Portland OR, Hellgate Press, 1997), 134.

[12] President George Herbert Walker Bush, "Responding to Iraqi Aggression in the Gulf (U)," National Security Directive 54, Washington, D.C., 15 January 1991. The President provided the NCA with guidelines for the defense of US vital interests in the face of unacceptable Iraqi aggression. In the directive, the military received its objectives (mission), its purpose and its limitations from which it could establish campaign plans and rules of engagement (ROEs).

[13] Leyden, 134.

[14] Ibid, 135.

[15] Cheney, 173.

[16] Leyden, 141.

[17] Keaney and Cohen, 2.

[18] Tom Clancy, Fighter Wing (New York NY, Berkley Books, 1995), 37.

[19] Ibid, 48.

[20] Keaney and Cohen, 42.

[21] Colin Powell and Joseph E. Persico, My American Journey (New York NY, Random House, Inc., 1995), 473.

[22] Clancy, 41.

[23] United States Joint Chiefs of Staff, JCS Pub. 3-56.1, Command and Control for Joint Air Operations (Washington D.C.: U.S. Government Printing Office, 14 November 1994), 11-2.

[24] Air Force Doctrine Document (AFDD) 1, Air Force Basic Doctrine (Maxwell AFB, Alabama: Air Force Doctrine Center, 1 September 1997), 45.

[25] United States Department of the Air Force, "Global Vigilance, Reach and Power: America's Air Force Vision 2020," July 2000; available from <http://www,af,mil/vision>; Internet; accessed 14 November 2001, 6.

[26] United States General Accounting Office, Operation DESERT STORM: Evaluation of the Air Campaign (Washington D.C.: U.S. Government Printing Office, 12 June 1997), 197.

[27] Schwarzkopf, 348.

[28] Cheney, 166.

[29] United States General Accounting Office, 196.

[30] Schwarzkopf, 487.

[31] Clancy, 57.

[32] Schwarzkopf, 453.

[33] United States Department of Defense, Office of the Secretary of Defense, Conduct of the Persian Gulf War (Washington D.C.: U.S. Government Printing Office, 1992), 225.

[34] Clancy, 57.

[35] Schwarzkopf, 487.

[36] Cheney, 168.

[37] United States Department of Defense, 247.

[38] Cheney, 166.

[39] Schwarzkopf, 579.

[40] Cheney, 166.

[41] Leyden, 167.

[42] Clancy, 37.

[43] Ibid, 36. A notable air operation failure during the 1980s included the bungled Iranian hostage-rescue. It led to changes in the way air power would be used in the future. In addition, the 1986 Goldwater-Nichols Military Reform Act redefined the military chain of command and established the JFACC position.

[44] Cheney, 167.

[45] Ibid.

[46] Ibid.

[47] Ibid.

[48] United States Department of Defense, 179.

[49] Clancy, 51.

[50] United States Department of Defense, 187.

[51] Ibid, 179.

[52] Powell and Persico, 490.

[53] United States Department of Defense, 193.

[54] Ibid, 185.

[55] Keaney and Cohen, 199.

[56] Ibid, 200.

[57] United States Department of Defense, 193.

[58] Clancy, 179.

[59] United States Department of Defense, 184.

[60] Keaney and Cohen, 65.

[61] Schwarzkopf, 366.

[62] Warden, 178.

[63] Cheney, 167.

[64] Bill Adler, The Generals: The New American Heroes (New York NY, Avon Books, 1991), 211.

[65] Cheney, 174.

[66] United States Department of Defense, 192.

[67] Cheney, 174.

[68] Clancy, 50.

[69] Ibid.

[70] United States Department of Defense, 189.

[71] Peter David, Triumph in the Desert (New York NY, Random House, Inc., 1991), 25.

[72] Ibid.

[73] Cheney, 168.

[74] United States Department of Defense, 180.

[75] Clancy, 36.

[76] Robert A. Pape, Bombing to Win: Air Power and Coercion in War (Ithaca NY, Cornell University Press, 1996), 216.

[77] Keaney and Cohen, 182.

[78] Ibid, 202.

[79] Ibid, 203.

[80] Commander James R. Everett, III, USN, NATO's New Strategic Concept, Kosovo and the Implications for Intelligence (Carlisle Barracks PA : Army War College Resident Program, Course 4, Vol II, LSN 21, 2000), 49.

[81] Benjamin S. Lambeth, The Transformation of American Air Power (Ithaca NY: Cornell University Press, 2000), 285.

[82] Ibid, 315.

[83] Keaney and Cohen, 250.

[84] Schwarzkopf, 430.

[85] Lambeth, 314.

[86] Cook, 4.

[87] Ibid, 11.

GLOSSARY

ABCCC	Airborne Battlefield Command and Control Center
AFDD	Air Force Doctrine Document
AFRES	Air Force Reserve
ANG	Air National Guard
APC	Armored Personnel Carrier
ATACMS	Army Tactical Missile System
ATO	Air Tasking Order
AWACS	Airborne Warning and Control System
BDA	Battle Damage Assessment
C2	Command and Control
C3	Command, Control and Communications
CALCM	Conventional Air-Launched Cruise Missile
CC	Commander
CENTAF	Central Command Air Forces
CINC	Commander in Chief
CJCS	Chairman of the Joint Chiefs of Staff
COG	Center of Gravity
CRAF	Civil Reserve Air Fleet
CSAF	Chief of Staff of the Air Force
GPS	Global Positioning System
IADS	Integrated Air Defense Systems
JFACC	Joint Force Air Component Commander
JFC	Joint Force Commander
JSTARS	Joint Secure Tracking and Reconnaissance System
KTO	Kuwaiti Theater of Operations
LOC	Lines of Communication
MAAP	Master Air Attack Plan
MTR	Military Technical Revolution
NBC	Nuclear, Biological and Chemical
NCA	National Command Authority
OAF	Operation ALLIED FORCE
OPLAN	Operations Plan
OPORD	Operations Order
PGM	Precision Guided Munition
RAF	Royal Air Force
RMA	Revolution in Military Affairs
SAM	Surface-to-Air Missile
SEAD	Suppression of Enemy Air Defense
SECDEF	Secretary of Defense
SOF	Special Operations Forces
TACC	Tactical Air Control Center
TLAM	Tomahawk Land Attack Missile
UAE	United Arab Emirates
UK	United Kingdom (Great Britain)
UN	United Nations
US	United States
USA	Untied States Army
USAF	United States Air Force
USCENTCOM	US Central Command

USMC	United States Marine Corps
USN	United States Navy
USSOCOM	US Special Operations Command
WMD	Weapons of Mass Destruction
WWI	World War I
WWII	World War II

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