DISTRIBUTION A:

Approved for public release;distribution is unlimited.

School of Advanced Airpower Studies
Maxwell AFB, Al 36112

Form SF298 Citation Data

Report Date ("DD MON YYYY")	Report Type	Dates Covered (from... to) ("DD MON YYYY")
00061999	N/A	

Title and Subtitle A Kill is a Kill Asymmetrically Attacking U.S. Airpower	**Contract or Grant Number**
	Program Element Number
Authors O'Halloran, Michael A.	**Project Number**
	Task Number
	Work Unit Number
Performing Organization Name(s) and Address(es) School of Advanced Airpower Studies Air University Maxwell AFB, AL 36112	**Performing Organization Number(s)**
Sponsoring/Monitoring Agency Name(s) and Address(es)	**Monitoring Agency Acronym**
	Monitoring Agency Report Number(s)
Distribution/Availability Statement Approved for public release, distribution unlimited	
Supplementary Notes	
Abstract	
Subject Terms	
Document Classification unclassified	**Classification of SF298** unclassified
Classification of Abstract unclassified	**Limitation of Abstract** unlimited
Number of Pages 84	

A KILL IS A KILL

ASYMMETRICALLY ATTACKING U.S. AIRPOWER

BY

MAJOR MICHAEL A. O'HALLORAN, USMC

A THESIS PRESENTED TO THE FACULTY OF THE SCHOOL OF

ADVANCED AIRPOWER STUDIES

FOR COMPLETION OF GRADUATION REQUIREMENTS

SCHOOL OF ADVANCED AIRPOWER STUDIES

AIR UNIVERSITY

MAXWELL AIR FORCE BASE, ALABAMA

JUNE 1999

Disclaimer

The conclusions and opinions expressed in this document are those of the author. They do not reflect the official position of the US Government, Department of Defense, the United States Air Force, or Air University. In accordance with Air Force Instruction 51-303, it is not copyrighted, but is the property of the United States Government.

About the Author

Major Michael A. O'Halloran is a native of State College, Pennsylvania and was commissioned through the United States Marine Corps Platoon Leaders Class in 1983. After attending The Basic School, he proceeded to Camp Pendleton, California, he was assigned to Marine Light Attack Helicopter Squadron 367 where he flew AH-1J, AH-1W, and UH-1N helicopters from 1986 through June of 1993. During this period he completed a number of overseas deployments to include service in Operations Desert Shield and Desert Storm. A 1994 honor graduate of the JSMC Amphibious Warfare School, he served as an instructor at Marine Aviation Weapons and Tactics Squadron One, Yuma, Arizona until 1997 when he was transferred to Maxwell AFB to attend Air Command and Staff College. He has a bachelor's degree in Accounting from the Pennsylvania State University. Major O'Halloran is a Weapons and Tactics Instructor, Aviation Safety Officer, and Flight Leader, and has logged over 2900 flight hours. In June 1999, he was assigned to the MAGTF Staff Training Program at Quantico, Virginia.

Acknowledgments

I would like to acknowledge several people without whose support and help I would have had great difficulty putting this study together. I want to thank Colonel B.C. Miller, the dentist at the Maxwell AFB Hospital who gave me the idea for this paper as he filled a cavity almost two years ago. Fittingly, the research process was in many ways very similar to dental work.

I especially want to thank Dr. James S. Corum for his guidance in the initial organization of this project and his insight and advice through its many permutations. Also, Lieutenant Colonel Wray R. Johnson USAF, a Marine at heart, continuously helped me dig deeper into my subject while providing sound editorial advice. Always in the background was Dr. Dave Mets, who has forgotten more about airpower than most men have ever learned; yet has retained enough to justifiably warrant classification as a national asset.

Of course, the research journey would have been a lonelier one without my family. I would like to thank my wife, Candice, for her love and support and my young sons Michael and Tommy for their constant distractions and reminders of what is really important in life.

Abstract

As the 20th Century closes, efforts towards organizing, training, and equipping U.S. airpower assets remain based on the assumption of face-to-face conventional confrontations. This is a comforting hypothesis, as U.S. technological superiority should keep the odds stacked in out favor for decades to come. Air strategists may be overlooking the fact, however, that this very technological superiority may force adversaries to counter U.S. airpower with other than conventional methods. Couple this with the strong possibility that the interests of the U.S. and our opponents will likely be found on opposite ends of the spectrum of war, and U.S. airpower could be in for some surprises. This study analyzes the asymmetric threat to U.S. airpower across the political, operational, and tactical levels of war and examines whether the U.S. has adequately prepared itself to counter asymmetrical measures against its airpower assets. The answers are not reassuring. U.S. airpower is not likely to overwhelming technological capability by increasing friction levels and changing our visions of surgical warfare into an attrition reality. They will attempt to inflict "virtual attrition" as well by changing U.S. targeting strategies and reducing our effectiveness while buying themselves time to attain their objectives. In this respect, U.S. airpower can be strategically defeated.

Contents

Page

DISCLAIMER ii

ABOUT THE AUTHOR iii

ACKNOWLEDGMENTS iv

ABSTRACT v

LIST OF ILLUSTRATIONS viii

INTRODUCTION 1
- The Question 2
- Background and Significance of the Problem 2
- Limitations of the Study 4
- Methodology 5
- Terminology 6
- Preview of the Argument 7

ASYMMETRIC RESPONSES AT THE POLITICAL LEVEL 10
- Propaganda 11
- Coalition Busting 15
- Enemy Measures to Change U.S. Targeting Strategy 22
- Conclusion 25

ASYMMETRIC RESPONSES AT THE OPERATIONAL LEVEL 28
- Attacking Airpower on the Ramp 30
  - Aircraft Carriers 33
- Deception 36
- Urban Warfare 39
- Conclusion 42

ASYMMETRIC RESPONSES AT THE TACTICAL LEVEL 44
- The Israeli Experience 45
- MANPADS 48
- The Laser Threat 51
- Conclusion 54

CONCLUSIONS 57

BIBLIOGRAPHY 63

Illustrations

Table

Page

1 Asymmetric Strategies 15

Figure

1 An Asymmetric Attack..... 10

2 USS Eisenhower and American Transit Suez Canal..... 40

Chapter 1

Introduction

> *For over a thousand years, Roman conquerors returning from the wars enjoyed the honor of a triumph, a tumultuous parade…The conqueror rode in a triumphal chariot…A slave stood behind the conqueror holding a golden crown and whispering in his ear a warning that all glory is fleeting.*
>
> —General George Patton[1]

In the spring of 1991, following a great victory, American generals lead a parade of their own in our nation's capitol. Held ostensibly to honor the men and women who participated in Operation *Desert Storm*, the parade clearly celebrated two additional accomplishments: first, that the American military had finally rid itself of the Vietnam War's self-doubting shackles; and second, that the country now stood alone as the world's only superpower. The US military had once again arrived at center stage and was reveling in the moment. In the din of congratulations and emotion, Rome's slave would have needed a bullhorn to issue any warnings, and as the ensuing decade has unfolded, U.S. forces have continued to prepare for war in a manner that largely anticipates *Desert Storm* redux.

But if the rest of the world learned anything from that conflict, it was precisely that the U.S. should *not* be fought along conventional lines.[2] As a recent study describes the actions of future enemies, "He will no more seek to confront U.S. power on U.S. terms than David would have gone out against Goliath with a sword and shield."[3] Although our next adversary may not be familiar with the Old Testament, the U.S. military can ignore the comparison at its own peril, as asymmetric options may be the only method available to a foe in conflict with the United States.

Long ago, the U.S. Marine Corps rightfully claimed the title "first to fight" and to this day, few doubt the Corps' ability to project power at a moment's notice. Increasingly however, U.S. airpower assets are the first (and sometimes only) forces that see action when decision-makers opt for a military solution. In the wake of the Gulf War, there is an almost universal expectation that U.S. military action will begin with a strategic air campaign.[4] With the combination of stealthy aircraft, precision guided munitions (PGMs), global reach, and stunning technological capability, the future of airpower will carry with it the expectation to deliver on its eternal promise—rapid, low-casualty, decisive victory.

The Question

In this study, I will examine how well this promise will be kept if an enemy fights in a less than conventional manner. Specifically, I will examine whether the U.S. military has adequately prepared itself to counter asymmetrical measures against its airpower assets.

Background and Significance of the Problem

Non-conventional, or asymmetric tactics are not new to the fair-fighting practitioners of Western warfare, but they have always been hated. The ancient Greeks, who preferred their fighting face-to-face, viewed those who fought from afar with universal disdain—skirmishers, javelin throwers, and above all, archers.[5]

The Greeks left an indelible stamp on Western society with their contributions to civics, law, and government. Their influence on modern warfare is equally striking—and in some eyes, disturbing. In *The Western Way of War: Infantry Battle in Ancient Greece*, Victor Davis Hanson explores this issue in detail. Although the Greek convention of limiting war strictly to combatant hoplites is not relevant today, the spirit of Hellenic warfare is alive and well in the minds of Western strategists.[6] According to Hanson, although the Greeks eventually realized that pitched battle was not always the most efficient form of war, such fighting retained its usefulness by "providing a decisive (and

glorious) conclusion.… The Greek's stark way of battle left us with what is now a burdensome legacy in the West: a presumption that battle under any guise other than a no-nonsense head-to-head confrontation between sober enemies is or should be unpalatable."[7]

The Clausewitzian quest for decisive battle and the "principles of war" taught throughout the professional military education system, are direct descendants of Greek culture. As taught by the U.S. military, the principles of war are essentially a cookbook approach to corral *any* enemy into a position where American firepower can be brought to bear so we can destroy him, return to the normal state of peace, and go home.

These principles assume that battlefield victory is relevant in itself, making few allowances for an enemy who practices a "live to fight another day" strategy, and, through sheer obstinacy and will, survives. For many in the U.S. military, the disturbing legacy of the Vietnam War is not that we failed to recognize the true non-Western nature of the conflict, but rather that politicians prohibited warfighters from fully applying the principles of war to our enemy.[8]

In many ways, Americans continue to view limited war as the British did a century ago when taming the African colonies. As John Ellis writes in *The Social History of the Machine Gun*, "Regular soldiers who went overseas…regarded the Africans as weird eccentrics, hardly even human beings, they would look on colonial warfare as an amusing diversion with little in common with real war."[9] Technology (in the form of the Maxim gun) was a godsend for these good citizens of the world: "In ancient times…civilized communities could hardly defend themselves against poor and barbarous races…. In our day it is the poor and barbarous tribes who are everywhere at the mercy of the wealthy and cultivated nations.[10]

Certainly, the British took their sense of fair play to any war they waged, and this too has firm roots in the U.S. military. While superintendent of the U.S. Military Academy at West Point, General Douglas MacArthur ordered the following verse inscribed on the portal of the school gymnasium:

> Upon the fields of friendly strife
> are sown the seeds
> that, upon other fields, on other days
> will bear the fruits of victory.[11]

Teamwork, camaraderie, and *esprit de corps* have a definite place in any conflict, but also implicit in the quatrain is the concept of sportsmanship. One of the primary reasons Americans disdain guerillas, terrorists, and irregulars is that they do not "fight fair." Time and again, the "dirty" tactics of these groups surprises the American military, yet little is learned from the experience.[12] When the next conflict arises, Americans assume that the Marquis of Queensbury Rules are back in effect.

With the inertia of 2,500 years of Western culture behind it, there is little wonder the U.S. military is frequently shocked when war differs from Western expectations. While airpower advocates view their tool as revolutionary, they have actually done little more than secure a niche in the conventional Western way of waging war. Like the Greeks, air strategists yearn for decisiveness. Towards that end, the United States has invested in generation after generation of the finest technology available to find, fix, target, track, and destroy our enemies. But when confronted with the skirmishers, javelin throwers, and archers of the 20th Century, airpower has been far less than decisive.

As this century closes, many pundits speculate that with the advent of nuclear weapons and global interdependence, Western-style war has become extinct. But as Victor Davis Hanson warns, "The legacy of the Greeks' battle style lingers on, a narcotic that we cannot put away."[13] The future of warfare cannot be seen in the hulks of Iraqi tanks, rather it can be found lurking in Haitian slums, Albanian villages, and Islamic pressure-cookers. In the next century, air strategists will continue to search for decisive results, but they may find greater success if they depend more on the advice of psychologists, sociologists, and linguists, and less on targeteers and technologists.

Limitations of the Study

The asymmetric response to airpower will be as varied as the list of America's potential adversaries. Finding *the* answer to the problem would assume that *all* asymmetric responses can be identified. Such a premise would be faulty, and I will not attempt to construct a comprehensive laundry list of likely asymmetric measures. Indeed, some of these responses, such as the use of Weapons of Mass Destruction (WMD), have received so much attention in the literature on Security Studies that it would make little

sense to cover them here. Whether employed against airfields, people, or ports, the WMD problem is a vexing one, and appears in virtually all of today's wargames. Perhaps this points to a greater issue concerning how Americans view the asymmetric threat. WMD represent a *technological* threat that can ultimately be countered with technology. Although Americans are uncomfortable with WMD use, they are at home grappling with problems that can be bounded by budgets and science.[14]

In a similar vein, the burgeoning topics of information and space warfare will not be discussed. As Lloyd J. Matthews asserts in *Challenging the United States Symmetrically and Asymmetrically: Can America be Defeated?*, "Our technological apparatus has far outstripped our ability to secure it, while government and public complacency is endemic."[15] With the tumultuous changes and dual-use nature of information and space systems, asymmetric threat options abound; but, as a U.S. Marine more comfortable with marching than megabytes and moon-shots, the specificity and jargon of these fields makes them too daunting for this author to enter. While I will discuss some technologically based asymmetric threats, I will mainly focus on ideas which may appear in an enemy's head and not so much in his laboratories.

Methodology

This study will examine likely asymmetric responses to U.S. airpower at three levels: political (strategic), operational, and tactical. I will examine each of these categories in turn, ultimately addressing a range of asymmetric threats experienced from the President to the Private. In the conclusion, I will bring the evidence together and analyze it in order to arrive at a general answer to the question. Underlying the study is the assumption of a limited conflict. While many of the issues discussed have valid transfer value to total war, many do not, and splitting hairs on this issue would be counter-productive.

While this study may appear to be simply a conglomeration of three smaller research projects addressing particular spheres of war, it is important that this work not be

interpreted as such. Asymmetric strategies complement one another and will most likely be at work simultaneously from the political level to the tactical. Indeed, as the evidence will show, "lower" asymmetric tactics frequently transcend their caste and render political effects.

As a subject area that has only recently received moderate attention, I expected to encounter a dearth of information on asymmetric threats. However, this was not the case. Accounts from the Vietnam War, Afghanistan and more recent conflicts provided a wealth of information; and surprisingly, Operation *Desert Storm* did as well. Although a virtual definition of Western style conventional war, the 1991 conflict contained many examples of asymmetric maneuvers that are likely to be repeated. Likewise, in the post-Cold War struggle to discern the future, professional journals have addressed 21st Century warfare in depth and invariably discuss the issues investigated herein. Newspapers, periodicals, and the Internet yielded a great deal of timely information as well.

Terminology

Having used the word "asymmetric" several times already, it would be appropriate to define it before proceeding. This is a task easier said than done—the Department of Defense (DOD) Dictionary does not even include the word.[16] Webster's Dictionary is of little help as well, labeling asymmetry as " An uneven disposition on each side of an (imaginary) central line or point.[17] One thing is certain, the concept of fighting asymmetrically is as old as war itself, and it is not a technique used solely by the underdog. Forces have always attempted to pit strength against an enemy weakness when able.[18] For the purpose of this work, I will narrow the definition to one oriented along the limited war scenarios in which America finds itself increasingly involved:

> *Asymmetric warfare* is a set of operational practices aimed at negating advantages and exploiting vulnerabilities rather than engaging in traditional force-on-force engagements. The incentive to engage in asymmetric warfare is usually greatest for the weakest party in defense against a stronger (and often extra-regional) foe. Asymmetric concepts and moves seek to use the physical environment and military capabilities in ways that are atypical and presumably unanticipated by more established militaries, thus catching them off-balance and unprepared.[19]

The term "airpower" presents difficulties as well with the DOD dictionary absent a definition. Billy Mitchell vaguely remarked that airpower was "the ability to do something in or through the air."[20] Uncharacteristically, Winston Churchill found himself at a loss for words when he avowed "airpower is the most difficult of all forms of military force to measure, or even to express in precise terms."[21] Lacking the *chutzpah* to define what one of this century's great minds could not, I will not describe what airpower *is*, but simply list what airpower consists of:

> Space systems, including the means for placing objects in space;
> Air systems, both manned and unmanned fixed-wing and rotary platforms;
> Missile systems operating from above, on, or—in the case of underwater platforms—below the surface of the earth against targets in air, in space, or on the surface; and
> The command, control, communications, computers, intelligence, surveillance, and reconnaissance (C4ISR) systems that enable linkage to all of the above systems.[22]

Preview of the Argument

As the armed services prepare for the 21st Century, efforts toward organizing, training, equipping and employing our airpower assets remain based on the assumption of face-to-face conventional confrontations. This is a comforting hypothesis, as U.S. technological superiority should keep the odds stacked in our favor for decades to come. Americans often overlook the fact, however, that there is a thinking and reacting enemy who may not be willing to lie prostrate as we apply airpower to him. By virtue of the very technological superiority we are banking on, we may force the enemy to find non-conventional methods to even the odds.

In retrospect, the Cold War appears a simple time. The West may have been close to a nuclear showdown occasionally, but at least one could see the hands on the doomsday clock and prepare for a fight that would clearly put our national survival at stake. Tomorrow's fight will likely be very different. While America's national survival might not be in question, the adversary's may very well be; fighting on opposite ends of

the spectrum of war, the U.S. will be "*in* the war, but not *of* it." [23] As Guenter Lewy observes in *Deception Operations: Studies in the East-West Context*,

> The capacity of people in a modern democracy to support a limited war is precarious at best. The mixture of propaganda and compulsion which a totalitarian regime can muster in order to exact support is not available to leaders of democratic states. Hence, when a war for limited objectives drags on for a long time it is bound to lose the popular backing essential for its successful pursuit.[24]

Airpower encounters problems in limited wars which technology cannot readily counter. As evidenced by CNN's Peter Arnett in the 1991 Gulf War, and a small army of journalists in Baghdad during Operation *Desert Fox* in December 1998, reporters will often be on the scene to broadcast U.S. air attacks as they happen. Air strategists today must answer a myriad of questions when planning a strike. First, they must overcome the traditional problem of putting bombs on targets; second, they must weigh how their enemy will use the media to exploit the bombing; third, they must assess how the strike will be received by Americans at home; fourth, coalition implications from this strike must be analyzed; and fifth, the political implications of lost aircraft and airmen as prisoners of war must similarly be considered. These political dilemmas become weapons in the hands of our adversaries.

Operationally, our adversaries can take advantage of their familiarity with terrain, culture, and climate to take the fight away from the level playing field at altitude and into venues which suit them better. Asymmetric options already seen at this level have included deception operations, attacks on parked aircraft, and urban warfare.

At the tactical level of war, men will do what is necessary to survive. Somalia in 1993 witnessed rocket propelled grenades bringing down U.S. helicopters with strategic consequences, and even the vaunted Israeli Air Force has had its hands tied when Hizbulla forces in southern Lebanon mix with (and win over) the local population. The asymmetric attacks on U.S. airpower are likely to run seamlessly across the spectrum of war in an effort to grind down our will to continue a conflict in which America's vital interests are not threatened. While some will be more effective than others, all will become history lessons for future adversaries to discard or improve upon.

U.S. airpower is not likely to be defeated by conventional means—although we fervently equip and train wishing our adversaries would try. Rather, opponents will counter the overwhelming technological capability of U.S. airpower with something even more incredible—the human brain. By increasing friction levels and changing our vision of surgical warfare into an attrition reality, and creating virtual attrition by changing targeting strategies, enemies can greatly reduce our effectiveness while buying time to attain their objectives. In this respect, U.S. airpower might be strategically defeated.

Chapter 2

Asymmetric Responses at the Political Level

> *Diplomats are just as essential to starting a war as Soldiers are for finishing it. You take Diplomacy out of war and the thing would fall flat in a week.*
>
> — *Will Rogers*

The distinction between the roles of politicians and generals at the highest levels of war has always been gray, but if the DOD definition is any indicator, politicians play the more dominant role.

> *Strategic Level of War*: The level of war at which a nation, often as a member of a group of nations, determines national or multinational (alliance or coalition) security objectives and guidance, and develops and uses national resources to accomplish these objectives.[25]

This work views the spectrum of war along Political, Operational, and Tactical lines. "Political" is used instead of the more traditional "strategic" for clarity. The above definition sounds much like politics, a word most people can intuitively digest easier than strategic. Today, the words are practically interchangeable in any case. Commanders in Chief (CINCs) no longer have the autonomy of Grant, Eisenhower, or MacArthur to boldly set strategic courses of action. Politicians are involved—if not driving—most courses of action in limited wars due to coalition considerations, media concerns, or a simple distrust of their military subordinates. Exacerbating this tendency is the increasing ease with which politicians can communicate with the front, providing the illusion of having a better understanding of the war than those on the ground.[26] Whatever the reason, it is fair to categorize most things occurring above the operational level of war as political.[27]

The political level is where the enemy stands the best chance of stopping U.S. airpower before a pilot even walks to his airplane. As a 1994 *RAND* study concluded, although our enemy "will attempt to counter U.S. capabilities at the operational level, he will realize that his *most effective responses will be made at the strategic level*, by deterring U.S. will to enter the conflict, by inducing the U.S. to discontinue intervention if it occurs, and by wearing out U.S. resolve and interest (emphasis in original)."[28]

If this strategy will keep Americans *out* of a war, what will keep Americans *in*? Donald Snow and Dennis Drew provide one set of answers in *From Lexington to Desert Storm: War and Politics in the American Experience*:

> Objectives must be easily understood
> There must be a moral appeal
> Desired ends that are important to national security
> Perceived importance to most individual Americans[29]

Combining *RAND*'s strategy with Snow and Drew's domestic political tasks may provide a thinking enemy with a point of departure for stymieing the United States—hopefully while still in the pre-hostilities mode. This chapter will examine how susceptible U.S. airpower is to such an approach. Specifically, I will discuss how enemy propaganda, coalition breaking, and influences on U.S. targeting strategy can affect virtual attrition on U.S. airpower.

Propaganda

> *I asked Tom if countries always apologized when they had done wrong, and he says: "Yes, the little ones does."*
>
> —Mark Twain, *Tom Sawyer Abroad*, 1894

If asked the identical question today, Tom Sawyer would be hard pressed to field the same answer, because in the 20th Century, even Liechtenstein rarely apologizes. Call it lying, propaganda, or spin, but ever since yellow journalists and the Third Reich and Soviet Union raised media manipulation to an art form, countries have embraced the idea of using words to justify and augment their use of weapons—and to decry weapons being

used against them. Propaganda is a slippery subject, and in order to at least begin on a concrete footing, the following DOD definition is provided:

> *Propaganda:* Any form of communication in support of national objectives designed to influence the opinions, emotions, attitudes, or behavior of any group in order to benefit the sponsor, either directly or indirectly.[30]

The recent work, *Deception Operations: Studies in the East-West Context*, claims propaganda as its own, stating, "Propaganda is not intrinsically deceptive. It is 'loaded', meaning that it tends to select the facts it chooses to expose, and the interpretations it places upon them, to support preconceived bias."[31] This study includes propaganda as the first example of asymmetric methods because of its pervasiveness in modern warfare. While the following pages cite specific examples of a dedicated propaganda campaign, the success of many other asymmetric strategies requires a solid propaganda underpinning.

Propaganda has a proven track record against U.S. airpower; accordingly, the United States is sensitive to where bombs are dropped and when. The December 1998 halt of Operation *Desert Fox* air strikes prior to the beginning of *Ramadan* is only the most recent example. Painfully aware that Iraq would capitalize on the image of Western bombs falling on Muslims during this holy month, General Zinni was on a tight schedule to hit targets before *Ramadan* began. With only four days allotted to severely degrade Iraqi capability, U.S. Central Command was presented with an almost undoable mission.

Had the attacks continued, the Iraqis would have undoubtedly omitted from their outraged press releases the Koranic loophole which permits *Ramadan* to be ignored in war.[32] Indeed, the 1973 Arab-Israeli War—initiated by the Arabs--and known in the West as the "Yom Kippur War," is called the "*Ramadan* War" in the Muslim world. The United States' sensitivity to anti-American propaganda can result in changing viable strategies in order to preemptively defuse enemy propaganda opportunities. U.S. airpower can be the best trained, organized, and equipped force in the world, with a flawless war plan to match, and never be allowed to get in the fight—or handcuffed so severely that airpower is reduced in ineffectiveness.

North Vietnam's use of the media during the Vietnam War is perhaps the quintessential example of an effective propaganda campaign. *RAND*'s strategy matches

up nicely with the North's approach to the U.S.: while Snow and Drew's domestic political prerequisites provide a menu of options for the enemy to leverage against each strategic goal. Looking at the left side of Table 1, North Vietnam's strategic options are listed in order of descending priority. Clearly, they failed at stopping the U.S. from entering the conflict and, if the length of the war is any indicator, their success in inducing the U.S. to quit was not very successful; which left them with option 3—wearing out U.S. resolve and interest in the conflict. Looking to the right at domestic political requirements, and the manner in which the North Vietnamese orchestrated their propaganda effort, they successfully attacked, *through the media,* every category that Snow and Drew deem essential.

Table 1.

RAND's Strategy	US Domestic Political Requirements
Deter US Will to Enter Conflict	Objectives Easily Understood
Induce US to Discontinue Intervention	Moral Appeal
Wear Out US Resolve and Interest	Desired Ends Important to National Security
	Perceived Importance to Most Americans

Attacks on the moral appeal of the war to Americans paid particularly handsome dividends. The David and Goliath story fits so well in any context where U.S. airpower is pitted against an inferior enemy that it bears repeating. North Vietnam pushed this image relentlessly to the point where it took on a life of its own, and directly contributed to its eventual success.

The Russell Tribunal is one example of well-intentioned Westerners unwittingly fighting Hanoi's fight. Lead by Nobel laureate Bertrand Russell, and allied with the likes of Jean Paul Sartre and Stokely Carmichael, they united to independently investigate the conduct of the United States in Vietnam.[33]

In May 1967, witnesses charged that "American flyers systematically and intentionally bombed North Vietnamese medical facilities. Hospitals are shown *on the*

maps of targets in the hands of downed U.S. pilots (emphasis in original)."[34] Missing from the testimony was the logical possibility that hospitals were marked on the maps precisely to ensure that they *were not* hit. To prevent this construct, the testimony was reported in the following manner: "Maps with hospitals *marked as targets* on them have been found in the possession of US pilots shot down over North Vietnam (emphasis in original).[35] Not surprisingly, the tribunal "convicted" the U.S. of a war crime, and later went on with other charges to "convict" on the charge of genocide for attempting to "Wipe out a whole people and imposing the Pax Americana on . . . Vietnam."[36]

Later in the war, during the Linebacker bombings, the Bach Mai Hospital in Hanoi was hit and received great media attention. Some reporters managed to provide detail in the story and revealed that the hospital was located 1,000 yards from the Bach Mai Airstrip and its military barracks—which were heavily bombed.[37] As *Deception Operations* notes, "Clearly, communist deceptive propaganda in this instance was not accepted uncritically."[38]

Perhaps not by *American* media, but the rest of the world received extensive coverage of such stories. According to one commentator, the "identification of strategic bombing with the United States has helped fuel considerable anti-U.S. sentiment in the world. Among intellectuals and media of Western Europe and the third world, a strong anti-American bias has been prevalent. There is a large and well prepared market for the worst possible stories about American military action."[39]

If the domestic political requirements for a war are not met, mainstream politicians and journalists will help feed this market in addition to organizations like the Russell Tribunal. At the 1966 Fulbright Hearings before the U.S. Senate Foreign Relations Committee, Ambassador George Kennan captured the recurring dilemma of U.S. airpower in limited wars: even if America won in Vietnam, victory would be offset by the image of Americans inflicting

> …grievous damage on the lives of a poor and helpless people, particularly on a people of different race and color…. This spectacle produces reactions among millions of people throughout the world profoundly detrimental to the image we would like them to hold of this country.[40]

The cumulative toll which direct and indirect propaganda actions exacted on the U.S. conduct of the Vietnam War were increasingly debilitating to airpower. By 1972, when the "Christmas bombings"—massive B-52 strikes centered on targets in and around Hanoi—were ordered to force North Vietnam back to the Paris Peace Talks, "the U.S. government was so concerned about the political fallout resulting from even moderate civilian casualties that some of the more lucrative military targets of the Linebacker II campaign were dropped from the target list rather than inflict civilian casualties."[41]

Although the theory of strategic bombing can trace its roots to many countries, the United States has become virtually the sole practitioner in the post-World War II world. With the emergence of airpower as an almost unique instrument of power separate from more traditional military means, this tendency will undoubtedly increase.

This specialization has a price however. Dresden, Hiroshima, and the Vietnam War sensitized Americans and the international community to the moral implications of strategic bombing. Today, questions about airpower overkill on the Gulf War's "Highway of Death" or even the uproar over the inclusion of the *Enola Gay* in the Smithsonian Institution keep the issue fresh and available to future adversaries.

Coalition Busting

The problem with allies is they often develop opinions of their own.

—Winston Churchill

In the early stages of a crisis when planning cells pick up the cards they are dealt, few are more important—and wild—as the ones dealing with coalitions. Less formal than an alliance, coalitions are "a force composed of military elements of nations that have formed a temporary alliance for some specific purpose."[42] The operative words are "temporary" and "specific purpose"--terms that defy definition in unilateral campaigns, much less the international bazaar we frequently see assembled in post-Cold War limited objective operations.

A recurring epiphany when studying war is confirmation of the biblical aphorism that nothing is new under the sun.[43] Coalition warfare is a strategy older than most. The Trojan War saw both Troy and Greece involved in coalitions. Napoleon contended with

a total of seven different coalitions balanced against him in 19th Century Europe, and the United States has been a coalition member in virtually all of the overseas wars we have fought.[44] "The typical international relations text says that historically coalitions and alliances have been created for three basic reasons:

> Provide sufficient power to resist or carry out aggression.
> Make known to potential adversaries an alignment of powers as a form of deterrence.
> Transform common goals to formal commitments"[45]

While this is a good retrospective template, current events would indicate that international relations professors have some writing to do, because these are no longer the reasons America establishes coalitions. Outside of standing alliance commitments, the U.S. military needs little augmentation to deter any conventional threats or to carry out operations should deterrence fail—indeed, things would probably go much smoother *without* a coalition. While the reasons listed above play well in public, they are really window dressing. Coalitions bring three things to the United States today: legitimacy, access, and money.

Although the rationale behind coalitions may be different, the degree of dependence remains unchanged. Especially for the United States, legitimacy is of paramount importance. As a 1993 article in the U.S. Army's *Military Review* highlights, "The question of legitimate use of force in a world conscious of the norms of international law, and more independent and layered with overlapping international organizations, will drive nations to seek allies to help justify their use of force."[46] As President Ronald Reagan stated during the 1983 U.S. intervention in Grenada, "I was . . . told that six members of the Organization of Eastern Caribbean States joined by Jamaica and Barbados had sent an urgent request that we join them in a military operation to restore order and democracy to Grenada."[47]

Although legitimacy is of paramount importance to grand strategists, for airpower, access is everything. "*Global Reach—Global Power*" is not an empty slogan to the U.S. Air Force: the ability to strike anywhere, anytime by USAF assets should not be discounted.[48] However, for a regional Commander in Chief with a war plan that may dictate daily sortie rates in the *thousands*, Diego Garcia and Whiteman AFB, Missouri

will always be very far away.[49] The logistics, aerial refueling, divert, and overflight plans behind the launching of an inter-theater strike comprise an impressive yet fragile arrangement that can easily collapse. Access means airbases, and airbases mean sorties, tempo, and parallel warfare—everything the USAF is optimized for.

Modern warfare is incredibly expensive. The Gulf War cost an estimated $61 billion.[50] While F-117s and Abrams tanks represent an enduring image of the conflict, a less publicized picture is the one of Uncle Sam with his hat in hand asking for contributions. Nevertheless, our fundraising efforts were effective with the U.S. "only" having to pick up seven billion dollars worth of the tab (Japan and Germany contributed a total of $16 billion)[51]. What if we had only been able to raise half of that amount, or none? Would politicians really be willing to fund such a bill for a war with very limited objectives? If the war turns bloody, will American citizens tolerate their soldiers dying as mercenaries for well paying but non-fighting partners in Japan and Germany? Coalitions can sometimes provide the transfusion of money the U.S. needs to fight in limited wars; if for no other reason, they are high-payoff targets for our adversaries.

Since coalitions are central to making modern military strategies work, what can an enemy do to take one apart? Unfortunately, an example is readily available. In *Challenging the United States Symmetrically and Asymmetrically*, Stephen C. Pelletiere describes events in the winter of 1997-98 when Iraq reduced a powerful coalition into the U.S. acting as a largely unilateral "aggressor."[52]

The story begins in October 1997 when Saddam Hussein banned further UN weapons inspections. As the U.S. prepared for a confrontation, Saddam backed away from the brink in December. Victory for the United States? Only a superficial one because the U.S. stood at the brink without a coalition. Russia, China, and France—fellow UN Security Council members—disassociated themselves, while only Kuwait joined the U.S. from the Arab world.[53]

Iraq is a country that could teach Vietnam a refresher course in propaganda. In a textbook example of selecting the facts it chose to expose, and placing its interpretations on them to support preconceived bias, Iraq "loaded" the image of the United States in the eyes of the coalition once arrayed against it.

As the world's sole superpower, the United States takes pride in its role as a benevolent pillar of stability and CEO of the world's economy. The rest of the world is not always as enthusiastic.[54] Iraq's view of the United States is that of a bullying hegemon intent on maintaining a sphere of economic and political influence in the Middle East—at the expense of the rest of the world. Who was the United States to set terms of trade to sovereign nations like France, Russia, and China? To add substance to this image, Iraq encouraged trade with other states and entered into lucrative international contracts against the day the embargo was lifted. These nations now had a vested interest in seeing America lift its embargo, and saw *themselves* being hurt by U.S. policies.[55]

Next, Iraq turned to its Arab neighbors and began to work on the "Israeli double standard." "If Israel has an estimated 200 atomic bombs…why is Iraq being embargoed on the chances we have *one*? Why has the UN allowed Israel to occupy southern Lebanon since 1978? Because the U.S. defends Israel and bullies the UN into defending it as well while requiring the UN to deal harshly with Iraq."[56]

As Pelletiere emphasizes, the double standard theme resonates in the Arab world. Many of these countries are barely legitimate and "all are under constant assault by centrifugal forces ranging from ethnic and religious tensions to Islamic fundamentalism to Pan-Arabism."[57] The double standard theme can also work against them. "Across the Arab world, as demonstrations started gearing up, Iraq was portrayed as the courageous party, standing up to western imperialism and Zionism; while by implication, the moderate Arab leaders were traitors."[58] Moderate Arab rulers begged Iraq to give in. As Alan Tonelson wrote in *The Atlantic Monthly*, "Iraq's neighbors can hardly support international punishment of Iraq…without eventually exposing themselves to judgement."[59] Unbelievably, and almost overnight, the United States had virtually lost access to the Persian Gulf. There was no overt action by Iraq, but moderate Arabs, "fearful of a popular backlash, refused permission to use their bases for combat missions, and in some cases even denied overflight rights."[60]

How would the inevitable U.S. attack have looked had Iraq not stepped down? December 1998's Operation *Desert Fox* provides an answer. While details remain classified, the manner in which the four-day strike was orchestrated seems to verify Pelletiere's coalition busting hypothesis. B-52s, which truly have global reach, probably

made the most of this capability to deliver their munitions, while carrier aircraft and naval ships operated in nearby waters. With this mix of assets delivering the preponderance of striking power, where were the rest of the platforms which performed yeoman service during Operation *Desert Storm*? They were not absent by design—most nations in close proximity to Iraq were reluctant to grant basing rights for offensive action.

This limitation on assets and sortie generation helps explain the "time-clock" nature of the operation as well. *Desert Storm* witnessed airpower striking across the entire spectrum of Iraqi targets, 24 hours a day, *for weeks.* Yet anyone watching CNN could plainly see that *Desert Fox* action was limited to hours of darkness only, for four days. The magnificent display of no respite, "horns of a dilemma," parallel warfare witnessed in *Desert Storm* had been reduced to a predictable serial action which probably saw everyone involved gasping for crew rest and PGM replenishment after four days. By breaking the coalition, Iraq had effected "virtual attrition" on U.S. airpower's capability to strike.

As noted, the U.S. looks to coalitions for three things: legitimacy, access, and money. By virtue of Saddam's coalition castration, it seems that *Desert Fox* was run with greatly reduced access, and the U.S. paid most of the cost. One can say that at least the U.S. retained its legitimacy—or perhaps not. As Pelletiere notes, "How could Washington claim to be acting in the interests of the international community, when practically the whole of the community had abandoned it?"[61] Whether out of ineptness or calculation, Iraq's lack of military response seemed to play on the legitimacy angle as well. By allowing massive media coverage from Baghdad, and quite simply absorbing U.S. attacks with essentially no resistance, several audiences—especially Arab ones—felt pangs of sympathy for yet another country being mercilessly bombed by the United States.

Returning to the access aspect of coalitions, naval enthusiasts will point to the aircraft carrier as the trump card for denied basing rights. With "90,000 tons of diplomacy" parked in international waters, the carrier operates in a venue free of status of forces agreements and foreign runways.[62] Alas, the strongest suit of aircraft carriers in the *Forward…From the sea* role is more the threat of force than force application.[63]

Carrier Battle Groups (CVBG) pack a wallop, but sustained combat operations exhaust ordnance and crews rapidly. Although the carrier may be nuclear powered, their jets burn JP-5 in staggering quantities. Additionally, a single carrier cannot conduct indefinite around the clock operations—for that capability the CINC needs *two* carriers, and a cautious CINC would probably want *three* as a casualty plan. Carriers deploy with an entourage of other ships as well; suddenly, a significant portion of the U.S. Navy may find itself together in a far-flung corner of the world.

It is taken for granted that they can get there; however, the U.S. Navy is also vulnerable to the whims of the international community. The Suez Canal is a case in point. "Totally under the jurisdiction of the Egyptian government…U.S. access, whether commercial or military, is determined by the Egyptian government not the Law of the Sea."[64] During Operation *Desert Storm*, access was not an issue, although there is speculation that transit fees were greatly increased.[65] East Coast-based U.S ships bound for the Persian Gulf or Red Sea depend on the goodwill of Egypt to get there quickly—lacking it, they must sail around the Cape of Good Hope. Ships coming from other parts of the world could run into problems of their own. "For example, if prevented from transiting through the Indonesian archipelago and the Strait of Malacca, a CVBG enroute from Yokusuka, Japan, to Bahrain would have to steam around Australia," adding fifteen days to the transit.[66]

Once in theater, the logistical requirements of the Carrier Battle Group(s) are enormous. The USS *Abraham Lincoln* CVBG, deploying in June 1999 with the USS *Essex* Amphibious Ready Group, will have in the neighborhood of twelve ships and over 16,000 Sailors and Marines embarked.[67] Simply getting the mail to that many people is a logistical challenge—supplying them with food, fuel, parts, and ordnance complicates matters—but to do it all without the benefit of a friendly port or airfield is a nightmare. Like the USAF, the U.S. Navy requires local land-based access to efficiently conduct sustained combat operations.

In short, Saddam Hussein skillfully tore apart a coalition that was skillfully put together almost a decade ago. In so doing, he capitalized on generic coalition weaknesses, while homing in on ones that apply specifically to the United States.

Coalition vulnerabilities are not limited to the confines of the Persian Gulf however, and the techniques we recently witnessed are by no means all-encompassing.

In the post-Cold War world, the anti-Communist glue that held U.S. alliances and coalitions together has weakened.[68] The urge to "go it alone" among independent nations is much easier to act upon.[69] Of course there is always the "ugly American" tendency for adversaries to leverage. As Stephen J. Blank writes, "our insistence on unilateral leadership and our ethnocentric disdain for foreign insights, interests, capabilities, experiences, and skills…suffice to make coalition forming a process replete with friction and fog."[70] And this is with no one shooting at us.

Once hostilities commence, coalitions can become brittle. Had Israel responded to Iraq's SCUD missile launches forcefully, *Desert Storm* may have taken on a completely different complexion. Strategic setbacks wreak havoc on coalitions. Reading the writing on the wall during World War II, Italy, Finland, and Romania abandoned Germany to side with the Allies.

With coalitions, the old adage that you can "choose your friends, but you can't choose your family" does not work. Geography plays a deciding role in coalition composition, and the United States frequently must choose between the lesser of two evils in wooing coalition partners. In our haste to find a friendly face, we often choose poorly and ultimately give our enemies a coalition with seams vulnerable to attack. In South Vietnam the U.S. backed several corrupt and incompetent governments, in Somalia America chose one warlord over another. Our Turkish allies are fighting the Kurdish cousins of the Kurds we are protecting in northern Iraq, and in the Balkans today any group we side with is not likely to be innocent.

For U.S. airpower, coalitions are much like the weather. We have to work with what we are given and, while rarely afforded a chance to make things better, we have ample opportunity to make them worse. Nevertheless, coalitions will remain a vital requirement in virtually any foreseeable conflict. If our enemies can degrade the legitimacy, access, and money coalitions provide, airpower's ability to contribute will be greatly reduced.

Enemy Measures to Change U.S. Targeting Strategy

> *Mercifully, the decision will be quick in this kind of war, since the decisive blows will be directed at civilians, that element of countries at war least able to sustain them. These future wars may yet prove to be more humane than wars in the past in spite of all, because they may in the long run shed less blood.*
>
> —Giulio Douhet, *The Command of the Air*, 1921

Giulio Douhet was a product of his environment. Although his writings strike one as ruthless Nineteenth-Century Social Darwinism, as a seminal air strategist he was merely trying to avoid something even more brutal—a repeat of the carnage of World War I. The next great war saw some of Douhet's ideas put to the test, and they failed. Today, there is wide consensus that Sir Arthur "Bomber" Harris' area bombing of German cities did little to hasten the war's end in Europe, while Curtis LeMay's incendiary raids on Japan killed far more people with far less decisive results than those delivered by single B-29s over Hiroshima and Nagasaki.

With a considerable amount of history behind them and an even larger body of law, conventions and technology to draw upon, modern strategists have a better grip on how to harness airpower than their predecessors. If the object of war is indeed a better state of peace, then strategists must pay careful attention to the means used to deliver the end result.

The most tangible manifestations of this aphorism are enshrined in "Rules of Engagement" (ROE), defined by DOD as "directives issued by competent military authority which delineate the circumstances and limitations under which United States forces will initiate and/or continue combat engagement with other forces encountered."[71] In the fog and friction of war, ROE provide combatants with essential guidance while also restraining them from turning the war into "something that is alien to its nature."[72] ROE define how Americans fight.

However, it is not so simple. While ROE are almost universally viewed from a restrictive aspect, they are also quite permissive. Witness the following passage from L.C. Green's *The Contemporary Law of Armed Conflict*: "Attacks may only be directed against military objectives and must not be indiscriminate, and to the extent that is

feasible, in accordance with the principle of proportionality."[73] So far, so good. Green subsequently defines "military objectives" with a litany of the combat equipment one would expect to be fair game, but moves on to list

> Buildings and objects providing administrative and logistic support for military operations…areas of land…of direct use to attacking or defending forces, as well as economic targets that indirectly but effectively support enemy operations. Civilian vessels, aircraft, vehicles and buildings are also legitimate targets if they contain combatant personnel or military equipment or supplies or are otherwise associated with combat activity incompatible with their civilian status.[74]

The law recognizes that there is no sanctuary for military forces or the activities that sustain them while a country is at war. A corollary of this law is that the onus of protecting civilians largely falls on the government being attacked. Therefore, an enemy tank parked in the playground of an elementary school is a legal target; if children are killed by an errant Maverick missile aimed at that tank, guilt does not lie on the pilot's shoulders but rather on the enemy's.

Viewed in this light, targeteers have considerable leeway under international law in assigning missions, and target arrays can be dispensed of in short order. But, the targeting process is not so straightforward. In a limited war, the worldwide outrage that would invariably accompany a "by the lawbook" bombing campaign would be as deafening as the bombs themselves, and these roars of protest would serve as effective weapons against the United States' war effort. Despite the PGM revolution and incredible technology available to the U.S. military, war is still subject to fog, friction, and Murphy's Law—if anything can go wrong, it will. A bombing campaign conducted to the legal limits will inevitably exceed them. The fear of international and domestic condemnation of our military actions is an undeniable U.S. center of gravity. Staving off this condemnation is what brings politicians into the targeting business.

Targeting is the nexus between politics and aerial bombardment. Whether our enemy has read Sun Tzu or not, they tend to heed his advice to "know the enemy and know yourself." In the preceding tank example, clearly the enemy abrogated his responsibility to safeguard civilians, yet intuitively one knows that U.S. aircraft will not be permitted to strike it. The enemy has placed us on William Tecumseh Sherman's "horns of a dilemma." If we attack the tank and miss, we kill schoolchildren and the

enemy strikes a propaganda blow that works against the moral appeal—and quite possibly the conduct—of the war. By not striking the tank, a valuable asset survives and we countenance schoolyards as military sanctuaries. It is a win-win scenario for the enemy.[75]

During the course of hostilities, any U.S. action that even appears to be excessive runs the risk of further restricting our warfighting efforts. Stated another way, any measure the enemy takes that forces a change in targeting strategy creates virtual attrition on U.S. airpower. Few examples illustrate this point better than the strike on Baghdad's Al Firdos bunker during Operation *Desert Storm.*

According to *The Gulf War Airpower Survey* (*GWAPS*), "the Al Firdos bunker was one of ten secondary leadership bunkers located in the suburban areas of Baghdad…and was believed to be capable of sheltering about 1,400-1500 people. Unknown to Coalition air planners, the upper level of the bunker was, according to the Iraqis, being used at night by families, and the destruction that resulted from the facility being hit by two GBU-27s, both aimed at the same point on the bunker's roof by different F-117s, was reported that morning over CNN to have caused hundreds of civilian casualties."[76] "Iraqi sources claimed that 200-300 civilians, including over 100 children, died in the bunker."[77]

Until this point in the war, planners had "enjoyed, within the bounds set by the air campaign's political and military objectives…nearly complete leeway in…the selection of targets."[78] The demonstrated capability of the F-117 was one of the reasons why. Although *GWAPS* does not say it directly, it appears that the second GBU-27 went *through* the hole created by the first bomb. Technology was working in *Desert Storm*. But the planners had mirror imaged their sense of strategy upon the Iraqis. "Given the priority Coalition air planners attached to targeting leadership facilities throughout the conflict…it was highly improbable, if not almost inconceivable, that civilians would be knowingly sheltered in any locations" associated with key elements of the Iraqi regime.[79] In choosing the Al Firdos bunker to shelter civilians, were Iraqi leaders deliberately placing civilians in harm's way to seize a propaganda victory, or simply practicing a "rank has its privileges" maneuver designed to safeguard family members of high Iraqi civilians in an "impregnable" shelter? That question is still open. What is

undeniable is the predictable Iraqi reaction to the bombing and the strike's impact on subsequent operations.

"In the wake of dramatic television coverage, the U.S. media soon advocated that further Coalition bombing of targets in Iraqi cities should be curtailed…*The New York Times* editorialized…that it would henceforth 'make sense' to limit Coalition bombing to purely military targets, like enemy troops, tanks and artillery dug in on the battlefield in Kuwait."[80] Of course, these events were not unfolding in a vacuum. As the media condemned the attack, Iraq continued to indiscriminately fire Scud missiles at cities throughout Southwest Asia. Nevertheless, General Schwarzkopf got the message. For the rest of the war, attacks against National Command Authorities were sharply limited, and Schwarzkopf himself personally reviewed all targets selected for attack in downtown Baghdad.[81]

The next week, an opportunity for air attacks to finally cut key communications nodes between Kuwait and Baghdad evaporated partially due to the impact of Al Firdos. The *GWAPS* final word on the incident states "It is impossible to rule out completely… that…constraints imposed on air operations following the bombing of the Al Firdos bunker provided the narrow margin that Saddam Hussein needed to remain in power after the war."[82]

The Iraqis claim that civilians were in the Al Firdos bunker solely to seek shelter. Coming from a regime with as abysmal a human rights record as Iraq's, this assertion is probably untrue. Unfortunately, the issue is moot. Even if Al Firdos was nothing more than a grisly reminder that war is hell, the Iraqi exploitation of the media furor and the ensuing change in targeting strategy was a predictable chain of events that may serve as a template for future adversaries to follow.

Conclusion

In the 1990s, virtually every instance of U.S. military involvement has been met with resistance—largely at the political level. With equal consistency, U.S. military involvement has depended on airpower—often *solely* on airpower—for mission accomplishment.

Although airpower is a favored tool among political decision-makers, its image is mixed almost everywhere else. The legitimacy of airpower is questioned *even when things go well*—when things do not go well, it is a media field day. The allure of propaganda as a weapon against airpower continues to grow. Understanding the "loaded" nature of propaganda, and with a large audience preconditioned to anti-airpower views, even strikes on terrorists such as Usama bin Laden and the countries that harbor him are frequently cast in a negative light.[83] While propaganda is an effective weapon in and of itself, it is also a vital ingredient in other asymmetric strategies. Media coverage following the Al Firdos bunker strike attacked the Gulf War's moral appeal *and* helped change U.S. targeting strategies.

For the United States, coalition warfare has evolved from a need to augment fighting power to a necessity for legitimacy, access, and money. All three of these factors play deciding roles in how—indeed if—airpower can be employed. With the tenuous views on U.S. airpower around the world, legitimacy is always an avenue ripe for asymmetric attack. The ability to deny the U.S. basing rights and access through political pressure on coalitions gives enemies the potential to take sorties away from a CINC, and greatly reduce airpower's effectiveness. Finally, whittling a coalition down to a few members reduces the ability to share costs and may make a limited war too expensive for one country to fight.

Efforts aimed at making the U.S. restrict targeting strategies have provided high payoffs for our enemies. The Linebacker bombings during the last days of the U.S. involvement in Vietnam were not as "all out" as they could have been--partly due to the cumulative effect of North Vietnam's relentless propaganda campaign. More recently, history condensed itself in the Gulf War when targeting strategies changed literally overnight in the wake of the Al Firdos bombing. As an asymmetric strategy only in its adolescence, surely this tactic will be seen again.

At the political level, has the U.S. adequately prepared to counter asymmetrical measures against its airpower assets? The answer has to be "no." The limited wars that America finds itself involved in do not lend themselves to galvanizing domestic opinion let alone that of the rest of the world. No matter how skilled a politician may be, no U.S. President can wring the same appeal out of the merits of bombing Kosovo as

Franklin Roosevelt did in avenging Pearl Harbor. Snow and Drew's domestic political requirements are almost impossible to even articulate in limited wars, let alone gain consensus about.

Clausewitz said "war is merely the continuation of policy by other means." When war commences however, it cannot merely pick up where policy left off. In the 21st Century, effective action and counter-action at the political level will be absolutely essential for the "other means" to achieve any degree of success.

Chapter 3

Asymmetric Responses at the Operational Level

> *In all honesty, we didn't achieve our main objective, which was to spur uprisings throughout the south. Still, we inflicted heavy casualties on the Americans and their puppets, and that was a big gain for us. As for making an impact in the United States, it had not been our intention—but it turned out to be a fortunate result.*
>
> —Tran Do on the Vietnam War's Tet Offensive[84]

As deputy commander of Communist forces in South Vietnam, Tran Do oversold the operational success of 1968's Tet offensive while underselling the political. Tet is generally considered to have been a Communist battlefield disaster that virtually destroyed the Viet Cong as a serious fighting force. However, the images of chaos, confusion, and executions on American television turned it into a strategic victory by galvanizing a mostly acquiescent anti-war movement in America (and Europe) into action.

The Vietnam War is the equivalent of "Asymmetric Warfare 101" for future adversaries of the United States. What the Communists stumbled upon in 1968, our subsequent enemies have shown a calculated inclination to duplicate. The 1983 bombing of the Marine's Beirut barracks or "Bloody Sunday" in Mogadishu a decade later would have seen scant coverage in World War II due to media censorship, accessibility, and lag-time. Today, these events are broadcast in real-time and help drive policy.

In recognition of the tremendous impact of adverse media attention and subsequent public reaction, military planners consider American public opinion to be a de facto center of gravity and plan accordingly. This is to be expected in a democracy, but when

the prospect of taking *any* casualties becomes a showstopper in the course of action development, the enemy has already scored a victory of sorts.

Contrary to popular belief, Americans are not necessarily averse to casualties in war. The American Civil War and the World Wars of this century bear testimony to the fact that American citizens will continue to support military actions that result in a steady stream of U.S. servicemen killed in action. Although casualties in the Gulf War were an order of magnitude lower than expected, Americans braced for the worst and seemed fatalistic about the prospect of thousands of casualties.[85]

However, most limited wars are a different species from the ones listed above. Many of these actions are not even sold to the American public as wars at all, but rather as humanitarian or peacekeeping operations. Americans were not outraged about Lebanon and Somalia because U.S. servicemen were killed: they were upset because they did not realize the United States was involved in a shooting war. They were frustrated because they had been mislead by their political and military leaders about the true nature of military involvement. This was the unintentional genius behind the Tet offensive. Until this point in the Vietnam War, Americans had been fed a steady diet of good news and compelling statistics; and, although many had misgivings, many believed that the war's end was right around the corner, compliments of superior firepower and technology.[86] Tet exposed the true nature of the war and destroyed the credibility of U.S. political and military leaders, who had said things were going *very well*, and provided a strategic windfall for North Vietnam.[87]

Even if direct enemy actions fail to yield dividends at the political level, operational asymmetric attacks remain alluring—especially against U.S. airpower. As a recent *RAND* study notes, "No other air force today appears to field the combination of platforms, weapons, and personnel—either in quantity or quality—that would be needed to defeat the USAF nose-to-nose at 35,000 feet."[88] As the DOD continues to invest in state of the art technology for a war at altitude, our enemies are likely to counter the airman's perspective with an earthbound view that goes no higher than the maximum ordinate of a mortar round.

Asymmetric strategies at the operational level of war offer adversaries payoffs on two levels. First, with effects like those seen at Tet, they compliment *and sometimes*

transcend strategies already at work at the political level. Second, and more pragmatically, they are often the only way the enemy has to strike back and cumulatively work against U.S. resolve and interest in the conflict. In either event, they are combat methods that are much more likely to occur in the future than a "Battle of Britain" style dogfight at 35,000 feet.

However, adversaries must weigh asymmetric strategies carefully. Successfully opposing the United States in a limited war requires a degree of threshold awareness. If an event is *too* cataclysmic or strikes too close to home, our enemies run the risk of "awakening a sleeping giant," as the Japanese did with their bombing of Hawaii in 1941. Asymmetric warfare at the operational level of war is a constant game of assessing where the United States has drawn the line. In the Gulf War, Iraq understood this by refraining from using WMD.

In that light, it is useful to examine several operational methods that an enemy may use to fight U.S. airpower in lieu of, or in addition to, anti-aircraft guns, SAMs, and Migs. Specifically, I will discuss enemy ground attacks on U.S. high value airborne assets (HVAA) and aircraft carriers, deception operations, and urban warfare.

Attacking Airpower on the Ramp

In his seminal work *The Command of the Air*, Giulio Douhet observed, "It is easier and more effective to destroy the enemy's aerial power by destroying his nests and eggs on the ground than to hunt his flying birds in the air."[89] While Douhet's comments were aimed at the commanders of future "battle planes," the implications of this simple observation are more far reaching. Aircraft on the ramp can be destroyed by ground attack as well.[90]

Airplanes do not become war-fighting assets until they are safely airborne. Until that moment, they are liabilities vulnerable to even the most primitive of weapons. This follows an increasing trend. "Despite the great leaps aviation technology has made since World War II, parked aircraft today are no sturdier in withstanding high explosives or shrapnel than were their predecessors 50 years ago. Indeed, the complexity and sophistication of modern aircraft may make them *more* vulnerable."[91] A rifle slug hitting

a P-51 Mustang could easily pass through the aircraft's fuselage. The same round striking an AWACS radome would probably disable it for an extended period.[92]

Attacking airfields is not a new idea. "Between 1940 and 1992, ground attacks on air bases occurred at least 645 times in ten separate conflicts, destroying or damaging over 2,000 aircraft."[93] As David A. Shlapak and Alan Vick note in *Check Six Begins on the Ground*, there have historically been three reasons to attack airfields: destroy high value airborne assets (HVAA), temporarily decrease sortie generation at a critical moment, and create a strategic event.[94] Limited war has melded this equation in a subtle but meaningful way: destroying HVAA decreases sortie generation and effectiveness thereby creating a strategic event.

This statement is not meant to discount the efficacy of destroying U.S. fighter and attack aircraft. The political picture of F-16s burning on the ramp would certainly be a compelling one. But the operational impact of destroying several fighters pales in comparison to the destruction of a specialized aircraft such as a KC-10 that will refuel an entire strike package. Two thirds of all combat missions in Operation *Desert Storm* required aerial refueling.[95]

HVAA are the force multiplying platforms that separate U.S. airpower from the rest of the world's air forces—they win air campaigns. The USAF doctrine of *Global Reach—Global Power* stays home without tankers, while the overall "air picture" becomes a mess without AWACS. Of course, modern warfare is a "come as you are" affair. The USAF has 59 KC-10 tankers and 33 E-3 Sentry (AWACS) aircraft.[96] The numbers are similarly small for bombers, JSTARS, Rivet Joint, AC-130s, and C-5/141/17s. For the duration of any foreseeable conflict, these aircraft are very difficult to replace. The Gulf War used virtually the entire USAF inventory of specialized assets—even minor attrition would have affected Air Tasking Order (ATO) execution. Chillingly, a *RAND* force structure analysis for a two mid-intensity regional contingency (MRC) scenario concluded, "The USAF does not have enough specialized aircraft to fight two simultaneous contingencies, even with *no* attrition."[97]

The USAF is well aware of the importance and vulnerability of HVAA and goes to great lengths to safeguard them. Typically, they are based well beyond an enemy's air radius of action not to mention the reach of their ground forces. During the Vietnam

War, Guam, Okinawa, and the Philippine Islands were secure bases for HVAA (Thailand slightly less so). The same can be said of Diego Garcia in Middle East strategy today. However, throughout the Gulf War, most HVAA were based on coalition Arab airbases. In a region of the world where Islamic connections carry greater weight than any cartographer's line, how safe were those aircraft?

They were somewhat vulnerable—and variants of the above question can be asked concerning Africa and the Balkans. It does not take an army to damage an airfield. That method would be too…conventional. It also would not be very effective according to *RAND,* which assesses the USAF's defenses against penetrating threats as quite good.[98] The attentive enemy who has read Mao and remembers Vietnam will place his "guerilla fish" amongst a "sea of people" enabling indirect strikes against HVAA.[99]

An 81mm mortar has a maximum effective range of 5,700 meters, or just over 3.5 miles, while a .50 caliber machine-gun can accurately range targets at 2,000 meters.[100] These systems are portable and readily available on the world market. The threat radius of these weapons makes them very difficult to preemptively defend against. Assisted by a forward observer—e.g., via cellular phone—mortars are extremely accurate weapons; add technology to the weapon in the form of upcoming precision guided mortar rounds, and the need for adjustment is gone.[101]

In Afghanistan, the Soviets dealt with the "sea of people" problem in a predictable manner by destroying every village within ten miles of Kabul.[102] This is not an option for U.S. forces. Any negative U.S. action that affects the population is liable to be leveled against the U.S. for propaganda purposes. In order to partially alleviate such problems, the USAF is transitioning to an expeditionary posture. But austerity presents logistical problems such as limited shelters, crowded parking ramps, above ground fuel storage, and the requirement to establish a defense plan from scratch.[103]

Mirroring industry, the U.S. military has embraced the concept of "just-in-time" logistics to reduce the need for procuring and storing large inventories of spare parts and supplies. Whether civilian companies and personnel will be willing to subject themselves to daily deliveries to places like Kabul remains to be seen. Just-in-time logistics could result in "just-too-late" combat effectiveness.

The greatest threat to HVAA assets, however, are on the ramps of Air Mobility Command (AMC) bases in the continental United States. Shlapak and Vick compare military bases to small cities, complete with stores, schools, construction crews, and delivery trucks.[104] They are extremely porous. Nor is the front gate the only method to gain access. A small airplane could land on a taxiway and immediately place its crew in a position to wreak havoc. A coordinated effort at several AMC airbases could stop a rapid deployment in its tracks, and allow an enemy to accomplish his objectives in a *fait acompli* manner. Even if the *physical* results of such a strike were not severe, the inevitable security crackdown would have a molasses-like effect throughout AMC.

The threat of attacks on continental United States' (CONUS) bases is often discounted due to the extreme penalty inflicted on the Japanese for their 1941 attack on the Hawaiian Islands, but post-World War II events show an increasing proclivity to take the war directly to Western homelands. France's ill fated "*la guerre d'Algerie*" during the 1950's saw many Algerian National Liberation Front members operating in France, while the Irish Republican Army has shown few qualms about carrying their fight to the streets of London.[105] Traditionally, terrorists have attacked soft targets, with military bases being relatively immune. However, in an open society such as ours, there are no guarantees.[106] Bringing the fight to the continental U.S. could very well be a step across America's threshold of tolerance. However, while Pearl Harbor may continue to resonate among many Americans, it is merely a historical footnote to the rest of the world.[107]

Aircraft Carriers

The blue water-equipped U.S. Navy has big problems in the littorals. Conventional threats such as diesel submarines and Silkworm missiles can perhaps be dealt with, but the Navy's anti-mine warfare capability is wholly inadequate. The USS *Princeton* and *Tripoli* both suffered major mine damage during the Gulf War.[108] While aircraft carriers can complicate a minelayer's solution by standing off a greater distance from shore, this very action limits the range of naval aviation (and increases their dependence on in-flight refueling, frequently by USAF tankers.) If an adversary manages to deploy even a few deep-sea mines, the prudent captain of an aircraft carrier would be compelled to recognize this threat and adjust his operations accordingly.

An under-appreciated asymmetric threat to carrier aviation is the Suez Canal. Extending 121 miles from Port Said on the Mediterranean to Suez on the Red Sea, the canal is as narrow as 525 feet at its southern end.[109] The sinking of ships in 1967 and 1973 closed the canal, and as Geoffrey Kemp notes in *Strategic Geography and the Changing Middle East*, "There is a possibility of direct military action to prevent U.S. transit even if Egypt were on the U.S. side of the conflict."[110]

Yet, the U.S. Navy treats a Suez Canal transit almost as casually as a passage under the Golden Gate Bridge. Aircraft are not flown off, and hangar bays only shield a small percentage of the ship's air wing. "Steel Beach" days are commonly held—events where the ship's crew gather topside to relax, barbecue, and generally take a day off from the rigors of flight operations.[111] The redundant pictures shown on the following page illustrate the point. They were both taken in the Suez Canal with their full compliments of airplanes, and they were both taken *during* Operation *Desert Shield/Storm.*[112]

A picture of an aircraft carrier passing through the Suez Canal is a "trophy shot" that will hang on the walls of 5,500 sailors' homes for the rest of their lives. This event is a cruise highlight, a rite of passage. Even during periods of heightened regional tensions, the Navy's posture during transit is relaxed.

The Navy makes the assumption that the war will start when and where the Navy says it will start; when the carrier is positioned in blue water, with its complement of escorts fully arrayed. Despite the public embrace of littoral warfare, the Navy's programmatic and procedural disregard for littoral threats such as diesel submarines, mines, and force protection measures belie an institution still bruising for a fight with Admiral Gorshkov's Soviet Navy.

USS *Dwight D. Eisenhower* and *America* transit Suez Canal

US Navy via Peter B. Mersky

This outlook presents a ripe vulnerability. Operators of mortars, machine-guns, and rockets used against airfields would have a simple solution firing at a slow-moving carrier in the Suez Canal, and hundreds of square miles of territory from which to launch their attack.[113] Mortar impacts on the flight deck would be particularly disastrous given the high density of parked aircraft.

The Navy is no stranger to aircraft carrier fires. In 0ctober 1966 the USS *Oriskany*, steaming off North Vietnam on "Yankee Station," suffered a fire which claimed 44 lives and required her to return to the United States for refitting.[114] Nine months later, the USS *Forrestal* underwent the same fate losing 134 men, 21 aircraft destroyed, and 43 damaged. She too left Yankee Station for repairs in CONUS.[115] In both cases, the North Vietnamese were handed no-cost operational victories.

A conflagration of this magnitude today would provide an enemy with operational and political returns. A major fire—or worse, a sinking—on a *nuclear* powered aircraft carrier would constitute a propaganda windfall for an enemy in addition to possibly closing the Suez Canal. Domestic consensus in limited wars is difficult to attain. A successful attack of this sort could sink an operation in the pre-hostilities phase.[116]

Suez stands out as a critical chokepoint, but there are others. Clearing the canal, a Persian Gulf-bound carrier must also negotiate the Bab El Mandeb, and the Strait of Hormuz (the latter, by all accounts, being a particularly tense and alert passage.) Around

the world, the Navy routinely steams through the Malacca and Lomback Straits, Gibraltar, and other narrow passages while enroute to port visits.

Deception

All war is deception.

—Sun Tzu

Deception has been defined as "a purposeful attempt by the deceiver to manipulate the perceptions of the target's decision makers in order to gain a competitive advantage."[117] In laymen's terms, deception distorts perceived reality by professing the false in the face of the real. However it is defined, "deception has been addressed by almost every philosopher and political or military commentator in history."[118] The reason is simple—it works.

Deception is often thought of in terms of an attacker's technique to achieve surprise.[119] As a counter to airpower, this study takes a different view. At the operational level, U.S. adversaries can use deception to drain sorties and munitions away from legitimate target sets, preserving them or providing the margin of survivability needed to accomplish their objectives.

Former Secretary of Defense Robert S. McNamara is widely condemned for introducing quantitative analysis methods to measure combat effectiveness. Yet McNamara was a product of America, and Americans in the DOD today remain quite comfortable with numerical measures of success. General Schwarzkopf, still recoiling from the Vietnam War, specifically eschewed enemy body counts during *Desert Storm*, but the number of sorties flown largely measured the success of the air campaign. With the continuing emphasis on PGMs, the emphasis on sortie counts will increase since it is easy to make the leap of faith that every bomb is effective. In other words, if the sortie rate is high we must be winning the war. General Horner, *Desert Storm*'s Joint Forces Air Component Commander (JFACC), confirmed this notion in a *GWAPS* interview: "By the time the ground offensive began, Schwarzkopf was using the *number* of air strikes against a target, not bomb damage assessment (BDA), as his prime indicator of enemy combat effectiveness" (emphasis in original).[120]

Even in the age of near real-time imagery of air strikes, accurate BDA remains elusive. The main reason Schwarzkopf relied so heavily on sortie counts was due to sheer frustration with the BDA process.[121] The raw data generated by hundreds of strike sorties represents an avalanche of information requiring rapid transformation into intelligence for planners working on subsequent ATO's. In *Desert Storm*, "the BDA assessment system failed to meet the requirements placed upon it because of the pace and scale of the air campaign. Technical systems could not keep pace with demand." [122]

If systems and organizations have difficulty finding targets and accurately measuring BDA, and the enemy has a target set that absolutely demands striking—the ingredients are in place for the deception of U.S. airpower. Weapons of Mass Destruction meet all of the above requirements.

At the unclassified level, one can only guess at the effectiveness of the 20 August 1998 cruise missile strike on the Sudanese pharmaceutical factory suspected of manufacturing chemical weapons. *The New York Times* reported that "within days of the attack, some of the administration's explanations for destroying the factory…proved inaccurate…Senior officials now say their case for attacking the factory relied on inference as well as evidence."[123] A total of 75 one million-dollar missiles were fired at the factory and other targets based partially on inference.[124] Obviously, money is no object in the fight against WMD.

The great Scud missile hunt of *Desert Storm* represents a foreshadowing of the "WMD as bait" strategy. Scuds were double trouble for the Gulf War coalition. Although militarily insignificant, the use of a WMD warhead would have thrown the direction of the war directly onto President George Bush's desk. On the other hand, conventional Scud missiles aimed at Tel Aviv threatened to bring Israel into the war with coalition ending potential. Iraqi Scud missiles were targets that absolutely had to dealt with.

With masses of strike aircraft in theater, air planners had the luxury of throwing sorties at the problem. During the course of the war, 4,000 missions were flown against Scuds.[125] Much was known about Scud missiles and by simply "doing the math" from Israel to Iraq, a Scud launch box was easy to construct. Additionally, the Iraqis were

firing Scuds almost exclusively at night. With almost 100 sorties per day going to a specific barren area in a narrowed time period, the planners had cause for optimism.

But mobile launchers proved to be a difficult target, and Iraq was surprisingly adept at employing Scud missiles. From studying Soviet models, analysts thought pre-launch signatures would give patrolling aircraft ample opportunity to attack. In reality, the Iraqis had significantly cut the time required to deploy and shoot.[126] Showing impressive foresight (and a calculated deception plan), they had also invested in both high and low fidelity Scud decoys, the former being indistinguishable from real Scuds from more than 25 yards.[127] Flying at night, with inadequate pre-launch cueing, pilots became entirely dependent upon on-board sensors—infrared and radar. As good as these systems were, they were not good enough to discriminate mobile launchers from decoys or even fuel trucks.

The default plan was not much better. If coalition aircraft could not find Scud launchers *before* firing, certainly the brilliant nighttime launch signature would enable them to be targeted post-launch. Even this method proved difficult. Of the 42 times strike aircraft witnessed Scud launches, only eight were able to deliver ordnance due to onboard sensor limitations and Iraqi proficiency in shoot and move tactics.[128] *GWAPS* wraps up Scud hunting on a somber note: "There is no indisputable proof that a single Scud mobile launcher was destroyed by a fixed-wing aircraft."

Yet, throughout the Scud hunt, analysts thought the campaign was working, with CENTCOM consistently overstating the results.[129] As one account notes, "It was not a conscious act of deception. American pilots were reporting that they had found and destroyed Scuds…to persuade the White House and the public that their Scud-hunting campaign was a success, Schwarzkopf and his air-war commanders were too quick to give credence to the "kills" instead of discounting them as the sort of excited report pilots sometimes make in the heat of battle."[130]

In dealing with the Scud threat, air planners were forced to *ad lib* a high visibility, complex plan, into an already elaborate air campaign. Even if the campaign were successful, the friction it caused the coalition was well worth Iraq's effort. As it stands, Scud hunting sucked 4,000 air to ground sorties away from Baghdad and Iraq's fielded forces—areas where airpower was especially effective. Future adversaries can learn from

Iraq's example. WMD target sets are irresistible bait for U.S. airpower and can be profitably used to siphon sorties away from other targets.[131]

Urban Warfare

> *The future is not the son of Desert Storm, but the stepchild of Somalia and Chechnya.*
>
> General Charles Krulak

The Pentagon's Military Operations on Urban Terrain (MOUT) Internet homepage has hundreds of links to subjects dealing with urban fighting. Virtually none of them address airpower's role.[132] For the U.S. Army and Marine Corps, urban warfare is a 21st Century standing assumption towards which they are preparing. Yet, at the Air War College and Air Command and Staff College, the curriculum is silent regarding the profound problems urban terrain presents the most technologically capable air force in the world.

However, airpower has proven itself to be the *most effective* tool for leveling the urban playing field in total war. Hamburg, Dresden, Hiroshima, and Nagasaki provided vivid testimony in World War II to this fact. In a limited war however, with friendly troops and civilians in close proximity, the sledgehammer approach is simply not an option, and an enemy that chooses to fight from the city presents U.S. airpower with an intractable dilemma from a philosophic and physical standpoint.

For airpower, urban warfare is not about striking key nodes of enemy infrastructure or attaining strategic paralysis. MOUT means Close Air Support (CAS) in the city, and CAS is a mission that the USAF sees itself performing at the expense of interdiction and strategic attack. In *The Air Campaign*, John Warden captures this spirit in his definition of CAS: "Let us define close air support as any air operation that theoretically could and would be done by ground forces on their own, if sufficient troops or artillery were available."[133] Warden does not view CAS as an integral part of a ground scheme of maneuver. Rather, he views a request for CAS as something that the ground force commander must justify and perhaps bargain for.[134]

Partially as a result of this Air Force predilection, the U.S. Army has equipped itself with attack helicopters and artillery systems that largely negate the need for fixed wing CAS on the conventional battlefield. Taking this capability to the streets is another matter however. As demonstrated in previous conflicts, artillery in a direct fire mode is a devastating weapon. But tearing down buildings with 155mm shells is a poor option in limited wars where civilians commingle with combatants. Although Army helicopters have a point target capability, survival in the urban environment is chancy. In 1993, Somali "Technicals" in Mogadishu brought down helicopters with rocket propelled grenades; an enemy with even slightly advanced weaponry could inflict far worse damage.

The U.S. Army will enter an urban fight with an organic firepower shortfall, and if the USAF has relegated CAS to the bottom of the priority list, *urban* CAS is not even on the page.[135] Not that fixed wing aircraft are a panacea for firepower shortfalls—far from it. But this is precisely the problem. Urban CAS is completely different from CAS on the *linear* battlefield. Urban fighting is three dimensional from rooftops to sewers, multi-cultural from mosques to movie theatres, and always *close* to something or someone who should be shielded from the effects of ordnance. CAS techniques learned on the raked ranges of the Western United States have little transfer value to the world's teeming cities and slums.

Nor will technology save the USAF from its philosophical indifference to MOUT. While flying at night enhances survivability, the urban environment greatly degrades the sensors that allow a pilot to fight. Night vision goggles (NVGs) are designed to amplify the ambient light of the moon and stars. Cultural lighting, headlights, and fires easily overwhelm NVG capabilities and greatly increase pilot workload with a corresponding decrease in effectiveness.

In a different spectrum, forward looking infrared (FLIR) devices are presented with similar hurdles. Built to distinguish hot items against cold backgrounds, FLIRs become thermally saturated in the blistering city environment, and neither NVGs nor FLIRs can see through walls.

Desert Storm BDA footage showed bombs whistling down airshafts. Urban fighting may require that only *parts* of a building be targeted. How true will a targeting laser's

spot be in a reflective or smoke filled environment? The Global Positioning System will allow aircraft to deliver munitions precisely regardless of environmental factors, but will the bomb take into account the enemy's elevation if he is fighting from a building's third floor—and what if friendly troops are on the first floor?

Urban warfare is a costly, destructive mess. Unless a sound military reason exists for the United States to fight in a city, U.S. forces should avoid this option. In a best case scenario, the U.S. will emerge with significant casualties, non-combatant deaths, and collateral damage. The worst case scenario has already been seen in places like Stalingrad in 1942, Manila in 1945, and Hue City in 1968. Although the smart strategist would avoid urban battles, he may not have an option, as its high cost works directly for an enemy trying to induce the U.S. to discontinue intervention.

Adding to this incentive is the probability that the USAF will be answering the questions posed above for the first time in the chaos of combat. This "on the job training" will come at the cost of reduced accuracy and responsiveness to the ground combat element, and increased collateral damage and fratricide. Here the possibility for an operational mistake to take on a political life manifests itself again. Regardless of the despotic nature of an enemy and the sterling quality of U.S. intentions, when bombs kill civilians or inflict wanton damage, local support and goodwill becomes a casualty as well.

Urban CAS represents a seam in the DOD concept of joint warfare. With some services grappling with the onerous issues that MOUT presents while others ignore them, the synergistic effects of the U.S. military may not be present inside city limits. Urban warfare offers the enemy payoffs too large to ignore. Urban fighting is a great equalizer and compounds the opportunities for operational events to take on strategic meaning. Even an air force superbly trained for urban fighting will probably achieve far less than decisive results. Nevertheless, if the United States desires to limit enemy payoffs to something less than a windfall, airpower must deal with the issue of MOUT and support urban fighting to the best of its substantial potential.

Conclusion

Finding good asymmetric strategies at the operational level of war has always been part and parcel of the art of war. Amongst peer competitors, indirect methods save lives and treasure by avoiding grinding battles of attrition, while in manpower rich countries (such as North Vietnam), a war of attrition necessarily *becomes* the strategy. For an adversary fighting the United States in the near future, however, asymmetric warfare goes beyond the realm of options into one of requirements. Lacking the assets to fight in a traditional force-on-force manner, an intelligent enemy is compelled to find unique ways to counter the overwhelming power the U.S. military brings to a fight.

In so doing, they hope to achieve two things. First, as Vietnam's Tet offensive illustrated, the enemy may transform operational events into political ones that strike at the American public from the evening news and front pages of newspapers. Second, asymmetric methods are frequently the only option available to a resource-poor enemy and greatly complement conventional efforts or in some cases replace them.

As an enemy develops his asymmetric strategy, however, he must be politically astute to the mood of Americans and the possibility of exceeding our level of tolerance. Nevertheless, the DOD should not take solace in the notion that anything is off limits—attacks on Americans or our assets could and should be anticipated anywhere.[136]

Regarding airpower, attacks on high value airborne assets promise the most immediate returns at both the political and operational level. Limited in number and impossible to quickly replace, CINCs depend upon them in order to execute their plan. Once in theater, the air campaign that planners have trained, organized, and equipped around is totally dependent on the presence of these complex and unique machines. Even minimal attrition can cause cascading problems.

The decades-old tendency of the U.S. Navy to ignore threats in the littorals requires immediate attention. Minesweepers and ASW methods against diesel submarines take time and money to implement. Simple force protection measures while transiting maritime chokepoints do not require any leadtime however. Avoidance altogether is the best option; if this is impractical, flying off portions of the Carrier Air Wing and treating

transits as tactical maneuvers would cost very little when compared to the very real potential for disaster.

The threat *de jour* among rogue nations is weapons of mass destruction. Manufactured with dual-use technology and easy to conceal, they are targets particularly difficult to deal with. Nevertheless, air planners can count on placing them high on their priority list of targets. As illustrated with the great Scud hunt of *Desert Storm*, this combination yields a rich deception opportunity for potential adversaries. By robbing sorties from an ATO to attack phantom targets, an enemy can effect virtual attrition on U.S. airpower without firing a shot.

Urban warfare presents a real dilemma for airpower. MOUT means CAS in cities for airpower, and CAS is low on the USAF priority list. Assuming it climbed to a higher level, airpower would still have a difficult time being effective in the urban environment. Cities complicate CAS greatly and regardless of the degree of mission planning and execution, bombs exploding in cities cause collateral damage. An enemy within their own country can leverage this damage while Americans at home will inevitably recoil at the images of well intentioned bombs gone awry. Despite the difficulties however, airpower cannot abrogate its responsibility to support soldiers engaged in one of the most vicious combat arenas imaginable. Like the Navy in the littorals, technology for the urban problem will take time to develop, but policies towards training for MOUT can appear with the stroke of a pen.[137]

At the operational level of war, the question poses itself: has the United States adequately prepared for asymmetric attacks against its airpower assets? As I have argued in this chapter, the answer appears to be "no". Through a combination of mirror-imaging and rigid adherence to traditional conventional warfare strategies and procedures, the predictability of U.S. airpower renders our assets vulnerable to attack or measures which render them ineffective.

Chapter 4

Asymmetric Responses at the Tactical Level

You can't say that civilization don't advance . . . for in every war they kill you a new way.

—Will Rogers

Far removed from places where politicians wrangle and generals pore over maps, soldiers confront one another as they have for millennia. Although the speed, lethality, and scale of war have evolved dramatically, soldiers are still looking for one thing in combat—a relative advantage. This very human instinct to think and react in order to survive drove men to counter mounted knights with longbows and radar with strips of aluminum foil. The genius of man in the face of adversity has always kept technological advantages short lived and illusory—when being shot at, soldiers innovate to survive.

To the junior officers who fly the preponderance of combat missions, enemy strategies at the political and operational level are largely transparent. Caught in the tempo of operations, they fly their assigned missions and eat and sleep when they can. Although oblivious to the grand strategy, they are keenly aware of the tactical situation and, if the enemy is shooting down airplanes, they quickly react. Minimum release altitudes may be adjusted higher, certain platforms may be kept from attacking certain target sets, re-attacks are limited, increased suppression of enemy air defense (SEAD) packages are flown, and shifts from daytime to nighttime sorties are all possible responses. Couple this sensible survival response with America's fixation on low or no-casualty campaigns, public uproar over Americans as prisoners of war, and the sheer expense of destroyed aircraft, and every loss assumes added significance. Not only are pilots likely to change their tactics to counter the threat, but U.S. policy itself can

change.[138] In limited wars, a $50,000 first generation infrared missile has the potential to become a strategic weapon.

The purpose of this chapter is to discuss several tactical-level asymmetric strategies that thinking and reacting enemies are likely to employ in the face of American airpower. Specifically, I will investigate the effectiveness of the Israeli Air Force (IAF) against Hizbulla forces in southern Lebanon in the 1990's, the significance of man-portable infrared missiles and the emerging laser threat against airpower. These cases represent only a few of the options available to an enemy who sees his country, his cause, his life, at stake. Our enemies will try to find a way to counter superior technology and it would be alien to human nature to assume they will not. In a limited conflict, even a small number of tactical victories can fundamentally alter airpower's effectiveness and affect U.S. involvement.

The Israeli Experience

Over the course of her short but tortured history, Israel has witnessed the ebb and flow of relative advantage first hand. In the first 48 hours of the 1967 Six Day War, Israeli pilots gained air superiority by destroying 416 Arab aircraft while losing only 26.[139] However, in 1973 the IAF was shaken when it ran into one of the strongest integrated air defense systems in the world during the Yom Kippur War, losing 102 aircraft and much of its ability to provide timely CAS. The 1982 *Peace for Galilee* campaign saw the momentum swing back to the IAF with Syria forfeiting 86 aircraft to Israel's one in the first week of fighting.

The IAF is widely regarded as one of the finest air forces in the world, and certainly among the most combat proven. From a purely military standpoint, one can envy the clarity of mission enjoyed by Israel's armed forces. To the Israelis, the term "exit strategy" can conjure up a vision of being pushed into the Mediterranean by their Arab neighbors. Armed with advanced technology weapons and the will and sometimes urgent need to use them, Israelis take the battle where they must to ensure their national survival. Israel's neighbors have come to anticipate and grudgingly respect this behavior. While some have made peace, others have adapted to fight more effectively. Egypt and

Jordan count themselves among the former, the fundamentalist Shiite group Hizbulla falls strongly with the latter.

Hizbulla was born in southern Lebanon during *Peace for Galilee*. A radical, fundamentalist Shiite group, Hizbulla is "dedicated to the removal of any and all non-Islamic influences from Lebanon in particular and the whole Middle East region in general."[140] Although Israel's original 1982 goals of restoring peace and order along its northern border were met, the emergence of the Iranian backed and Syrian-supported Hizbulla complicated matters.[141]

Hizbulla's tactics are simple. Primarily using Russian World War II era Katyusha 122-mm unguided rockets, they indiscriminately fire at northern Israeli towns and farms in Galilee. In response, Israel has maintained for almost two decades a security zone in southern Lebanon to counter Hizbulla and reduce the area of Israel subject to rocket attacks. Although this is a low intensity conflict, periodically Israel makes concerted efforts against Hizbulla in a major campaign: Operation *Grapes of Wrath* in 1996 is a recent example.

Israel envisioned a surgical character for *Grapes of Wrath* with Hizbulla's installations, troops, and weapons being targeted. With several UN resolutions condemning Israeli actions and experience with a similar operation in 1993, Israel was very cognizant of international opinion regarding their newest operation. They began by forewarning the local population of the coming attack and by striking positions outside of populated areas.

Hizbulla quickly recognized the self-imposed restrictions on the Israeli Air Force and moved into the villages. The IAF followed them but preceded any bombings with warnings on Lebanese radio. Predictably, subsequent attacks accomplished little as the enemy received the warnings as well. Perhaps anticipating that the Israelis would revert to their historical style of punishment and sensing an opportunity to turn a somewhat pro-Israeli population into Hizbulla supporters, Hizbulla began launching attacks from positions close to public buildings and used public vehicles such as ambulances for transportation. The IAF faced a dilemma in pressing attacks.

Israel chose the high road and declined to conduct a mass bombing campaign. Hizbulla succeeded on two fronts, not only did they keep their combat power intact, but

they were out of even the vaunted IAF's reach, and building credibility by the day. But with Katyusha attacks on Galilee continuing while Israel's strategy foundered, Israel reverted to form and its doctrine of punishing countries that give aid and sanctuary to terrorists. On 19 April 1996, Hizbulla launched yet another attack on Galilee. This time the Israeli Defense Force (IDF) responded with an artillery barrage. But Hizbulla's launch site was 200 yards from a refugee camp, and Israeli rounds killed over 100 civilians, which angered a portion of the Israeli public and permanently destroyed the notion of a surgical operation.

In addition to domestic dissent, the international community was swift in condemning Israel and a cease-fire was arranged shortly thereafter. But the damage did not stop there. Although Hizbulla's actions had brought the Israeli attack, Hizbulla embraced the refugee population and largely succeeded in consolidating support against Israel. The Katyusha strikes resumed—coming from an enemy strengthened by virtue of being attacked. Brigadier General (Ret) Ephraim Segoli of the IAF sums up the situation as follows:

> Even though the mistaken attack was executed by IDF artillery, the lesson was not lost on the air force. A "clean and surgical" operation in this type of war was impossible. Since the terrorists used civilians as human shields, it was not realistic to anticipate only minor casualties. Given this situation, aggressive utilization of airpower, even exclusively with precise munitions, cannot avoid collateral damage and killing civilians.[142]

In battling the Hizbulla, Israel is responding to direct attacks upon its civilian population. Theoretically, the IAF has everything in its favor—good intelligence, technology, experience, and national will. Yet, she is widely viewed as the villain, particularly among her Arab neighbors, the United Nations, and increasingly from Israelis themselves. The rocket attacks continue.

U.S. airpower enters nearly all of its battles lacking many of the advantages listed above. The safety of American civilians is a hypothetical concern most of the time, and, although some facets of intelligence are outstanding, *human* intelligence is generally very limited. National will for limited wars can almost be assumed to be low. Reflecting on the Israeli experience in southern Lebanon as the U.S. continues to strike Iraq and targets

in Kosovo in 1999, one asks whether technology and experience are enough when prosecuting limited war strategies?

MANPADS

The role of man-portable air-defense systems (MANPADS) on the modern battlefield has reached beyond their originally intended mission. Designed initially as a last ditch revenge method to counter aircraft that eluded an integrated air defense system, MANPADS have evolved into sophisticated all-aspect weapons with impressive killing capability.[143] With the Stinger missile, the U.S. military continues to employ MANPADS in a manner consistent with their original design philosophy. However, since no enemy aircraft have attacked American ground troops since the Korean War, the U.S. has not used Stingers in combat.[144]

MANPADS have been fired at U.S. aircraft, however. In the last days of the Vietnam War, Soviet SA-7s appeared and proved effective against mostly helicopters and low, slow flying airplanes. During the 1972 Easter offensive, a single SA-7 hit an AC-130 gunship in Military Region I near Hue. The aircraft was destroyed and the threat of future occurrences kept the gunships out of the operating area.[145] During the Gulf War, thirteen out of 38 coalition aircraft lost were attributed to infrared (IR) SAMs.[146] These losses had an effect on tactics. As the *GWAPS* observed, "Crews bombed from much higher altitudes than those at which they had trained for in order to remain above the effective altitude of the AAA and infrared SAMS." Bombing from higher altitudes resulted in reduced effectiveness of cluster munitions, reduced accuracy of non-PGMs, and greater difficulty in identifying targets.[147]

To view the future of MANPADS in limited war, one should examine the Soviet Union's war in Afghanistan. By 1986, the Soviets were on the verge of defeating their *mujahideen* enemies.[148] Although overall Soviet combat performance was mediocre, airpower was responsible for positioning them for success. In a country as vast and rugged as Afghanistan, the Soviets lacked the manpower and desire to occupy large areas; consequently, airpower was used in place of large troop deployments.[149]

In 1986, the U.S. government supplied Stinger missiles to the *mujahideen* in hopes of denying a Soviet victory. Previously, the Chinese had provided the SA-7 and,

although the *mujahideen* had some success with them, the Soviets quickly countered by equipping their aircraft with flares.[150] Stinger was different. With the ability to reject flares and recognize infrared energy from all aspects, Stinger was instantly effective. During the last three months of 1986, the *mujahideen* shot down an average of one aircraft per day.[151]

The net effect of the Stinger missile is well documented: almost single-handedly it stopped Soviet airpower and the overall Soviet effort in Afghanistan. As one commentator noted, "It is clear that both the psychological and physical impact of the Stinger proved decisive. The very presence of the missile, whether used to full effect or not, forced a fundamental alteration in the nature of Soviet air tactics throughout Afghanistan."[152] The *mujahideen*—an illiterate dispersed band of tribal Asian Muslims—had turned a defensive weapon into an offensive counter air campaign and defeated a nuclear superpower. When viewed as an offensive weapon, MANPADS assumes an entirely different complexion. A country with no air force or IADS can now fight U.S. airpower when and where it chooses. It is an underdog tactic with great potential.

MANPADS are inexpensive and readily available. According to *Aviation Week & Space Technology*, "Shoulder-fired SAMs known to be available on the international black market…include the French Mistral, the U.S. Stinger, and the Russian SA-7, -14 – 16 and –18." Prices range anywhere from $50,000 to $100,000.[153] The legitimate international arms market offers them as well. Stinger has been exported to nineteen different countries and is under license in four more.[154] Additionally, countries such as Yugoslavia have manufactured Soviet MANPADS. As *Jane's Land Based Air Defence* noted, the Strela (SA-7 variant) is "in service with the Croatian militia, Serbian militia, Slovenian Civil Defense, and the army of Yugoslavia, and offered for export."[155] MANPADS are everywhere.

They are also portable. U.S. airpower trains and equips to defeat integrated air defenses (IADS). Fixed SAM sites are readily identifiable. Mobile SAMs have visual and electronic signatures and can be templated according to their doctrinal position within a conventional force. MANPADS do not radiate and can be distributed and carried anywhere—they are simply not a definable target set. Some *areas* are more

conducive to MANPAD launches than others, but entire mountain ranges, jungles, fishing boats, cities, and airport approach/departure corridors are difficult to preemptively suppress.

The Gulf War witnessed coalition attack pilots honoring the MANPAD threat. However, High Value Airborne Assets may have a more difficult time. Although the doctrinal geometry of airspace management safeguards HVAA from attack while on station, assumed within the doctrine is a safe airfield for takeoff and recovery. The previous chapter explored the difficulty of protecting airfields within the effective radius of indirect fire weapons: MANPADS expand this window of vulnerability exponentially. *Jane's* lists the maximum range of most Stinger equivalent missiles in the neighborhood of 14,000 feet. A fully loaded KC-10, AWACS, or Civilian Reserve Air Fleet 747 carrying troops cannot quickly attain such altitudes and will be vulnerable for long periods of time. According to one study, "In normal landing patterns, the danger zone will be about 50 miles long."[156]

Depending on the nature of basing arrangements, there may be very little U.S. airpower can do to counter this threat. As long as mules and men have backs and automobiles have trunks, these weapons can be transported to a firing position. And they are easy to use. The U.S. Army originally considered Stinger user "unfriendly" with only 45% of trained personnel achieving kills. But the Mujahideen, using the weapon under circumstances that they dictated (and disregarding the confusing Identification Friend or Foe feature), greatly improved on this percentage. [157]

The mere possibility of MANPADS changes the behavior of air strategists. Certainly this is a proper reflection of the threat, but planners look beyond the image of a destroyed HVAA to the reaction of the American people to such a loss. Like any good asymmetric strategy, MANPADS as an offensive counter air weapon carry the dual benefits of bringing the fight to the enemy tactically while creating opportunities for political victories as well. If the past is prologue, the downing of even a single HVAA with loss of life would have significant impact on American involvement in most conflicts. A concerted MANPAD effort resulting in multiple kills would be catastrophic to the U.S. effort from the tactical level to the political.

The Laser Threat

The industry journal *Laser Focus World* envisions battlefield roles for lasers not unlike those seen in a multitude of bad science-fiction movies.

> Proliferation of laser weapons will reshape global military balances over the next three decades, neutralizing the power of traditional weapons such as tanks and warplanes and triggering a race among nations to develop better and better laser weapons and defenses against them…Whoever owns the speed-of-light weapons will dominate the battlespace in almost every respect.[158]

They may be right. If high-energy lasers with the ability to burn through metal can be adapted for military use, warfare may be fundamentally altered. The term "time of flight" for munitions will become meaningless—laser "bullets" will travel at the speed of light, 187,281 miles per second.[159] Timely warnings of laser attacks will be difficult to attain; the first inkling a pilot may receive is seeing his wingman's plane explode. On the ground, the perpetual millstone of logistics will become much lighter; as long as the laser has power, it has bullets. With a greatly diminished logistics trail, future commanders may have forces with "tooth-to-tail" ratios last seen on ancient battlefields.

Governments around the world are hedging their bets concerning the above prognosis. China, France, Germany, Israel, Russia, United Kingdom, and the U.S. have deployed or are developing laser weapons.[160] But in the near term, militarized high-energy lasers remain a theoretical problem, while treaties and concerns about arms races may severely check their development.

Low-energy lasers are another matter entirely. Ever since a flight of USAF F-4 Phantoms dropped North Vietnam's Than Hoa bridge in 1972 with laser guided bombs (LGBs), laser target designators, laser rangefinders, and laser pointers have enjoyed a warm welcome in the inventories of militaries around the world.[161] Entire weapons systems are now designed around laser target designators and rangefinders. The F-117 drops LGBs exclusively, while the main gun of the M-1 Abrams tank depends on a laser rangefinder for its superb accuracy. The Marine Corps Intelligence Activity lists 141 different laser rangefinders and 59 laser target designators either in development or deployed around the world.[162]

While these systems are designed as tools to facilitate weapons delivery, they are weapons in and of themselves—not efficient weapons, but they are capable of delivering "soft-kills" on mechanical sensors and the human eye. During the Iran/Iraq war, the Iranians documented over 4,000 eye casualties from Iraqi lasers (most likely tank-mounted laser rangefinders), numbers high enough to indicate their dedicated use in the weapons mode.[163] In Afghanistan, Soviet use of lasers as weapons was so frequent that a press report stated "that the area has become a concentrated test bed."[164]

U.S. pilots have been on the receiving end of laser energy as well. In the late 1980s, pilots of P-3s and KC-135s were "lased" by Soviet ships. Aircraft sent to intercept Soviet aircraft also reported incidents. [165] The most recent instance occurred during a 1998 peacekeeping mission. Two American helicopter pilots flying over Bosnia suffered minor corneal burns when a laser was pointed at them from the ground. A search of the residential area where the beam came from turned up several *toy* lasers. [166]

Lasers typify the military's growing problem with dual-use technology. Besides being abundantly available on the battlefield, lasers are found in classrooms, supermarkets, and operating rooms. These systems receive little export oversight, and it does not take a gifted scientist to convert some of them into blinding weapons. Although coalition troops were not exposed to enemy lasers during the Gulf War, international trends indicate that we should prepare to see them on a large scale in future conflicts.

Protecting eyes and sensors from laser energy is a difficult task. Lasers work in highly specific visible portions of the electromagnetic spectrum. Laser eye protection must filter that wavelength to be effective—in so doing, that portion of the visible spectrum is lost to the eye. There are several "popular" wavelengths for lasers however, and to protect against all of them, a significant amount of visible light is filtered. For pilots, this poses a problem as "the need for laser protection is always in conflict with the requirements for unlimited visibility in day and night combat situations."[167] As lasers evolve, laser eye protection will have to adapt to agile lasers that hop from wavelength to wavelength—pilots may spend much more time with a large paper map in front of their face "navigating" when flying around the laser threat.

Night Vision Goggles (NVGs) provide a fair degree of laser eye protection, but a laser shot in the photocathode tube severely damages the goggle, rendering the pilot non-

mission capable while dealing with this inflight emergency. Other sensors on the aircraft are equally vulnerable to lasers. FLIRs can be damaged in the same manner as NVGs, and most laser target designators operate through a FLIR system, again taking an aircraft out of the attack mode if the FLIR is damaged. Of greater concern are direct view optics. These targeting systems are essentially high-powered binoculars that enable a pilot to acquire targets at long range. Laser energy entering direct view optics is magnified to whatever level the pilot has selected, almost guaranteeing severe eye damage.

There has been a fair degree of international discussion on the role of lasers in war. The 1980 Blinding Laser Protocol to the United Nations Conventional Weapons Convention has mixed news for combatants. Article 1 states "It is prohibited to employ laser weapons specifically designed, as their sole combat function or as one of their combat functions, to cause permanent blinding to unenhanced vision."[168] Assuming combatants pay attention to this protocol, this is good news for ground troops, although the caveat concerning "permanent blinding" is quite a loophole. [169]

Article 3 is bad news for aircrew: "Blinding as an incidental or collateral effect of the legitimate military employment of laser systems, including laser systems used against optical equipment, is not covered by this protocol." The fact that virtually all combat aircraft use some type of optical equipment makes them fair game; that human eyeballs happen to be in close proximity to those optics is another matter. At the Certain Conventional Weapons Conference held in Vienna in 1995, the 1980 protocol was essentially renewed.[170]

In a sense, the legal wrangling over the anti-personnel role of lasers is confusing. There have been no initiatives to ban other far more lethal weapons such as missiles and machine-guns. News reports give headline coverage to laser incidents but barely mention other threats. By merely blinding someone and removing him or her from combat, is the laser actually a more humane approach to war? Actuarially, the answer is probably yes. Psychologically, it seems to be no. Superior eyesight is the first hurdle a military pilot must cross in order to earn his wings, and pilots are notoriously vain regarding their vision. The threat of losing one's eyesight is unnerving to anyone; to a pilot there is more at stake—he will probably never fly again. He will either lose control and crash a perfectly good airplane, eject, or be permanently grounded by a weapon that he could

neither see nor hear. World War II bomber crews dealt with many personal demons on their harrowing missions over occupied Europe. Most of them accepted the Luftwaffe fighter threat—they could see them and fire on them, however ineffectively. The threat that bothered aircrews the most was flak. Random black puffs which could indiscriminately knock any member out of the formation at a moments notice—and there was nothing they could do about it.

The laser threat is similar to flak. If an enemy uses lasers against aircraft, they are likely to be effective in causing casualties and mission aborts, and in a war where an enemy has this option to strike back, we should certainly expect it. But the laser's greatest impact will occur behind a pilot's eyes. Individual pilots will have to deal with this new threat of injury within their own personal risk calculus, and their answers will not be readily apparent on a Heads Up Display (HUD) video or BDA reports. Without adequate protection and countermeasures, threats of this type can insidiously rob airpower of the results its equipment can so accurately deliver.

Conclusion

In the early 1980's, newly commissioned Second Lieutenants at the Marine Corps' Basic School were given sweeping advice on how to request fire support. "Ask for the main guns of the battleship USS *New Jersey;* maybe you'll get it, maybe you won't, but start there and work your way down before attacking a position." With the vision of nine sixteen-inch guns firing for a rifle platoon, instructors effectively communicated the concept of relative advantage at the tactical level.

What they failed to communicate were the "what ifs." What if the enemy is located next to a refugee camp? What if I do not know who or where the enemy is? What if the law of war and my own ethics prohibit me from using the same tactics that are being used against me? What if an enemy with his back against the wall finds a way to counter the technology that I am depending upon to win a limited war?

The USS *New Jersey* is in mothballs; likewise, so should be many of the tactics that the conventional U.S. military brings to limited wars. The example of Hizbulla and the Israeli Air Force is particularly instructive for U.S. airpower. Hizbulla's main weapon system remains the archaic, inaccurate, truck-mounted Katyusha rocket. The IAF brings

some of the world's finest technology, training, and experience to bear, yet Hizbulla emerges from the experience as a capable fighting force.

Few nations have demonstrated the absolute will to protect their citizens better than Israel. By breaking the Law of War and putting noncombatants at risk, Hizbulla discovered a loophole in that will and greatly degraded the IAF's ability to influence events in southern Lebanon. If Hizbulla acquires shoulder fired infrared missiles, they could stop the IAF entirely—or at least significantly reduce its capabilities. MANPADS are a threat that U.S. airpower has only been exposed to in conventional scenarios. Even within this arena, they have proven themselves extremely effective in killing aircraft and altering airpower tactics. That is the "good news." The bad news will come when an adversary adopts tactics like those used in Afghanistan against Soviet airpower. By standing the defensive concept of MANPADS on its head, and turning the Stinger missile into an offensive counter air weapon, the Mujahideen snatched an unqualified victory from probable defeat.

If any country had the ability to keep the Stinger threat contained, it was the Soviet Union. But even with a tightly controlled press and brutal scorched earth tactics, Stinger attacks increased and the trickle of bad news returning to the homeland turned into a torrent. In the airport traffic area of a coalition country, news crews are likely to capture catastrophe on film and broadcast it home in near real-time. Americans may tolerate an isolated incident of this nature, but a successful campaign of MANPAD attacks on HVAA will have severe effects on aircrew and citizens alike.

Americans are already upset at the idea of lasers being used in an anti-personnel role, but this is likely to carry little weight in future conflicts. Lasers are so ubiquitous in modern weaponry and business that keeping them contained to their originally intended role will prove difficult. Couple their current effectiveness with their relatively low cost and tremendous growth potential and lasers may eventually live up to their Hollywood image as decisive weapons. In the meantime, the lasers that are currently fielded are eminently capable of influencing airpower by damaging sensors and the tactics and morale of our pilots.

Tactically, U.S. airpower will face great difficulties in overcoming the asymmetric threat. Technology has made airline travel a decidedly safe mode of transportation, yet

disaster sometimes intervenes in the form of weather, human factors, or bad engineering. In combat aviation, pilots must face these same factors in addition to the dangers that thinking and reacting enemies—diametrically opposed to our will—place in our way. The combination of the two presents an imposing challenge.

Chapter 5

Conclusions

Air power is an unusually seductive form of military strength because, like modern courtship, it appears to offer the pleasures of gratification without the burdens of commitment.

—Revolution in Warfare? Air Power in the Persian Gulf

The road to America's airpower preeminence began in the stalemated trenches of World War I. Witnessing the pure carnage and waste that modern weaponry inflicted on conventional armies, men like Giulio Douhet, Hugh Trenchard, John Slessor, and Billy Mitchell envisioned the airplane as a means to leap over static trenchlines and return decisiveness to war. The history of U.S. airpower has been fairly straightforward ever since. Technology begets better technology, while airmen temper themselves and their machines with hard training and actual combat. As a result, U.S. airpower stands ready today to decisively wreak havoc on our enemies and literally erase civilizations, if so ordered.

The Holy Grail of airpower is decisiveness. The same can be said for the Greek hoplites 2,500 years ago. Western civilizations view war as a necessary evil that must be decided as quickly as possible. Clausewitz's quest for decisive battle directly reflected this thinking—so does the development of the F-22 and Joint Strike Fighter.

The rub in the last days of the 20th Century is that conventional Western-style conflicts have turned into something of a niche market in the business of war. U.S. airpower arrives in a Cadillac to quell disturbances around the world, but our enemies are mixed in the traffic on motorcycles and mopeds—or walking. Americans demand a fair fight—right now—so they can get it over with and go home. As noted in the preceding chapters, opponents may not be so accommodating.

Fair fights mean different things to different people. As the saying goes, "one man's terrorist is another man's freedom fighter." For U.S. airpower, the fair fight is at altitude. However, our adversaries are not concerned with fair fighting. First, the concept may be alien to their culture; and second, they might perceive that their very existence is at stake. With such asymmetries of interest and technological capability, the asymmetric fight that follows should not be surprising.

As a model, this study organized potential asymmetric strategies along the political, operational, and tactical levels of war. The reality of conflict is not as clear-cut. Asymmetric strategies are additive, and the whole strategy is greater than the sum of its parts. The smart enemy will fight asymmetrically across the spectrum of war, using what one commentator called "combined arms asymmetry."[171]

This combined arms strategy can begin well before U.S. airpower arrives in theater. While every conflict is unique, post-World War II history reveals some predictable political patterns among technologically weaker adversaries, regardless of their location or cause. In descending order, our foes will attempt to deter U.S. involvement, encourage us to discontinue intervention, and finally wear out U.S. resolve and interest if we do become involved.

U.S. involvement in a limited war is never a given. Somalia and Kosovo do not deliver images of threatened vital interests to most Americans. Among the citizenry, support for limited wars requires a governmental appeal. There are many ways that an enemy can interfere with this process. At the political level, skillful use of the media routinely chips away at America's credibility, while the successful destruction of coalitions can result in a greatly weakened American presence, regardless of our motivation. Operational and tactical events can take on political meaning as well; in the wake of the Al Firdos bunker strike, note the effect that two legally dropped bombs had on the nature of *Desert Storm*'s air campaign.

Operationally, the field of asymmetric options widens considerably and, although this study discussed several—anything is possible. Successfully attacking high value airborne assets on airfields or ships promises operational and potential political rewards for our enemies. The word "airborne" in HVAA is telling. We assume that these high value assets are most vulnerable when they are flying, despite their positions in

sanctuaries protected by the world's leading air force. HVAA are certainly most valuable when airborne, but they are most vulnerable when their landing gear is down and locked—whether in the airport traffic area or on the deck. Visibly absent from the discussion, but no less threatening, is the prospect of weapons of mass destruction and information warfare being targeted at airpower.

At the operational and tactical level of war, the capability of our enemies to frustrate U.S. airpower has been amply demonstrated for almost half a century. Superbly armed and trained for conventional fights, airpower remains vulnerable to a variety of deception techniques and may cause as many problems as it can solve in the urban environment. Hizbulla has followed a well-traveled 20th Century path by willingly placing noncombatants at risk to shield themselves from air strikes. If such a tactic can stymie the Israeli Air Force in their own backyard, we are certain to be faced with similar scenarios in the future.

Most asymmetric methods are inexpensive. Shoulder launched infrared missiles can be purchased for less than $100,000 and destroy aircraft worth many times that amount. As an offensive weapon, these systems reinvented irregular warfare in the mountains of Afghanistan. Lasers were discussed as an example of dual use threats easily adaptable for battlefield use. As police forces and military organizations around the world become more interested in non-lethal technologies, threats of this sort could become much more prevalent in the future.

Has the United States adequately prepared itself to counter asymmetrical measures against its air power assets? For a variety of reasons, the answer is "no."

With the American aversion to casualties and the historical difficulties in extracting troops once committed, policymakers have saddled airpower with everything from nuclear retaliation to feeding refugees. However, airpower cannot be thrown with equal effectiveness across this spectrum of missions. U.S. airpower will decisively affect any conventional conflict America becomes involved in—this is the threat the entire inventory was designed and built around. But in many instances of limited war, thrusting airpower alone at the problem is a losing proposition, and invariably exposes the force to the threats described in this work.

Contextual elements have played a large role in rendering airpower vulnerable to the asymmetric measures discussed. The international stability that was present during the Cold War prevented strategists from experiencing the variety of situations seen since the collapse of the Soviet Union. In Europe and Korea, the United States military faced a very real conventional threat, and rightfully concentrated on defeating it. The force we employ today is a direct reflection of that era.

The Vietnam War provided a useful glimpse into the future, but many in the military looked the wrong way and learned the wrong lessons. Instead of concentrating on the implications of fighting a non-conventional war, many in the U.S. military largely subscribed to the post-World War I German equivalent of the "stab in the back" theory, blaming politicians and the media for not allowing them to prosecute the war in Clausewitzian fashion.[172]

During the Gulf War, a generation of Vietnam era officers arrived at the helm of the U.S. military and were given a freer reign than that granted in Vietnam. The events of that spectacularly decisive war seemed to vindicate the military's thesis of political incompetence in Vietnam; but, as the decade has progressed, evidence is mounting that *Desert Storm* was the anomaly—not Vietnam. As U.S. airpower proceeds along a high technology path for a conventional war in the stratosphere, the wrong lesson may have been learned.

The psychological bent of Americans does not lend itself to thinking about asymmetric threats. The British say they won their Napoleonic battles on the playing fields of Eaton, but egalitarian Americans were taught similar lessons from West Point to Boy Scout troops to inter-city basketball courts. Americans learned about the importance of teamwork and sportsmanship in life, and quite naturally carried these concepts to war under conditions of life and death. In combat, teamwork is essential, but sportsmanship is an unaffordable luxury for a poor nation likely to oppose the U.S.

The asymmetric threat is largely a cultural issue, which technology can only counter to a degree. *Joint Vision 2010*, the DOD roadmap to military success in the 21st Century, waxes eloquently about "full spectrum dominance"—a technological chicken-in-every-pot strategy. None of *Joint Vision 2010*'s tenets comes close to dealing with asymmetric dilemmas at the political level, and only a single paragraph and one-half of a page are

focused on coalitions and the enemy respectively. As *Washington Times* syndicated columnist Georgie Anne Geyer observed, "The most crucial element is still being left out of our military and foreign policy planning. This is cultural knowledge of the enemy, and the ability to predict, to foresee or finally to act in concert with reality."[173]

Ms. Geyer could have also mentioned the element of training. At Red Flag, Top Gun, the Army's National Training Center, and the USMC Aviation Weapons and Tactics Instructor Course, America's military trains under intense conditions for conventional war. To sharpen the combat edge, these exercises pit aircrew against world-class opposing forces (Opfor)—which fight in a conventional manner. There is no world-class opposing force for asymmetric warfare, nor a third rate one for that matter.

The DOD does not have an asymmetric Opfor. Contextual, psychological, and cultural explanations aside, the simple reason for this shortfall is that training for asymmetric threats is difficult. In order to train properly, it will be rather expensive as well. The Opfor the U.S. military needs must look beyond Navy SEAL teams sneaking past sentries, and rote intelligence briefs that feign to increase awareness by merely announcing a higher "threat condition."

A good Opfor will bring personnel who have been immersed in various countries, cultures, and conflicts to inject their knowledge into training scenarios. As a beginning, the Foreign Area Officer program should be expanded, with officers pursuing this specialty receiving enhanced career support for their decision. Promotion and pay incentives should be established for personnel who demonstrate a level of foreign language proficiency, and the list could go on. A good Opfor will require attention and support from the highest levels of command. Although training does not fall under a CINC's bailiwick, as the employer of airpower he has a vested interest in making sure aircrews have trained for all contingencies. CINCs are in a powerful and visible position to communicate the need for asymmetric training. U.S. airpower must begin to train beyond the point where a pilot calls "knock it off," because this is when the fight is likely to really begin.

By mostly ignoring the asymmetric threat, the U.S. military defaults to a one size fits all style of conventional war. Consequently, when confronted with situations at the tactical, operational, or political levels of war, Americans instinctively execute the

organizational repertoires described almost thirty years ago in Graham T. Allison's classic *Essence of Decision*.[174] But Allison merely put a name to an old phenomenon; in the words of Marshal Maurice Comte de Saxe 240 years ago, "in default of knowing how to do what they ought, [they] are very naturally led to do what they know."[175]

"Doing what we know" works well when pre-flighting an aircraft or responding to an in-flight emergency. When piecing together a coalition or transiting the Suez Canal however, our imagination must be as open as the enemy's. In Afghanistan, the Soviet Union executed its doctrinal repertoire with traditional heavy-handedness and reaped the rewards. In Southern Lebanon, the Israelis did what they knew, and created a more dangerous enemy. As U.S. airpower enters the 21st Century, air strategists will inevitably look forward to new technologies and the ability to find, fix, target, track, and destroy any enemy—but an enemy in a sportsmanlike conventional war.

Strategists need to take more than a cursory glance at the past. In this century, Americans have fought much weaker opponents in the Philippines, Latin America, the Caribbean, Asia, Africa, and now the Balkans. Few of these fights have been conventional, fewer still have fully met pre-hostility objectives, and only the Gulf War resulted in a ticker-tape parade. The military theorist Martin van Creveld issues some simple guidance to policymakers who would dabble in limited wars, "He who is wise should never engage the weak for any length of time. He who, whether through his fault or that of others, is already involved in such a situation should consider ways to end it as fast as possible."[176] As General Charles C. Krulak warns, "A symmetrical and overwhelming approach by a dominant power . . . always . . . always . . . invites an asymmetrical response."[177] From the Philippine *insurrectos* in 1900 to Somali "Technicals" almost a century later, van Creveld's and Krulak's observations remain valid. As U.S. airpower soars into the 21st Century, the realities of asymmetric warfare will be present throughout our assigned missions. It is incumbent upon strategists to acknowledge and accept these realities, then plan and train accordingly.

Bibliography

Allison, Graham T. *Essence of Decision: Explaining the Cuban Missile Crisis*. United States: Harper Collins Publishers, 1971.

Ambrose, Stephen E. *Duty, Honor, Country: A History of West Point.* Baltimore: The Johns Hopkins Press, 1966.

Anderberg, Major General Bengt and Wolbarsht, Dr. Myron L. *Laser Weapons: The Dawn of a New Military Age*. New York: Plenum Press, 1992.

Bennett, Bruce W., et al. *Theater Analysis and Modeling in an Era of Uncertainty: The Present and Future of Warfare.* Santa Monica: RAND Corp., 1994.

Charters, David A. and Tugwell, Maurice, A. *Deception Operations: Studies in the East-West Context*. New York: Brassey's, 1990.

Cain, Major Anthony Christopher, et al. "Stopping US Airpower." Research Report no. 95-05. Maxwell AFB, Ala.: Air Command and Staff College, 1995.

Clausewitz, Carl Von. *On War*. Edited and translated by Michael Howard and Peter Paret. Princeton, N.J.: Princeton University Press, 1976.

Cohen, Dr. Eliot A., dir. *Gulf War Air Power Survey*. Washington, D.C.: U.S. Government Printing Office, 1993.

Conversino, Mark J. "The Changed Nature of Strategic Attack." *Parameters* XXVII, no. 4 (Winter 1997-98): 28-41.

Cullen, Tony and Foss, Christopher F. *Jane's Land Based Air Defence*. London: Butler and Tanner Ltd., 1994.

Czerwinski, Thomas J. "Asymmetrical Threats." *Marine Corps Gazette* 83, no. 4 (April 1999): 87-88.

Douhet, Giulio. *The Command of the Air*. USAF Warrior Studies. Edited by Richard H. Kohn and Joseph P. Harahan. New imprint, Washington, D.C.: Office of Air Force History, 1983.

Dunnigan, James F. and Nofi, Albert A. *Victory and Deceit: Dirty Tricks at War*. New York: W. Morrow, 1995.

Ellis, John. *The Social History of the Machine Gun.* New York: Pantheon Books, 1975.

Freeman, Maj Gen Waldo D. et al. "The Challenges of Combined Operations." *Military Review* 72, no. 11 (November 1992): 2-11.

Futrell, Robert Frank. *Ideas, Concepts, Doctrine: Basic Thinking in the United States Air Force, 1907-1960. Vol. 1.* Maxwell AFB, Ala.: Air University Press, 1989.

Galdorisi, Captain George, USN. "The United States and the Law of the Sea: Changing Interests and New Imperatives." *Naval War College Review* 49, no. 4 (Autumn 1996): 23-43.

Garrity, Patrick. "Implications of the Persian Gulf War for Regional Powers." *The Washington Quarterly* 16, no.3 (Summer 1993): 153-170.

Geyer, Georgie Anne. "Domain of Many Challenges." *Washington Times*, 26 April 1997, D-10.

Glenn, Russell W. *Marching Under Darkening Skies: The American Military and the Impending Urban Operations Threat*. Santa Monica, Ca.: RAND Corp, 1998.

Gordon, Michael R. and Trainor, General Bernard E. *The Generals' War: The Inside Story of the Conflict in the Gulf*. Boston: Little, Brown and Company, 1995.

Goure, Daniel and Szara, Christopher M., ed. *Air and Space Power in the New Millenium*. Washington, D.C.: The Center for Strategic and International Studies, 1997.

Green, L.C. *The Contemporary Law of Armed Conflict*. Manchester: Manchester Univ. Press, 1993.

Guilmartin, John F. Jr. *A Very Short War: The* Mayaguez *and the Battle of Koh Tang.* College Station: Texas A&M University Press, 1995.

Hanson, Victor Davis. *The Western Way of War: Infantry Battle in Classical Greece.* New York: Alfred A. Knopf, 1989.

Herman, Paul F. Jr. "Asymmetric Warfare: Sizing the Threat." *Low Intensity Conflict and Law Enforcement* 6, no. 1 (Spring 1997): 176-183.

Herzog, Chaim. *The Arab-Israeli Wars*. New York: Vintage Books, 1984.

Hitti, Philip K. *Makers of Arab History*. New York: St. Martin's Press, 1968.

Horne, Alistair. *A Savage War of Peace: Algeria 1954-1962*. New York: Penguin Books, 1979.

Johnson, Wray R. "War, Culture, and the Interpretation of History: The Vietnam War Reconsidered." *Small Wars and Insurgencies* 9, no.2 (Autumn 1998): 83-113.

Karnow, Stanley. *Vietnam: A History*. New York: Penguin Books, 1984.

Keaney, Thomas A. and Cohen, Eliot A. *Revolution in Warfare? Air Power in the Persian Gulf*. Annapolis: Naval Institute Press, 1995.

Kemp, Geoffrey and Harkavy, Robert E. *Strategic Geography and the Changing Middle East*. Washington, D.C.: Brookings Institution Press, 1997.

Leckie, Robert. *The Wars of America*. New York: Harper Collins Publishers, 1992.

Little, Michael R. *A War of Information: The Conflict Between Public and Private U.S. Foreign Policy in El Salvador, 1979-1992*. Lanham: University Press of America, 1994.

Mahnken, Thomas G. "America's Next War." *The Washington Quarterly* 16, Number 3 (Summer 1993): 171-184.

Mark, Eduard. *Aerial Interdiction in Three Wars*. Washington, D.C.: Center for Air Force History, 1992.

Marshall, Thomas J., Kaiser, Phillip, and Kessmeier, Jon. *Problems and Solutions in Future Coalition Operations*. Carlisle Barracks, Pa.: U.S. Army War College, 1997.

Matthews, Lloyd J. ed. *Challenging the United States Symmetrically and Asymmetrically: Can America be Defeated?* Carlisle Barracks, Pa.: Strategic Studies Institute, 1998.

Mitchell, William. *Winged Defense: the Development and Possibilities of Modern Air Power Economic and Military*. New York: Dover Publications, Inc., 1925, 1988.

McMichael, Scott, R. *Stumbling Bear: Soviet Military Performance in Afghanistan*.. London: Brassey's, 1991.

Mueller, John. *Policy and Opinion in the Gulf War*. Chicago: The University of Chicago Press, 1994.

Nagy, Lieutenant Commander Paul N. USNR. "Access is Key to Power Projection." *U.S. Naval Institute Proceedings* 125, no. 2 (February 1999): 58-61.

Nawroz, Mohammed Yahya and Grau, Lester W. *The Soviet War in Afghanistan: History and Harbinger of Future War*. Fort Leavenworth, Ks.: Foreign Military Studies Office, 1993.

O'Balance, Edgar. *Afghan Wars 1839-1992: What Britain Gave Up and the Soviet Union Lost*. London: Brassey's, 1993.

Record, Jeffrey. *Hollow Victory: A Contrary View of the Gulf War*. Washington, D.C.: Brassey's (US), 1993.

Schaffer, Marvin B. *Concerns About Terrorists With Manportable SAMS.* Santa Monica, Ca.: RAND Corp., 1993.

Shlapak, David A. and Vick, Alan. *"Check Six Begins on the Ground:" Responding to the Evolving Ground Threat to U.S. Air Force Bases.* Santa Monica, Ca.: RAND Corp., 1995.

Schlapak, David A and Thaler, David E. *Back to First Principles: U.S. Strategic Forces in the Emerging Environment*. Santa Monica, Ca.: RAND Corp., 1993.

Segoli, Brig. Gen. (Ret.) Ephraim, IAF. "The Israeli Lebanese Dilemma: Israeli Airpower and Coercive Diplomacy in Lebanon." Paper presented to the School of Advanced Airpower Studies. Maxwell AFB, Ala.: 1998.

Sheehan, General John J., USMC. "Building the Right Military for the 21st Century." *Strategic Review* XXV, no. 3 (Summer 1997): 5-13.

Snow, Donald M. and Drew, Dennis M. *From Lexington to Desert Storm, War and Politics in the American Experience*. Armonk, N.Y.: M.E. Sharpe Inc., 1994.

Tuchman, Barbara W. *The March of Folly: From Troy to Vietnam.* New York: Alfred A. Knopf, 1984.

Van Creveld, Martin. *The Transformation of War*. New York: The Free Press, 1991.

Van Creveld, Martin. *The Sword and the Olive: A Critical History of the Israeli Defense Force.* New York: Public Affairs, 1998.

Vick, Alan. *Snakes in the Eagle's Nest: A History of Ground Attacks on Air Bases*. Santa Monica, Ca.: RAND Corp., 1995.

Tiwathia, Major Vijay. *The Grenada War: Anatomy of a Low Intensity Conflict.* New Delhi: Lancer International, 1987.

Tonelson, Alan. "The Persian Gulf: Still Mired." *The Atlantic Monthly* 271, no. 6 (June 1993): 48-52.

Warden, Col. John A., USAF. *The Air Campaign*. Washington, D.C.: Pergamon: Brassey's, 1989.

Westermann, Major Edward B., USAF. "The Limits of Soviet Airpower: The Bear Versus the Mujahideen in Afghanistan, 1979-1989." Student thesis presented to the faculty of The School of Advanced Airpower Studies (Maxwell AFB. Ala.: School of Advanced Airpower Studies, 1997).

---

[1] Quoted in Lance Morrow, "Triumphant Return," *Time*, 18 March 1991, 23.

[2] India's Chief of Staff was quoted as saying that the main lesson of the Gulf War is "never fight the U.S. without nuclear weapons." Les Aspin, "National Security in the 1990's: Defining a New Basis for U.S. Military Forces," paper presented to the Atlantic Council of the United States, Washington, D.C., 6 January 1992.

[3] Bruce W. Bennett et al., *Theater Analysis and Modeling in an Era of Uncertainty: The Present and Future of Warfare* (Santa Monica, Ca.: RAND Corp., 1994), xvii.

[4] Patrick Garrity, "Implications of the Persian Gulf War for Regional Powers," *The Washington Quarterly* 16, no.3 (Summer, 1993): 163.

[5] Victor Davis Hanson, *The Western Way of War: Infantry Battle in Classical Greece* (New York: Alfred A. Knopf, 1989), 15.

[6] Ibid., 225.

[7] Ibid., 225, xv.

[8] For a complete discussion of this proposition see Wray R. Johnson, "War, Culture, and the Interpretation of History: The Vietnam War Reconsidered," *Small Wars and Insurgencies* 9, no. 2 (Autumn 1998): 83-113.

[9] John Ellis, *The Social History of the Machine Gun* (New York: Pantheon Books, 1975), 102.

[10] Ibid., 81.

[11] Stephen E. Ambrose, *Duty, Honor, Country: A History of West Point* (Baltimore: The Johns Hopkins Press, 1966), 275.

[12] The U.S. Army began the 20th Century with a guerilla war against Emilio Aguinaldo's Philippine *insurrectos*. With over 4,000 Americans killed in a three year period, soldiers were stunned by the barbaric tactics of their enemy and "became what they fought," committing atrocities of their own and distancing the American public's support for the conflict. A Kiplingesque poem from the period speaks volumes: "We've taken up the white's man's burden, Of ebony and brown; Now will you tell us, Rudyard, How we may put it down?" Robert Leckie, *The Wars of America* (New York: Harper Collins Publishers, 1992), 569-574.

[13] Hanson, 13.

[14] See Charles J. Dunlap Jr., "Asymmetrical Warfare and the Western Mindset," in *Challenging the United States Symmetrically and Asymmetrically: Can America be Defeated?*, ed. Lloyd J. Matthews (Carlisle Barracks, Pa.: U.S. Army War College, 1998), 6. Dunlap questions whether WMD is an asymmetric threat at all: "In interstate war, the U.S. has a decisive advantage in this arena. In a very real sense, using WMD against the U.S. . . . would represent an ill-considered attempt to match the West symmetrically."

[15] Matthews, 111.

[16] "DOD Dictionary of Military Terms," *Joint Doctrine,* 18 March 1999, *n.p.;* on-line, Internet, 22 March 1999, available from www.dtic.mil/doctrine/jel/doddict/.

[17] *The New Lexicon Webster's Dictionary of the English Language* (New York: Lexicon Publications, Inc., 1988), 58.

[18] For example, infantry are most vulnerable when being transported. On 14 November 1942, as Admiral Raizo Tanaka's destroyers escorted eleven Japanese troop transports through the New Georgia Sound ("the Slot") of the Solomon Islands, they were attacked by U.S. dive bombers, torpedo planes, B-17's, and surface forces. Only four of

the transports survived to beach themselves on Guadacanal, and these too were subsequently destroyed, leaving the surviving 2,000 troops without supplies. As a result of this action, U.S. Marines on Guadacanal were spared the task of fighting thousands of additional Japanese troops. John Costello, *The Pacific War 1941-1945* (New York: Quill, 1982), 369-372.

[19] Paul F. Herman, "Asymmetric Warfare: Sizing the Threat," in *Low Intensity Conflict and Law Enforcement* 6, No.1 (Spring 1997), 176.

[20] William Mitchell, *Winged Defense: The Development and Possibilities of Modern Airpower—Economic and Military* (1925; reprint, New York: Dover Publications, Inc., 1981), 181.

[21] Ronald R. Fogelman, "Introduction," in *Air and Space Power in the New Millennium* eds., Daniel Goure and Christopher M. Szara (Washington, D.C.: The Center for Strategic and International Studies, 1997), xxvii.

[22] Daniel Goure and Christopher M Szara, "The Coming of Age of Air and Space Power," in ibid., 3.

[23] Donald J. Mrozek, "Asymmetric Response to American Air Supremacy in Vietnam," in Matthews, 80.

[24] Guenter Lewy, "Deception and Revolutionary Warfare in Vietnam," in *Deception Operations: Studies in the East-West Context*, eds. David A. Charters and Maurice A.J. Tugwell (London: Brassey's, 1990), 171.

[25] "DOD Dictionary of Military Terms," *Joint Doctrine*, 18 March 1999, n.p.; on-line, Internet, 22 March 1999, available from www.dtic.mil/doctrine/jel/doddict/data/s/05794.html.

[26] Even in 1975, technology had delivered the capability for politicians to monitor and make decisions concerning on-going military operations. The order for combatants to disengage from combat on Koh Tang Island during the *Mayaguez* crisis was "issued directly from the White House almost immediately upon receipt of news that the crew had been recovered." John F. Guilmartin, Jr., *A Very Short War: The* Mayaguez *and the Battle of Koh Tang* (College Station: Texas A&M University Press, 1995), 107.

[27] This is not a new concept. Prior to World War II, services clearly recognized the influence of politics on war. "It is the duty of our statesmen to define a policy relative to international relationships and provide the military and naval establishments with the means to carry it into execution. With this basis, the military and naval authorities may act intelligently in the preparation of war plans in close cooperation with the statesman. There is mutual dependence and responsibility which calls for the highest qualities of statesmanship and military leadership. *The initiative devolves upon the statesmen.*" (emphasis added.) *Small Wars Manual* (1940; reprint, Washington, D.C.: Dept. of the Navy, 1987), 1-2-2.

[28] Bennett, xvii.

[29] Donald M. Snow and Dennis M. Drew, *From Lexington to Desert Storm, War and Politics in the American Experience* (Armonk, NY: M.E. Sharpe Inc., 1994), 332.

[30] "DOD Dictionary of Military Terms," *Joint Doctrine*, 18 March 1999, n.p.; on-line, Internet, 22 March 1999, available from www.dtic.mil/doctrine/jel/doddict/data/p/04812.html.

[31] Charters and Tugwell, 7.

[32] *The Qur'an*, trans. M.H. Shakir (Elmhurst, N.Y.: Tahrike Tarsile Qur'an, Inc., 1988), 24-26. The Koran makes allowances for days of the *Ramadan* fast that are missed due to illness, travel, or "difficulty." Specifically, Surah II:194 states: "The Sacred month…and all sacred things are (under the law of) retaliation; whoever then acts aggressively against you, inflict injury on him according to the injury he has inflicted on you…" The Prophet Muhammad himself initiated an attack "on a day of *Ramadan* (mid-March 624), during the "holy truce" against members of the Umayyah clan. Phillip K. Hitti, *Makers of Arab History* (New York: St. Martin's Press, 1968), 14.

[33] "Russell, Bertrand Arthur" and "Sartre, Jean-Paul," *Microsoft Bookshelf Encyclopedia 98*, CD-ROM, Microsoft Corp., 1997. Also, Charters and Tugwell, 178.

[34] Charters and Tugwell, 179.

[35] Ibid.

[36] Ibid., 180.

[37] Ibid., 181.

[38] Ibid., 181.

[39] James S. Corum, "Inflated by Air: Common Perceptions of Civilian Casualties from Bombing," Research Report no. 080/1998-04 (Maxwell AFB, Ala.: Air War College, 1998), 29-30.

[40] Barbara W. Tuchman, *The March of Folly: From Troy to Vietnam* (New York: Alfred A. Knopf, 1984), 335.

[41] Mark Clodfelter, *The Limits of Airpower* (New York: The Free Press, 1989), 194-195.

[42] "DOD Dictionary of Military Terms," *Joint Doctrine*, 18 March 1999, n.p.; on-line, Internet, 22 March 1999, available from http://www.dtic.mil/doctrine/jel/doddict/data/c/01184.html.

[43] Ecclesiastes 1:9.

[44] Thomas J. Marshall, *Problems and Solutions in Future Coalition Operations* (Carlisle, Pa.: Strategic Studies Institute, 1997), 1.

[45] Major General Waldo D. Freeman et al, "The Challenges of Combined Operations," *Military Review*, (U.S. Army Command and General Staff College, 1993). The "typical" text they cite is Henry Kissinger's *The Troubled Partnership: a Reappraisal of the Western Alliance* (NY: McGraw Hill, 1965), 11.

[46] Freeman, 6.

[47] Excerpted from "Address by President Reagan on Lebanon and Grenada," 27 October 1983, in Major Vijay Tiwatha, *The Grenada War: Anatomy of a Low Intensity Conflict* (New Delhi: Lancer International, 1987), 223.

[48] *Toward the Future: Global Reach—Global Power, U.S. Air Force White Papers, 1989-1992* (Washington, D.C.: Department of the Air Force, 1993).

[49] An average of 2,697 sorties were flown by U.S. and allied aircraft per day during *Desert Storm*, with sorties peaking on 24 Feb 91 at 3,280. Dr. Eliot A. Cohen, dir., *Gulf War Airpower Survey: Vol V* (Washington D.C.: U.S. Government Printing Office, 1993), 234.

[50] Department of Defense, *Conduct of the Persian Gulf War: Final Report to Congress* (Washington, D.C.: United States Department of Defense, 1991), P-2.

[51] Ibid, P-3.

[52] Stephen C. Pelletiere, "Regional State Competitors: The Case of Iraq," in Matthews, 289.

[53] Ibid., 290.

[54] General John J. Sheehan, USMC, "Building the Right Military for the 21st Century," *Strategic Review* XXV, no. 3 (Summer 1997), 6. Sheehan writes "In the eyes of most non-Americans, globalization means much more than just cross-border economic activity. Globalization to them connotes the Americanization of the world…They view globalization as a serious threat to their societies and cultures."

[55] Ibid., 291.

[56] Ibid., 292.

[57] Alan Tonelson, "The Persian Gulf: Still Mired," *The Atlantic Monthly* 271, no. 6 (June 1993): 48-52.

[58] Pelletiere, 292.

[59] Tonelson, 48-52.

[60] Pelletiere, in Matthews, 293.

[61] Ibid., 293.

[62] Matthew Klam, "The Pilot's Tale: At Sea with 90,000 Tons of Diplomacy," *Harper's Magazine* 298, no. 1785 (February 1999): 33.

[63] *Forward…From the sea* is the U.S. Navy's operational concept for the 21st Century which emphasizes "Forward naval operations both to ensure unimpeded use of the seas and to project American influence and power into the littoral areas of the world." "*Forward…From the sea*: The Navy Operational Concept," March 1997, n.p.; on-line, Internet, 5 April 1999, available from http://www.chinfo.navy.mil/navpalib/policy/fromsea/ffseanoc.html.

[64] Geoffrey Kemp and Robert E. Harkavy, *Strategic Geography and the Changing Middle East*, (Washington, D.C.: Brookings Institution Press, 1997), 260.

[65] Ibid. 1993 transit fees for an aircraft carrier and five escorts were $901,250.

[66] Captain George Galdorisi USN. "The United States and the Law of the Sea: Changing Interests and New Imperatives," *Naval War College Review* 49, no.4 (Autumn 1996): 33.

[67] The typical CVBG is composed of nine ships. The *Essex* Amphibious Ready Group has three ships. For information on *Lincoln* CVBG see *Welcome to Third Fleet*, n.p.; on-line, Internet, 10 January 1999, available from http://www.comthirdflt.navy.mil. Composition of "typical" CVBG from "The Carrier Battle Group," *Official Web Site of the United States Navy*, n.p.; on-line, Internet, 10 January 1999, available from http://www.chinfo.navy.mil/navpalib/allhands/ah0197/cvbg.html. *Essex* information from *USS Essex*, n.p.; on-line, Internet, 10 January 19999, available from http://www.essex.navy.mil/.

[68] Patrick Garrity, "Implications of the Persian Gulf War for Regional Powers," *The Washington Quarterly* 16, no.3 (Summer, 1993): 33.

[69] Even before the end of the Cold War, U.S. allies exhibited this tendency; witness France's refusal to allow overflight rights for the *El Dorado Canyon* strike on Libya in 1986.

[70] Stephen J. Blank, "How We Will Lose the War With Russia," in Matthews, 274.

[71] "DOD Dictionary of Military Terms," *Joint Doctrine*, 18 March 1999, n.p.; on-line, Internet, 22 March 1999, available from http://www.dtic.mil/doctrine/jel/doddict/data/r/05235.html.

[72] Karl Von Clausewitz, *On War*, ed. and trans. Michael Howard and Peter Paret (Princeton, N.J.: Princeton Univ. Press, 1984), 88.

[73] L.C. Green, *The Contemporary Law of Armed Conflict* (Manchester: Manchester Univ. Press, 1993), 183.

[74] Ibid.

[75] A more important dilemma today concerns the decision to attack WMD in an urban environment. Successfully striking this target set could result in the deaths of thousands of civilians. World opinion would likely assign the U.S. a large share of the blame for these deaths.

[76] Cohen, 282-283.

[77] Cohen cites "Needless Deaths in the Gulf War," *Middle East Watch* (Washington, DC: Middle East Watch, 1991), 128-129.

[78] Cohen, 363.

[79] Ibid., 368.

[80] Ibid., 284.

[81] Ibid.

[82] Ibid.,378-379.

[83] Many in the Muslim World view bin Laden as a hero for his anti-U.S. stance. See Tim Weiner, "Missile Strikes Against bin Laden Won Him Esteem in Muslim Lands, U.S. Officials Say," *New York Times*, 8 February 1999, Foreign.

[84] Quoted in Stanley Karnow, *Vietnam: A History* (New York: Penguin Books, 1984), 523. Tran Do, as deputy commander of Communist forces in South Vietnam, was instrumental in the Tet offensive.

[85] John Mueller, *Policy and Opinion in the Gulf War* (Chicago: The University of Chicago Press, 1994), 125.

[86] See Karnow, 523-566.

[87] Lyndon Johnson was said to be "shocked and depressed" by Walter Cronkite's post-Tet pronouncement that it seemed "more certain than ever that the bloody experience of Vietnam is to end in a stalemate." Ibid, 547.

[88] David A. Shlapak and Alan Vick, *"Check Six Begins on the Ground:" Responding to the Evolving Ground Threat to U.S. Air Force Bases* (Santa Monica, Ca.: RAND Corp., 1995), 11.

[89] Douhet, 53-54.

[90] This is the premise of Alan Vick, *Snakes in the Eagle's Nest: A History of Ground Attacks on Air Bases* (Santa Monica, Ca.: RAND Corp., 1995).

[91] Shlapak and Vick, 13-14.

[92] Ibid.

[93] Ibid., 21.

[94] Ibid., 15.

[95] Thomas A. Keaney and Eliot A. Cohen, *Revolution in Warfare? Airpower in the Persian Gulf* (Annapolis: Naval Institute Press, 1995), 220.

[96]"KC-10 Extender," *USAF Fact Sheet 93-14*, December 1993, n.p.; on-line, Internet, 15 February 1999, available from http://www.af.mil/news/factsheets/KC_10A_Extender.html.

"E-3 Sentry AWACS," *USAF Fact Sheet 96-13*, March 1996, n.p.; 15 February 1999, available from http://www.af.mil/news/factsheets/E_3_Sentry__AWACS_.html.

[97] Schlapak and Vick, 17. Authors cite Chris Bowie et al., *Analyzing Airpower's Changing Role in Joint Theater Campaigns*, (Santa Monica, Ca.: RAND Corp., 1993), 77.

[98]Schlapak and Vick, xv.

[99] Major Anthony Christopher Cain et al, "Stopping US Airpower," Research Report no. 95-05 (Maxwell AFB, Ala.: Air Command and Staff College, 1995) in *Air and Space Operations Coursebook*, Course Dir. Maj Andre Provoncha (Maxwell AFB, Ala.: Air Command and Staff College, 1998), 362.

[100]*United States Marine Corps Factfile*, 15 December 1995, n.p.; on-line, Internet, 16 February 1999, available from http://www.hqmc.usmc.mil/factfile. See Schlapak and Vick, 48-60 for an analysis of the tactical employment of infantry weapons against aircraft.

[101] Schlapak and Vick, 49.

[102] Scott R. McMichael, *Stumbling Bear, Soviet Military Performance in Afghanistan* (New York: Brassey's, 1991), 58.

[103] Schlapak and Vick, 15.

[104] Ibid., 60.

[105] For a complete account of Algerian FLN activities in France, see Alistair Horne, *A Savage War of Peace: Algeria 1954-1962*, (New York: Penguin Books, 1979).

[106] Terrorists would not necessarily have to attack a military base to strike military aircraft. The Air National Guard stations large numbers of its aircraft on the parking ramps of regional airports throughout the country.

[107] Besides Pearl Harbor, other aircraft have been attacked on U.S. territory. On 12 January 1981, Puerto Rican nationalists targeted a group of US Navy A-7s on the parking ramp of Muniz Air National Guard Station (San Juan, Puerto Rico). Using satchel charges, the *Macheteros* destroyed seven aircraft and escaped undetected. Schlapak and Vick, 30.

[108] For a concise account see Michael R. Gordon and General Bernard E. Trainor, *The General's War* (Boston: Little, Brown and Company, 1995), 343-345.

[109] Kemp and. Harkavy, 260.

[110] Ibid.

[111] The author interviewed several officers who had transited the Suez Canal on aircraft carriers. All attested to the relaxed atmosphere and preferred to remain anonymous.

[112] David Donald and Jon Lake, eds., *US Navy & Marine Corps Airpower Directory* (London: Aerospace Publishing, 1996), 13, 15.

[113] Adversaries could use the full gamut of infantry weapons. The successful employment of mines would be particularly devastating.

[114] *USS Oriskany CVA-34*, n.p.; on-line, Internet, 22 February 1999, available from http://www.theeaglesnest.com/USS-Oriskany-CVA-34/.

[115] "The Tragic Fire," *USS Forrestal Museum, Inc.*, 5 November 1997, n.p.; on-line, Internet, 22 February 1999, available from http://forrestal.org/fidfacts/page13.htm.

[116] On the other hand, it could work in the opposite manner and *galvanize* support.

[117] Michael T. Handel, "Intelligence and Deception," *The Journal of Strategic Studies* March 1982, 122, quoted in Charters and Tugwell, 4.

[118] Charters and Tugwell, 2.

[119] FORTITUDE SOUTH, World War II's deception plan for Operation *Overlord*, is a classic example of deception at the strategic level. This elaborate plan largely convinced the Nazi's that the cross-channel invasion site would be at Pas de Calais vice Normandy. See Charters and Tugwell, 267.

[120] Keaney and Cohen, 122.

[121] According to Schwarzkopf, national intelligence estimates were so heavily qualified as to be "useless" to him in the field, and BDA done in Washington varied from those done in theater. Keaney and Cohen, 105.

[122] Ibid., 123.

[123] Tim Weiner and James Risen, "Decision to Strike Factory in Sudan Based Partly on Surmise," *The New York Times*, 21 September 1998.

[124] Ibid.

[125] Record, 67.

[126] Keaney and Cohen, 75.

[127] Ibid.

[128] Ibid., 76.

[129] Gordon and Trainor, 238.

[130] Ibid.

[131] Additionally, the influence of Colonel John Warden's "Five Rings" targeting strategy is pervasive among USAF planners. With its emphasis on leadership targets and key nodes, USAF targeting priorities have become predictable, allowing an enemy to template us with our own template, and presenting him with an abundance of deception opportunities.

[132] For example, see *Military Operations on Urbanized Terrain (MOUT) Homepage*, n.p.; on-line, Internet, 5 April 1999, available from http://www.geocities.com/Pentagon/6453/.

[133] Warden, Col. John A. USAF. *The Air Campaign* (Washington, D.C.: Pergamon-Brassey's, 1989), 87.

[134] Curtis E. LeMay was more forceful in his views, claiming that the U.S. "Could no longer afford the luxury of devoting a substantial portion of our Air Force effort to support ground forces." Robert Frank Futrell, *Ideas, Concepts, Doctrine: Basic Thinking in the United States Air Force, 1907-1960. Vol. 1.* (Maxwell AFB, Ala.: Air University Press, 1984), 398.

[135] As evidenced by the AC-130 gunship, the USAF does pay attention to urban CAS within the special operations community. But this niche capability would be inadequate across the spectrum of urban combat envisioned by the other services.

[136] U.S. companies abroad could become targets. If the U.S. can legitimately strike an enemy's economic infrastructure (e.g. Iraq's electricity grid), can that country attack a U.S. computer company that supplies equipment to the DOD (e.g. Microsoft Corp.)? Soft targets such as these could be attacked at night while workers are at home, resulting in few casualties and the possibility of limitations on U.S. investments abroad.

[137] This may in fact be happening. On 24-25 March 1999, the USAF held a "first of its kind" conference on the role of aerospace power in joint urban operations in order to "generate dialogue and exchange ideas regarding aerospace strategy, operational-level

decision-making, and tactical application of current/future aerospace systems, platforms and ordnance in the urban environment." See Message, 080819Z MAR 99, HQ USAF.

[138] LtGen Horner, *Desert Storm*'s JFACC, was particularly sensitive to this fact. "Every dead pilot was another debating point in Iraq's campaign to turn Americans against the war. And every captured pilot was a potential POW that Baghdad could parade across the television screen." Accordingly, Horner and his deputy, "Buster" Glossen, mandated that most bombing raids be conducted at medium altitude where Iraqi AAA could not reach them. When dropping dumb bombs, this altitude sanctuary comes at the expense of bombing accuracy. Gordon and Trainor, 249-250.

[139] All statistics taken from Chaim Herzog, *The Arab-Israeli Wars* (New York: Vintage Books, 1984).

[140] Details of the entire Hizbulla account which follows were found in the unpublished work of Brigadier General Ephraim Segoli, IAF (retired), "The Israeli Lebanese Dilemma: Israeli Airpower and Coercive Diplomacy in Lebanon," (Maxwell AFB, Ala.: School of Advanced Airpower Studies, 1998). For a similar Israeli viewpoint, see Martin van Creveld, *The Sword and the Olive: A Critical History of the Israeli Defense Force* (New York: Public Affairs, 1998).

[141] Enemy adaptation does not always work. *Peace for Galilee* crushed the Palestinian Liberation Organization (PLO), who had abandoned their guerilla/terrorist ways in favor of becoming a conventional fighting force. The PLO proved no match for the Israelis.

[142] Segoli, 14.

[143] First generation MANPADS such as the American Redeye and Soviet SA-7 Grail are equipped with uncooled seeker heads that "see" infrared energy primarily in the micron ranges associated with jet exhaust. Known loosely as "hot metal trackers," these missiles are most effective when fired at an aircraft from the rear aspect—hence the term "revenge weapon."

[144] The British have however. In the Falkland Island campaign in 1982, Stinger was used to great effect and "had gained a combat reputation for lethality." Edgar O'Balance, *Afghan Wars 1839-1992: What Britain Gave Up and the Soviet Union Lost* (London: Brassey's, 1993), 163.

[145] Eduard Mark, *Aerial Interdiction in Three Wars* (Washington, D.C.: Center for Air Force History, 1992), 394.

[146] Keaney and Cohen, 273. This statistic makes no distinction between MANPADS and self-propelled IR SAM systems such as the SA-9 and SA-13.

[147] Ibid., 80.

[148] O'Balance, 154. Also, see Scott R. McMichael, *Stumbling Bear: Soviet Military Performance in Afghanistan* (London: Brassey's, 1991), 62, in which he terms 1986 "A year of crisis for the *mujahedin.*" The best empirical evidence of Soviet success in 1986 is the American decision to supply Stinger missiles to the Afghan rebels. Introducing a weapon that would inevitably fall into Soviet (and other) hands was hopefully a carefully weighed (and desperate) decision that was made in order to keep the *mujahedin* afloat.

[149] Major Edward B. Westermann "The Limits of Soviet Airpower: The Bear Versus the Mujahideen in Afghanistan, 1979-1989" (Student thesis presented to the faculty of The School of Advanced Airpower Studies, Maxwell AFB, Ala., 1997), 72.

[150] McMichael, 90.

[151] Ibid. McMichael cites Charles Dunbar, "Afghanistan in 1986: The Balance Endures," *Asian Survey*, February 1987, 129.

[152] Westermann, 66.

[153] David A. Fulghum, "Mixed Threat From Small SAMs," *Aviation Week & Space Technology*, 29 July 1996, 31.

[154] Tony Cullen and Christopher F. Foss, *Jane's Land Based Air Defence* (London: Butler and Tanner Ltd., 1994). 57.

[155] Ibid., 59.

[156] Marvin B. Schaffer, *Concerns About Terrorists With Manportable SAMS*, (Santa Monica, Ca: RAND, 1993), 4.

[157] Westermann cites Larry Grossman, "Stinger Success," *Military Forum* 4 (Apr 88), 54.

[158] Vincent Kiernan, "The Laser-Weapon Race Is On," *Laser Focus World*, December 1996, n.p.; on-line, Internet, 7 April 1999, available from www.optoelectronics-world.com/lfw/archive/1996/12/12wash.html.

[159] *Laser Weapons* gives an example of lead computation for an antiaircraft gun shooting a projectile with a muzzle velocity of 1,375 yards per second. If the target is three miles away and traveling at 610 miles per hour (300 yards per second), the required lead is 1,260 yards. For a speed of light weapon, the aircraft would travel two yards from trigger pull to impact., Major General Bengt Anderberg and Dr. Myron L. Wolbarsht, *Laser Weapons: The Dawn of a New Military Age* (New York: Plenum Press, 1992), 94.

[160] Ben Wong, "The Tactical Laser Threat—An Overview," Marine Corps Intelligence Activity Note (MCIA-1833-001-96, May 96).

[161] In 1965, 79 F-105s targeted the Than Hoa Bridge in North Vietnam with 638 750 pound bombs. Five aircraft were lost in the attack and the bridge remained in service. In 1972, 16 F-4's went unscathed and totally destroyed the bridge with a mix of laser guided and conventional bombs. Mark, 387-388.

[162] Wong, 7.

[163] "Anti-Personnel Lasers," *Federation of American Scientists*, 3 November 1998, n.p.; on-line, Internet, 15 March 1999, available from http://www.fas.org/nuke/guide/iraq/ other/laser.html.

[164] Anderberg and Wolbarsht, *Laser Weapons*, 142.

[165] Ibid., 143-144.

[166] "Lasers Burn U.S. Pilots' Eyes," *ABCNEWS.COM*, n.p.,; on-line, Internet, 5 April 1999, available from http://www.abcnews.com/sections/world/DailyNews/bosnia981104 _laser.html.

[167] Anderberg and Wolbarsht, 184.

[168] Lt Cmdr Bill Schutt USN, interviewed by author, 12 March 1999. Schutt is Aeronautical Medical Safety Officer with Marine Aviation Weapons and Tactics Squadron One, where he lectures on the laser threat.

[169] Ibid.

[170] Ibid.

[171] Bennett et al., 44.

[172] For a more detailed investigation of this theme, see Johnson, 83-113.

[173] Georgie Anne Geyer, "Domain of Many Challenges," *Washington Times*, 26 April 1997, D-10, in ibid., 84.

[174] Graham T. Allison, *Essence of Decision: Explaining the Cuban Missile Crisis* (United States: Harper Collins Publishers, 1971).

[175] Maurice Comte de Saxe, *Mes Reveries; or, Memoirs Upon the Art of War [1757]* (Westport, CT: Greenwood Press, 1971), 162, in Johnson, 89.

[176] Martin van Creveld, *The Sword and the Olive: A Critical History of the Israeli Defense Force* (New York: Public Affairs, 1998), 363.

[177] Quoted in Thomas J. Czerwinski, "Asymmetrical Threats," *Marine Corps Gazette* 83, no. 4 (April 1999): 87.