SEEKING SHADOWS IN THE SKY:

THE STRATEGY OF AIR GUERRILLA WARFARE

BY

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ABSTRACT

This study analyzes the feasibility of guerrilla warfare as the basis for a strategy of airpower employment for a weak air force confronting an opponent with a stronger air force. The analysis begins with a distillation of the theory of guerrilla warfare into five elements essential to its success: superior intelligence, security, mobility advantage, surprise, and sustainment. The author then compares the ground combat environment of the traditional guerrilla with the airpower environment of the potential air guerrilla and concludes that these five elements can be met in the airpower environment provided the weak force has sufficient ingenuity and the necessary resources. An investigation of recent trends in technology and the prevailing strategic environment indicates that it increasingly possible for a weak force to obtain these resources. The author assesses that air guerrilla warfare is a viable warfighting strategy, but points out that the likelihood of a weak force actually adopting air guerrilla warfare will depend on its regional security needs and its resolve to protract a conflict. The study concludes that air guerrilla warfare is a credible threat to a stronger opponent. To meet this threat, the author recommends that the United States re-examine its intervention strategy, reinforce its policy of strategic engagement, and research both airpower and non-airpower means to neutralize an elusive guerrilla air force.

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CHAPTER 1

INTRODUCTION

When offensive weapons make a sudden advance in efficiency, the reaction of the side which has none is to disperse, to thin out, to fall back on medieval guerrilla tactics which would appear childish if they did not rapidly prove to have excellent results.

General G. J. M. Chassin

"Naturally we will come to the aid of our kinfolk," declared the President of Farchant, pointing to the message that lay on the table before him. The message had arrived from Alpenstein, a province in Schazzen, Farchant's neighbor to the east. The President glanced around the table at the members of his High Council and continued, "Our friend, the governor of Alpenstein intends to hold a plebiscite in the near future. He is convinced that the Alpensteiners, 70 percent of whom are ethnic Farchantians, will vote to secede from Schazzen and to annex Alpenstein to Farchant. The Hypernationalist Party has dominated the government in Shazzen for the past two years and repressive measures against ethnic Farchantians are becoming just too much to bear. The governor assumes, of course, that the Schazzen government will attempt to prevent the secession by force, so he wants to know if we Farchantians are willing to protect Alpenstein as it makes this brave move of self-determination."

"We can certainly take on the Schazzens militarily," offered the Defense Minister. "Our forces are equal, if not superior, to anyone in the region. And we do have friendly neighbors to the north and west. "

"It's not regional foes I'm worried about," interrupted the Foreign Minister. "What if Schazzen appeals to the United Nations and they put together a coalition to thwart our defense of Alpenstein? And what if it is a United States-led coalition? If the Americans play true to form, they'll start off with their 'Airpower Extravaganza' and we'll last about two days trying to defend Alpenstein—and Farchant as well!"

The President turned to his Grand Air Marshal. "What can we do in the face of such a superior air force?"

"Well," answered the Grand Air Marshal, "we don't want to lose the Farchantian Air Force completely. One way or another, this incident will be over—either Alpenstein secedes successfully or it doesn't; but afterwards, we'll still need our air force to retain our position in the region."

"Are you suggesting that we do an 'Iraqi Shuffle' and send our aircraft off to one of our friendly neighbors for safe-keeping until the conflict is over?" retorted the President. "It's hard to believe that we've spent all that money buying top-notch fighters, bombers, surveillance aircraft, and air defense equipment, and invested all that time training pilots and support personnel, and now you tell me that they are not good enough to win, but too valuable to lose? No, there's got to be a way we can use the Farchantian Air Force to help our ethnic brethren in Alpenstein. Come up with a plan." The President addressed the rest of the High Council; "We *will* come to the aid of the Alpensteiners if they need us. Meet back here tomorrow and be ready to discuss a strategy."

The Grand Air Marshal returned to his office and contemplated the situation. "The Farchantian Air Force versus the United States Air Force, now that's a real 'David and Goliath' story. But David actually had an advantage over Goliath: he brought a *different* weapon to the fight. With his sling, he could launch his attack beyond the lethal zone of Goliath's sword and spear. Unfortunately, I'm stuck using the same weapons as my opponent—and mine are not as good. I'm supposed to beat Goliath using a shorter spear, a blunter sword, and a thinner shield. Hmm…of course, I don't really need to *defeat* Goliath, I mean, the United States. The Americans wouldn't have a vital national interest at stake in the Alpenstein conflict. If we could use the Farchantian Air Force to make life uncomfortable for them here—to raise the cost of their intervention, to lengthen the time it takes them to accomplish their objectives—maybe, just maybe, the Americans would decide that the costs outweighed the benefits and they'd leave."

The situation in which the fictional country of Farchant finds itself may be a common one for military opponents of the United States in the foreseeable future. America's potential adversaries do not *plan* on confronting a superpower; they are more concerned with being militarily competitive in their own region and they build their force structure and develop their employment doctrine accordingly.[1] Furthermore, most states cannot afford the array of expensive, advanced-technology target intelligence and acquisition, rapid command and control, and high kill-probability precision firepower systems that the United States brings to the conventional battlefield.[2] Outmatched on the conventional battlefield, states like Farchant must seek other means if they are to overcome such a superior foe.

Seeking alternative means of foiling a superior foe is, of course, nothing new in warfare. Ever since one caveman picked up a club in order to avoid hand-to-hand combat with a stronger adversary, men have sought methods and weapons to negate the advantages of the opponent. In modern parlance, these alternative means have come to be known as "asymmetric warfare." Charles Dunlap describes asymmetric warfare as:

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[1] Jeffery R. Barnett, *Future War: An Assessment of Aerospace Campaigns in 2010* (Maxwell AFB, Ala.: Air University Press, 1996), 71-77.

[2] Zeev Bonen, "Sophisticated Conventional War," *Mideast Security and Policy Studies No. 28*, n.p.; on-line, Internet, 22 December 1999, available from http://www.biu.ac.il/SOC/ besa/books/28book1.html.

warfare that seeks to avoid an opponent's strengths; it is an approach that tries to focus whatever may be one side's comparative advantages against its enemy's relative weaknesses…. Asymmetrical warfare emphasizes what are popularly perceived as unconventional or nontraditional methodologies.[3]

Paul Herman takes a more military angle in his definition of asymmetric warfare as:

> a set of operational practices aimed at negating advantages and exploiting vulnerabilities rather than engaging in traditional force-on-force engagements…. 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.[4]

There are two ways to achieve this "nontraditional" or "atypical" aspect of asymmetric warfare. The first is to use unconventional weapons for which the opponent is unprepared; the second is to use traditional weapons in an unconventional manner to negate an opponent's strength. The first approach, the use of unconventional weapons, has received much attention of late. Most recent studies of asymmetric warfare focus on specific technologies or weapons with which an inferior adversary can threaten a superior opponent. These technologies include nuclear, biological, and chemical weapons (commonly referred to as weapons of mass destruction (WMD)), and the use of computers as weapons in cyberwarfare.[5] The Chairman of the US Joint Chiefs of Staff, in his assessment of future warfare, particularly emphasizes WMD and information warfare as the asymmetric approaches to be expected from potential adversaries.[6] That the technological side of asymmetric warfare should receive so much notice is not surprising. Western society tends to be technology-oriented; there is great concern about technology for which there is no effective counter-technology. But nontraditional technology and weapons constitute only half of a possible asymmetric approach. The innovative and unconventional use of traditional weapons can also provide an advantage to an otherwise inferior adversary. As Jeffery Barnett points out: "Whoever best

[3] Charles J. Dunlap Jr., "Preliminary Observations: 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, Strategic Studies Institute, July 1998), 1.
[4] Paul F. Herman Jr., "Asymmetric Warfare: Sizing the Threat," *Low Intensity Conflict & Law Enforcement* 6, no. 1 (Summer 1997): 176.
[5] See for instance, Barnett; Lloyd J. Matthews, ed. *Challenging the United States Symmetrically and Asymmetrically: Can America Be Defeated?* (Carlisle Barracks, Pa.: U.S. Army War College, Strategic Studies Institute, 1998); Bruce W. Bennett, Christopher P. Twomey, and Gregory F. Treverton, *What Are Asymmetric Strategies?* (Santa Monica, Calif.: RAND, 1999).
[6] John M. Shalikashvili, *Joint Vision 2010* (Washington, D.C.: Joint Chiefs of Staff, 1996), 10-11.

employs its weapons wins the battle…. As in past wars, future battles will be won by the side that has the best concept of operations."[7]

The classic example of an asymmetric concept of operations adopted by the weak to fight the strong is guerrilla warfare. In *The Official Dictionary of Military Terms*, guerrilla warfare is defined as "military and paramilitary operations conducted in enemy held or hostile territory by irregular, predominantly indigenous forces."[8] A more helpful description is provided by N. I. Klonis in his book, *Guerrilla Warfare: Analysis and Predictions*, as he writes:

> It is a method of warfare by which one of the adversaries avoids direct confrontation with the enemy main forces...where operations are conducted in enemy controlled territory by relatively small forces which strike the enemy where he may be relatively weak or where the guerrillas can obtain a temporary superiority over a localized enemy force.[9]

In essence, guerrilla warfare turns the conventional style of warfighting on its head: instead of closing with the enemy and annihilating him, guerrillas avoid decisive battle and harass the enemy on his flanks; instead of seeking a quick end to the conflict, guerrillas attempt to protract it; instead of concentrating forces and establishing a front, guerrillas disperse and make hit-and-run attacks in a frontless war. Defeat of the enemy through the destruction of his superior forces is beyond the capability of the guerrilla; thus he endeavors to compel the stronger

[7] Barnett, 29.
[8] The Joint Chiefs of Staff and the U.S. Department of Defense, *The Official Dictionary of Military Terms*, 2nd ed. (Irvine, Calif.: Global Professional Publications, 1992), 161.
[9] N. I. Klonis, *Guerrilla Warfare: Analysis and Projections* (New York: Robert Speller & Sons, 1972), 5.

enemy to quit the fight by making it too expensive or too uncomfortable for him to continue. The strategy and tactics of guerrilla warfare have proven effective throughout history. Quintus Fabius Cunctator, Bertrand du Guesclin, Francis Marion, Denis Davydov, John Mosby, Emiliano Zapata, T. E. Lawrence, Mao Zedong, Vo Nguyen Giap, Tito, Fidel Castro, Che Guevara—these are but a few of the men who have led guerrilla campaigns in the face of a superior foe.

Success naturally breeds imitation. Today one finds guerrilla strategy and tactics applied to many fields of human activity beyond military ground operations. There are guides to guerrilla techniques for business, marketing, investing, immunology, dating, parenting, and so on. One book that is not available however, is an airman's guide to flying and fighting guerrilla-style. Why this omission? Does the nature of airpower preclude air guerrilla warfare? Or is an airpower strategy based on traditional guerrilla warfare theory a viable method for a weak air force to confront an opponent with a considerably stronger air force?

This study investigates the feasibility of air guerrilla warfare as a strategy for a weak air force facing an adversary with a stronger air force. It begins in Chapter 2 with an examination of traditional guerrilla warfare theory and a distillation of that theory down to its essential elements. Chapter 3 then explores whether these essential elements of traditional guerrilla warfare can be fulfilled in the airpower environment. It compares the traditional guerrilla warfare ground environment with the airpower environment and explores historical, theoretical, and technological evidence to reveal whether guerrilla warfare's essential elements can be met given the unique characteristics of airpower. Chapter 4 weighs the evidence to determine the feasibility of the concept of air guerilla warfare, and the final chapter explores the implications of air guerrilla warfare for the current and future employment of airpower.

SIGNIFICANCE OF THE STUDY

With the current spotlight on weapons of mass destruction and information warfare as the troublesome asymmetric threats, why investigate something as mundane as the employment of conventional aircraft? After all, many military analysts contend that US airpower will have little trouble neutralizing a weaker adversary's air platforms in future conflicts.[10] The question of the feasibility of air guerrilla warfare is significant, however, because it challenges this conventional

[10] See for instance, Barnett, 92; Bruce W. Bennett, et al., *Theater Warfare and Modeling in an Era of Uncertainty: The Present and Future of Warfare* (Santa Monica, Calif.: RAND, 1994), 59.

wisdom regarding the threat posed by a weak air force and does so in three ways. First, if air guerrilla warfare is a viable strategy, then it could place a potent warfighting tool in the hands of quite a number of weaker adversaries. Second, the United States may be particularly susceptible to this air guerrilla warfighting tool due to the nature of its prevailing intervention strategy. And third, the current US aerospace defense concept of operations may prove vulnerable to an air guerrilla method of fighting, for air guerrilla warfare undermines the basic assumptions upon which US aerospace defense rests.

"There are now two kinds of air force in the world," claims Alan Stephens of the Royal Australian Air Force Air Power Studies Centre, "the USAF and everyone else."[11] "Everyone else" of course, has witnessed what happens to a weaker air force when it is employed conventionally against US airpower. In the Gulf War, in Operation Deliberate Force, and in Operation Allied Force, weaker air forces operating in relatively conventional modes were quickly decimated or suppressed by superior US forces. Consequently, many of these air forces may be looking for other methods by which to gain maximum effect from their limited resources; as Shaun Clarke describes it, there is a "mandate for alternative strategies."[12] The market for these alternative strategies could be considerable. There are over one hundred 'medium' and 'small' air forces around the world and they possess two-thirds of the world's fighter aircraft and sixty percent of its offensive strike aircraft.[13] Thus, if air guerrilla warfare is a feasible strategy, it could fill a strategy niche for a large number of potential practitioners and place an effective warfighting tool in the hands of weaker adversaries.

Of course, the effectiveness of a warfighting tool depends on the susceptibility of the opponent to the instrument. The strategy of air guerrilla warfare may prove particularly effective against the United States because it directly counters the specific features around which US intervention strategy is designed. As the sole remaining superpower in a strategic environment characterized by local ethnic, religious, and nationalistic strife, the United States has found itself involved increasingly in conflicts with few, if any, vital or important national

[11] Alan Stephens, "You'll Remember the Quality Long After You've Forgotten the Cost: Structuring Air Power for the Small Air Force," in *Air Power Confronts an Unstable World*, ed. Richard P. Hallion (London: Brassey's, 1997), 181.
[12] Shaun Clarke, *Strategy, Air Strike and Small Nations* (Fairbairn, Australia: Air Power Studies Centre, 1999), 78.

interests at stake. With little at stake, except, perhaps, international prestige, US policymakers are reluctant to spend any large amount of human or political capital to resolve these conflicts. Consequently, the United States has developed intervention strategies that prioritize casualty avoidance above mission accomplishment and seek political and humanitarian legitimacy through collateral damage minimization and multilateral operations.[14] Casualty avoidance, collateral damage minimization, and coalition/alliance operations, however, serve not only to make the strategy attractive to US policymakers, but they also render it susceptible to a counter-strategy of air guerrilla warfare. Air guerrilla warfare is deliberately designed to generate enemy casualties, to increase the probability of collateral damage, and to foster a sense of frustration and war-weariness by prolonging a conflict so it appears that there is no end in sight. Together, these effects also have coalition-fracturing potential.[15] Therefore, if air guerrilla warfare is feasible, the United States may be forced to reconsider its intervention strategy when faced with an adversary prepared to fight guerrilla-style with a weak air force.

Currently, most military analysts are optimistic about the ability of the United States to handle the threat posed by weak air forces. "Manned aircraft in the hands of a [non-peer] competitor," asserts Jeffery Barnett, "is probably the easiest aerospace defense task. Any [non-peer] fighting the US would quickly lose its frontline fleet and pilots."[16] A 1994 RAND report on the present and future of warfare notes that the "opposition will enjoy few successes [in air-to-air engagements against the US] and suffer major losses because of their poor pilot quality and, in many cases, poor aircraft."[17] These gloomy prognoses of the viability of a weak air force facing a stronger foe, however, are based on the symmetric employment of aircraft within the prevailing US aerospace defense concept of operations. This concept of operations, as Barnett points out, assumes "limited numbers of expensive, high-signature attackers (e.g., Su-24s and *Scuds*), visible from launch to engagement, with an exposed

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[13] Christopher J. Bowie, et al., *Trends in the Global Balance of Airpower* (Santa Monica, Calif.: RAND, 1995), 42; Clarke, 79, 187-190.
[14] Mark A. Bucknam, "The Influence of UN and NATO Theater-Level Commanders on the Use of Airpower Over Bosnia During Deny Flight: 1993-1995" (PhD diss., King's College, University of London, 1999), 215; Daniel Byman and Matthew Waxman, "Defeating US Coercion," *Survival* 41, no. 2 (Summer 1999): 108.
[15] Byman and Waxman, 111-116.
[16] Barnett, 92.
[17] Bennett, et al., 59.

support infrastructure."[18] The unconventional nature of air guerrilla warfare, however, would undermine each of these assumptions. Aircraft fighting guerrilla-style would not be easily discernable or readily identifiable from launch to engagement, their support infrastructure would be dispersed and hidden, and they would avoid rather than seek air-to-air engagements. Under these circumstances, a superior foe may find it much more difficult to neutralize the threat presented by the aircraft of a weaker adversary. Consequently, if air guerrilla warfare is feasible, US airpower thinkers may need to examine new methods to ensure "freedom from attack" in an air guerrilla warfare environment where conventional counterair methods are no longer effective.

DEFINITIONS

All warfare is a test of relative strength; consequently, the label "weak air force" as it appears in this study cannot be defined in absolute terms. A given air force may be superior to one opponent and inferior to the next. Chile, for example, with its 331 old model fixed-wing aircraft,[19] might be considered the stronger air force in a conflict with Bolivia (151 old aircraft), but the weaker air force against Brazil (701 useful and old aircraft). Numbers alone, of course, do not determine strength. The overall strength of an air force is a product of many factors including the number of aircraft and weapons in the inventory, the capability of those aircraft and weapons, operator skill, and sustainability. A numerically inferior air force may prove to be the stronger force due to the capability of its platforms and the proficiency of its pilots—as the Israeli Air Force has demonstrated in its wars with its Arab neighbors. Thus, "weak" is a relative term that must be assessed in the context of each conflict.

LIMITATIONS OF THE STUDY

This study examines the feasibility of air guerrilla warfare executed by air platforms, manned or unmanned, likely to be found in the current or near-future inventory of a US-non-peer competitor. Of course, airpower consists of more than just air platforms; command and control (C2) and ground-based air defense (GBAD) systems are also integral parts of the airpower weapon. There is evidence, however, that weaker forces have embraced lessons

[18] Barnett, xxiv.

[19] Aircraft capabilities as per Bowie, et al., 38, in which "frontline" describes aircraft of 1970s-1980s design with cutting-edge technology, "useful" denotes aircraft of late 1950s-1960s design with still useful combat capabilities, and "old" refers to aircraft of 1940s-1950s design.

learned from the Gulf War and have become more adept in their C2 and GBAD operations against stronger opponents. For example, in their 1994-1996 conflict with the Russians, the Chechens coordinated combat operations with cellular phones to counter Russian targeting of their traditional telecommunications facilities.[20] In Operation Allied Force, the Serbs dispersed major elements of their GBAD system and fired their surface-to-air missiles (SAMs) using pop-up and electro-optical techniques. These techniques did not prove highly effective in shooting down NATO aircraft, but were enough of a threat to force NATO aircraft to fly and strike from higher altitudes—which compounded problems of target identification, weather hindrances, and collateral damage—and to allow most of Serbia's air defense assets, aside from the SA-2 and SA-3, to survive the war.[21] There does not seem to be any evidence, however, that weaker forces have developed comparable techniques by which to employ their air platforms effectively in the face of a superior foe.

This study focuses on the weak force's air platforms then, because it appears that aircraft employment is the more difficult problem to solve. Naturally, there are synergistic relationships between air platforms, C2, and GBAD that enhance airpower's effectiveness. This study notes these relationships where they strengthen the ability of a weaker force to achieve the essential elements of guerrilla warfare using air platforms, but does not explore the relationships in great detail.

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"Guerrilla warfare," thought the Grand Air Marshal, "harass, hit-and-run, exhaust and frustrate the opponent—it works for ground troops. Maybe the Farchantian Air Force can adopt a similar guerrilla warfare strategy in the air. Perhaps, if we avoid attacking Goliath directly and strike instead his water bearer, Goliath might faint from dehydration. Or, if we

[20] Timothy L. Thomas, "The Battle for Grozny: Deadly Classroom for Urban Combat," *Parameters* 29, no. 2 (Summer 1999): 94. Of course, the Law of Unintended Consequences prevails in any given situation: Chechen president Dudayev was killed while talking on a cell phone. A Russian A-50 (AWACS) picked up Dudayev's signal and relayed his position to a Su-25, which targeted Dudayev with a TV-guided bomb. See Timothy L. Thomas, "Air Operations in Low Intensity Conflict: The Case of Chechnya," *Airpower Journal* 11 no. 4 (Winter 1997): 54.

[21] Department of Defense, *Kosovo/Operation Allied Force After-Action Report: Report to Congress,* 31 January 2000, 64; on-line, Internet, 08 February 2000, available from http://www.defenselink.mil/pubs/kaar02072000.pdf; Anthony H. Cordesman, *The Lessons and Non-Lessons of*

ignore Goliath completely and simply attack the other Philistines in his camp, they might grow angry and

annoyed at Goliath's inability to smite a weaker foe and decide to withdraw him from the battlefield or, perhaps, pressure him into committing a rash act that we can exploit. Air guerrilla warfare…this just might be the strategy we're looking for."

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the Air and Missile War in Kosovo: Report to the USAF XP Strategy Forum, 27 July 1999, 110, 113-114; on-line, Internet, 09 November 1999, available from http://www.csis.org/kosovo/Lessons.html.

CHAPTER 2

THE ESSENTIALS OF GUERRILLA WARFARE

Come the right moment, a pawn can bring you victory.

Ho Chi Minh

Introduction

Guerrilla warfare is as old as history. In the Anastas Papyrus of the fifteenth century B.C., Mursilis, the Hittite king, complains that "the irregulars did not dare to attack me in the daylight and preferred to fall on me by night."[22] Chinese chronicles describe the guerrilla tactics employed by Emperor Huang of the Han Dynasty to defeat the Miao Dynasty around 3600 B.C.[23] In 512 B.C., the Persian warrior-king Darius I, who ruled the largest empire and commanded the best army in the world, bowed to the hit-and-run tactics of the nomadic Scythians and left them to their lands beyond the Danube.[24] Hannibal was stymied in his march on Rome in the second century B.C. by Quintus Fabius Cunctator ("the Delayer"), who turned the Roman army into a virtual guerrilla force and shadowed Hannibal's marches, "harassing his foragers, cutting off stragglers, nipping off a stray patrol, but never permitting himself to be drawn into full-scale battle."[25] In the Hundred Years' War (1337-1453), Bertrand du Guesclin, High Constable of France, employed a "Fabian" policy to coerce the English to leave France. Du Guesclin refused to attack the main English army; instead he raided their garrisons at night, ambushed their convoys, and harassed their fortified camps and towns. He made no effort to drive the English from France; he merely made it uncomfortable for them to stay. Within five years, the English lost most of what they had occupied in France without ever meeting the foe on the battlefield.[26]

The term "guerrilla" itself originated in the Peninsular War (1808-1814), Napoleon's unsuccessful campaign on the Iberian Peninsula. In the aftermath of Napoleon's destruction

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[22] Walter Laqueur, *Guerrilla Warfare: A Historical & Critical Study* (New Brunswick, N.J.: Transaction Publishers, 1998), 3.
[23] Baljit Singh and Ko-wang Mei, *Theory and Practice of Modern Guerrilla Warfare* (New York: Asia Publishing House, 1971), 2.
[24] Robert B. Asprey, *War in the Shadows: The Guerrilla in History* (New York: William Morrow and Company, 1994), 3-4.
[25] Ibid., 22; R. Ernest Dupuy and Trevor N. Dupuy, *The Harper Encyclopedia of Military History, From 3500 B.C. to the Present*, 4th ed. (New York: HarperCollins Publishers, 1993), 71.
[26] B. H. Liddell Hart, *The Decisive Wars of History* (London: G. Bell & Sons, Ltd., 1929), 51-52.

of the Spanish regular army, Spanish civilians took up arms to resist the French presence. These Spanish fighters avoided direct contact with the French troops and instead conducted raids and ambushes and attacked French lines of communications. The Spanish called this form of fighting *guerrilla*—"little war"—and with these harassment tactics, the *guerrilleros* sapped the strength of the French and thus set the stage for their eventual expulsion from the Iberian Peninsula by the Duke of Wellington and his English troops.[27]

History is replete with further examples of the weak confronting the strong with "little war" tactics. Guerrillas have engaged in these confrontations for a multitude of various political objectives. Royalists in the Vendée led a counter-revolutionary guerrilla campaign against the new French Republic in 1793. Emiliano Zapata and his guerrilla peasant bands struggled for land reform in Mexico. Mao Zedong's communist guerrillas fought a revolutionary war in China. Mujaheddin guerrillas in Afghanistan took up arms to expel a communist regime.[28] Communists, conservatives, nationalists, traditionalists, revolutionaries, monarchists—all have engaged in guerrilla warfare. However, in essence, guerrilla warfare itself is devoid of ideological content; it is simply a set of combat tactics. What defines guerrillas is not why they fight, nor when, nor where, but *how*.[29] Guerrilla warfare is the weapon of the weak, whatever their political complexion. The decision to engage in a guerrilla struggle is simply an answer to the question: How shall we fight against overwhelming odds?[30]

HOW DO GUERRILLAS FIGHT?

When a weaker force chooses to engage in guerrilla warfare, what exactly is it choosing to do? Where does it find the instructions on how to fight like a guerrilla? On the one hand, guerrilla warfare appears very complicated. Historical analysis indicates that each guerrilla war is unique, affected by the specific geographical, technological, cultural, social, and political conditions under which the war is fought. On the other hand, guerrilla warfare can be seen as very simple. Guerrilla tactics are fundamentally a combination of common sense and imagination.[31]

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[27] Lt Col Frederick Wilkins, "Guerrilla Warfare," in *Modern Guerrilla Warfare*, ed. Franklin Mark Osanka (Glencoe, N.Y.: Free Press, 1962), 4-5.
[28] For an extensive history of guerrilla wars through the ages, see Asprey and Laqueur.
[29] Klonis, 4.
[30] Anthony James Joes, *Modern Guerrilla Insurgency* (Westport, Conn.: Praeger, 1992), 5.
[31] Laqueur, xvii.

Military thinkers over the years have sought to capture the common sense and imagination that make up guerrilla warfare. Walter Laqueur, in his book *Guerrilla Warfare: A Historical and Critical Study*, traces the origins of guerrilla war theory to the seventeenth century and the aftermath of the Thirty Years' War, which, perhaps more than any other, had been a war without fronts.[32] Laqueur provides an extensive review of the development of guerrilla doctrine over the years; to determine the essentials of guerrilla warfare however, an examination of the significant waypoints will suffice.

Among the most influential early authors on guerrilla warfare (referred to as *petite guerre* or "small warfare" at the time) was Grandmaison, a Flemish lieutenant colonel whose work, *La petite guerre*, was published in Paris in 1756. Grandmaison's focus was on the "small war" fighters of his day: light units of the regular army who conducted harassment operations in the enemy's rear. Grandmaison emphasized the importance of the mobility of these light units, which had to be able to move quickly and over long distances. He also highlighted the necessity of surprise; Grandmaison was a great advocate of night attacks, for such attacks, he found, cause confusion out of proportion to the effort required from the attackers.[33]

Another leading small war analyst of the era was Andreas Emmerich, a Hessian colonel, whose 1791 work, *The Partisan in War*, details the various situations light units were likely to face. Emmerich stressed security as a vital principle for the small war fighters. He warned that a light unit should never, under any circumstances, be taken by surprise. The main danger that faced a detachment of raiders was their own negligence and lack of caution. He also offered practical advice on how to gain surprise: cover wooden bridges with straw to minimize noise when crossing at night, or play with the reins of one's horse to prevent it from neighing and betraying one's presence. Further, Emmerich described the usefulness of spies as sources of information both to improve one's own security and to enhance surprise attacks.[34]

In the Napoleonic Wars, the French faced irregular warfare not only from the *guerrilleros* in Spain, but also from partisans in Russia. Lt Col Denis Davydov led a small regular unit operating in the French army's rear and, according to Tolstoy, was "the first to

[32] Ibid., 101.
[33] Ibid., 102-103.
[34] Ibid., 104-105.

realize the significance of this terrible weapon."[35] Davydov, in his book, *The Journal of Partisan Actions*, recognized that mobility is the ideal; the partisan should be perpetually on the move and the enemy should never know his whereabouts. Davydov's slogan was *ubit-da-uiti*—"kill and get away." Additionally, Davydov referred to the importance of flexibility: the partisan acts more through his skill than his strength. He acknowledged that the large 'modern' armies of the day were especially vulnerable to the effects of partisan warfare. These armies needed ammunition, food, clothes, hospitals—light cavalry units could easily cut their supply lines. In general, Davydov considered the purpose of the partisan's activities to be to demoralize the enemy and give a moral lift to one's own side.[36]

These early writers examined guerrilla operations largely from a tactical perspective. The strategy of the small war units was subsumed into the overall strategy of the regular army to which they were a corollary. The Peninsular War, however, demonstrated what guerrilla forces could accomplish independent of regular army forces. Thus, military theorists in the nineteenth century began to analyze not only the tactics needed to attack a superior foe, but also the accompanying strategy to enable a weaker force to survive and overcome a stronger opponent.

Carl von Clausewitz, in his 1832 treatise *On War*, touched upon the strategy of guerrilla warfare in his short chapter, "The People in Arms." Clausewitz pointed out that a general insurrection, like the one Napoleon faced in Spain, requires time to overcome the enemy; likewise, the strategy of the guerrilla relies on time to erode the enemy's strength and will. To gain this needed time, the guerrilla force must first of all survive. Thus, Clausewitz indicated that the guerrillas must maintain a strategic defense and avoid decisive battles. He cautioned that "they are not supposed to pulverize the core but to nibble at the shell and around the edges."[37] Clausewitz described the nature of this new guerrilla force as

> nebulous and elusive; its resistance should never materialize as a concrete body, otherwise the enemy can direct sufficient force at its core, crush it, and take many prisoners…. On the other hand, there must be some concentration at certain points: the fog must thicken and form a dark and menacing cloud out of which a bolt of lightning may strike at any time.[38]

[35] Ibid., 45.
[36] Ibid., 45-47.
[37] Carl von Clausewitz, *On War*, ed. and trans. Michael Howard and Peter Paret (Princeton, N.J.: Princeton University Press, 1989), 480-481.
[38] Ibid., 481.

Thus, Clausewitz addressed the strategic concepts of time and strategic defense, of avoiding the decisive battle and harassing the flanks. To execute this strategy, Clausewitz listed

certain conditions that must be met: the war must be fought in the interior of the country, it must not be decided by a single stroke, the theater of operations must be fairly large, the national character must be suited to this type of war, and the terrain must be rough and inaccessible.[39]

Clausewitz's contemporary, Antoine-Henri Jomini, also dedicated a short article to what he calls "National Wars" in his principal work, *The Art of War*. In general, Jomini's ideas overlap those of Clausewitz, but Jomini went further to emphasize the importance of the information differential between the guerrilla and his adversary. Jomini noted:

> Each armed inhabitant knows the smallest paths and their connections; he finds everywhere a relative or friend who aids him; the commanders know the country, and, learning immediately the slightest movement on the part of the invader, can adopt the best measures to defeat his projects; while the latter, without information on his movements…is like a blind man: his combinations are failures; and when…he thinks he is about to accomplish his aim and deal a terrible blow, he finds no sign of the enemy but his campfires.[40]

This information differential leads to a war so disastrous for the adversary that he must inevitably yield after a time.[41]

Nineteenth-century guerrilla wars were not, of course, restricted to the European continent. "Small war" fighting occurred in many parts of the world as indigenous forces confronted foreign colonizers and their technologically superior armies. In 1896, Col Charles Callwell, a regular British officer of the Royal Field Artillery, published *Small Wars: Their Principles and Practice*, a book in which he attempted to codify the strategy and tactics of the irregular warfare he had witnessed in the British colonial wars.

Callwell defined the very essence of guerrilla warfare as the avoidance of definite engagements combined with harassment of the adversary. This combination is achieved by "stratagems and artifice," as the guerrillas "prowl about waiting for their opportunity to

[39] Ibid., 480.
[40] Antoine-Henri Jomini, *The Art of War*, trans. G.H. Mendell and W.P. Craighill (Westport, Conn.: Greenwood Press, 1971), 29-31.
[41] Ibid., 31.

pounce upon small parties moving without due precaution."[42] Inherent in these "stratagems and artifice" is, of course, the principle of surprise. Callwell emphasized that guerrilla operations are based on surprise, followed by immediate retreat, before the opponent can recover.[43] Surprise and

retreat in turn depend on mobility, which is predicated on knowing the terrain, traveling light in small groups, and having no set lines of communication.[44] Callwell explained how guerrillas exploit difficult terrain to create a relative advantage in mobility. Their ability to move faster than the adversary in the local environment serves to offset the adversary's numerical and technical superiority. Surprise relies not only on mobility, but secrecy as well: "Guerrillas trust to secret and sudden strokes, and if the secret is discovered their plan miscarries."[45] Further, Callwell pointed out the value of protraction to frustrate the superior adversary: "The Maoris played a game of hide and seek," he noted, "and considering their inferiority to the regular troops they kept it up for a vexatiously long time."[46]

In contrast to the descriptive analyses of Clausewitz, Jomini, and Callwell, T. E. Lawrence's study of guerrilla warfare offers a prescription for success. In *Seven Pillars of Wisdom*, a work that describes his experience in the Arab revolt against the Turks during World War I, Lawrence contended that guerrilla warfare will be successful if certain factors are met and if certain methods are pursued. The required factors are an unassailable base, a sophisticated alien enemy who has to control a wide territory, and a sympathetic population. Furthermore, the guerrilla must have the virtues of secrecy and self-control and the qualities of speed, endurance, and independence of lines of supply. The guerrilla also needs the technical equipment to destroy or paralyze the enemy's supply lines and communications.[47] Simply put, Lawrence's thesis is:

> In fifty words: granted mobility, security (in the form of denying targets to the enemy), time, and doctrine (the idea to convert every subject to friendliness), victory will rest with the insurgents, for the algebraical factors are in the end

[42] Col C. E. Callwell, *Small Wars: Their Principles and Practice* (Lincoln, Nebr.: University of Nebraska Press, 1996), 125.
[43] Ibid., 127.
[44] Ibid., 136.
[45] Ibid., 143.
[46] Ibid., 129.
[47] T. E. Lawrence, *Seven Pillars of Wisdom: A Triumph* (Garden City, N.Y.: Doubleday & Company, Inc., 1935), 196.

> decisive, and against them perfections of means and spirit struggle quite in vain.[48]

The correct method of fighting, Lawrence asserted, is to cut the enemy's lines of communication rather than attack his forces. Like Davydov, Lawrence recognized that a modern army's weakness is its dependence on supplies; hence it is more effective to cut the enemy off

from his supplies than to attack his army directly. Accordingly, Lawrence advocated the interdiction of Turkish supply lines rather than attacks on Turkish troops. The "death" of a Turkish bridge or rail line was more profitable than the death of a Turk.[49] Conversely, the guerrilla force must not be tied to vulnerable supply lines. As Lawrence pointed out:

> suppose we were (as we might be) an influence, an idea, a thing intangible, invulnerable, without front or back, drifting about like a gas? Armies were like plants, immobile, firm-rooted, nourished through long stems to the head. We might be a vapour, blowing where we listed.[50]

Lawrence's thoughts on guerrilla warfare found an echo in the writings of B. H. Liddell Hart. Lawrence's idea of eschewing direct attack fit nicely into Liddell Hart's concept of the strategy of the indirect approach. According to Liddell Hart, the aim of strategy is the dislocation rather than the destruction of the enemy—a dislocation that will lead to the enemy's dissolution (not necessarily by battle) or his easier disruption in battle.[51] A guerrilla too, seeks to dislocate the enemy, since he is not strong enough to destroy the enemy directly. In his book *Strategy*, Liddell Hart stated that guerrilla action reverses the normal practice of warfare, strategically by seeking to avoid battle and tactically by evading any engagement where the guerrilla force is likely to suffer losses. Guerrilla war also inverts one of the main principles of orthodox war, the principle of concentration.

> Dispersion is an essential condition of survival and success on the guerrilla side, which must never present a target and thus can operate only in minute particles, though these may momentarily coagulate like globules of quicksilver to overwhelm some weakly guarded objective. For guerrillas the principle of 'concentration' has to be replaced by that of 'fluidity of force'.[52]

This intangibility, combined with ubiquity, is the foundation of a guerrilla campaign. The illusion of ubiquity can be created, contended Liddell Hart, by conducting multiple hit-and-

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[48] From Lawrence's article "Guerrilla Warfare" in the 1927 *Encyclopaedia Britannica*, quoted in Laqueur, 169.
[49] Lawrence, 194, 197.
[50] Ibid., 192.
[51] B. H. Liddell Hart, *Strategy*, 2nd ed. (New York: Meridian, 1991), 325.

run attacks. Numerous minor attacks can have a greater effect than a few major strikes, for they produce more cumulative distraction, disturbance, and demoralization among the enemy and a more widespread positive impression among the population.[53]

Widespread positive support of the population was also critical to Mao Zedong in the Chinese revolution. In essays written in the 1930s, Mao emphasized the political aspects of guerrilla warfare as it was fought in China. He stressed the importance of propaganda and political mobilization of the people as the true keys to successful revolutionary war.[54] Mao's keys to successful guerrilla fighting *within* a revolutionary war, however, reflect principles that reach back to the earliest guerrilla writers.

Mao's fundamental principle of combat is: "Conservation of one's own strength; destruction of enemy strength."[55] To fulfill this axiom using a force inferior to that of the adversary, Mao envisioned the need for a three-stage protracted war. In the first stage, the guerrillas conduct a strategic defensive—a posture noted earlier by Clausewitz but described more precisely by Mao as the frequent and effective use of "tactical offensives within a strategic defensive."[56] During this phase, the guerrillas gain strength as they wear down the enemy. The second stage is a strategic stalemate in which the two sides reach equilibrium. Finally, during the third stage, the guerrillas, who by this point have developed into a regular army, commence a strategic offensive to defeat the enemy.[57] The purpose of the war's protraction is twofold: first, to permit the guerrillas to gain strength to reach equilibrium with the adversary; and second, to allow external and internal political and economic pressure to build on the adversary to erode his ability and will to continue the war.[58]

To execute Mao's protracted war strategy, guerrillas depend on effective tactics and adequate sustainment. Guerrilla tactics must be based on deception, perceptiveness, and mobility. As Mao wrote:

> In guerrilla warfare, select the tactic of seeming to come from the east and attacking from the west; avoid the solid, attack the hollow; attack; withdraw; deliver a lightning blow, seek a lightning decision. When guerrillas engage a

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[52] Ibid., 365.
[53] Ibid., 365-366.
[54] Mao Tsetung, *Six Essays on Military Affairs* (Peking: Foreign Language Press, 1972), 268-271.
[55] Mao Tse-tung, *On Guerrilla Warfare*, 2nd ed. trans. Brig Gen Samuel B. Griffith, II (Baltimore: The Nautical & Aviation Publishing Company, 1992), 116.
[56] Mao Tsetung, *Six Essays*, 275.
[57] Ibid., 237.
[58] Ibid., 234-236.

> stronger enemy, they withdraw when he advances; harass him when he stops; strike him when he is weary; pursue him when he withdraws.[59]

In developing this "tactic," Mao borrows freely from the fifth century B.C. writings of Sun Tzu. Sun Tzu's basic maxims, such as "All warfare is based on deception," "Attack where he is unprepared; sally out when he does not expect you," "He who knows when he can fight and when he cannot will be victorious," and "Know the enemy and know yourself; in a hundred battles you will never be in peril," are all captured in Mao's thoughts on guerrilla warfare.[60] Mao's thoughts also turned to the need to sustain the guerrilla force through a protracted war. This support, he noted, will come largely from the politically mobilized local population. Sustenance may also be found in secure base areas or be furnished by friendly outside sources.[61]

Mao's success in China led to the imitation of his strategy by revolutionary leaders elsewhere. In Vietnam, General Vo Nguyen Giap heeded Mao's dictum that propaganda and political mobilization were more important than fighting and he similarly advocated a three-stage protracted war as a means to victory. Giap's writings, published the 1960s and 1970s, contain much political discourse and add little to the military strategy and tactics described by Mao. Giap, however, implied that a weaker entity engaged in a guerrilla war with a stronger opponent is fighting just half the battle. For a weaker party truly to prevail over a stronger foe, it must fight not only militarily through guerrilla warfare on the battlefield, but also diplomatically, culturally, psychologically, and philosophically using propaganda away from the battlefield.[62] Giap's two-prong attack reflects early Vietnamese communist doctrine called *dau tranh* ("struggle"). According to *dau tranh* doctrine, one should engage an opponent using a pincer attack, with political *dau tranh* serving as one arm and armed *dau tranh* as the other. The two arms are inseparable; the opponent finds himself in a crossfire of propaganda from one side and armed violence from the other and must defeat both to claim victory. Thus, an adversary may win the armed *dau tranh*, but still not win the war. Conversely, a guerrilla force may lose the armed *dau tranh*, yet still not lose the war.[63]

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[59] Mao Tse-tung, *On Guerrilla Warfare*, 73.
[60] Sun Tzu, *The Art of War*, trans. Samuel B. Griffith (Oxford: Oxford University Press, 1963), 66, 69, 82, 84.
[61] Mao Tsetung, *Six Essays*, 161.
[62] General Vo Nguyen Giap, *Big Victory, Great Task* (New York: Frederick A. Praeger, 1968), 52.
[63] Douglas Pike, *PAVN: People's Army of Vietnam* (Novato, Calif.: Presidio Press, 1986), 215-217, 227.

Within the *dau tranh* strategy, the outcome of a guerrilla war may be determined far from the field of battle.

By the late twentieth century, little could be added to the combat aspects of guerrilla warfare theory. Writers, such as Che Guevara, Régis Debray, and Carlos Marighela in Central and South America, Frantz Fanon and Amilcar Cabral in Africa, George Grivas in Cyprus, and the Al-Fatah doctrine writers of the Palestinian Liberation Organization (PLO), vary greatly in their political and ideological perspectives, but little in their views on the basics of guerrilla operations. Many of these writers advocated terrorism as a tool for the guerrilla force, especially for guerrillas in urban areas, but the underlying operational requirements they proposed for guerrillas, even those committing terrorist acts, remained the same. Surprise, better knowledge of the terrain, greater mobility and speed, and a better information network all emerge as keys to successful guerrilla warfare.[64]

As this brief review of guerrilla warfare theory illustrates, military thinkers have analyzed guerrilla warfare from many different perspectives over the past three centuries. They have studied guerrillas as corollaries to regular armies and as independent forces, considered guerrillas in rural and urban settings, and examined guerrilla forces that emerge from popular uprisings and those that serve as combat arms of revolutionary political parties. Common elements, however, are evident. Distilled from their context, these common elements are the essentials of guerrilla warfare.

THE ESSENTIALS OF GUERRILLA WARFARE

If one distills guerrilla warfare theory down to its common elements, the following essentials emerge:

Objectives

The ultimate objective of a guerrilla force is to survive and eventually overcome the adversary. Guerrilla warfare analysts of all eras agree that to survive, the weaker guerrilla force must avoid decisive engagements in which it might be destroyed by the stronger force. To overcome, the guerrillas must either defeat the adversary outright or coerce him to quit the fight. As Clausewitz and his successors point out, both of these options require time—time

[64] Laqueur, 330-352, 358-369.

for the guerrilla force to gain enough strength relative to the adversary to defeat him on the battlefield, or time for the guerrillas' coercive measures to raise the political, economic, or social costs of the conflict to the point where the adversary decides to end the confrontation. Accordingly, the guerrillas' secondary objective is to protract the conflict to gain this necessary time.

Strategy

For the guerrilla force to survive and overcome, the most effective strategy is "strategic defense," or, as Mao puts it, the pursuit of tactical offensives within a strategic defense. On the one hand, the guerrillas must avoid decisive battles; thus, they are strategically defensive. On the other hand, to reverse its balance of strength relative to the adversary and to implement its coercive measures, a guerrilla force must retain tactical initiative in the conflict. A weak force on the offensive, however, is largely limited to harassment operations. But, as Grandmaison, Liddell Hart, and others emphasize, constant and well-aimed harassment can erode the adversary's ability and will to continue the conflict. Frequent minor attacks on the adversary's troops, equipment, lines of communication, and other vulnerable targets reduce his fighting power and increase his weariness and frustration over his inability to triumph over a weaker foe. Consequently, "protracted harassment" can be an effective means implementing a strategy of strategic defense. Protracted harassment, of course, is not limited to actions on the battlefield. A guerrilla campaign may prove more effective if, as Giap recommends, the guerrillas launch a propaganda "harassment" campaign as an inseparable complement to its combat actions on the battlefield.

Tactics

For protracted harassment, the tactic found most effective by guerrilla warfare theorists is the hit-and-run attack. A successful hit-and-run strike, however, requires that the guerrillas gain at least temporary superiority at the point of attack. To achieve this relative superiority[65] repeatedly, the guerrillas must have several essential elements in their favor.

[65] For a thorough examination of the role of relative superiority in Special Operations, which, like guerrilla warfare, deals with small forces confronting large forces, see William H. McRaven, *SPEC OPS: Case Studies in Special Operations Warfare: Theory and Practice* (Novato, Calif.: Presidio Press, 1995).

Essential Elements

The primary element that a guerrilla force needs in its favor is *superior intelligence*; no other element is so highly emphasized by guerrilla warfare writers. Normally, a guerrilla has an innate information advantage over the foe because the guerrilla is fighting in his own territory and is thus better able to exploit the environment. However, to evade the adversary's strengths and attack his weaknesses, a guerrilla must know the enemy's disposition and readiness, his movements and intentions, his proclivities and patterns. Traditionally, guerrillas obtain this information from sympathetic locals; therefore, the generation and maintenance of popular support is crucial to the guerrilla force.

To gain temporary superiority over a stronger foe, the guerrilla must not only know the opponent's disposition, but must keep his own intentions hidden from the adversary. Thus, the second element essential to the execution of the guerrilla strategy is *security*. The compromise of a guerrilla's location or plan may lead to an encounter with a well-prepared adversary; the guerrilla force may be unable to prevail or flee and may thus be destroyed. Security, as Emmerich, Callwell, and others point out, stems from caution and secrecy, from concealment in the environment, and from dispersal throughout the territory. Guerrillas can also find security in base camps established in inaccessible areas or in sanctuary provided by a friendly neighbor. In addition, a sympathetic local populace provides a measure of security by denying the adversary information about the guerrilla, furnishing the guerrilla with temporary hiding places, and allowing him to blend in with the civilian population.

A third element essential to the execution of the guerrilla strategy is a *mobility advantage*. To avoid presenting a lucrative target to the adversary, guerrillas normally remain dispersed throughout their territory. However, to conduct a hit-and-run attack, the guerrilla force must concentrate at the point of attack, execute the strike, and disperse again before the adversary can recover. As each author points out, this requires maneuverability and speed. Guerrillas create a mobility advantage over the adversary by operating in difficult terrain, unsuited to maneuver by the adversary's cumbersome vehicles. Additionally, since the guerrillas are operating in familiar surroundings, they are cognizant of escape routes and alternative passages that will enable them to escape a pursuing adversary. The mobility advantage of the guerrilla is further enhanced by his independence of established lines of communication or fixed positions that would require defense.

Along with intelligence, security, and mobility, *surprise* is also essential for a strategy predicated on successful hit-and-run attacks. A weaker force may successfully attack a superior force if the adversary is caught unprepared and is slow to react. Guerrilla warfare analysts enumerate various means by which guerrillas generate surprise, for instance, using their intelligence sources to determine when and where the adversary is unprepared for an attack, employing deception to keep the adversary off-balance, and exploiting their knowledge of the local terrain to provide concealment for the speedy concentration of the guerrilla force prior to the attack.

Employing intelligence, security, mobility, and surprise to gain the relative superiority necessary to conduct harassing hit-and-run attacks accomplishes, of course, only half of the strategy. The harassment must be protracted; thus, the final essential element is *sustainment* of the guerrilla force. Supplies, weapons, recruits—all must be replenished or replaced over time. Guerrillas do capture some arms and supplies from the adversary, but as Mao and Giap especially stress, true sustainment comes largely from the local population; again, it is vital for the guerrillas to win the local civilians to their cause. Sustenance from the local population is crucial to the guerrilla because it frees him from dependence on lines of supply; this increases the guerrilla's mobility and denies the adversary a vulnerable target. An additional source of sustainment may be furnished by friendly neighbors or other third parties, who may provide arms, materiel and training. Many guerrilla warfare writers underscore the need for this outside support, or the support from a regular army, arguing that guerrillas are seldom successful without it.

CONCLUSION

Success in traditional guerrilla warfare rests on five essential elements: superior intelligence, security, a mobility advantage, surprise, and sustainment. To conduct a strategy of protracted harassment that will enable it to survive and overcome, a traditional guerrilla force must be able to fulfill these essentials. Can a force fighting with aircraft instead of foot soldiers similarly satisfy guerrilla warfare's essential elements when facing a foe with a superior air force? Is it possible for an air force to execute a strategy of protracted harassment? Chapter 3 explores the differences between the traditional guerrilla warfare ground environment and the airpower environment and examines the historical, theoretical, and technological evidence that provides the answers to these questions.

CHAPTER 3

GUERRILLA WARFARE IN THE AIRPOWER ENVIRONMENT

> *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.*
>
> *Martin van Creveld*

Introduction

Superior intelligence, security, mobility advantage, surprise, sustainment—these are the keys to a successful guerrilla campaign. The ability of a weaker force to survive and overcome a stronger opponent rests largely on how well the weaker force can fulfill these five essential elements of guerrilla warfare. The selection of the right combat environment is therefore critical. A weaker force must fight in an environment where the elements of superior intelligence, security, mobility, surprise, and sustainment are in its favor. Traditionally, guerrillas have fought in the ground environment, seeking out difficult terrain that places the stronger adversary at a disadvantage. But what if a weaker force set its sights on the skies, envisioning a campaign of aerial hit-and-run strikes on the stronger opponent's airborne platforms, ground assets, or infrastructure? Is the airpower environment also conducive to the fulfillment of the essential elements of guerrilla warfare? To answer this question, this chapter first examines the differences between the airpower environment and the ground combat environment of traditional guerrilla warfare. It then investigates whether these differences aid or hinder a weaker force's ability to fulfill the essential elements of guerrilla warfare in the airpower environment.

THE AIRPOWER ENVIRONMENT

In *Air Power: A Centennial Appraisal*, Air Vice Marshal Tony Mason defines airpower as:

> an extension of the war to the third dimension. Yet the air is used, not merely as a medium that is traversed by a bullet or other projectile, but as a medium for manoeuver, concealment, and surprise…. Air power represents the ability to project military force in the third dimension, which includes the environment of space, by or from a platform above the surface of the earth.[66]

[66] Air Vice Marshal Tony Mason, *Air Power: A Centennial Appraisal* (London: Brassey's, 1994), 2.

In this definition, Mason identifies two key features of the airpower environment: the combat medium—the air, the "third dimension"—and the combat platform—a vehicle operating above the surface of the earth. A comparison of these key features of the air environment with those of traditional guerrilla warfare reveals differences between the two environments that impact the fulfillment of the vision of guerrilla warfare in the airpower arena.

The Nature of the Combat Medium

Traditional guerrilla warfare is conducted on the ground—a two-dimensional, variably complex combat medium. The complexity of the ground combat medium varies from relatively simple terrain—such as a desert or a grassy plain—to more complicated terrain that has many different physical elements—for instance, a jungle or a city. In addition, the complexity of the ground combat medium can be manipulated; one can add physical elements to the medium. For example, one can plant mines or set booby-traps in an open field to make the field more difficult to cross. The ground combat medium is further influenced by local weather patterns.

Variations in the complexity of the terrain affect the operations of men and equipment and their maneuverability and visibility in the ground combat medium. Additionally, such combat factors as observation and fields of fire, cover and concealment, obstacles, and avenues of approach are affected by the terrain.[67] The variation in complexity of the ground combat medium also leads to a variable effectiveness of technology in the medium. A technologically advanced mode of transportation, for instance, may increase the speed and range of movement in one terrain, but be of little value in another. An armored personnel carrier (APC) may improve a combat squad's mobility on roads or across open fields, but may actually slow down the squad if used in a swampy area. Similarly, concealment technology optimized for one terrain may prove counterproductive in another: desert camouflage is not helpful in an alpine forest.

In the ground combat environment then, terrain is not neutral; it either helps or hinders each of the opposing forces.[68] Consequently, the variable complexity of the ground combat

[67] US Army Field Manual (FM) 90-8, *Counterguerrilla Operations*, 29 August 1986, 4-3, 4-6.
[68] US Army Field Manual (FM) 100-5, *Operations*, 14 June 1993, n.p.; on-line, Internet, 22 February 2000, available from http://www.adtdl.army.mil/cgi-bin/atdl.dll/fm/100-5/100-5toc.htm.

medium presents opportunities for a weaker force to neutralize the strengths of a stronger opponent. As Martin van Creveld notes in *Technology and War*:

> there is no weapon but that has its limitations and no technology so perfect that it cannot, in principle at any rate, be countered with the aid of appropriate organization, training, and doctrine. The more complex the environment in which the conflict takes place, the greater the prospect of doing this successfully.[69]

Thus, by choosing an appropriate manner of fighting in a sufficiently complex terrain, a weaker force may gain the upper hand in a combat environment in which the stronger adversary cannot bring his strength to bear.

In contrast to the ground environment however, the airpower combat medium is three-dimensional and relatively simple. The vast expanse of the sky is, for the most part, free from the wide physical variations that characterize the earth's surface. The earth's surface does, of course, define the *bottom* of the sky. Mountains protruding into the air create a more complex low-level combat environment than that at the ground-air interface of a desert. These variations in complexity, however, are found in but a small slice of the total air combat medium. The variability of the air environment can also be manipulated to some degree by adding physical obstacles or obscurants—such as the barrage balloons of World War II or the smoke from oil fires set by Iraqi forces in the Gulf War.[70] Weather, of course, is also an influential factor in the air environment.

The three-dimensionality of the air combat medium and its general lack of physical obstacles endow airpower with considerable advantages in speed, range, elevation, flexibility, and versatility in relation to ground forces.[71] However, the relative uniformity of the air environment also means that there is little differential in ease or effectiveness of operations across the medium: the air is considered a neutral combat medium.[72] In this neutral environment, there is little that a weak force can exploit to negate a stronger adversary's

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[69] Martin van Creveld, *Technology and War* (New York: The Free Press, 1989), 230.
[70] Future war scenarios also foresee aerial minefields. See, for instance, Martin C. Libicki, "The Small and the Many," in *In Athena's Camp: Preparing for Conflict in the Information Age*, ed. John Arquilla and David Ronfeldt (Santa Monica, Calif., RAND, 1997), 207.
[71] Air Commodore Andrew G. B. Vallance, "The Changing Nature of Air Warfare," in *Air Power Confronts an Unstable World*, ed. Richard P. Hallion (London: Brassey's, 1997), xv; Alan Stephens, *The Implications of Modern Airpower for Defence Strategy*, Air Power Studies Centre Paper Number 5 (Fairbairn, Australia: Air Power Defence Studies Centre, 1992), 1.

maneuverability or firepower (except, perhaps a sufficiently complex ground-air interface). Superior capabilities provided by advanced technology and good training will be effective throughout the combat medium. As van Creveld points out, "other things being equal, the simpler the environment in which war is waged, the greater the advantages offered by high technology."[73] In a simple medium that offers few, if any, inherent advantages to an inferior combatant, a weak air force may have to turn to solutions outside the combat medium—doctrinal, technological, or otherwise—to survive and overcome in the airpower environment.

Thus, the complexity of the combat medium influences the options a weaker force has to neutralize the strengths of the adversary. These options are also affected by differences in the second key feature of the airpower environment—the combat platform.

The Nature of the Combat Platform

A weak force operating in the air environment must consider not only a combat medium that differs from that of guerrilla warfare on the ground, but a distinct combat platform as well. In traditional guerrilla warfare, the combat platform is a human being equipped with a weapon. In the airpower arena, however, the combat platform is an airborne vehicle, manned or unmanned, equipped with weapons. By its very nature, flight requires technology, and this difference between the relatively low-tech human being and the relatively high-tech airborne platform has a definite impact on the ability of a weaker force to survive and overcome in the face of a superior foe.

A low-tech human platform can be relatively easy to procure, sustain, and conceal. In traditional guerrilla warfare, guerrillas strive to win public support for their efforts and thus increase the pool from which to recruit additional human 'combat platforms.' Similarly, sustenance for the guerrillas is, to a large extent, derived from these supportive sources. In addition, human combat platforms can conceal themselves not only in the complex ground combat environment, but also among local human noncombatants. With this assistance from the local population, a weak force does not need to create its own extensive infrastructure to support its combat platforms or to prevent their detection by the superior foe.

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[72] Col Phillip S. Meilinger, *10 Propositions Regarding Airpower* (Washington, D.C.: Air Force History and Museum Programs, 1995), 16; Guilio Douhet, *The Command of the Air*, trans. Dino Ferrari (1942; new imprint, Washington, D.C.: Office of Air Force History, 1983), 9.
[73] Van Creveld, 272.

The human combat platform does have its limitations, however. It is slow moving and carries relatively lightweight weapons. A certain mass of these platforms must concentrate to bring significant firepower to bear on a target. The supply of weapons for the human platforms is also a concern of the guerrilla. To maintain an adequate supply of weapons and ammunition, guerrillas have traditionally relied on self-made weapons, arms captured from the opponent, and equipment supplied by third parties.

In the air environment, however, a single aircraft can strike with much greater rapidity and force than an entire unit of ground guerrilla fighters. High-tech air combat platforms give a weaker force greater speed, range, and firepower with which to carry out its operations against a superior foe. However, the high-tech nature of the air combat platform increases the difficulty of its procurement, sustainment, and concealment.

A weaker force must first, of course, obtain air combat platforms. Procurement is usually a costly venture that requires either the establishment of a domestic aircraft manufacturing capability or importing air combat platforms from an outside source. Once obtained, aircraft require special sustenance: aviation fuel and specialized aircraft parts cannot usually be supplied by the local population; they too require domestic industrial production or import. Thus, a weak force must create an adequate manufacturing or import infrastructure to provide a supply of combat platforms, fuel, parts, and armaments both before and during a conflict. In addition to building this procurement and support infrastructure, a weak force must also develop a training system to provide a sufficient supply of skilled operators and maintenance personnel to employ and service the relatively high-tech air combat platform and its weapons.

The nature of the air combat platform affects not only the infrastructure required to procure and sustain it, but also the measures needed to prevent its detection by the superior foe. Current air combat platforms can remain airborne for only a finite amount of time before they must return to the earth. Therefore, to deny decisive battle, aircraft must elude detection and destruction both in the sky and on the ground. In neither medium can the air combat platform simply blend in with the natural surroundings. A weaker air force therefore, must obtain the resources necessary to employ passive or active denial measures. These measures can range from low-tech solutions, such as camouflage or simple decoys, to high-tech means, such as stealth, electronic warfare (EW), or underground facilities.

In general, the key differences between the airpower environment and the guerrilla ground combat environment lie in the complexity of the combat medium and the infrastructure required to operate and support the combat platform. The simplicity of the air combat medium gives a weak force greater speed, range, and flexibility of action, but offers no inherent features that might be used to negate the strengths of a superior adversary. Similarly, air combat platforms can increase the speed, reach, and firepower of a weak force's operations, but require a distinctive support infrastructure to do so. As a consequence of these differences between the airpower and ground combat environments, a weak air force must seek different measures than its counterpart on the ground to fulfill the essential elements of guerrilla warfare.

THE ESSENTIALS OF GUERRILLA WARFARE IN THE AIRPOWER ENVIRONMENT

Traditionally, weak forces on the ground have been able to survive and overcome stronger adversaries because they have found relatively simple means by which to fulfill the essential elements of guerrilla warfare. Likewise, a weak force in the airpower environment must seek correspondingly simple measures to achieve the essential elements of superior intelligence, security, mobility advantage, surprise, and sustainment in the face of a superior foe. The differences in the combat medium and combat platform of the two environments, however, affect the ability of a weak force to find simple solutions in the airpower environment.

Superior Intelligence

In traditional guerrilla warfare, superior intelligence provides the key to successfully avoiding the strengths and attacking the weaknesses of a stronger adversary. A guerrilla in the ground combat environment creates an information advantage over the foe by controlling an important intelligence source inherent in the combat medium. In the airpower environment, on the other hand, intelligence information is gathered largely by technologically sophisticated sensors that are external to the combat medium and that may be beyond the control of the weaker force.

The ground combat medium of the traditional guerrilla is shared not only by the guerrilla and his opponent, but also by other, noncombatant, and humans. These

noncombatants constitute an important source of information regarding the happenings in the medium. A guerrilla who befriends the local population and wins its support can create an information advantage over a superior foe: the local populace will supply him with information regarding the location and movement of the adversary and deny similar information about the guerrilla to the adversary. The information advantage generated by this human source is invaluable—a guerrilla who does not gain the support of the local population will rarely find success. Furthermore, this human intelligence (HUMINT) source may be difficult for the superior opponent to neutralize or turn to his advantage. Removing the local population may not be feasible for political or humanitarian reasons, and insulating the noncombatants from the guerrillas through programs, such as the "strategic hamlet" operation that the United States conducted in Vietnam, may prove a Sisyphean task.[74]

Thus, in the ground combat environment, a weaker force can gain an information advantage over a superior foe by controlling a simple, yet critical source of information inherent in the combat medium. Humans, however, do not reside in the air combat medium; hence, a weaker force must look elsewhere for an intelligence advantage in the airpower environment.

Although HUMINT plays a role in the airpower environment, gathering information in the air combat medium depends, to a large extent, on technologically sophisticated monitors, such as visual, ultraviolet (UV), radar, and infrared (IR) sensors.[75] A superior adversary will most likely have his own array of these sensors safely beyond the reach of the weaker force. Thus, unlike in the ground environment, the weaker force in the airpower environment will not be able to create an intelligence advantage by monopolizing a critical source of information about the environment.

Despite the lack of an information monopoly, a weak air force may still be able to avoid the strengths and attack the vulnerabilities of the adversary by employing its own sensors or relying on sensor information supplied by a third party. In the Vietnam War, a weaker air force demonstrated how it could identify and exploit weaknesses of a stronger foe

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[74] Senate Committee on Foreign Relations, *The U.S. Government and the Vietnam War: Executive and Legislative Roles and Relationships, Part I: 1945-1961*, prepared by the Congressional Research Service, Library of Congress, 98th Cong., 2nd sess., 1984, Committee Print, 334; *Part II: 1961-1965*, 104-106, 134-135; Robert D. Schulzinger, *A Time for War: The United States and Vietnam, 1941-1976* (New York: Oxford University Press, 1997), 115.

with a simple radar and radio system. By monitoring the radio calls of US pilots and integrating this information with their radar picture, North Vietnamese intercept controllers were able to direct their MiG fighters to attack US aircraft that had made low-fuel or "bingo" calls and were thus unable to counter the MiG attacks aggressively.[76] To gather information beyond that provided by its own sensors, a weak force may turn to commercial sources or friendly states. For example, commercial satellite companies can furnish imagery of an adversary's ground sites and force dispositions at greater than one-meter resolution.[77] Additionally, the news media, which has been referred to as the "poor man's intelligence service," may prove a significant source of operational information.[78] During the Falklands War, for instance, the Argentines relied on the BBC for information on the progress of the conflict. Through BBC reports, the Argentines knew of the British attack on Goose Green before it occurred; similarly, it was through the BBC that the Argentines first discovered that their bombs had a detonation problem.[79] A weak force may also receive intelligence support from a sympathetic third party. In the Yom Kippur War and the Falklands War, both sides in each conflict relied heavily on intelligence, surveillance, and reconnaissance (ISR) products provided by outside sources.[80]

In many circumstances, though, the flow of information to the weaker air force from mechanical sensors and third parties can be interdicted by the stronger opponent. Unlike in the ground environment, where the neutralization of the human noncombatant intelligence source may be considered an illegitimate action, in the airpower environment, the destruction of the weaker force's mechanical sensors, such as radars and communications equipment, is a legitimate act of armed conflict. An adversary might also be able to cut the supply of

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[75] "Can We Rely on Advanced Reconnaissance Methods in a World of Camouflage?" *Military Technology* 11, no.6 (June 1987): 133.
[76] Marshall L. Michel III, *Clashes: Air Combat Over North Vietnam 1965-1972* (Annapolis, Md.: Naval Institute Press, 1997), 234.
[77] Joseph C. Anselmo, "Commercial Space's Sharp New Image," *Aviation Week and Space Technology* 152, no. 5 (31 January 2000): 53.
[78] Charles J. Dunlap, Jr., "21st-Century Land Warfare: Four Dangerous Myths," *Parameters* 27, no. 3 (Autumn 1997): 32.
[79] R. G. Funnell, "It Was a Bit of a Close Call: Some Thoughts on the South Atlantic War," in *The War in the Air: 1914-1994*, ed. Alan Stephens (Fairbairn, Australia: Air Power Studies Centre, 1994), 234.
[80] Yom Kippur War: Alan Stephens, "You'll Remember the Quality Long After You've Forgotten the Cost: Structuring Air Power for the Small Air Force," in *Air Power Confronts an Unstable World*, ed. Richard P. Hallion (London: Brassey's, 1997), 197; Anthony H. Cordesman and Abraham R. Wagner, *The Lessons of Modern War*, vol. I, *The Arab-Israeli Conflicts, 1973-1989* (Boulder, Colo.: Westview Press, 1990), 46.

information to the weaker force from third parties by using economic or diplomatic means to pressure the third party into ceasing its support. For example, in response to the United Nations
trade embargo on Iraq in the Gulf War, the commercial satellite companies SPOT Image and EOSAT discontinued the sale of satellite imagery to Iraq, which effectively eliminated Saddam Hussein's overhead view of the battlefield.[81]

Thus, there is no simple source in the combat medium of airpower that can provide a weaker force superior intelligence in relation to the stronger adversary. The weaker force may have access to the information it needs from various intelligence sensors, but the superior foe will likely have access to the same, if not more, sensors in the airpower environment. Consequently, the capacity of a weaker force to create a positive information differential may lie, not in a greater access to critical information sources, but in the security measures it takes to deny information to the adversary.

Security

To deny decisive engagement to a superior adversary, a weak force must make itself hard to find or, if found, hard to destroy.[82] For the guerrilla, security is vital. In the ground environment, the complexity of the combat medium and the low-tech nature of the human combat platform allow the weaker force to rely on some relatively simple measures to gain security. Providing security for a high-tech air combat platform in both the air and the ground environments, however, presents a weaker force with a much greater challenge in the face of the superior foe.

A weak force makes itself hard to find in the ground environment by taking advantage of the complexity of the combat medium and the low-tech nature of its combat platform. In the complex ground combat medium, the guerrilla can use camouflage, both artificial and natural, to blend into the terrain or he can simply mingle with civilians in the local area to avoid detection by the adversary. Hiding does become more difficult as the superior foe introduces more technologically sophisticated sensors into the combat medium—thermal

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Falklands War: Anthony H. Cordesman and Abraham R. Wagner, *The Lessons of Modern War*, vol. III, *The Afghan and Falklands Conflicts* (Boulder, Colo.: Westview Press, 1990), 270; Libicki, 197.
[81] Jon Trux, "Desert Storm: A Space-Age War," *New Scientist* 131, no. 1779 (27 July 1991): 33.
[82] Libicki, 195.

imaging devices or human odor detectors, for instance—but guerrillas have often found simple solutions to defeat these sensors.[83] In the Vietnam War, for example, the Viet Cong used urine soaked rags to deceive the "people sniffers" that US forces had placed along jungle trails.[84] In addition, the low-tech nature of the human combat platform enhances the ability of the guerrilla to avoid detection. Since the guerrilla does not need to create and sustain a special infrastructure to support its combat platforms, there are no particular base camps to which he must return or supply lines that he must defend. Thus, there are no predictable places where the adversary might find the weaker force. The guerrilla fighters can remain safely dispersed throughout the combat medium.

The complexity of the combat medium also contributes to the ability of the weak force to protect itself from destruction when it encounters the stronger adversary. The guerrilla can use his mobility advantage in difficult terrain to elude an adversary's counterstrike after the guerrilla

has executed his own hit-and-run attack. Similarly, the guerrilla can protect himself by fighting in restrictive terrain where the adversary cannot bring his firepower to bear. The critical key for the guerrilla, of course, is to flee rather than fight when attacked by the stronger opponent. The guerrilla avoids destruction by shunning the tactical defensive; he will abandon his position rather than defend it. The most effective means for a guerrilla to avoid the destructive strength of the adversary is to operate from a sanctuary, where guerrilla forces are beyond the reach of the superior foe.

Therefore, in the traditional guerrilla ground combat environment a weaker force can rely on features inherent in the combat medium and the combat platform to provide security for his operations. Although the guerrilla's security measures may appear relatively simple, they can prove difficult for the stronger foe to counter. The adversary could attempt to cut the guerrilla off from the supportive local population, but as mentioned earlier, this may be problematic. Similarly, reducing the complexity of the combat medium through the use of defoliants or burning may have political or environmental backlash for the adversary. The use of Agent Orange and other defoliants by US forces to deny cover and habitat to the Viet Cong in the Vietnam War generated much controversy, some of which continues today.[85] A

[83] "Can We Rely": 133.
[84] Van Creveld, 304.
[85] Schulzinger, 114, 193.

superior adversary might also increase the number or types of mechanical sensors employed in the combat medium, but these sensors themselves are vulnerable to the weaker force's countermeasures.[86]

For the traditional guerrilla then, the complexity of the combat medium and the presence of supportive civilians afford a natural means of security for the human combat platform. There is nothing natural, however, about an air combat platform. The effective concealment and protection of aircraft and ground support infrastructure in the face of a superior opponent may require an extensive array of preservation measures. A weak force must meet a significant challenge if it is to make itself hard to find and hard to destroy both in the air and on the ground.

To make itself difficult to find in the air, a weak force must escape detection by the superior foe's sensors. An obvious means for an aircraft to escape this detection is to remain outside the sensor's coverage. For example, in the 1981 raid on the Osirak nuclear reactor near Baghdad, Israeli strike aircraft flew 635 miles at 100 feet above the desert floor to avoid detection by Saudi, Jordanian, and Iraqi radars.[87] Currently, the North Korean Air Force has plans to insert ranger-commando units deep into South Korea undetected by using An-2 Colt biplanes flying at low level down the valleys that lead from north to south at speeds below the doppler gates of most air defense radars.[88] Of course, the weaker force must have accurate intelligence about the adversary's sensors to exploit their weaknesses. If its aircraft are unable to avoid an opponent's sensors, then the weaker air force must find a method to negate them. Negation techniques may include the use of stealth, chaff, decoys, jamming, or the destruction of the sensor itself.[89] Expensive negation measures, such as stealth or EW, however, may be beyond the financial means of a weak air force.[90]

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[86] Van Creveld, 304.

[87] R. A. Mason, "Air Power as a National Instrument: The Arab-Israeli Wars," in *The War in the Air: 1914-1994*, ed. Alan Stephens (Fairbairn, Australia: Air Power Studies Centre, 1994), 197; Dennis M. Drew, "Air Power in Peripheral Conflict: From the Past, the Future?" in *The War in the Air: 1914-1994*, ed. Alan Stephens (Fairbairn, Australia: Air Power Studies Centre, 1994), 252. The Israeli Air Force is recognized as the stronger force in this incident, but it is cited here to illustrate the concept of detection avoidance—a concept important to both strong and weak air forces.

[88] William J. Williams, "Bedcheck Charlie and the An-2," *Air Power History* 43, no., 4 (Winter 1996): 6-9; Defense Intelligence Agency, *North Korea: The Foundations for Military Strength—Update 1995*, 19, 22.

[89] George and Meredith Friedman, *The Future of War: Power, Technology, and American World Dominance in the 21st Century* (New York: Crown Publishers, 1996), 289-291.

[90] Shaun Clarke, *Strategy, Air Strike and Small Nations* (Fairbairn, Australia: Air Power Studies Centre, 1999), 69. However, "cheap and reasonably effective" ad hoc stealth was provided to the RAF Tornado GR1s in the

If the weaker air force's combat platforms cannot escape detection, then they must take measures to avoid destruction in the air at the hands of the stronger foe. Similar to their counterparts on the ground, a weak force in the air must avoid the tactical defense; thus, the classic guerrilla tactic of hit-and-run is as applicable in the air as it is on the ground. In the Vietnam War for example, North Vietnamese MiG-21s eluded US fighters by employing a "one pass and haul ass" tactic in which the MiGs would make a single high-speed dive attack on an isolated US aircraft and then dash away before the US fighters could engage.[91] Weaker air forces have also used the other end of the velocity spectrum to evade a superior opponent. The North Korean Air Force flew slow-moving, open-cockpit PO-2 biplanes in night attacks on Seoul during the Korean War. By flying at 80 knots at low level, these extremely maneuverable PO-2s
(referred by the UN troops as "Bedcheck Charlies") often eluded the high-performance US fighters scrambled to intercept them.[92] Today, modern standoff attack capability may provide a weak air force with the best opportunity for a hit-and-run strike against a superior adversary. The use of long-range precision-guided missiles may allow a weak force to inflict significant damage on an adversary while minimizing its own exposure to risk.[93] To take advantage of this capability, however, a weak air force would need adequate targeting intelligence as well as sufficient financial resources.

If the weaker air force's combat platforms are able to escape detection and destruction in the sky, the battle is still but half won. Eventually, all aircraft must return to the surface of the earth, where they are more vulnerable to detection and destruction than in the air.[94] This vulnerability stems not only from the lack of maneuverability and combat capability of an aircraft on the ground, but also from its predictability: on the ground, an air combat platform is predictably found near its support infrastructure. This specialized support infrastructure is typically located at fixed sites easily identifiable by the presence of runways, hangars, and other facilities. Naturally, such sites are lucrative targets for an adversary. As Giulio Douhet first pointed out, the surest and most effective way of destroying an opponent's air force is to

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Gulf War by adding radar absorbent materials to the aircraft. See Stephens, *Implications of Modern Air Power*, 7.

[91] Michel, 130.

[92] Robert F. Futrell, *The United States Air Force in Korea, 1950-1953*, revised edition (Washington, D.C.: Office of Air Force History), 309-311.

[93] Stephens, *Implications of Modern Air Power*, 12.

destroy his aircraft at their bases.[95] History provides several examples of a superior force decimating a weaker air force by attacking its airbases in the early days of a conflict. At the start of Operation Barbarossa in 1941, the German Luftwaffe virtually annihilated the Russian Air Force on the ground in two days.[96] Israeli Air Force strikes on Egyptian airbases crippled the Egyptian Air Force in less than three hours as the Six-Day War opened.[97] In 1994, the Russian Air Force attacked airbases in Chechnya and destroyed the 265 aircraft in Chechen possession before they could get airborne.[98] Consequently, to survive and overcome a superior foe, it is imperative for a weak air force to take appropriate security measures to avoid such decisive engagement on the ground. Security on the ground depends, much as it does in the air, on the ability of the weaker force to make its combat platforms and infrastructure hard to find, or if found, hard to destroy.

Of course, it is not easy to make an installation as large as the average airbase difficult to find. A weak air force, however, can reduce the signature of its ground operations through footprint reduction, dispersal, and camouflage, concealment, and deception techniques.[99] During the Cold War years, for instance, the Swedish Air Force constructed an elaborate system of dispersed and hidden operating sites from which to conduct air operations in the face of an invasion by the Soviet Union. The Swedes minimized the footprint of their air operations by building small sites with short runways and little maintenance infrastructure, and by designing easy-to-maintain, short-take-off-and-landing (STOL) aircraft, such as the Viggen, optimized to operate from these small sites. They also hardened and widened highway strips to serve as auxiliary runways and taxiways between the dispersed sites. Aircraft and key maintenance facilities were hidden several miles from the sites. Mobile logistics teams practiced travelling between the dispersed locations to refuel, rearm, and

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[94] Air Force Doctrine Document (AFDD) 1, *Air Force Basic Doctrine*, September 1997, 19.
[95] Douhet, 53-54.
[96] Richard Muller, *The German Air War in Russia* (Baltimore: The Nautical & Aviation Publishing Company of America, 1992): 28, 44.
[97] Benjamin Franklin Cooling, *Case Studies in the Achievement of Air Superiority* (Washington, D.C.: Air Force History and Museums Program, 1994), 577-578.
[98] Vyacheslav Kondratyev, "The Awesome Sky Over Chechnya," *Krylya Rodiny*, January 1996, n.p., in *FBIS [Foreign Broadcast Information Service] Report: Central Eurasia*, FTS19970404001035, 4 April 1997; on-line, Internet, 7 March 2000, available from http://199.221.15.211/index.html.
[99] Randall Williams and Thomas Wheeler, *Air Base Camouflage, Concealment and Deception Guide*, Technical Report JCCD-94-1 (Alexandria, Va.: Defense Technical Information Center, January 1994), 1-1, 5-1 - 5-18.

repair incoming aircraft.[100] The Swedes also developed a camouflage screen that combated "all modern sensor threats" and jet-fighter decoys that created the same radar readings, heat signatures, and visual identification features as actual aircraft.[101] With a large number of small, well-concealed sites and the ability to move logistics material between them, a weak air force can decrease the predictability of where it is operating on the ground. Dispersal and concealment techniques may reduce the efficiency of a system, but a weak force conducting a protracted harassment campaign does not need to generate a high operations tempo—a lengthy aircraft turnaround time is unlikely to affect its operations.[102] Dispersed basing and on-site servicing do, however, place a tremendous logistics burden on a weak air force's resources.[103] Furthermore, dispersed operations must be planned well in advance of a conflict; a system of dispersed hidden bases and a network of responsive mobile logistics may require years to build.

In addition to making its air combat platforms and support infrastructure difficult to find on the ground, a weak force must also take measures to prevent their destruction if the adversary does manage to find them. The traditional guerrilla uses his mobility advantage to avoid decisive battle with a stronger opponent. Similarly, a weak air force might also be able to escape from an adversary's attack on a ground site by flushing its aircraft at the site into the air and driving the mobile support vehicles away from the site. Given sufficient warning, fleeing may prevent destruction. However, moving aircraft in the air or vehicles on the ground in the presence of the adversary's attack aircraft may invite destruction. If it cannot immediately flee an adversary's attack on a particular ground site, a weak air force may be able to weather the attack before moving its assets to a new site. To prevent destruction of its combat platforms and support infrastructure during an attack, a weak force can turn to active protection measures, such as ground-based air defenses, or passive measures, such as camouflage and hardened aircraft shelters (HASs). The defenses, however, should be considered expendable, designed to provide temporary protection until the weaker force can

[100] Richard A. Bitzinger, *Facing the Future: The Swedish Air Force, 1990-2005*, RAND Report R-4007-RC (Santa Monica, Calif.: RAND, 1991), 17-18, 24; Col Kent H. Harrskog, "Sweden's Air Power Doctrines, 1926-2000," Research Report (Maxwell AFB, Ala.: Air War College, 1988), 26.
[101] "Can We Rely": 133, 137.
[102] Clarke, 69, 137. Dispersal does not necessarily mean reduced efficiency, however. The Swedes have refined their system to the point where they can refuel and re-arm a Viggen in ten to twenty minutes. They have also developed a sophisticated data link system to provide C2 for dispersed operations. See Bitzinger, 22-25; Malcolm English, "SAAB's Classic Canard," *AIR International* 56, no. 2 (February 1999): 92, 101.

move its assets elsewhere. Like its counterpart on the ground, a weak air force must not allow itself to be drawn into a prolonged tactical defense of its ground sites.

To avoid the necessity of defending a ground site, a weak air force can seek to operate from sites against which the adversary cannot bring his firepower to bear. It can, for example, place assets in residential areas or near important archeological sites, making it difficult for the adversary to attack the assets without causing extensive collateral damage.[104] Further, a weak air force can create a legal and moral conundrum for an opponent by purposefully constructing underground operations facilities below schools and hospitals.[105] The most effective means of security for a weak air force, however, is the sanctuary offered by a sympathetic neighbor or granted by operational restrictions that the superior adversary places on itself. In the Korean War, for example, United Nations Command (UNC) airmen found it difficult to eliminate the Chinese Air Force when it entered the war because, in order to prevent expansion of the conflict,

the UNC forbade its airmen to attack the Manchurian airbases from which the Chinese were operating.[106] Likewise, in Vietnam, the North Vietnamese Air Force survived and operated in the face of superior US airpower because the Johnson Administration declared North Vietnamese airfields, initially in North Vietnam and later in China, off-limits to US attack aircraft.[107]

In general, the nature of the air combat platform makes it difficult for a weak force to gain security in the airpower environment. As George and Meredith Friedman remark, "Aircraft are several tons of hard material moving around in the sky. That is hard to hide from all the spectra that might see it."[108] It is hard to hide aircraft on the ground as well; earthbound, an aircraft loses its combat capability and must be protected, along with its supporting infrastructure. A weak air force can provide this necessary protection in the air and on the ground through procedural measures, such as low-level flight to avoid radar

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[103] Van Creveld, 320; Bitzinger, 29-30.
[104] As demonstrated by Iraq in the Gulf War. See John D. Morrocco, "Soviet Peace Plan Weighed as Gulf Ground War Looms," *Aviation Week & Space Technology* 134, no. 8 (25 February 1991): 22.
[105] Dunlap, "21st-Century Land Warfare," 34.
[106] Futrell, 41, 694.
[107] Cooling, 515-517; Earl H. Tilford, Jr., *Setup: What the Air Force Did in Vietnam and Why* (Maxwell AFB, Ala.: Air University Press, 1991), 109.
[108] Friedman and Friedman, 293.

detection or operations from ground sites off-limits to the adversary, and through technological measures,

such as standoff weapons or the construction of state-of-the-art HASs. The most effective means of security for a weak air force may be procedural— reliance on technology to provide security is risky in a conflict with a technologically superior foe. The weaker air force's standoff weapons may be countered by the opponent's longer-range missiles, or, as Saddam Hussein discovered in the Gulf War, "super-hardened" bunkers may be destroyed by the adversary's advanced "bunker-busting" munitions.[109]

Thus, in contrast to the guerrilla in the ground environment whose combat medium affords his combat platform a significant degree of security, a weak force in the airpower environment must look to resources outside the combat medium to protect its combat platform. Such resources are available; however, the ease with which the weaker force can acquire these resources will determine how well it can fulfill the essential element of security.

Mobility Advantage

To conduct a protracted harassment campaign, a weak force must not only preserve itself through appropriate security measures, but it must also attack the superior adversary with a persistent series of small strikes. Of course, the classic guerrilla tactic for these strikes is the hit-and-run attack. For this tactic to be effective though, the guerrilla must be able to 'outrun' the stronger opponent.

In the traditional guerrilla ground environment, the complexity of the combat medium influences the mobility of different combat platforms in the medium. The guerrilla therefore, chooses to fight in rugged terrain, where his human combat platform has greater mobility than the mechanized combat platforms of the stronger adversary. In addition, the guerrilla typically fights in familiar territory; he knows short cuts and escape routes that enhance his ability to outrun the adversary. The guerrilla's reliance on his natural surroundings to generate this mobility makes it difficult for the opponent to eliminate the advantage. As noted previously, reduction of the complexity of the terrain by chemical or physical means may be too difficult or costly to be feasible. Similarly, fighting the guerrilla symmetrically, on foot

[109] Christopher M. Centner, "Ignorance is Risk: The Big Lesson from Desert Storm Air Base Attacks," *Airpower Journal* 6, no. 4 (Winter 1992): 26.

with light infantry, in his own backyard, may be playing to the guerrilla's strength. Thus, the guerrilla's use of an asymmetric combat platform in a complex, familiar terrain gives him the ability to concentrate, strike, and flee faster than the stronger opponent can pursue him.

Whereas mobility in the ground environment is a product of platform characteristics and complexity of the terrain, in the relatively simple terrain of the air combat medium, mobility is determined largely by the capabilities of the platform itself (and the ability of the operator to exploit those capabilities). By definition, a weak force is unlikely to possess platforms and operators more capable than those of the stronger adversary; thus, it is improbable that a weaker air force will have the necessary speed and range advantages needed to outrun a superior foe in the air. A weak force may, however, turn to support from the ground to find a way to elude an opponent. In an area with a sufficiently complex ground-air interface—the Italian Alps, for instance—a pilot familiar with the peaks and valleys of the region may be able to evade a faster pursuer during a hit-and-run attack. Sanctuaries and hidden operating sites also offer opportunities to outrun a more capable adversary. In the Korean War, for example, Chinese MiG-15s managed to elude the UNC Sabres by remaining close to their sanctuary bases in Manchuria. The Chinese restricted their attacks to "MiG Alley," just south of the Manchurian border, where they could strike and then dash back across the Yalu River before being intercepted by the F-86s.[110] Similarly, an aircraft operating in the vicinity of its hidden base may be able to hit, run, land, and hide before a pursuer is able to catch it. In addition, long-range weapons may provide a means to outrun an opponent by allowing an aircraft to operate at such a distance from the adversary that it can strike and return to safety before the adversary can reach it.

A weak air force, therefore, may be able to generate a mobility advantage by employing long-range missiles and exploiting the ground portion of the airpower environment. However, this advantage may be susceptible to countermeasures by the stronger opponent. An adversary might, for instance, attempt to block access to a sanctuary, much as the UNC Sabres did as they flew patrols along the Yalu to intercept Chinese MiGs leaving or entering Manchuria.[111] In the same manner, an opponent might post combat air

[110] Cooling, 455.
[111] Futrell, 250, 252, 296, 301.

patrols (CAPs) and optimize low-level radar coverage in areas suspected to harbor hidden operating sites.

Thus, although the use of a symmetric combat platform in a simple combat environment does hamper the ability of a weak air force to achieve a mobility advantage, safe areas and long-range weapons may enable it to outrun a superior opponent. Moreover, the weaker opponent can maximize the effectiveness of the speed and range capabilities it does possess by invoking the element of surprise.

Surprise

For a weak force to strike a stronger force and survive, it must temporarily achieve superiority at the point of attack. The weak force must strike at a time or place or in manner for which the superior foe is unprepared—it must achieve the element of surprise.[112] Surprise prevents the stronger opponent from effectively using his superior capabilities while the attacker maximizes the impact of his own limited resources.[113] Unlike the essential elements of guerrilla warfare discussed so far, surprise is not necessarily determined by the features of the combat medium or the combat platform. Theoretically, a weak force can generate surprise whether operating in a desert or in a jungle, whether fighting on foot or in aircraft. Instead, the ability of a weaker force to achieve surprise is determined by its fulfillment of the associated essential elements, superior intelligence and security.[114] The weak force must know where and when the stronger adversary can be found unprepared and must prevent its own intentions from being discovered by the opponent in time for him to brace for the attack.

A guerrilla in the ground environment, as previously noted, relies on properties inherent in his combat medium to achieve superior intelligence and security, and thus to achieve surprise. In the airpower environment, however, the weak force must depend on resources external to the combat medium to achieve the same end, and these resources may be difficult to obtain. Thus, the ability of a weak air force to gain surprise will depend on the range of intelligence assets and security measures it has at its disposal. Of course, surprise is determined not only by the availability of resources, but also by the manner in which they are

[112] Joint Publication (JP) 3-0, *Doctrine for Joint Operations*, 1 February 1995, A-2.
[113] Richard K. Betts, *Surprise Attack: Lessons for Defense Planning* (Washington, D.C.: The Brookings Institution, 1982), 5, 11, 109.
[114] JP 3-0, A-2.

employed. Innovation, deception, variations in tactics and methods, and the imaginative use of rather simple resources can generate enormous surprise.[115]

Weak air forces in the past have amply demonstrated the imagination and innovation required to generate surprise with limited resources in the face of a stronger foe. In the Korean War, for instance, the North Koreans painted four Yak-9s with South Korean markings to deceive the UNC air defenders. The Yaks successfully penetrated UNC defenses and attacked Osan Airfield, strafing the field and knocking out a telephone repeater station.[116] Deception was also employed by the Argentine Air Force in the Falklands War as two Super Étendards used deceptive routing at very low altitude to surprise the British Task Force. The Task Force did not have enough warning time to deflect the attack, and the Étendards struck the well-stocked container ship MV *Atlantic Conveyor*, sinking the vessel and causing considerable material losses.[117] The North Korean Air Force demonstrated the imaginative use of simple resources in its employment of the PO-2 biplanes, not only in the "Bedcheck Charlie" nuisance attacks on Seoul, but also in strikes against airfields. In one instance, a single PO-2 bombed the airfield at Suwon, completely destroying one UNC Sabre and damaging eight others. This one biplane attack did more damage to the Sabres than had all combat with MiGs up to that time.[118] During the Vietnam War, the North Vietnamese used biplanes to introduce a new tactic into their repertoire. Slow-moving An-2 Colts were used to attack a US radar site in Laos, slightly damaging the site and putting the tactical air navigation (TACAN) equipment out of commission for several days. The attack surprised US intelligence analysts; the US Deputy Chief of Mission reported that the attack was "a highly unusual variation in the normal pattern of enemy tactics."[119]

Thus, through the innovative and imaginative employment of available assets, a weak air force may be able to achieve the essential element of surprise despite limited intelligence and security resources. For a campaign of protracted harassment, however, the weak force must be able to achieve this surprise repeatedly. To attack a superior foe persistently over a

[115] Betts, 111-115; JP 3-0, A-2.
[116] Futrell, 99.
[117] Funnell, 218; Cordesman and Wagner, vol. III, 319.
[118] Futrell, 309.
[119] Timothy M. Castle, *One Day Too Long* (New York: Columbia University Press, 1999): 76-80. The innovative tactic did not remain in the North Vietnamese repertoire for long, however. Both An-2s crashed during the strike and the North Vietnamese did not conduct another air attack against a US ground site for the rest of the war.

prolonged period of time, a weak air force must fulfill the final essential element of guerrilla warfare, sustainment.

Sustainment

The ultimate goal of a guerrilla is to outlast the opponent on the battlefield, to generate a war-weariness and fatigue in the superior foe such that he chooses to quit rather than continue an apparently unending fight. Protraction itself is the chief weapon wielded by the weaker force. Thus, the guerrilla must make it appear that he can fight forever. As Douglas Pike remarks in *PAVN: People's Army of Vietnam*, "Even if you are patently unable to fight a fifty-year war, you must never let the enemy realize that."[120] The key to fighting for "fifty years" is sustainment.

The resources required by a weak force to sustain a conflict are determined largely by its combat platforms. In the ground environment, the guerrilla employs a human combat platform that is sustained, for the most part, by fellow human beings in the combat medium. In the airpower environment, on the other hand, the combat platform is a sophisticated machine that requires an array of manufactured goods and trained specialists for its sustainment. The ease with which a weak force can acquire these sustainment items will determine its ability to protract a conflict in the airpower environment.

A guerrilla in the ground environment fights with the bare necessities: a foot soldier and his weapon. The foot soldier—the combat platform—is readily sustained by material found in the local area. The indigenous population furnishes replacement soldiers, food, clothing, and shelter for the human combat platform. Weapons too, can be procured locally, either self-made or captured from the opponent, who shares the combat medium with the guerrilla. The guerrilla may obtain additional weapons and supplies from external sources, such as sympathetic neighbors or commercial arms merchants.

The guerrilla's reliance on sustainment from noncombatants nearby in the combat medium makes it difficult for a stronger opponent to cut the weak force off from its supplies. As noted previously, removing or isolating the noncombatant population may not be feasible. Furthermore, the dispersal of the guerrilla force among the locals and the frontless nature of

[120] Douglas Pike, *PAVN: People's Army of Vietnam* (Novato, Calif.: Presidio Press, 1986), 220.

the war itself means that there are no distinct supply lines leading to base camps or to troops at the front that the opponent can disrupt. The adversary may find more success through interdicting any external supply sources the guerrilla might have; the loss of these resources usually has little impact on the guerrilla's overall ability to survive, but may curtail his offensive capabilities against the superior foe.[121]

In general then, the guerrilla in the ground environment has a very simple, yet reliable sustainment method with which to protract a conflict fought with a human combat platform. In contrast, a weak force in the airpower environment must rely on a complex system of production facilities, transportation schemes, and training centers to support its combat platform, the aircraft.

Fighting with a machine rather than a human may increase the firepower and maneuverability of a weak force, but this increase in capability does not come cheaply. Sustainment of air operations requires a myriad of manufactured products, such as fuel, weapons, spare parts, replacement aircraft, radars, refueling vehicles, and repair tools. Trained pilots and maintenance personnel are also indispensable. To produce these goods and skilled personnel, one needs factories, training centers, and other support infrastructure. In combat, the demand for replacement platforms may be great: high-tech machines tend to break down faster over time than do human combat platforms.[122] On the other hand, however, the weaker force's protraction strategy of intermittent, yet persistent, air strikes against the opponent reduces the amount of material that it needs to fight a superior foe.

The ability of a weak force to conduct protracted air operations will depend on the quantity and quality of the personnel, equipment, and material it has at the start of the confrontation and its sources of resupply after the conflict begins. The weak force's initial warfighting stockpile will be shaped by the domestic economic, technological, and resource constraints that affect the aerospace products and services the state can either produce internally or acquire from abroad. Once the conflict starts, it is doubtful that domestic production of major items and trained personnel would be sufficient to keep up with

[121] Anthony James Joes, *Modern Guerrilla Insurgency* (Westport, Conn.: Praeger, 1992), 8.
[122] James F. Dunnigan, *How to Make War: A Comprehensive Guide to Modern Warfare for the Post-Cold War Era*, 3rd ed. (New York: William Morrow and Company, Inc., 1993), 20.

sustainment demands.[123] Even a state as highly capable as Great Britain needed resupply from the United States to continue its air operations during the Falklands War.[124] Thus, sustenance from external sources is crucial. A reliable source of goods and services greatly improves a weak force's prospects for protraction; unsupported, a weak force could calculate to the day when its first critical provisions would run out.[125]

In contrast to the human support system that sustains the traditional guerrilla in the ground environment, the specialized infrastructure that supports the weak air force is highly susceptible to interdiction by the superior foe. A weak force's domestic production facilities are obvious targets for attack by the opponent. In Operation Allied Force, NATO air strikes destroyed or damaged an estimated 100 percent of Serbia's petroleum refining production capability, 65 percent of its ammunition production capacity, and 70 percent of its aviation assembly and repair capacity.[126] External sources of combat material may also be vulnerable to interruption by the stronger adversary. During the Falklands War, for example, Great Britain used diplomatic means to persuade France to cease providing support to the Super Étendards and Exocet missiles it had previously sold to Argentina.[127] Physical means, such as blockades and aerial interdiction, might also be employed to sever external supply lines, although the use of these methods may be limited by the nature of the conflict and the stronger opponent's corresponding political will. In the Vietnam War, for instance, the United States did not cut North Vietnamese access to imports from the Soviet Union early in the war for fear that a Soviet response to the interdiction would escalate the conflict. By 1972, however, the relationship between the United States and the Soviet Union had improved (as had the US-Chinese relationship), and, with the fear of escalation removed, the United States did block North Vietnamese supply lines by mining Haiphong harbor.[128]

The high-tech nature of the air combat platform therefore, presents a significant sustainment challenge to a weak force. Whereas the guerrilla in the ground environment can gain the sustenance he needs by persuading his fellow humans in the combat environment to

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[123] Clarke, 69.
[124] Stephens, "You'll Remember the Quality," 197.
[125] Clarke, 69.
[126] Anthony H. Cordesman, *The Lessons and Non-Lessons of the Air and Missile War in Kosovo: Report to the USAF XP Strategy Forum*, 27 July 1999, 82; on-line, Internet, 09 November 1999, available from http://www.csis.org/ kosovo/Lessons.html.
[127] Cordesman and Wagner, vol. III, 243.
[128] Tilford, 139-140, 232, 254.

support his cause, the weak force in the airpower environment must buy his sustainment with economic resources. Thus, it may be harder for a weak air force to lead a superior adversary to think that it can fight for "fifty years" than it is for the traditional guerrilla. The guerrilla has an infinite ability to persuade; it is unlikely that a weak air force will have an infinite ability to pay.

CONCLUSION

The stark differences between the airpower environment and the ground combat environment influence the ability of a weak force to fulfill the five essential elements of guerrilla warfare in each environment. In the ground environment, the combination of a complex combat medium and an asymmetric combat platform provides the guerrilla the key to achieving the essential elements of superior intelligence, security, mobility advantage, surprise, and sustainment. Wise use of the terrain and steadfast support from the local populace are the means to the guerrilla's success. It takes time and effort to cultivate these means, but time and effort are two characteristics of which the guerrilla seems to have an almost infinite supply. In the airpower environment, the combination of a simple combat medium and a symmetric combat platform leaves the weak air force facing the full strength of the superior foe. Since there is nothing inherent in this medium-platform combination to give a weak force a simple means to fulfill the five essential elements, it must look to procedural and technological solutions. A weak air force may well have an infinite supply of imaginative tactics and innovative procedures, but these, of course, must be grounded in its technological resources. It takes economic resources to cultivate the technological means of warfare, and economic resources are not infinite. A weak air force, therefore, must carefully choose where best to invest its resources.

Theoretically then, a weak force operating in the airpower environment can fulfill the five essential elements of guerrilla warfare if it has the resources necessary to do so. If, for instance, a weak air force acquires sufficient intelligence sources, constructs an extensive system of dispersed and survivable sites from which to conduct operations, obtains aircraft that are suited to dispersed operations, trains mobile maintenance crews, and purchases large numbers of long-range standoff munitions, it may be able to conduct a protracted harassment campaign to coerce a superior adversary to withdraw from a conflict. But is it likely that a weak force will have resources sufficient to carry out such a strategy? And if so, is it the best

use of those resources? To answer these questions, Chapter 4 examines the feasibility of the practical application of air guerrilla warfare.

CHAPTER 4

THE FEASIBILITY OF AIR GUERRILLA WARFARE

I can't believe that a fourth-rate power like Vietnam doesn't have a breaking point.

Henry Kissinger

INTRODUCTION

Conceptually, air guerrilla warfare is a viable strategy for a weaker air force confronting an adversary with a much stronger air force. A weak force could, given the right conditions, conduct a campaign of protracted aerial harassment through hit-and-run attacks that would enable it to survive and eventually overcome a superior foe. Those "right conditions" are, of course, the key to translating concept into reality—the key to the feasibility of air guerrilla warfare. Feasibility, however, has two meanings: in one sense, it means possible, capable of being accomplished; in the second, it means likely or logical. Thus, for air guerrilla warfare to be a feasible strategy, it must be both possible—the means must be available to permit a weak air force to fight guerrilla-style effectively—and likely—the weak force must be inclined to acquire and employ those means. This chapter, therefore, investigates both the possibility and likelihood of air guerrilla warfare to determine whether a guerrilla-style air force is indeed a feasible threat in the near-term global environment.

THE POSSIBILITY OF AIR GUERRILLA WARFARE

A weak force contemplating air guerrilla warfare can be compared to the average hiker considering an ascent of Mount Everest. For it to be possible for the hiker to climb the highest mountain in the world, he needs the proper equipment—Polartec climbing gear, oxygen bottles, and $65,000—and the right context—a world in which adventure tourism thrives and offers 'first-timer' groups led by experienced guides.[129] Likewise, for air guerrilla warfare to be practicable, a weak force requires both the appropriate means to carry out the strategy and a strategic environment that is conducive to success.

In the previous chapter, the analysis of a weak force's ability to fulfill the five essential elements of guerrilla warfare in the airpower environment identified the means

[129] Alpine Ascents International; on-line, Internet, 15 May 2000, available from http://www.alpineacents.com/everest.asp.

necessary for air guerrilla warfare to be a viable warfighting strategy. These means included a survivable ground operations sites, the capability to conduct successful hit-and-run attacks from those sites, reliable intelligence sources, an adequate number of properly trained operators and technicians, and a dependable method of sustainment. Do conditions today promote the procurement of these means? Will they do so in the near future? The answers to these questions can be found, to a great extent, in the realm of modern technology.

Possibility through Technology

Technology today is creating the right conditions for air guerrilla warfare. Powerful new technologies are available that can increase the ability of a weak force to survive and operate in the face of a superior opponent. The survivability of an air guerrilla's system of dispersed, small-footprint ground sites, for instance, can be improved by state-of-the-art physical and electronic multi-spectral camouflage, concealment, and deception materials and techniques designed to be effective against an array of sensors.[130] Survivability in the air is likewise enhanced by the advent of accurate, long-range, launch-and-leave weapons that will allow an air guerrilla to conduct hit-and-run attacks from beyond reach of the adversary's defenses. Within the next two years, stealthy, Global Positioning System (GPS)-guided, all-weather, all-terrain, day-and-night, standoff weapons, such as the US Joint Air to Surface Standoff Attack Missile (JASSM), the German-Swedish KEPD 350 Taurus, the British Storm Shadow, and the French Scalp-EG, will offer accurate strike capability from a range of up to 200 miles for approximately $300,000 a missile.[131] An extended-range US Joint Direct Attack Munition (JDAM) will provide 50-mile standoff range for under $30,000.[132] Using

[130] "Can We Rely on Advanced Reconnaissance Methods in a World of Camouflage?" *Military Technology* 11, no.6 (June 1987): 133. The general survivability of the system does, however, depend greatly on the given terrain in which the air guerrilla force operates—it is easier to conceal a site in the complex landscape of Sweden than in the open terrain of Iraq.

[131] John A. Tirpak, "Brilliant Weapons," *Air Force Magazine* 81, no. 2 (February 1998): 50; Michael A. Taverna, "Taurus Cruise Missile Begins Flight Tests," *Aviation Week & Space Technology* 151, no. 16 (18 October 1999): 35; John D. Morrocco, "Storm Shadow/Scalp Derivatives Studies," *Aviation Week & Space Technology* 150, no. 26 (28 June 1999): 46; Nick Cook, "Europe's Cruise Missile Conundrum," *Interavia Business & Technology* 53, no. 621 (June 1998): 39-41; Paul Proctor, ed. "JASSM Exports Predicted," *Aviation Week & Space Technology* 148, no. 19 (11 May 1998): 17. Of course, GPS guidance is not a panacea for a weak air force's targeting concerns. The system is US-owned and -operated; thus, its reliability might be questionable in a conflict with the United States or its partners. However, due to the increasing number of commercial users who rely on GPS, it is unlikely that the United States would manipulate the system appreciably. See Christopher J. Bowie, et al., *Trends in the Global Balance of Airpower* (Santa Monica, Calif.: RAND, 1995), 74.

[132] Bill Sweetman, "Coming Soon to a Theater Near You," *Interavia Business & Technology* 54 no. 633 (July/August 1999): 37-38.

available precision guidance technology, an air guerrilla force can also create inexpensive, yet accurate, ad hoc cruise missiles by adding GPS guidance kits and weapons payloads to low-cost reconnaissance UAVs ($300,000 for the UAV as opposed to $1.5 million for a Conventional Air Launched Cruise Missile (CALCM)).[133]

The targeting data required to employ these long-range systems is already available at competitive prices from commercial satellite imagery sources.[134] In addition, the enormous growth of information technologies has made real-time and near real-time information available to a weak force from global media outlets on the airwaves and over the Internet.[135] Naturally, these information conduits provide not only a means to gather information, but a method to disseminate it as well. The Internet, for example, furnishes a weak force with an ideal medium in which to conduct its political *dau tranh*, or propaganda campaign, against the stronger opponent. In Operation Allied Force, for example, Serb organizations and supporters used the Internet extensively and, on many occasions, successfully out-propagandized NATO.[136]

In addition to weapons and words, a weak force requires a sufficient number of skilled workers to execute an air guerrilla strategy. Here, too, recent technological developments might offer solutions to many of the personnel problems that weak forces often face. Difficulties—such as poorly educated conscripts, a shortage of qualified instructors, and a reluctance to conduct realistic training for fear that expensive aircraft might be lost—may be overcome in part through new computerized teaching techniques and simulation. In his article, "21st-Century Land Warfare: Four

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[133] Bruce Rolfsen, "Report: Bases Near Combat Zones May Be Threatened," *Air Force Times*, 29 November 1990, 20; House, *Performance of the B-2 Bomber in the Kosovo Air Campaign: Hearing before the Subcommittee on Military Procurement of the Committee on Armed Services*, 106th Cong., 1st sess., 1999, n.p.; on-line, Internet, 14 February 2000, available from http://commdocs.house.gov/committees/ security/has181200.000/has181200_Of.htm.

[134] Joseph C. Anselmo, "Commercial Space's Sharp New Image," *Aviation Week and Space Technology* 152, no. 5 (31 January 2000): 54.

[135] Charles J. Dunlap, Jr., "21st-Century Land Warfare: Four Dangerous Myths," *Parameters* 27, no. 3 (Autumn 1997): 32.

[136] Anthony H. Cordesman, *The Lessons and Non-Lessons of the Air and Missile War in Kosovo: Report to the USAF XP Strategy Forum*, 27 July 1999, 38; on-line, Internet, 09 November 1999, available from http://www.csis.org/ kosovo/Lessons.html; Timothy L. Thomas, "Kosovo and the Current Myth of Information Superiority," *Parameters* 30, no. 1 (Spring 2000): 23-24.

Dangerous Myths," Charles Dunlap cites a $49 computer simulation program used by the US Marine Corps

to teach recruits tactical combat techniques as an example of the inexpensive, yet sophisticated instruction that is becoming increasingly available on the open market.[137] Similarly, in the airpower environment, low-cost simulation and computerized teaching programs may provide operators and technicians supplementary basic skill instruction and realistic advanced training scenarios without placing precious lives and valuable equipment at risk.

The availability and affordability of other emerging technologies will also grow as the United States and other advanced nations continue to turn to commercial-off-the-shelf (COTS) products as a way to reduce costs and avoid the technology lag often associated with government-run projects.[138] With cutting-edge technology priced to sell on the global market, it is all the more feasible that a weak force can acquire the tools it needs to wage air guerrilla warfare effectively.

Existing air guerrilla tools, of course, need not be discarded. A low, slow An-2 Colt, for example, can still be useful for penetrating an adversary's air defenses. But current trends in technology are producing new options, making it increasingly possible for a weak force to construct survivable ground operations, to remain outside hostile air defenses by using long-range precision weapons, to gather reliable intelligence, and to train its personnel more effectively. These trends, of course, are changeable: in the reactive atmosphere of military innovation, the advantages introduced by a new technology or procedure are eventually eroded by counter-developments. On the balance, however, recent technological advances are furnishing weak forces with expanding opportunities to obtain potent tools for protracted aerial harassment.

Possibility through Context

While developments in technology clearly are contributing to the possibility of air guerrilla warfare, it is less certain whether the prevailing strategic environment is

[137] Dunlap, "21st-Century Land Warfare," 30; David J. Dean, *The Air Force Role in Low-Intensity Conflict* (Maxwell AFB, Ala.: Air University Press, 1986), 63; A. J. Bacevich, et al., *American Military Policy in Small Wars: The Case of El Salvador*, special report (Cambridge, Mass.: Institute for Foreign Policy Analysis, 1988), 32.
[138] Dunlap, "21st-Century Land Warfare," 31.

providing the right conditions for the strategy to be carried out. The end of the Cold War and the emergence of the United States as the only remaining great power have generated both aids and hindrances to the potential success of the air guerrilla warfare strategy.

The current strategic environment has strengthened the possibility of air guerrilla warfare by increasing a weak force's access to top-of-the-line weapons systems. In today's post-Cold War world, many major powers have significantly reduced their

defense budgets and, consequently, have turned increasingly to foreign sales to keep their domestic arms industries healthy. As a result, current-generation systems equipped with the latest technology are available on the world market.[139] The United States, for instance, is selling Block 60 F-16s, an aircraft markedly superior to the F-16s in the US inventory, to the United Arab Emirates.[140] Likewise, Sweden is aggressively hawking its newest combat aircraft, the JAS 39 Gripen, a multi-role, short-take-off-and-landing (STOL) platform optimized to operate in the Swedish Air Force's dispersed ground support system—an ideal aircraft for an air guerrilla force.[141] Weak states strapped for cash may even be able to barter with sellers anxious to close a deal: Malaysia recently purchased eighteen MiG-29s from Russia in a transaction that included palm oil as payment.[142]

The possibility of air guerrilla warfare is also enhanced by the rise of what Tony Mason calls "optional warfare" in the international security arena. The local ethnic, religious, and nationalistic conflicts that characterize today's strategic environment pose little threat to the national security or commercial interests of most major nations; intervention in these conflicts is, therefore, largely optional. Unwilling to incur heavy resource or political costs, the intervening states pursue strategies that minimize casualties and maximize legitimacy, through, for example, collateral damage

[139] Justin Brown, "Arms Sales: Exporting US Military Edge?" *Christian Science Monitor*, 02 December 1999, 2.
[140] David A. Fulghum, "UAE's F-16s Will Be Envy of USAF Pilots," *Aviation Week & Space Technology* 152, no. 11 (13 March 2000): 24.
[141] Jason Sherman, "Smooth Sailing: Sweden's Armed Forces, Industrial Base Strike a New Post-Cold War Posture," *Armed Forces Journal International* 135, no. 5 (December 1997): 33.
[142] Air Vice Marshal Tony Mason, *Air Power: A Centennial Appraisal* (London: Brassey's, 1994), 262.

avoidance and coalition operations.[143] This minimum risk posture, however, may render a superior adversary highly susceptible to the protracted, casualty-generating strategy of air guerrilla warfare. An air guerrilla force would present today's "optional warriors" with high-cost predicaments on both ends of the battlefield. On the adversary's end, the weak force would create a steadily growing number of casualties as a result of its hit-and-run attacks. On its own end, it would increase the potential for collateral damage by interspersing its ground operations in and around civilian infrastructure. Such predicaments may not only raise costs above the opponent's threshold after the conflict is engaged, but may serve as a deterrent as well. Faced with the near certainty of casualties and collateral damage over a patiently prolonged conflict, a stronger adversary may decide to opt out of the intervention altogether.[144]

Although the current "optional warfare" environment does appear to be conducive to air guerrilla warfare, it poses a critical hindrance as well. During the Cold War, a weak force confronting a superior foe could call on the United States or the Soviet Union for help and, if it played its ideological cards right, most likely receive it. With the fall of the Berlin Wall, though, that ideological patronage has for the most part evaporated. In a conflict with the United States or its partners, a weak force is likely to have little hope for substantial assistance from a major nation, as Iraq discovered in the Gulf War and, more recently, Serbia realized in Kosovo.[145] In a conflict in which the United States is not involved, patronage may be more forthcoming, but will depend on the particular situation. A weak force fighting in political isolation might still have access to commercial sources of sustainment materiel, but these supply lines are vulnerable to interdiction by diplomatic and economic means, such as international sanctions, as well as by physical means. External support is, of course, a crucial component of guerrilla warfare; only in exceptional cases will a guerrilla force, either in the

[143] Ibid., 242-244; Daniel Byman and Matthew Waxman, "Defeating US Coercion," *Survival* 41, no. 2 (Summer 1999): 108-110.
[144] Friedrich August Frhr. von der Heydte, *Modern Irregular Warfare In Defense Policy as a Military Phenomenon*, trans. George Gregory (New York: New Benjamin Franklin House, 1986), 62.
[145] Brigadier V. K. Nair, *War in the Gulf: Lessons for the Third World* (New Delhi: Lancer International, 1991), 12, 218-219; Cordesman, 31-32; Department of Defense, *Kosovo/Operation Allied Force After-Action Report: Report to Congress*, 31 January 2000, 11; on-line, Internet, 08 February 2000, available from http://www.defenselink.mil/ pubs/kaar02072000.pdf.

air or on the ground, prevail over a superior foe without outside assistance.[146] The lack of a reliable third-party source of resupply and a sanctuary in which to continue training would make it almost impossible for an air guerrilla force—especially one operating in a country of little geographical depth—to protract a conflict over an extended period of time.[147]

Thus, conditions exist today that both contribute to and detract from the possibility of air guerrilla warfare. Prevailing technological trends offer the means to fight air guerrilla-style and the current strategic environment holds potentially susceptible opponents, but that same environment also raises doubts that a dependable outside source of sustainment will be available in a conflict against those opponents. This assessment of possibility, however, answers only half of the feasibility question. Even if it were clearly evident that sustainable means were available and the adversary was coercible, a weak force might still decline to pursue guerrilla-style air operations. For the strategy to be feasible, available means must be matched with a willing practitioner.

THE LIKELIHOOD OF AIR GUERRILLA WARFARE

Although it is quite possible for the average hiker with $65,000 in the bank to obtain the appropriate climbing gear and join a suitable ascent group, that does not necessarily mean that he is instantly off to Kathmandu. The likelihood that the hiker will actually climb Mount Everest depends on the subjective judgments he makes regarding his personal circumstances. Does he feel the need or desire to climb Everest? Would the $65,000 be better spent elsewhere, on a Jaguar XK8 coupe perhaps?[148] Does he feel strong enough to withstand the pain and exhaustion of a trek to the top of the world? Similarly, the likelihood of a weak force adopting an air guerrilla warfare strategy will depend on its appraisal of whether the strategy fills an important strategic need, whether it is the best use of limited resources, and whether the state itself has the ability to persevere through the dislocation and damage to be expected from a protracted conflict.

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[146] Von der Heydte, 80; Alan Stephens, "You'll Remember the Quality Long After You've Forgotten the Cost: Structuring Air Power for the Small Air Force," in *Air Power Confronts an Unstable World*, ed. Richard P. Hallion (London: Brassey's, 1997), 197.

[147] Shaun Clarke, *Strategy, Air Strike and Small Nations* (Fairbairn, Australia: Air Power Studies Centre, 1999), 69.

[148] As per Edmunds.com automobile pricing; on-line, Internet 15 May 2000, available from http://edmunds.com/edweb/newcars/1999/jaguar/xkseries/xk8coupe.html.

Likelihood through Need

In general, a state develops strategy primarily based on its regional security needs. If, in its region, a state is most likely to come in conflict with peer or weaker opponents, then the adoption of air guerrilla warfare is rather unlikely. If, on the other hand, the state is likely to face a significantly superior adversary (or one of its partners) in its region—as Sweden was during the Cold War and as North Korea is today—then the strategy would be highly attractive.[149] Naturally, there are states with conflicting needs: they do not face a greatly superior foe directly, but their intentions may conflict with a powerful state's declared interests. These states face a dilemma: if they prepare only for most likely encounters against equal or lesser opponents, they will, almost certainly, be unable to conduct air guerrilla warfare against a superior foe (although they might attempt it from a sanctuary); if they prepare for a worst-case scenario against a stronger adversary, they may sacrifice some conventional capacity against more likely opponents. The construction and operation of the air guerrilla's defensive dispersed and survivable ground system would divert resources from the development of offensive capabilities that might be more valuable against a peer or weaker opponent.[150] In addition, an air guerrilla force trained and equipped to strike high-value targets from long range while avoiding air-to-air engagements may find it difficult to conduct successful defensive counterair operations against an equal competitor. Of course, the force structure of air guerrilla warfare is not completely incompatible with conventional air operations. A state with sufficient resources might hedge its bets and attempt to prepare for both contingencies by building a survivable ground infrastructure, obtaining multi-role STOL aircraft, and training for both air guerrilla and conventional air operations. Such a design might be acceptable if it does not deleteriously detract from the state's regional security posture. In general then, a state is likely to adopt air guerrilla warfare only if the strategy and force structure are flexible enough to encompass its most-likely regional security needs as well as its worst-case concerns.

<u>Likelihood through Best Value</u>

[149] Bruce W. Bennett, et al., *Theater Warfare and Modeling in an Era of Uncertainty: The Present and Future of Warfare* (Santa Monica, Calif.: RAND, 1994), 40-41.
[150] Alan Stephens, *Kosovo, Or the Future of War*, Air Power Studies Centre Paper Number 77 (Fairbairn, Australia: Air Power Defense Studies Centre, 1999), 19.

A state with the need to prepare for a potential conflict with a superior adversary need not perforce create an air guerrilla force; alternative methods of conducting protracted aerial harassment do exist. Many airpower analysts argue, for instance, that a weaker force would be better advised to invest its resources in ballistic and cruise missiles as its primary weapons delivery systems. Missile systems, they point out, are, on average, less expensive than aircraft, require less training to operate, can be easily dispersed and hidden, and are often mobile.[151] Missiles are also capable of generating the dual predicament of casualties on the adversary's end of the battlefield and collateral damage on the user's end, if the systems are placed in civilian areas. Missiles, therefore, may create the desired coercive effect at a much lower expenditure of effort than that required for a fleet of manned aircraft.

In contrast, manned aircraft offer qualities not found in missiles. Whereas missiles are purely a weapons delivery system, aircraft have the flexibility to perform various roles in peacetime, crisis, and conflict. Consequently, many states prefer to own manned aircraft for the regional presence and prestige they endow.[152] In addition, the reusability of aircraft as weapons delivery platforms renders them less costly to employ than missile systems. According to a 1995 RAND study, manned aircraft are more cost effective than missiles over prolonged operations—such as those envisioned for air guerrilla warfare—even when calculated at high aircraft loss rates.[153] Successful employment of manned aircraft, however, is highly sensitive to the training and experience of the operators, and a key weakness of many inferior air forces is the low number and poor quality of their pilots.[154] Naturally, aircraft and missile systems are not mutually exclusive; a state is likely to possess both. But the likelihood that a state adopts air guerrilla warfare as its primary strategic defense will depend on its assessment of the best use for its limited resources. If the ability to cultivate a cadre of skilled pilots is beyond its means, a weak force may have to turn to missile employment as its coercion tool. With quality operators and technicians however, a state may be more likely to opt for air guerrilla warfare as the more efficient means of protracted aerial harassment against a superior foe.

Likelihood through Resolve

[151] See for instance, Mason, 72; Bennett, et al., 18-19.
[152] Capt George C. Morris, "The Other Side of the COIN: Low-Technology Aircraft and Little Wars," *Airpower Journal* 5, no. 1 (Spring 1991): 58.
[153] Bowie, et al., 77-83.

Protraction, of course, demands its own price. A state might well find that air guerrilla warfare meets its security needs and offers the most effective weapons delivery system, but it will be unlikely to adopt the strategy if it cannot actually afford to carry it out. To protract a conflict against a stronger opponent, the weaker force must be willing to absorb considerable material, economic, social, political, and psychological costs.[155] Recent conflicts, such as the Gulf War and Operation Allied Force, demonstrated the degree of destruction that a weaker force can expect to endure in contemporary warfare. It has been estimated that Iraq suffered $400 billion in damage in the forty-three days of the Gulf War.[156] The mounting damage to Serb strategic, military/industrial, and economic infrastructure was cited as one of the reasons Slobodan Milosevic capitulated after seventy-eight days of NATO bombing in Operation Allied Force.[157] As Indian Brigadier V. K. Nair emphasizes in his book, *War in the Gulf: Lessons for the Third World*, war in the modern era has the potential to set back a developing country's growth substantially.[158] A highly destructive conflict might also jeopardize a state's regional security posture, increasing its vulnerability to opportunistic neighbors.[159] A state, therefore, must assess its susceptibility to and capability to withstand such damage over an extended period. A pre-industrial society—for instance, North Vietnam during the Vietnam War—may be less vulnerable to economic disruption than a more modern society—such as Serbia.[160] Authoritarian societies may be better suited to withstanding protracted deprivation than democracies.[161] Reliable third-party sustainment may increase the ability of a weak force to sustain protraction by mitigating the effects of the adversary's attacks. It is risky, of course, to generalize about human behavior; in World War II, citizens of both democratic and authoritarian states demonstrated remarkable ability to endure

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[154] Ibid., 83.
[155] Constantine P. Danopoulos with Rebecca R. Ruelas, "Tentative Observations and Conclusions," in *Prolonged Wars: A Post-Nuclear Challenge*, ed. Karl P. Magyar and Constantine P. Danopoulos (Maxwell AFB, Ala.: Air University Press, 1994): 451.
[156] Nair, 191.
[157] Department of Defense, *Kosovo/Operation Allied Force After-Action Report*, 10-11; Cordesman, 6, 91.
[158] Nair, 191.
[159] Cordesman, 91.
[160] Stanley E. Spangler, *Force and Accommodation in World Politics* (Maxwell AFB, Ala.: Air University Press, 1991), 451.
[161] Danopoulos with Ruelas, 450-451; Richard N. Haass, *Intervention: The Use of American Military Forces in the Post-Cold War World* (Washington, D.C.: Carnegie Endowment for International Peace, 1994), 75.

hardship. Theoretically though, an authoritarian state with a reliable source of outside support and an economic infrastructure that presents few lucrative strategic targets may be more likely to conclude that it has the potential to withstand the protraction demanded by an air guerrilla warfare strategy.

The likelihood of air guerrilla warfare, therefore, depends on subjective judgments made by each state contemplating its security needs and national resources. A state is likely to adopt the strategy if it believes it must prepare to confront a superior foe in its region, if it has the resources to create a cadre of skilled pilots and technicians, and if the nature of its society is conducive to bearing the burden of protracted warfare. Since these assessments must be made individually by each state, it is difficult to determine the specific likelihood of air guerrilla warfare. In general however, it is likely that suitable candidates do exist. One state with a high air guerrilla potential is North Korea. In its region, North Korea is likely to face a significantly stronger opponent (the United States,
with South Korea), it possesses a relatively large air force (albeit of dubious quality), it has placed much of its military capability underground or in hardened shelters, and it is an authoritarian society accustomed to deprivation. Furthermore, North Korea's large military stockpiles would most likely allow it to conduct a limited—in intensity or duration—air guerrilla campaign unsupported by a third-party patron.[162] Stockpiles, however, are finite. To project the impression of infinite will and ability that is critical to the success of air guerrilla warfare, North Korea, too, would have to secure dependable sources of outside support for its cause.

CONCLUSION

Air guerrilla warfare is possible. The right objective conditions are either present in today's global environment or can be created by a savvy practitioner of the strategy. Through technology, the ideal tools for fighting air guerrilla-style are becoming increasingly available and affordable. The strategic landscape offers potentially vulnerable opponents, and although obvious patrons are not evident, a skillful propaganda campaign might induce supporters to come forward. The likelihood that a weak force will actually adopt the strategy, however, rests on

subjective conditions that are much more difficult to assess. Each state must determine for itself whether air guerrilla warfare is suited to its needs, resources, and nature. A lack of resources and a reluctance to protract the pain of modern warfare may dissuade many weak forces from fighting air guerrilla-style. But for those states with the means to acquire the necessary air guerrilla tools and the will and ability to withstand the burden of protracted conflict, air guerrilla warfare does offer a feasible strategy with which to confront an adversary with a considerably stronger air force.

[162] Defense Intelligence Agency, *North Korea: The Foundations for Military Strength—Update 1995,* 19.

CHAPTER 5

CONCLUSION AND IMPLICATIONS

Always remember, however sure you are that you can easily win, that there would not be a war if the other man did not think he also had a chance.

Winston Churchill

Mao Zedong once described the relationship between the guerrilla and the people as that of a fish to water.[163] Just as water provides a fish with the basic necessities of life, so the local populace furnishes the traditional guerrilla with the elements essential for a weaker force to survive and overcome a superior foe. The support of the local population and a setting that offers a sufficiently complex terrain are the simple means by which the guerrilla gains the intelligence, security, mobility, surprise, and sustainment he needs to conduct a protracted harassment campaign to coerce a stronger opponent to give up the fight.

When guerrilla warfare takes wing, however, the fish leaves the pond. No longer surrounded by a nurturing native habitat, the air guerrilla must create his own survival system in an environment dominated by a superior foe. This is no easy task: employing a symmetric platform in a neutral combat medium, the air guerrilla must rely on a combination of procedural and technological solutions to achieve the essential elements necessary to deny decisive engagement and execute persistent hit-and-run attacks against a stronger adversary. These solutions require resources, both human and economic, that are often beyond the means of a weak force.

Trends in modern technology and the prevailing strategic environment are overcoming these resource hurdles by providing new solutions to the challenge of air guerrilla warfare. Commercial satellite services, Internet communications, and long-range precision weapons, for example, furnish a weak force with improved opportunities to gather information, garner outside support, and successfully strike a stronger opponent without unduly jeopardizing its own survival. Of course, the strategy is not a universal remedy for all weak forces that might confront a superior foe. Air guerrilla warfare demands a strategically defensive posture, a degree of airpower competency, and a willingness to absorb the ravages of contemporary

[163] Mao Tse-tung, *On Guerrilla Warfare*, 2nd ed. trans. Brig Gen Samuel B. Griffith, II (Baltimore: The Nautical & Aviation Publishing Company, 1992), 113.

warfare over a protracted period of time. But for a weak force with the necessary will, resources, and external sustainment, air guerrilla warfare offers a viable means by which to survive and overcome in the face of a significantly stronger adversary.

Aircraft in the hands of a weaker opponent, therefore, can pose a credible threat to a superior foe. Employed unconventionally in a protracted hit-and-run campaign, a weak air force has the potential to generate substantial coercive pressure on a stronger adversary. The ability of the aircraft of the weak to influence the actions of the strong has weighty implications for a great power, such as the United States, whose action, or inaction, can have repercussions around the globe.

The Implications of Air Guerrilla Warfare

The existence of air guerrilla warfare as a viable warfighting strategy holds three major implications for US national security. First, the threat of air guerrilla warfare may curtail the ability of the United States to respond to the localized, "optional" crises that dominate the international environment. The protracted, high-casualty engagement promised by air guerrilla warfare directly counters the US preference for quick, minimum risk solutions to such conflicts. Thus, a weak force prepared to fight air guerrilla-style could successfully deter US involvement in its area of interest. To preserve freedom of action in the face of an air guerrilla threat, the United States must reduce its vulnerability to the air guerrilla's casualty-generating strategy. One method of accomplishing this is to lower the probability of friendly casualties through improved force protection measures that deny the air guerrilla lucrative targets. Such measures would include positioning critical fixed sites outside the range of the air guerrilla's standoff weapons, reorganizing US forces into small, low-signature units capable of conducting dispersed operations, and employing robust theater missile

defense (TMD) systems.[164] A second method of reducing susceptibility to coercion is to increase US tolerance of casualties and collateral damage. Casualty tolerance will, of course, depend largely on the extent to which vital US interests are at stake in a particular conflict, but US public support for intervention may be strengthened through information campaigns that clearly spell out the importance of US action and the sacrifices it will require.[165]

Information operations are critical for generating support not only on the domestic front, but in the international arena as well. The reliance of an air guerrilla force on international support leads to the second implication of air guerrilla warfare: the current US national security strategy of "engagement and leadership abroad" may be the most effective means to attenuate the threat of air guerrilla warfare.[166] Much of the coercive pressure of air guerrilla warfare stems from the weak force's ability to protract a conflict—an ability that is derived largely from support provided by outside sources. The US peacetime engagement strategy of diplomatic, economic, cultural, and educational activities designed to win friends and strengthen alliances can, however, deprive a weak force of that support by reducing the number of potential patrons available.[167] Similarly, during periods of crisis and conflict, US efforts to build multinational coalitions and international consensus for intervention can blunt the threat of air guerrilla warfare by diplomatically isolating the weak force, cutting it off from external support, and eliminating its capacity for protraction. Therefore, to counter the

[164] Jeffery R. Barnett, *Future War: An Assessment of Aerospace Campaigns in 2010* (Maxwell AFB, Ala.: Air University Press, 1996), 97-99; Bruce W. Bennett, Christopher P. Twomey, and Gregory F. Treverton, *What Are Asymmetric Strategies?* (Santa Monica, Calif.: RAND, 1999), 11-12.
[165] Daniel Byman and Matthew Waxman, "Defeating US Coercion," *Survival* 41, no. 2 (Summer 1999): 118; Richard N. Haass, *Intervention: The Use of American Military Forces in the Post-Cold War World* (Washington, D.C.: Carnegie Endowment for International Peace, 1994), 71-72.
[166] President of the United States, *A National Security Strategy for a New Century*, The White House, December 1999, 3.
[167] Ibid., 5.

threat of air guerrilla warfare, US policy makers must fend off isolationist tendencies and hold to the strategy of peacetime engagement and wartime coalitions.

The ability of the United States to counter the sources of an air guerrilla's strength off the battlefield is critical, because on the field, the air guerrilla force may be difficult to eliminate. This elusiveness of the air guerrilla gives rise to the third implication of air guerrilla warfare: current US conventional counterair operations may prove incapable of providing friendly forces with freedom from attack by air guerrilla forces. In Kosovo, the United States demonstrated the difficulty it has using airpower to locate and destroy a well-dispersed, well-sheltered air force quickly and effectively.[168] Neutralization of an air guerrilla force, therefore, may require improvements in US counterair capabilities through, for instance, enhanced intelligence, surveillance, and reconnaissance (ISR) capabilities and weapons delivery platforms that can loiter for extended periods in areas suspected to harbor an air guerrilla's ground operating sites. Alternatively, non-airpower solutions may effectively remove the air guerrilla threat. During the Cold War, for example, the Soviet Union planned to neutralize Sweden's guerrilla-style air operations by using special forces to kill Swedish aircrews in their homes before they could reach their aircraft.[169] Of course, such a dramatic solution might not be appropriate in today's limited conflicts, but the use of special forces does illustrate the availability of alternative means to negate the threat of a dispersed and concealed air force.

The threat posed by the aircraft of a weak force should not be dismissed lightly. The unconventional use of those aircraft in an air guerrilla strategy could present a significant

[168] Anthony H. Cordesman, *The Lessons and Non-Lessons of the Air and Missile War in Kosovo: Report to the USAF XP Strategy Forum*, 27 July 1999, 108; on-line, Internet, 09 November 1999, available from http://www.csis.org/ kosovo/Lessons.html.

challenge to US freedom of action in the international arena. To meet this challenge, the United States must reexamine its conflict intervention strategy and reinforce its peacetime engagement posture. Likewise, US airpower thinkers must expand the horizon of air operations to encompass the asymmetric and unconventional strategy of air guerrilla warfare.

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The lights in the High Council chamber room dimmed as the Grand Air Marshal began his presentation.

"Operation Giant Killer," he announced, "is our key to the liberation of Alpenstein. We will reshape the Farchantian Air Force into a guerrilla-style fighting machine that will strike fear in the heart of any potential opponent, especially that of the United States. We'll follow the model of the Swedish Air Force and build a series of small, dispersed, well-concealed operating sites that will make it difficult for an opponent to find our aircraft. We'll protect these sites either by locating them in the mountains, where we can create shelters by tunneling into rock, or by placing them in civilian areas, where their proximity to schools and hospitals will make them difficult targets to destroy. We'll replace the bulk of the F-16s in our force structure with aircraft that are optimized to operate from these small sites. The Defense Minister is currently talking to the Swedes, who are willing to sell us their top-of-the-line Gripen aircraft at a very good price. We'll arm the Gripen with long-range precision weapons that can strike targets in Schazzen, or any other neighboring state where the United States sets up operations. With these long-range missiles, we'll be able to stay out of reach of US fighters and other air defense assets. Of course, we'll still maintain our An-2 Colts.

[169] Gordon H. McCormick, *Stranger than Fiction: Soviet Submarine Operations in Swedish Waters,* RAND Report R-3776-AF (Santa Monica, Calif.: RAND, 1990), 24-25.

They'll give us an added ability to surprise the Americans by penetrating their defenses undetected."

"Excellent!" exclaimed the President.

"This sounds expensive," murmured the Finance Minister.

The Grand Air Marshal continued. "The make-over of our air force will also require intense aircrew and maintenance personnel training. Our aircrews must become proficient in conducting hit-and-run attacks and recovering quickly to one of our hidden ground sites. Our ground crews must be able to move efficiently between sites, turning aircraft and performing basic maintenance tasks. Together, this combination of trained personnel and suitable air assets will make the Farchantian Air Force a lethal, yet elusive, weapon with which to confront any foe. Ideally, this lethality should deter the Americans from getting involved in Alpenstein. Of course, if they do intervene, we will not be able to overwhelm them—we are too small to defeat a giant like the United States outright. But the Farchantian Air Force will make life so miserable for the Americans that they'll give up their misguided efforts to help Schazzen suppress Alpenstein's right to self-determination. Our persistent strikes on US assets in the region will generate significant American casualties, and the inability of the United States to stop our attacks will increase their frustration and raise their fear of future casualties. In the face of such losses, the Americans will not be able to maintain domestic support for their intervention and they will go home."

"Outstanding!" remarked the President. "When can we commence Operation Giant Killer?"

"I estimate in about four to five years," replied the Grand Air Marshal.

"Five years!" cried the President. "Alpenstein can't wait five years for us to come to their aid. We need to do something now!"

"On the contrary," answered the Grand Air Marshal, "if the Alpensteiners do wait five years, they'll be more likely to achieve their goal of secession. We'll need five years not only to build our air guerrilla force and prepare our country to withstand the onslaught of American airpower, but also to generate support for the Alpensteiner's cause. Over the next five years, we'll conduct an information campaign to convince the international community of the legitimacy and righteousness of Alpenstein's claim to autonomy and to win support for our own actions to assist them. The success of our air guerrilla strategy depends on this outside support. We need time to establish a close relationship with any neighbor in the region who might be able to provide our air guerrilla force with intelligence, resupply, and sanctuary if a conflict with the United States does occur. Believe me ladies and gentlemen, time is one weapon we have that the Americans do not; we have to use it wisely."

The President considered the Grand Air Marshal's words. "Air guerrilla warfare," he thought, "sounds risky, but it does offer us a way to confront the Americans. And what did he say about withstanding the onslaught of American might? He skipped over that part rather quickly. Of course, in five years, I'll probably be out of office, living quietly in Barbados…." The President turned to the High Council. "Commence Operation Giant Killer. We will show the great powers of this world that strength and size do not always carry the day. Alpenstein will have its freedom!"

BIBLIOGRAPHY

Books

Asprey, Robert B. *War in the Shadows: The Guerrilla in History*. New York: William Morrow and Company, 1994.

Barnett, Jeffery R. *Future War: An Assessment of Aerospace Campaigns in 2010*. Maxwell AFB, Ala.: Air University Press, 1996.

Betts, Richard K. *Surprise Attack: Lessons for Defense Planning*. Washington, D.C.: The Brookings Institution, 1982.

Callwell, Col C. E. *Small Wars: Their Principles and Practice.* Lincoln, Nebr.: University of Nebraska Press, 1996.

Castle, Timothy M. *One Day Too Long.* New York: Columbia University Press, 1999.

Clarke, Shaun. *Strategy, Air Strike and Small Nations*. Fairbairn, Australia: Air Power Studies Centre, 1999.

Clausewitz, Carl von. *On War*. Edited and translated by Michael Howard and Peter Paret. Princeton, N.J.: Princeton University Press, 1989.

Cooling, Benjamin Franklin. *Case Studies in the Achievement of Air Superiority*. Washington, D.C.: Air Force History and Museums Program, 1994.

Cordesman, Anthony H., and Abraham R. Wagner. *The Lessons of Modern War.* Vol. III, *The Afghan and Falklands Conflicts.* Boulder, Colo.: Westview Press, 1990.

Dean, David J. *The Air Force Role in Low-Intensity Conflict.* Maxwell AFB, Ala.: Air University Press, 1986.

Douhet, Guilio. *The Command of the Air.* Translated by Dino Ferrari. 1942. New imprint, Washington, D.C.: Office of Air Force History, 1983.

Dunnigan, James F. *How to Make War: A Comprehensive Guide to Modern Warfare for the Post-Cold War Era*. 3rd ed. New York: William Morrow and Company, Inc., 1993.

Dupuy, R. Ernest, and Trevor N. Dupuy. *The Harper Encyclopedia of Military History, From 3500 B.C. to the Present*. 4th ed. New York: HarperCollins Publishers, 1993.

Friedman, George, and Meredith Friedman. *The Future of War: Power, Technology, and American World Dominance in the 21st Century*. New York: Crown Publishers, 1996.

Futrell, Robert F. *The United States Air Force in Korea, 1950-1953.* Revised edition. Washington, D.C.: Office of Air Force History, 1983.

Giap, General Vo Nguyen. *Big Victory, Great Task*. New York: Frederick A. Praeger, 1968.

Haass, Richard N. *Intervention: The Use of American Military Forces in the Post-Cold War World.* Washington, D.C.: Carnegie Endowment for International Peace, 1994.

Joes, Anthony James. *Modern Guerrilla Insurgency*. Westport, Conn.: Praeger, 1992.

Joint Chiefs of Staff and the U.S. Department of Defense. *The Official Dictionary of Military Terms*. 2nd ed. Irvine, Calif.: Global Professional Publications, 1992.

Jomini, Antoine-Henri. *The Art of War*. Translated by G.H. Mendell and W.P. Craighill. Westport, Conn.: Greenwood Press, 1971.

Klonis, N. I. *Guerrilla Warfare: Analysis and Projections*. New York: Robert Speller & Sons, 1972.

Laqueur, Walter. *Guerrilla Warfare: A Historical & Critical Study*. New Brunswick, N.J.: Transaction Publishers, 1998.

Lawrence, T. E. *Seven Pillars of Wisdom: A Triumph.* Garden City, N.Y.: Doubleday & Company, Inc., 1935.
Liddell Hart, B.H. *The Decisive Wars in History*. London: G. Bell & Sons, Ltd., 1929.
_____. *Strategy*. 2nd ed. New York: Meridian, 1991.
Mao Tse-tung. *On Guerrilla Warfare.* 2nd ed. Translated by Brig Gen Samuel B. Griffith, II. Baltimore: The Nautical & Aviation Publishing Company, 1992.
_____. *Six Essays on Military Affairs.* Peking: Foreign Language Press, 1972.
Mason, Air Vice Marshal Tony. *Air Power: A Centennial Appraisal*. London: Brassey's, 1994.
Matthews, Lloyd J., ed. *Challenging the United States Symmetrically and Asymmetrically: Can America Be Defeated?* Carlisle Barracks, Pa.: U.S. Army War College, Strategic Studies Institute, 1998.
McRaven, William, H. *SPEC OPS: Case Studies in Special Operations Warfare: Theory and Practice*. Novato, Calif.: Presidio Press, 1995.
Meilinger, Col Phillip S. *10 Propositions Regarding Airpower.* Washington, D.C.: Air Force History and Museum Programs, 1995.
Michel, Marshall L. III. *Clashes: Air Combat Over North Vietnam 1965-1972*. Annapolis, Md.: Naval Institute Press, 1997.
Muller, Richard. *The German Air War in Russia.* Baltimore: The Nautical & Aviation Publishing Company of America, 1992.
Nair, Brigadier V. K. *War in the Gulf: Lessons for the Third World.* New Delhi: Lancer International, 1991.
Pike, Douglas. *PAVN: People's Army of Vietnam*. Novato, Calif.: Presidio Press, 1986.
Schulzinger, Robert D. *A Time for War: The United States and Vietnam, 1941-1976.* New York: Oxford University Press, 1997.
Singh, Baljit, and Ko-wang Mei. *Theory and Practice of Modern Guerrilla Warfare*. New York: Asia Publishing House, 1971.
Spangler, Stanley E. *Force and Accommodation in World Politics*. Maxwell AFB, Ala.: Air University Press, 1991.
Sun Tzu. *The Art of War.* Translated by Samuel B. Griffith. Oxford: Oxford University Press, 1963.
Tilford, Earl H. Jr. *Setup: What the Air Force Did in Vietnam and Why.* Maxwell AFB, Ala.: Air University Press, 1991.
Van Creveld, Martin. *Technology and War*. New York: The Free Press, 1989.
Von der Heydte, Friedrich August Frhr. *Modern Irregular Warfare In Defense Policy as a Military Phenomenon.* Translated by George Gregory. New York: New Benjamin Franklin House, 1986.

Articles

Anselmo, Joseph C. "Commercial Space's Sharp New Image." *Aviation Week and Space Technology* 152, no. 5 (31 January 2000): 52-54.
Bonen, Zeev. "Sophisticated Conventional War." *Mideast Security and Policy Studies No. 28* n.p. On-line. Internet, 22 December 1999. Available from http://www.biu.ac.il/SOC/besa/books/28book1.html.

Brown, Justin. “Arms Sales: Exporting US Military Edge?” *Christian Science Monitor*, 02 December 1999, 2.

Byman, Daniel, and Matthew Waxman. “Defeating US Coercion.” *Survival* 41, no. 2 (Summer 1999): 107-120.

“Can We Rely on Advanced Reconnaissance Methods in a World of Camouflage?” *Military Technology* 11, no.6 (June 1987): 133-137.

Centner, Christopher M. “Ignorance is Risk: The Big Lesson from Desert Storm Air Base Attacks.” *Airpower Journal* 6, no 4 (Winter 1992): 25-35.

Cook, Nick. “Europe’s Cruise Missile Conundrum.” *Interavia Business & Technology* 53, no. 621 (June 1998): 39-41.

Danopoulos, Constantine P., with Rebecca R. Ruelas. “Tentative Observations and Conclusions.” In *Prolonged Wars: A Post-Nuclear Challenge.* Edited by Karl P. Magyar and Constantine P. Danopoulos. Maxwell AFB, Ala.: Air University Press, 1994.

Drew, Dennis M. “Air Power in Peripheral Conflict: From the Past, the Future?” In *The War in the Air: 1914-1994.* Edited by Alan Stephens. Fairbairn, Australia: Air Power Studies Centre, 1994.

Dunlap, Charles J. Jr. “Preliminary Observations: Asymmetrical Warfare and the Western Mindset.” In *Challenging the United States Symmetrically and Asymmetrically: Can America Be Defeated?* Edited by Lloyd J. Matthews. Carlisle Barracks, Pa.: U.S. Army War College, Strategic Studies Institute, 1998.

_____. “21st-Century Land Warfare: Four Dangerous Myths.” *Parameters* 27, no. 3 (Autumn 1997): 27-37.

English, Malcolm. “SAAB’s Classic Canard.” *AIR International* 56, no. 2 (February 1999): 91-102.

Fulghum, David A. “UAE’s F-16s Will Be Envy of USAF Pilots.” *Aviation Week & Space Technology* 152, no. 11 (13 March 2000): 24-25.

Funnell, R. G. “It Was a Bit of a Close Call: Some Thoughts on the South Atlantic War.” In *The War in the Air: 1914-1994*. Edited by Alan Stephens. Fairbairn, Australia: Air Power Studies Centre, 1994.

Herman, Paul F. Jr. “Asymmetric Warfare: Sizing the Threat.” *Low Intensity Conflict & Law Enforcement* 6, no. 1 (Summer 1997): 176-183.

Kondratyev, Vyacheslav. “The Awesome Sky Over Chechnya.” *Krylya Rodiny*, January 1996, n.p. In *FBIS [Foreign Broadcast Information Service] Report: Central Eurasia*. FTS19970404001035, 4 April 1997. On-line. Internet, 7 March 2000. Available from http://199.221.15.211/index.html.

Libicki, Martin C. “ The Small and the Many.” In *In Athena’s Camp: Preparing for Conflict in the Information Age.* Edited by John Arquilla and David Ronfeldt. Santa Monica, Calif.: RAND, 1997.

Mason, R. A. “Air Power as a National Instrument: The Arab-Israeli Wars.” In *The War in the Air: 1914-1994.* Edited by Alan Stephens. Fairbairn, Australia: Air Power Studies Centre, 1994.

Morris, Capt George C. “The Other Side of the COIN: Low-Technology Aircraft and Little Wars.” *Airpower Journal* 5, no. 1 (Spring 1991): 56-70.

Morrocco, John D. “Soviet Peace Plan Weighed as Gulf Ground War Looms.” *Aviation Week & Space Technology* 134, no. 8 (25 February 1991): 20-22.

_____. "Storm Shadow/Scalp Derivatives Studies." *Aviation Week & Space Technology* 150, no. 26 (28 June 1999): 46.
Proctor, Paul, ed. "JASSM Exports Predicted." *Aviation Week & Space Technology* 148, no. 19 (11 May 1998): 17.
Rolfsen, Bruce. "Report: Bases Near Combat Zones May Be Threatened." *Air Force Times*, 29 November 1999, 20.
Sherman, Jason. "Smooth Sailing: Sweden's Armed Forces, Industrial Base Strike a New Post-Cold War Posture." *Armed Forces Journal International* 135, no. 5 (December 1997): 28-33.
Stephens, Alan. "You'll Remember the Quality Long After You've Forgotten the Cost: Structuring Air Power for the Small Air Force." In *Air Power Confronts an Unstable World.* Edited by Richard P. Hallion. London: Brassey's, 1997.
Sweetman, Bill. "Coming Soon to a Theater Near You." *Interavia Business & Technology* 54 no. 633 (July/August 1999): 37-39.
Taverna, Michael A. "Taurus Cruise Missile Begins Flight Tests." *Aviation Week & Space Technology* 151, no. 16 (18 October 1999): 35.
Thomas, Timothy L. "Air Operations in Low Intensity Conflict: The Case of Chechnya." *Airpower Journal* 11, no. 4 (Spring 1997): 51-59.
_____. "The Battle of Grozny: Deadly Classroom for Urban Combat." *Parameters* 29, no. 2 (Summer 1999): 87-102.
_____. "Kosovo and the Current Myth of Information Superiority." *Parameters* 30, no. 1 (Spring 2000): 13-29.
Tirpak, John A. "Brilliant Weapons." *Air Force Magazine* 81, no. 2 (February 1998): 48-53.
Trux, Jon. "Desert Storm: A Space-Age War." *New Scientist* 131, no. 1779 (27 July 1991): 30-34.
Vallance, Air Commodore Andrew G. B. "The Changing Nature of Air Warfare." In *Air Power Confronts an Unstable World.* Edited by Richard P. Hallion. London: Brassey's, 1997.
Wilkins, Lt Col Frederick. "Guerrilla Warfare." In *Modern Guerrilla Warfare*. Edited by Franklin Mark Osanka. Glencoe, N.Y.: Free Press, 1962.
Williams, William J. "Bedcheck Charlie and the An-2." *Air Power History* 43, no., 4 (Winter 1996): 4-13.

Reports & Hearings

Bacevich, A. J., et al. *American Military Policy in Small Wars: The Case of El Salvador*. Special Report. Cambridge, Mass.: Institute for Foreign Policy Analysis, 1988.
Bennett, Bruce W., Christopher P. Twomey, and Gregory F. Treverton. *What Are Asymmetric Strategies?* Santa Monica, Calif.: RAND, 1999.
Bennett, Bruce W., et al. *Theater Analysis and Modeling in an Era of Uncertainty: The Present and Future of Warfare.* Santa Monica, Calif.: RAND, 1994.
Bitzinger, Richard A. *Facing the Future: The Swedish Air Force, 1990-2005.* RAND Report R-4007-RC. Santa Monica, Calif.: RAND, 1991.

Bowie, Christopher J., et al. *Trends in the Global Balance of Airpower*. Santa Monica, Calif.: RAND, 1995.
Bucknam, Mark A. "The Influence of UN and NATO Theater-Level Commanders on the Use of Airpower Over Bosnia During Deny Flight: 1993-1995." PhD diss., King's College, University of London, 1999.
Cordesman, Anthony H. *The Lessons and Non-Lessons of the Air and Missile War in Kosovo: Report to the USAF XP Strategy Forum*, 27 July 1999. On-line. Internet, 09 November 1999. Available from http://www.csis.org/kosovo/Lessons.html.
Defense Intelligence Agency. *North Korea: The Foundations for Military Strength—Update 1995*.
Department of Defense. *Kosovo/Operation Allied Force After-Action Report: Report to Congress*, 31 January 2000. On-line. Internet, 08 February 2000. Available from http://www.defenselink.mil/pubs/kaar02072000.pdf
Harrskog, Col Kent H. "Sweden's Air Power Doctrines, 1926-2000." Research Report. Maxwell AFB, Ala.: Air War College, 1988.
McCormick, Gordon H. *Stranger than Fiction: Soviet Submarine Operations in Swedish Waters.* RAND Report R-3776-AF. Santa Monica, Calif.: RAND, 1990.
President of the United States. *A National Security Strategy for a New Century.* The White House, December 1999.
Shalikashvili, John M. *Joint Vision 2010*. Washington, D.C.: Joint Chiefs of Staff, 1996.
Stephens, Alan. *The Implications of Modern Air Power for Defence Strategy.* Air Power Studies Centre Paper Number 5. Fairbairn, Australia: Air Power Studies Centre, 1992.
_____. *Kosovo, Or the Future of War*. Air Power Studies Centre Paper Number 77. Fairbairn, Australia: Air Power Defense Studies Centre, 1999.
US House. *Performance of the B-2 Bomber in the Kosovo Air Campaign: Hearing before the Subcommittee on Military Procurement of the Committee on Armed Services*. 106th Cong., 1st sess., 1999. On-line. Internet, 14 February 2000. Available from http://commdocs.house.gov/committees/security/has181200.000/has181200_Of.htm.
US Senate Committee on Foreign Relations. *The U.S. Government and the Vietnam War: Executive and Legislative Roles and Relationships, Part I: 1945-1961 & Part II: 1961-1965.* Prepared by the Congressional Research Service, Library of Congress. 98th Cong., 2nd sess., 1984.
Williams, Randall, and Thomas Wheeler. *Air Base Camouflage, Concealment and Deception Guide*. Technical Report JCCD-94-1. Alexandria, Va.: Defense Technical Information Center, January 1994.

Manuals and Other Publications

Air Force Doctrine Document (AFDD) 1. *Air Force Basic Doctrine*, September 1997.
Joint Publication (JP) 3-0. *Doctrine for Joint Operations*, 1 February 1995.
US Army Field Manual (FM) 90-8. *Counterguerrilla Operations*, 29 August 1986.
2000. Available from http://www.adtdl.army.mil/cgi-bin/atdl.dll/fm/100-5/100-5toc.htm.