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The Art of Aerial Warfare

David A. Moore
Colonel, USAF



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*Dedicated to
Muir S. Fairchild (1894–1950), the first commander of
Air University and the university’s conceptual father.
General Fairchild was part visionary, part keen taskmaster,
and “Air Force to the core.” His legacy is one of confidence
about the future of the Air Force and the central
role of Air University in that future.*

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Foreword

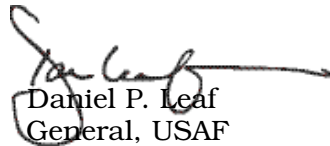
I believe readers will find David Moore's work thoughtful and thought provoking. I found this a stimulating paper about conducting aerial warfare, defined as the use of "the destructive instrument of airpower applied against an enemy in time of war." David challenges Airmen to acquire mental agility commensurate with the unprecedented flexibility of their instruments.

I believe the author has filled a critical gap in aerial warfare literature. Most works focus on the technical or tactical aspects of our profession and medium, but stop short of discussions of the broader nature of war itself. Consideration of war in that larger sense is essential for those who seek to understand and especially apply air and space power in combat.

The author begins with the Clausewitzian assumption, easily accepted in theory but difficult to maintain during combat, that war has the purpose of achieving political goals and that almost any reason for fighting a war has or soon acquires a political dimension. As he points out, the most difficult cases arise when the political objectives are difficult to reconcile with the reality of warfare: violence and casualties.

His discussion of the many obstacles to achieving military and political aims raises many issues facing Airmen today and does not hesitate to take unequivocal positions. His clear and compelling examination of the changing context of warfare makes a strong case that the enemy's fielded forces are still the best targets of airpower. His consideration of the tension between the "seductiveness" of the incremental approach and the legitimate need for political authorities to modulate the use of airpower is stimulating and forceful. His discussion of Douhet and the enduring fascination with "strategic attack" merits the consideration of those who plan modern aerial campaigns.

I recommend this book to anyone who wishes to engage in a serious discussion of the role of airpower in war. You will find much with which to agree and certainly much with which to take issue. The thinking that results from both will be of great value to the modern Airman.



Daniel P. Leaf
General, USAF

Vice Commander,
Air Force Space Command

About the Author



Col David A. Moore

Col David A. Moore is a command pilot with over 2,000 flight hours in the A-10 and over 400 hours in the F-117 Stealth Fighter. He was the commander of the 8th Fighter Squadron in 1999 and 2000. Prior to that, he was the operations officer of the 9th Fighter Squadron during Operation Allied Force, flying combat missions in the F-117 against targets in Belgrade and Novi Sad. He is a graduate of the Air War College, the Marine Command and Staff College, the Armed Forces Staff College, and the USAF Fighter Weapons School. He served at the United States State Department in International Security Affairs as a White House fellow in 1996–1997. He met his wife Anne at Duke University, and they are both proud members of the “Class of ’79.” They have three children.

Preface

The subject of this treatise is war. More specifically, it concerns war conducted in the medium of the air, how it is waged, the effects it produces, and the relationship between this instrument of war and the political oversight it serves.

To be clear, though, this treatise is not a checklist for applying airpower in war. It contains no step-by-step instructions for victory. It contains no war stories of daring aviators. It contains no fawning portraits of airpower leaders like Hugh Trenchard, Pete Quesada, or Mike Short. Instead, it mentions the efforts of particular groups of aviators (including the Condor Legion in Spain, the American Volunteer Group in China, and the Royal Air Force during the Battle of Britain) only to illustrate particular points. For example, it does not address the development of specific aircraft, nor does it contain diagrams or charts. Finally, it does not contain any declarative proclamations as to airpower's decisiveness in war.

To explore an issue as broad as aerial warfare inevitably runs the risk of focusing too narrowly on the particulars of the subject (thereby failing to anchor the issue in the larger context of which it is a part) or focusing so expansively as to offer only superficial insight into the constituent elements that make up the whole. Cognizant of these hazards, I have tried to avoid these dangers to consider both the depth and breadth of the issue.

I have cited (either directly or indirectly) the works of four military theorists in this essay. The first is Carl von Clausewitz whose *On War* was translated into English by Michael Howard and Peter Paret and published in 1976. The second is Dino Ferrari's English translation of Giulio Douhet's *The Command of the Air*, published in 1942. I have documented references to these works in the body of the text. I also have referred on occasion to the airpower theories of Robert Pape (with whom I generally agree) and John Warden (with whom I generally do not). With the exception of these references, all other thoughts and opinions expressed in this work are my own and should not be construed as the official views or policies of the United States Air Force or the United States government.

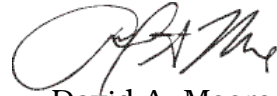
Several terms require definition, including *war*, *politics*, and *battlefield*, to name a few. These terms will be discussed at length in the chapters that follow, but a few need to be defined here. The first is the term *we*, which I use to refer to the collaborative consciousness shared by the author and reader. While the use of personal pronouns in a study like this may be impolitic, I am convinced it makes for an easier read. Next is the term *state*, which I use to describe organized entities capable of mustering sufficient military power to engage in war. As the events of 9/11 demonstrate, states are not the only entities that can launch an aerial attack. But we must differentiate between a specific terrorist action and the ability to engage in sustained aerial combat. There is a difference. While 9/11 demonstrated the devastation possible from a single air strike, the true significance of that event stems more from the target attacked than from the method used. More of that appears later.

For the moment, suffice it to say that in a world confronted by specters as far-flung as terrorism and ethnic cleansing, such terms as *state*, *nation*, or *country* sometimes seem antiquated or insufficiently malleable to accommodate the full realities of war. But despite the warlike capacity of nonstate actors, terrorists, and supranational organizations, *state* is generally a term of appropriate shorthand insofar as the discussion centers on the issue of aerial warfare. The sustained maintenance and application of airpower in war is a complex enterprise that, with few exceptions, generally exceeds the destructive intent of all but the traditionally defined national entities.

In this examination of aerial warfare, I have tried to avoid the assumption that our own epoch, simply by virtue that it is familiar to us, contains more relevant lessons than any other era upon which to base assumptions about past or future trends. Such determined objectivity can sometimes be difficult, though, especially when discussing a subject with a comparatively short historical life span. That concern notwithstanding, we will try to look beyond present examples in our assessment of airpower's role as one element of a larger military instrument.

Finally, I need to say a few words about perspective. I have experienced a certain tension between my attempts, on the one hand, to write from a universal perspective and what I perceive

as a necessity, on the other hand, of providing both practical and relevant analysis for my fellow American military aviators. Consequently, while many of the issues discussed in the pages that follow apply with equal measures of relevance to any nation or military, the perspective employed in cutting to the heart of the matter has remained necessarily American in those cases where I have felt compelled to put a sharp edge on the analysis.

A handwritten signature in black ink, appearing to read 'D. A. Moore', with a large, stylized initial 'D'.

David A. Moore
March 2005

Acknowledgments

I am profoundly grateful to Dr. Dan Hughes of the USAF Air War College. As my principal advisor while writing this essay, Dr. Hughes contributed to the creation of this work in many invaluable ways. He was the first to examine my arguments and provide thoughtful guidance and recommendations. More importantly, however, he gave me the freedom to proceed in unorthodox ways. The organic development of the arguments in this essay and the scope of the issue described are just two examples of the latitude he encouraged. No other individual has been as crucial to the development of this work.

A number of other scholars at both the USAF Air War College and the USAF School of Advanced Airpower Studies were also gracious enough to read the early drafts of this analysis and provide their thoughts and insights. These scholars were Dr. Jeffrey Record, Dr. Steve Chiabotti, Dr. Grant Hammond, Dr. David Mets, Lt Col Loye Eschenburg, Lt Col Bruce McClintock, and Kevin Monroe. Their suggestions and recommendations significantly improved and refined the finished product before you. I am deeply grateful to each of them.

I would be remiss if I did not also thank Col John Snider, Col Kevin Smith, and Lt Col Joe Salata for providing the opportunity to study the effects of strategic attack first-hand in the skies over Belgrade.

Finally, I would like to acknowledge the role played by my wife, Anne, and my children: Rider, Ian, and Cassandra. Their support has been the bedrock on which I have constructed the edifice of theory that follows.

Chapter 1

Introduction: The Nature of War

The study of war is a prerequisite to the study of aerial warfare. This essay begins with an examination of war in broad terms and then moves to a more specific study on the particular art of aerial warfare. The major areas of concentration in this regard concern aerial warfare's role as an instrument of war, its political dimensions, and the effects of strategic attack. Following that analysis, the focus broadens once again to a more general perspective, discussing—among other issues—cyber warfare, space warfare, and the impact of technology on war. It concludes with the identification of several themes that characterize the general nature of war and the more specific nature of aerial warfare.

The Purpose of War

War is the violent application of force to achieve political goals—political in the sense that the stated aims and objectives of war serve a greater purpose than to achieve the destructive effects of violence applied for its own sake. War always serves a purpose greater than itself. Depending on the circumstances, different motives may inform and impel that purpose. War may ignite for several political, economic, religious, or ethnic reasons. It can take many forms. War can be conducted with nuclear weapons or machetes. The geography of war's conduct also can vary. War sometimes flares up between traditionally defined nations; however, it also can erupt between subnational groups. But in every case—regardless of the form war takes or where and between whom it occurs—war serves a greater purpose. It is not the application of violence for the sake of violence alone. War is the application of violence to achieve a greater purpose.

The Political Nature of War

The underlying motives that propel states—or nations or groups—into disagreement or potential conflict may be religious, ethnic, or social in origin. But when a cause requires violence to

achieve its ends, the cause becomes political. Groups sometimes claim that they fight for other than political reasons—to rectify economic inequality, to propagate a particular bloodline, or to camouflage a religious jihad. In their attempts to establish purity of purpose, however, they use these claims to sidestep the reality of the relationship between political intent and the application of power.

Nearly all societies exist in a context of social, economic, religious, informational, diplomatic, military, and cultural forces. Politics, for the purpose of this discussion, refers to the controlled and coordinated use of these forces to achieve both general and specific ends. The method of that application in peacetime is typically nonviolent. The method by which these forces are applied in wartime, however, is not. It is violence in the pursuit of these objectives that characterizes and confirms a military objective's political nature. One could select a different term—*government*, for example, or *group authority*—to describe the controlling force of a state's various instruments of power. But forms of government and sources of authority vary widely from one society to the next.

As a process of orchestrating and controlling power, politics—of which violent military power is one subset—remains remarkably identifiable regardless of the state or group in question. Politics is the motive force housed in the architecture of government or other corresponding authority. It is with this understanding, and in this context, that war—the violent application of force to achieve political goals—should be weighed.

Regardless of the form war takes or the nature of the groups involved, warfare is an instrument of politics. For this reason, I use the term *politics* rather than the term *policy* when referring to the entity to which the military instrument of national power is subordinated. Politics is the broad, controlling element of the various instruments of national power. Policy—although politically engendered—refers to specific contextual courses of action. Where politics is general, policy is specific and is therefore a subset of politics. Since war always serves a purpose greater than itself, it necessarily serves the greater purpose of politics, rather than the political manifestation enumerated by a specific act of policy.

Total War Versus Limited War

The relevance of Carl von Clausewitz's observations regarding *absolute war* has not changed over the last 200 years.¹ What has changed, however, is man's overwhelming destructive capacity to use nuclear weapons and possibly other weapons later to approach the theoretical limits of absolute war in ways not physically possible in Clausewitz's time. While Clausewitz considered this extreme (and essentially impossible to achieve) form of warfare a starting point for his analysis of the theoretical range and framework of war, we must consider it in real, rather than theoretical, terms. As we examine the nature of war, we must note the concept that Clausewitz called absolute war has loomed more prominently in the last half century than at any other point in world history.* Thus, this discussion expands on Clausewitz's earlier observations in light of the increased destructive capacity engendered by mankind in the two intervening centuries.

The intensity and purpose of war can vary according either to the circumstances giving rise to the conflict or those encountered during its course. If we arrange past wars along a spectrum from least violent to most violent (arranged according to the limited or unlimited character of their objectives, their methods, or both), we will find that, in most cases, there is little disagreement concerning which wars constitute examples of total war and which constitute examples of limited wars. Global thermonuclear war demonstrates the extreme nature of total war where not only national survival, but even the lives of the citizens of the belligerent states are placed at overwhelming risk.

If we step back slightly from this extreme, we find several real-world examples that approach this concept of total war in their intensity of effort, their application of violence, and the totality of their objectives. The most commonly cited example of a total war is World War II. But certain periods and locales within this war stand out as extreme examples of the phenomenon of total war.

*In this essay, I refer to this (hopefully) hypothetical extreme as *total war* to avoid confusion with Clausewitz's term *absolute war*.

These include the portion of World War II that occurred between Germany and the Soviet Union on the eastern front and the bombings of Hiroshima and Nagasaki. Another commonly cited example of total war includes the latter phase of the American Civil War, culminating in Sherman's march to the sea in the autumn of 1864.

That certain elements or segments of conflicts stand out within the context of these wars highlights the complexity entailed in both waging and studying war. Before we can affix a particular war to a particular point along the spectrum of defining the range of total to limited war, a few practical generalizations are necessary. First, during the course of a war, objectives can change. What begins as a limited war sometimes can evolve until its objectives approach those of total war. Consequently, a war's position on the spectrum may shift over time. Second, the limits (or totality) of war can vary depending on the perspective of the state involved. The Vietnam War was limited from the US perspective but a total war from the North Vietnamese perspective. Third, due to its scope and complexity, war does not always accomplish its objectives in a purely linear fashion. Some elements may have aims that are limited while other elements have unlimited aims. An example would be the war on the eastern front in 1944 as compared to that in the Mediterranean theater. Fourth, military performance itself can influence the extent of war aims. Poor military performance can reduce war aims while good performance can expand war aims.

At the other end of the spectrum from total war is limited war. This is war fought for limited objectives, with limited means. In limited wars, the acceptable application of violence and the aims of war are sometimes muddled. One irony today is that several states currently possess the technical means, in ways and quantities never before realized, to wage total war on an unprecedented scale. In practice, however, most states (the United States included) often find themselves engaged in wars known for the limitations of their aims and the circumscription of their methods. Therefore, limited wars either can be large or small according to the circumstances. The reasons for the limitations placed on their objectives also can vary. The Vietnam War, from the US perspective, was a large-scale limited war. We limited our

objectives and the degree of applied force against North Vietnam out of concern for drawing China or Russia into a wider conflict. Some examples of American small-scale, limited wars include the operations in Grenada in 1983, Panama in 1989, and Afghanistan in 2002.

If we recognize that the stakes involved when states go to war can vary from absolutely vital to practically unimportant, then we must be prepared to ask, "When are the stakes involved insufficient to justify the use of force in the pursuit of a particular objective?" The answer, of course, varies from society to society and situation to situation. There is a threshold where the application of policy transitions to the use of violence in search of its aims. This threshold of violence marks the transition between peace and war. The action, situation, or national interest that justifies crossing this line varies according to the cultures, the leaders, the resources, and the histories (and probably to a hundred other factors) of the states involved.

When we examine the reasons that states go to war, we learn that sometimes motivations that seem important at the time can prove entirely unjustified when the achievement gained is weighed against the cost in lives and treasure spent. Consequently, in situations where less than vital national interests are at stake, but only military options appear available to resolve the situation, states set the bar for the application of violence higher rather than lower. The calculus of determining exactly what does or does not constitute a vital national interest, however, is complicated by the nature of the forces that can sometimes propel countries into armed conflict. States sometimes go to war out of fear, to seek revenge, or as a matter of honor. Are these issues less than vital national interest?

The Role of Natural Selection in the Evolution of Warfare

Methods of warfare evolve through a process of natural selection. Those methods and innovations that contribute to success in military operations propagate accordingly. Those ideas and innovations that meet with failure disappear, no matter how brilliant they may have appeared when first developed. The rate at

which a military force adapts to the imperatives of natural selection, either by exploiting a good idea or by discarding a bad one, can mean the difference between victory or defeat.

On occasion, new ideas and tactics develop in the heat of battle. An example occurred during the post-D-day breakout of World War II when enterprising soldiers affixed earth-moving plows to the front of their tanks to help clear paths through the Normandy bocage. Sometimes methods of warfare evolve in the laboratory or in the minds of commanders and are transplanted to the battlefield to see if they will take root. The process by which these ideas are transferred to the battlefield may differ by era, circumstance, or military service, but the result is the same. Sometimes the ideas fail, other times they succeed. Those war-fighting evolutions that succeed in the environment of combat engender copies and refinements according to the same logic by which living organisms evolve and reproduce to exploit their environment.

This process of natural selection applies with equal relevance to the evolution of military organization and doctrine—just as it does to the development of particular weapons. The effects of natural selection generally contain their most profound impact during periods of rapid change. The lesson is simple: adapt to and exploit the environment or die. Thus, one of the greatest military strengths is the flexibility to consciously adapt to change. The flexibility to exploit change in a dynamic environment is an essential measure of military success. One of the greatest military weaknesses, however, is the failure to adapt when necessary. Ironically, this sometimes happens in the wake of overwhelming military success when perceptions of history contravene the incentive for change, as they did for the French military after the era of Napoléon.

Trial and Error in Force Application

The forces that determine which side emerges victorious in war involve the complexity of action, reaction, and chance. Of these three elements, military planners typically obsess over the first phase, try to predict the most dangerous and the most likely examples of the second phase, and minimize or ignore the third

phase. In preparing for war, the emphasis invariably and overwhelmingly focuses on the issue of the actions to be taken by friendly forces at the outset of hostilities. This is an appropriate step but only a first step. To focus only on the first phase of combat is like planning the first move of a chess game without considering potential follow-on moves. The reason for this skewed emphasis is easy to understand. It stems from the inherent uncertainty and variety of countermoves available to the enemy. To plan for every potential countermove on the enemy's part—to say nothing of our response to that move and the enemy's counter-response—quickly overwhelms the planning process. As a compromise, military planners, instead, consider a finite number of potential scenarios, knowing that the actual course of action in war will depend as much on the specific circumstances of the situation as it will on the considered preparations.

A commander's most critical decision-making opportunity occurs in the heat of battle itself after the initial plan has been implemented, after the enemy has reacted to what we have done, and after the forces of chance have had an opportunity to insert themselves into the process. Thus, the commander is presented with a complex and dynamic situation in which the appropriate next move must be considered carefully. If the military plan to that point has met or surpassed its expectations for success, the decision is easier and will usually follow the course of action already laid out. Unfortunately, when bullets start flying, few things proceed according to plan. In such situations—confronted either by failure or by less than the expected measures of success—the commander faces a dilemma. Is it better to stick with a plan of action that has not produced success or to select a new option appropriate to the circumstances encountered?

There is no right answer, *per se*, to this dilemma. Sometimes the best thing to do is stick with a plan of action, even though it may not meet with initial or overwhelming success. Other times, the best thing to do may be to abandon the preconceived plan of action and take a new direction. Obviously, this can be one of the most difficult decisions a commander makes. History provides examples of success and failure on each horn of this dilemma. Perhaps the most important point for a military commander is

not to be too easily swayed into abandoning a good plan at the first sign of trouble, or, conversely, not to continue down an inflexible path even when the need for adaptation clearly presents itself.*

If a commander believes a change is called for, then what is the correct direction in which to proceed? Sometimes the correct path will be entirely clear. On most occasions, however, it will not. When faced with this situation, there is merit in the straightforward method of trial and error; that is, the extent that the actions selected for trial stems from the commander's informed judgment of the situation at hand. If one course of action looks attractive, the best approach may be to try it and see if it works (mindful that the most attractive options can sometimes be enemy traps). If the course of action produces success, exploit it. If it leads to a dead end, abandon it. The willingness to attempt different options is key to the ability of a fighting force to react to the unforeseen actions of an enemy. There is a parallel between the process of natural selection in the evolution of war, discussed in the previous section, and the process of trial and error in selecting follow-on options during the ongoing development of wartime courses of action. In each case, the key is to be willing to attempt several options and allow them the necessary time and resources to develop before making the decision—based on their wartime performance—to abandon those that fail and to exploit those that succeed.

This is not to imply that the art of war fighting is merely a matter of trial and error. The point is to highlight how this particular process influences the direction war takes. Scores of other issues influence the process of action, reaction, and chance. This includes the commander's vision, strength of will, courage, daring, initiative, resourcefulness, experience, intuition, and often luck. These attributes and influences are admirably described in books one, two, and three of *On War*.²

*The stagnant battle lines and wholesale sacrifice of human lives during the trench warfare of World War I demonstrate the inherent dangers of inflexible thought under fire. Under such circumstances, a small dose of what Clausewitz referred to as the genius (or vision) of the commander might have proven a decisive tonic.

The Role and Influence of Chance

Action, reaction, and chance are the operative elements of war. Of these, the influence of chance on the outcome of war is sometimes the most profound but often the most overlooked. Chance is an intrinsic and inescapable element in the calculus of war. For this reason alone, war cannot be reduced to a mathematical formula that—assuming we fulfill certain preconditions—will produce predictable and foreknowable results. It may be comforting to think that we can reduce war—and aerial warfare in particular—to a universal targeting formula. But to do so ignores the inconvenient realities superimposed on war's conduct by the play of chance, time, and culture as indicated below.

- Chance undercuts the presumed certainty of such military prediction by introducing into military operations the element of the unknowable. Chance is the random and radical variable in the mathematical formula of war that can—and so often does—render the unanticipated result.
- Time undercuts the presumed certainty of such military prediction by introducing the element of change, an element as unpredictable and unknowable in shaping future nations, institutions, and people, as the forces of chance at work in battle.
- Culture undercuts the presumed certainty of such military predictions because no two enemies are alike. In the conduct of war, context is all.

As such, cookie-cutter formulas averring victory in war merely provide solutions to problems already known, and any success their employment enjoys in confronting an enemy occurs as much by virtue of the same elements of chance and variation—which reductionist military theories often ignore—as they do from any gain introduced by the theories themselves.*

*This is my chief objection to the “one size fits all” theories of John Warden. Additionally, I find his apparent view of the enemy state as an essentially static entity too simplistic.

This is not to say that war is bereft of enduring principles. The classic military tenets of simplicity, security, surprise, mass, economy of force, maneuver, offensive, objective, and unity of command have not changed. Even today, they contain as much application and relevance to success in war as always. What has changed, however, is the context in which these principles are applied. Possible changes from one conflict to the next include national leadership, military forces, technology, the stakes involved in success or failure, interests, and objectives. Every situation is different, and every enemy is different. Even the same adversary in a different era becomes different. The Germany of World War I and World War II, for example, was the same nation, and yet—owing to the changes brought about during the two decades between the wars—Germany was a very different nation. Every war requires a different and uniquely appropriate strategy to succeed, depending on the specific character of the belligerent states involved. The principles of war mentioned above still serve as a reasonably accurate barometer for wartime success to the extent these principles are either properly or improperly applied. However, such principles are merely guideposts for success, not guarantees. In planning a strategy for success in war, context is all.

Notes

1. Carl von Clausewitz, *On War*, ed. and trans. Michael Howard and Peter Paret (Princeton, N.J.: Princeton University Press, 1976).
2. *Ibid.*

Chapter 2

Aerial Warfare as an Instrument of War

To understand the nature of aerial warfare, this chapter begins by discussing the supporting role aerial warfare plays with regard to the broader instrument of war. Just as the military instrument is one of the instruments of national power available to a political leader, aerial warfare, the destructive instrument of airpower applied against an enemy, is one of the instruments available to a commander in the conduct of war. Aerial warfare contains unique characteristics, but it remains one element of a broader political means. It may operate differently from the other instruments of war, but it serves the same objectives. It can be applied independently or in concert with land, amphibious, or naval forces, depending on the requirements of the situation. However, it remains subordinate to the larger political construct in which it is administered.

This study focuses on how states bring destructive or coercive aerial effects to bear against an enemy and the effect of those attacks. For the most part, the purveyors of these effects are bomber, strike, fighter, and attack aircraft. The effects of airlift, refueling, reconnaissance, surveillance, suppression of enemy air defenses, jamming, and escort all play vital roles in this process. With certain exceptions, their contribution in wartime is to enhance or enable the efficacy of destructive strikes against the enemy.* For this reason, this discussion focuses less on the individual roles and missions of particular aircraft and more on the overall effects of airpower in war. We will consider those effects in terms of their ability to influence both the conduct of the battle and the actions of an enemy state.

*Airlift operations also have the potential to achieve strategic effects. Two examples include the Berlin airlift during the cold war and the airlift of troops loyal to Gen Francisco Franco across the Strait of Gibraltar from North Africa during the Spanish Civil War.

A Comparison of Aerial Warfare to Land Warfare

To understand what aerial warfare is, we must understand what it is not. The conduct of land armies provides a useful comparison. A land army is a force of personnel, equipment, and weaponry that must be deployed and maneuvered into fighting positions against an enemy. The ensuing clash of force normally results in one side achieving advantage in terms of personnel, equipment, territory, or position. The degree of that advantage determines the extent of the victory. This general description applies either to offensive or defensive action. It applies with equal relevance to the armies of Alexander the Great, Robert E. Lee, or Douglas MacArthur. In land warfare, the army moves into battle, fights, and, if victorious, occupies and dominates the battlefield. After the battle ends, the army repositions itself for the next engagement, garrison duty, redeployment, or demobilization. This study defines the cycle time of combat action as the time required to move into battle position, to fight the battle, withdraw, and reconstitute. For a medium-sized ground unit to deploy to another country (in the case of the United States, to deploy across the Atlantic or the Pacific to fight in another hemisphere), it normally takes from several weeks to several months. If the ground unit is already in the region where it needs to fight, the combat cycle time might be reduced to days or weeks. This is the classic engagement model for land warfare. From this starting point, this study examines how and why the application of airpower fundamentally differs from the application of land power.

The Friction of the Medium

The primary difference between aerial warfare and surface warfare stems from the differences in friction associated with the medium in which each operates.* On a superficial level, this difference is obvious. A body moving through the air encounters less resistance than a body moving over the land or through the

*Friction, in this sense, refers to the actual physical property, rather than to the effect of psychological friction described by Clausewitz. See Clausewitz *On War*.

water. While the degree of effort required to overcome the resistance (or friction) of each of these mediums is evident, the effect is profound. Since air provides less physical resistance than land or water, a body can travel through the air at greater speed. Because it can travel at greater speed, it can travel greater distances for a given amount of fuel. Less friction equals greater speed, which equals greater range. Compare the average speeds of combat vehicles in each medium. The average ship can travel from 30 to 40 miles per hour. The average tactical ground vehicle can travel between 50 to 60 miles per hour. By comparison, the average combat aircraft travels around 500 miles per hour. The difference in speed is 10-fold. While the cycle time of combat action for a surface force—once established in a theater of operations—is normally measured in days, the cycle time for an aerial battle is normally measured in hours.

This increase in speed means that aerial warfare is conducted differently from surface warfare. In the time it takes a surface force to move into position for a single battle, an aerial force can attack multiple times. While there are factors, including weather, weapons, fuel, mechanical breakdowns, and battle damage that may limit the number of times an aircraft can attack in a given period, it is important to understand that aircraft can attack—either singly or in waves—with much more rapid combat cycle times than surface forces. Additionally, while armies or navies move the bulk of their forces into position to directly engage the enemy, aerial forces attack from distant points, exposing a smaller fraction of their actual forces to direct combat. There are advantages and disadvantages to each of these forms of warfare, and the strengths and weakness of each complement one another.

The fundamental difference between the conditions and conduct of surface warfare and aerial warfare directly result from the significant reduction of friction encountered in the medium of air as compared with other mediums.* Decreased friction is the cause; speed and range are the result. The increase in speed and range of aerial forces, as compared with

*We will discuss the mediums associated with space and with computers in chapter 5.

surface forces, results in significantly decreased combat cycle times that typically result in a method of attack by successive waves rather than by extended physical presence on the battlefield.* This is one of the differences between the way aerial and surface forces are applied in combat.

The Typewriter Analogy

Attack by way of rapid and successive waves of aircraft provides an instructive, but not entirely illuminating, portrait of aerial warfare. To appreciate the conduct of aerial warfare better, consider the analogy of an old-fashioned typewriter. Because computer keyboards have almost entirely replaced typewriters, I should clarify this analogy. When I was a child, typewriters were mechanical, finger-actuated, printing machines. When you pressed any of the keys, a mechanical arm would swing forward to strike an inked ribbon with a raised impression of a letter. The most commonly used keys were widely separated so that the striking arms of the typewriter would not continually jam. Therefore, the analogy is based on this kind of instrument.

Suppose each finger key of the typewriter is an air base. Imagine that each time one of the arms swings forward, it is an aircraft, or flight of aircraft, flying to the target to deliver its weapons. Also, imagine that the letter left on the page is the ordnance being delivered. Press a key, an aircraft strikes and a letter forms on the page. Press another key, an aircraft from another base strikes, and another letter forms on the page. By coordinating the letters into a sequence (in a language the enemy understands), we—quite literally—send the enemy the specific script of our destructive intent.

The analogy extends further. The various air bases—widely dispersed on the keyboard, as they might be in a theater of operations—can concentrate the effects of their hammering on a

*The ability of certain unmanned platforms to dwell over a target area for extended periods is one exception to the “attack via successive waves” method by which aircraft are routinely employed in combat. This may, at some point, alter the way we view presence over a battlefield, but one point is without question: that the ability to do so stems from the decreased friction of the medium of the air that makes that presence possible.

single point. In aerial warfare, the same effect is possible. Aircraft from anywhere in the theater of operations (and sometimes anywhere in the world) can focus the efforts of their strikes against a single point on the battlefield or, for that matter, against any set of points on the battlefield—or beyond the battlefield—as the situation requires.

Just as the typist controls and coordinates the sequence in which the keys are pressed to compose the letters and words of a sentence, a well-orchestrated aerial attack normally requires a single controlling authority to ensure maximum efficiency in the coordination of the attacks from the different air bases. To subordinate each air base to a different controlling authority would be like asking 26 typists (each with a finger on a different key of the typewriter) to type a coherent sentence.

My friends in the Marine Corps probably suspect this analogy is a thinly disguised argument in support of centralized control of airpower. Actually, it is not. If efficiency is not a paramount requirement, or if specific structural safeguards have been established to deconflict flight patterns and areas of responsibility, then it is certainly possible to decentralize the control of airpower. In this respect, the analogy is an imperfect one. It also does not account for the relative differences in capabilities between one set of pilots or one type of aircraft and another. With these qualifications, however, the analogy retains sufficient utility to illustrate a few important points.

To continue the analogy, a proficient typist can vary the speed at which the keys are struck from a slow 20 words per minute, to a medium speed of 40 words per minute, to a fast 80 words per minute. Aerial warfare can be modulated in similar ways. The number of aircraft in a given attack can vary from a few to many. The frequency of the attack waves themselves can vary from a single wave to many waves in succession. The time over which the waves of attacks can be sustained may be short or long. Just as a proficient typist can vary the pace and speed of the typing, an effectively orchestrated aerial attack can also be modulated. The ability to modulate the pace of aerial operations sometimes proves of interest to political leaders, and chapter 3 details the implications of that phenomenon.

Finally, the typist does not compose the message. A boss dictates to the typist. If, for the purpose of this analogy, the typist represents the controlling authority of a military headquarters, then the boss corresponds to the political leadership that directs the application of military force. In the final analysis, the military instrument of national power, of which aerial power is only one element, remains subordinated to the mandate of the state's political leadership. The political leader dictates the message to be sent to the enemy. The military puts its fingers on the keys and sends the message.

Chapter 3

The Political Dimensions of Aerial Warfare

Any attempt to study the nature of aerial warfare immediately encounters the pervasive and controlling oversight political considerations place on the conduct of aerial war. To discuss aerial warfare without addressing the extent to which political considerations affect the application of airpower in combat is to fail to understand the nature of aerial war. Airmen often lament, with equal measures of pride and shortsightedness, how decisive airpower could be in combat if they were given free rein to prosecute an aerial attack with the full measure of destructive power theoretically at their disposal. However, the utilitarian focus of their enthusiasm entirely misses the point of the larger context against which their actions play out. Simply put, airpower is potentially so destructive and dominant that its effects must be limited.

Aerial warfare often becomes a political weapon, rather than a military one, when applied outside the lateral limits of the immediate ground battle. When aerial warfare is used to attack targets of an exclusively military character (like tanks or armored personnel carriers already engaged in combat against friendly ground forces), it obeys and is constrained by the same laws that govern every other purely military instrument of war on the battlefield. However, as aerial warfare is applied further and further from the immediate vicinity of the ground battle, the military effect of its influence decreases, while at the same time, the political effect of its employment becomes potentially more significant.

When opposing forces meet on the battlefield to engage in a violent confrontation for domination and survival, the logic and precedent for action at that moment is martial rather than political.* Kill or be killed. While the decision to employ the military instrument in pursuit of national objectives is a political one,

*The battlefield in this context is a specific and definable area in which military forces face opposing military forces.

once military forces become engaged in actual combat, the distant political motive for their employment becomes subordinated to the immediate violence, danger, and destruction that make up the character of war. This applies primarily to traditional examples of warfare like Gettysburg, Guadalcanal, or the tank battle at Kursk. Nonetheless, aerial warfare does not fit as neatly into this category of warfare (i.e. traditional warfare directed against strictly military targets) in the same way that it overflows the constricted geography of the traditional battlefield.

Aerial warfare generally ranges far beyond the limits of the immediate ground battle. While airpower is less constrained by the physical dimensions of the battlefield, it is fully and completely constrained by the political dimensions of the objectives underlying the conflict. Airpower advocates have long asserted that airpower's ability to range outside the limits of the traditional battlefield enables it to bring war directly to the heart of the enemy. Many airpower adherents believe that by bombing enemy cities and infrastructure and by disrupting communication with the military forces in the field, airpower provides the capability to extend the limits of the battlefield to bring force to bear on all segments of a society, not just its fielded military forces. In one sense, this assertion is true. The physical capacity of airpower to bring force on the enemy's civil population, infrastructure, and leadership targets is not the question. The questions are (1) do the stakes involved in the conflict warrant this extension of violence outside the traditional arena of the battlefield? and (2) to what extent do attacks on these kinds of targets, outside the traditional battle area, actually affect the outcome of war? This study addresses the first question in this chapter and addresses the second question in chapter 4.

As to the question of whether the stakes involved in the conflict warrant extending violence beyond the limits of the traditional battlefield, the answer, simply put, is that sometimes the situation warrants this kind of attack and sometimes it does not. But, and this is the significant point, the decision to extend the application of violence beyond the zone of the ground battle is a political one. Consequently, Airmen should hardly be surprised if the political constraints applied in such

situations fit more tightly than their destructive inclinations might prefer.

Thus, comprehending the effect of politics on the conduct and execution of aerial warfare requires an understanding of the following:

1. The political effects of strategic attack may—and frequently do—outweigh the military effects of the attack.
2. The decision to extend the application of violence beyond the immediate limit of the traditional battlefield will be a political one.
3. The political constraints placed on the application of air-power in such situations will be more restrictive than those placed on the application of airpower in more traditional war-fighting situations.

How Political Effects in Aerial Warfare Outweigh Military Effects

Part of the folklore of the American military experience in the Vietnam War is that President Lyndon Johnson and Secretary of Defense Robert McNamara selected bombing targets each week at their regular Tuesday luncheons in the west wing of the White House. Airmen often cite this example of political micromanagement of a military operation as axiomatic of the dangers inherent in politicians attempting to perform the work of generals. Yet, there is another lesson in this historical minuet that Airmen overlook. The fact that the president and the secretary of defense took the trouble to select targets in North Vietnam stemmed less from their interest in “playing general” than it did from their recognition of the political ramifications of applying force in the interior of North Vietnam. This is not to imply that we should adopt the example and methods of Johnson and McNamara as model behavior for the application of political oversight to military operations. Rather, Airmen should take this example as emblematic of the political gravity their actions potentially play in the prosecution of war.

For example, how could the actions of a single Airman possibly warrant the time and attention of the president of the

United States? Soldiers and sailors rarely receive such unwanted oversight of their actions as they plan for combat. Essentially, three factors differentiate the application of aerial warfare and drive this increased political oversight. They relate to (1) the increase in relative target value, (2) the potential dual use of targets for both civilian and military purposes, and (3) the increased likelihood of civilian casualties from aerial attacks during off-battlefield strikes.

As aerial attacks range further and further from the lateral limits of the ground battlefield, the first political concern that arises relates to the potential variability of target value. On a traditional battlefield, the available targets are primarily, if not exclusively, military. If we destroy a tank, a truck, or an artillery piece on the battlefield, the effect on the enemy is strictly military. The result is that the enemy possesses one less piece of hardware with which to wage war and to threaten friendly forces. The political effect of such an attack is normally minimal, except to the extent to which such losses contribute to the overall outcome of the battle. But if we leave the immediate confines of the traditional battlefield, other targets (of potentially greater value) present themselves: palaces, factories, communication centers, supply depots, bridges, dams, radio towers, oil refineries, and cultural landmarks.* By definition, increased target value carries with it the possibility of increased political effect.

Along with the recognition that such targets contain greater political value comes the additional recognition that the political value of off-battlefield targets can be either positively or negatively charged. For example, while the political effect of striking an enemy's ministry of defense might be positive (from our perspective), the political effect of striking an enemy school or place of worship would be just the opposite. In either case, off-battlefield targets generally contain more political value (vis-à-vis the achievement of wartime objectives) than they do military value.

*There may be military targets outside the limits of the battlefield that, if struck, have a potentially similar effect on the outcome of the battle (an air defense sector operations center situated in an underground bunker miles from the battlefield would be one example). But, in general, targets outside the immediate area of the battlefield are of less military value, unless they directly contribute to the ongoing conduct of the battle.

Of course, that is not to say that targets outside the immediate area of the battlefield do not potentially contain military value, but whatever military value they contain is outweighed—in most cases—by their potential political value.

The second reason the destruction of off-battlefield targets contains a potentially greater political (rather than military) effect stems from the increased likelihood that a target will have dual uses for both civilian and military needs. Examples of dual-use targets include a power plant, telephone exchange, or railway station. While the destruction of such targets might affect the enemy military's ability to fight, their destruction also affects the enemy's civil population. Whether or not such an effect is considered acceptable, or even desirable, depends on the situation. The potential dual use of off-battlefield targets increases the inherent political sensitivity attendant to their destruction.

The third and perhaps most important reason off-battlefield targets receive such a high degree of political oversight involves the increased probability of civilians in and around target areas as we progress further from the lateral limits of the traditional battlefield. This consideration remains, of course, a function of both culture and situation. While political and military leaders of the United States agonized over the prospect of shooting into crowds of civilians in Somalia in 1993, they showed less concern for greater numbers of civilians killed in the firebombing of Dresden during World War II. Generally, the greater the stakes involved in war, the less effect civilian casualties (or collateral damage) will have on the subsequent criteria for determining how, when, and what measure of force will be applied. Conversely, when the stakes involved in war are less compelling, the aims are more circumspect, and when the degree of oversight and transparency available to independent news media is more pervasive, then the degree to which civilian casualties undermine the achievement of war aims will be significant.*

*By their complete disregard for the lives of innocent civilians, the terrorists who committed the attacks of 9/11 demonstrated (with stunning clarity) just how high the stakes were, from their perspective. Ironically for the terrorists, perhaps, the American civilians murdered on 9/11 ensured the US stake in the conflict that followed also would be significant.

When these three factors occur in combination—high-target value, dual civil and military use of the target, and the potential for high numbers of civilian casualties—the resulting convergence of political concerns may preclude the application of destructive force against the target in all but the most extreme cases. A fully operating nuclear power plant would be a good example of such a target.

Although the political value of a target may exceed its military value, this does not mean its destruction necessarily contributes any more or less to the achievement of the overall aims of war, since war is a political act conducted with military means. Instead, military planners assume that destroying such targets will have a more pronounced effect on the political end of the spectrum of war aims than it will on the military end of the spectrum. In either case, if the political and military goals appropriately complement one another, the effects should not contravene the overall aims of war. The problem is that political effects are subjective and more difficult to predict than military effects. Hence, there is an inevitable increase in the stake the politician bears in the process when the destructive effects of aerial warfare are applied beyond the lateral limits of the traditional battlefield.

Political Targets Versus Military Targets

If the destruction of a target can have a political effect on the outcome of a battle, we can logically conclude that in addition to traditionally defined military targets, there are also targets of a purely (or primarily) political character. The ability to range throughout the geographic limits of an adversary's homeland presents practitioners of aerial warfare (and political leaders) with the enticing conundrum of having to decide whether to focus the destructive effects of aerial attacks against traditional military targets or broaden their destructive intent to include nonmilitary targets.

The course most frequently chosen is to seek a compromise between political ramifications and military value when considering targets outside the zone of the immediate ground battle. In these cases, the litmus test used to determine target legitimacy

usually includes consideration of whether a target in some way contributes to the enemy's war-making capability. Under this guise, the selection of a power plant that supplies electricity to both military and civilian users could, for example, rise to the necessary threshold of military utility for consideration as a legitimate target. At the limit of this logical thread, the fire-bombing of Tokyo in World War II (and its many dispersed cottage industries supporting the Japanese war effort) also could conceivably fall under the umbrella of such justification.

Yet, sometimes targets are attacked in war despite a complete lack of military utility or contribution to the war effort. To some extent, the bombing of the town of Guernica during the Spanish Civil War fits this mold. Another example would be the blitz against London.* Still another (although the point is probably arguable) would be the atomic attacks against Hiroshima and Nagasaki. The effects of these attacks were considerable, but not necessarily in the ways the attackers intended. In the case of Guernica, the effect was gradually to swell worldwide indignation, although not in sufficient amounts to appreciably sway the outcome of that war. The London blitz had an effect opposite to the one intended, by steeling the resolve of the British populace. In the case of Hiroshima and Nagasaki, the atomic attacks served as a final and fatal series of blows to Japanese resistance. Or, as Robert Pape argues, the attacks proved to be just one action in a series of decisive events (along with, most notably, Russia's invasion of Manchuria) that ultimately convinced Japan to surrender.¹

The terrorist attacks on the World Trade Center do not fit this mold. While the World Trade Center was not a military target, its destruction most certainly contributed to the war aims of the attackers. This presents an interesting conundrum. If an attacker decides to wage a cultural war of annihilation and does not mind dying in the process, then certain fundamental assumptions about negotiation and force will need to be reevaluated in the specific cultural context in which

*Although London had tremendous military value, the German night bombing of the blacked-out city effectively amounted to an effort of indiscriminate destruction.

they occur. The United States faced a similar challenge at the end of World War II—with the prospect of an invasion of the Japanese mainland. Such challenges are not insurmountable. Yet, they significantly alter the threshold and the acceptability of violence. Atrocities against civilians tend to steal the resolve of the nation victimized and, rightly or wrongly, tend to be used to justify even greater applications of violence in response. Examples include the atomic attacks on Hiroshima and Nagasaki, Israeli responses to Palestinian suicide bombings, and the immediate American response both to Al Qaeda following 9/11 and Iraq in 2003.

Therefore, political effects are difficult to predict, even when the degree of force applied might be otherwise decisive in purely military terms. In addition, the variable political character of targets means there are sometimes targets selected for destruction that are entirely political in their character—that is to say, targets with no intrinsic military value on the outcome or the conduct of the battle.

While the number of *purely* political targets may be limited, they bear some examination. The World Trade Center is the most obvious example of a purely political target. There are others, however. A curious example from the first Persian Gulf War was the statue of the crossed swords in Baghdad, molded in the likeness of the arms of Saddam Hussein himself. Allied war planners put the statue on their early target lists, but US political leaders removed it from consideration during the course of their review of the targets. The point is not whether that particular target was, or was not, destroyed but rather that it merited consideration as a target at all. The effect of its destruction, had it occurred, would have been purely political. That is not to say that political effects do not contribute to the achievement of a war's overall aims. The effects of a political attack can prove decisive in ways that military effects might not. Many have argued this is what happened during Operation Allied Force in Kosovo. However, this also highlights, as we discussed a moment ago, the great unpredictability of attempted political effects. That unpredictability does not restrain politicians (nor should it) from controlling the application of airpower to achieve specific political effects by deciding what should—and should not—be attacked in

war. This paper examines that issue shortly and later considers the problems associated with determining the political effects of an attack against a specific target.

Problems in Attacking a Political Target

With the knowledge that targets may contain political as well as military value comes the recognition of the difficulty inherent in determining whether an attack against this type of target actually achieves the intended political effect. Measuring the success of an attack on a political target can prove dubiously inexact owing to the difficulty of establishing a direct and recognizable link between the action taken and the result, if any, observed. To illustrate the problem of ascribing political effects of an action, consider results on a battlefield. Bomb damage assessment, even in an era of sophisticated imagery, remains an inexact science. In the early airpower years, aircrews frequently overestimated the accuracy and effect of their bombs. With the development of reconnaissance platforms in more recent years, overhead imaging systems have been relied on more than the reports of aircrews.

Unfortunately, determining the success of even a straightforward military attack with post-strike imagery is sometimes difficult. Consider the following example: a bomb strikes a bunker or cave complex and burrows deep underground before detonating (as it is designed to do), but post-attack imagery shows just a small hole in the roof of the complex. Has the complex been destroyed? How extensively has it been damaged? Should additional sorties be dispatched to further ensure its destruction?

The ongoing need to determine attack effects against traditional military targets is difficult enough. Attempting to determine attack effects against nonmilitary targets is just as difficult in the physical sense, but even more difficult in the psychological, social, and political sense. If we destroy an enemy bridge or power plant, determining the extent of physical damage is the first step. Assuming the attack has been physically successful, we must then determine what effect it has actually had on the enemy. Still, how do we measure the extent of our success in

achieving our overall war aims? Can we establish a direct linkage between an attack taken against a largely political target and the subsequent behavior of the enemy? Do we simply assume some linkage exists, in some indirect and indeterminate way?

The truth is that the result of an attack against an enemy yields effects that are both physical and psychological. On a traditional battlefield, if you destroy a tank, there is a negative physical effect (the attrition of the tank), which is easy to measure. But there is also a psychological effect (on the other tank crews) that is more difficult to measure. The psychological effect may be negative if it triggers fear or confusion on the part of the other tank crews. Nevertheless, what if the psychological effect is to provoke anger, outrage, or blood lust? Because of the complexity of the human mind, psychological effects are not predictable. In the above example, one adjacent tank crew member might react with fear, another with outrage. On different days, their individual reactions may be reversed. Even if one assumes psychological reactions to an attack are universal, these reactions are actually unique to each situation and to each individual. Exact psychological effects cannot be predicted with certainty.

Now, expand the preceding battlefield example to one that addresses a primarily political target and predicting the psychological effects becomes less certain. An attack against the enemy's capital, for example, may have less immediate physical effect on the outcome of an ongoing ground battle, but a potentially enormous psychological effect on the enemy civil populace and the enemy leadership.* However, if individual psychological effects are difficult to predict, predicting the reaction of the populace of the enemy state is more problematic.

Will the reaction be outrage or despair? Determination or panic? Perhaps all of the above. The reactions of the enemy

*Gen James Harold "Jimmy" Doolittle's raid on Tokyo is the archetypal example of an attack that produced minimal physical effects but enormous psychological effects. The primary reason for its success was contextual. The Japanese military had convinced its population that the Japanese home islands were invulnerable to attack. The insecurity brought on by Doolittle's raid helped convince Japan to slow its outward expansion in the Pacific and begin the process of consolidating its gains. Later attacks on Tokyo, which were far more physically devastating, had far less overall effect on the outcome of the war. Like every other aspect of war, psychological effects are contextual.

leader may be equally problematic. Just as the individual reactions of the tank crew may vary, the reactions of an individual leader may vary from situation to situation. The psychological effects may well be profound—as they were on the Japanese after Gen James Harold “Jimmy” Doolittle’s raid—but predicting with certainty exactly what those effects will be is another matter entirely.

Because political effects are difficult to measure, and even more difficult to predict, achieving a political objective may require a different approach than a military objective. Military objectives are generally measurable, political objectives much less so, at least from the standpoint of determining how a specific military action produces a recognizable political effect. Until someone develops the means to measure the degree an attack against a political target influences an enemy’s behavior, the extent of airpower’s contribution to the achievement of war aims will remain inconclusive. While the result of attacks on political targets may be difficult to measure, the extent to which political forces shape and determine the ways in which airpower’s destructive effects are applied is profound.

Reasons Political Leaders Modulate Airpower

The nature of aerial warfare provides specific opportunities to modulate and control the intensity of aerial attack throughout the range of combat operations. This characteristic differentiates aerial warfare from many other forms of warfare. This is because more of the variables that control the intensity and duration of an aerial attack remain under the direct control of external leadership than they do in land or naval warfare. When we send an army or a navy into battle, at the outset, we can control some of the variables of time, size, intensity, and duration of the application of force. We can increase the size of the combat forces. We may be able to accelerate the speed with which they reach the battlefield. We can specify which weapons can be used and in what context. However, once the battle starts, external (meaning political) adjustments to these objective aspects of the force engaged become significantly more difficult to apply. When an army or navy goes into battle, it does so as a single coordinated

action using all available forces with a specific opportunity to fight and win. Once the battle ends, there is an opportunity to externally control how quickly, and, in what strength, they are sent into battle again. But, owing to both the cost and inertia of marshalling surface forces for battle, in most cases, these changes occur much more slowly than they do with aerial forces.

In aerial warfare, additional variables remain under external control throughout the span of combat operations. As in the previous example, at the outset, we can control both the size and the alacrity with which an aerial force is directed into battle. We can specify the weapons to be used and the context for their employment. But, even after the battle begins, additional variables often remain within the grasp of external control. We can, up to a certain physical limit, control the number of sorties produced per attack wave (notwithstanding other external influences, like weather and the actions of the enemy, for example). We can control the spacing between the attack waves, and we can control the overall duration of the attack. This is not to say that armies and navies do not control these elements in battle as well, but in the heat and furor of actual conflict, they are necessarily controlled by the engaged forces themselves and to a far less significant extent by the political leadership overseeing the conflict. To illustrate this point, a political leader is unlikely to direct a radio message to a foot soldier telling him where to aim his rifle. Yet, politicians frequently redirect or cancel an aircraft strike—even after they become airborne and are en route to the target area.

There are few military commanders who would choose to go into battle using a small portion of their available forces. When these forces sit directly in harm's way (as surface forces normally do when they are engaged in combat), political leaders normally have enough appreciation of the collective risk borne by the combatants not to suggest that their generals or admirals try to attack with anything less than the full complement of approved combat power available to them. The logic of force survival is a powerful motivator. Two thousand years of land and naval warfare experience provide numerous examples of the perils of failing to bring all available combat power to bear on the enemy at the decisive time and place. This is why, in a surface battle, we do not send out tanks or ships a few at a

time to engage the enemy. To do so allows the enemy to focus his land forces against the contingent described.

But sometimes aerial commanders can find themselves (especially in limited wars) directed to strike the enemy with a fraction of their available assets. This is because, unlike army or navy forces, air bases usually sit beyond the ranges of immediate ground threats. The distance an aircraft can travel before it strikes obviates the need to maneuver the bulk of its support structure directly into harm's way to engage the enemy. If this geographic buffer were to evaporate (by the base being attacked or overrun, for example), any external mandate to restrain the use of available force would likely disappear as well. Nevertheless, it is the ability of aerial forces to conduct attacks at long range, with little commensurate threat to friendly forces back at their recovery base, which makes it possible to conduct an attack with less than maximum available aerial power.

The protection of distance and the survival of the home airfield are not the only considerations. Survival is also important when an aircraft flies into enemy territory or within the range of enemy defenses. In such situations, aircraft commanders often seek safety in numbers, since a large attack force can sometimes overwhelm an air defense system that might otherwise make mincemeat out of a smaller force. This provides a powerful argument favoring the traditional military view of attacking with overwhelming force whenever possible. We use this logic in our attack planning for surface engagements. A single tank charging into battle faces threats not only from other tanks, but also from infantry, helicopters, artillery, special operations units, and sometimes even angry mobs (as occurred in Chechnya). The threats to an aircraft are generally more specialized and less widely deployed. Consequently, another reason political leaders sometimes direct a fraction of the available aerial forces to strike the enemy is that, depending on the situation, there may be no greater risk to a small force overflying an enemy than a large force. It may be possible sometimes to scale back the size of the attacking force without increasing the risk of the mission simply because the threat to any number of friendly aircraft, large or small, is essentially negligible. For example, in a country without a viable air defense,

a lone-wolf attack by a single aircraft might be an entirely appropriate attack option. Given a more robust air defense, however, the same lone-wolf tactic might prove suicidal by allowing the enemy to focus its air defense on a single target.

The third and perhaps most powerful reason political leaders sometimes choose to use less-than-maximum available aerial force is that the political ends of the situation may not justify the use of overwhelming means. For this reason, airpower is often the force application tool of choice in limited wars. Airpower is a flexible military instrument that can be used once, twice, or as many times as necessary to meet limited political ends. It can be terminated at any time, resumed at any time, or continued without letup. Violence and danger are inherent elements in war, and the military instrument of national power is nothing if not a blunt instrument. Yet, the ability to limit and continually modify aerial warfare to meet political ends makes it, in the eyes of many political leaders, the “least blunt” military instrument among those available.

The final reason political leaders are sometimes tempted, especially in limited wars, to direct the use of less-than-maximum available aerial force in battle is simply because they can. The nature of aerial warfare itself makes this possible. When land and naval forces engage in battle, they generally sustain the application of force until the battle is either won or lost. Once combat begins, there is no natural and predictable pause during a land or naval battle (as there is when an aircraft returns to base to rearm and refuel) at which time political leaders can consciously and deliberately alter the subsequent applications of force. However, aerial warfare provides this opportunity, and political leaders sometimes avail themselves of these occasions (even in limited wars with circumscribed objectives) to adjust subsequent intensity and degree of force brought to bear on the enemy.

Appeal of the Incremental Approach

Defeating an enemy by gradually increasing the amount of force applied seems a counterintuitive approach to success in war. Logically, if military planners intend to defeat an enemy, it

makes sense that we stand the greatest chance of success if we bring the greatest available military force to bear on the problem. If we bring all available force to bear at the outset, logically, it should maximize our chances for success and minimize our chances of becoming engaged in a protracted conflict. The Vietnam War is an American example of a war waged by incremental increases in the degree of force applied. Another example was Operation Allied Force in Kosovo.* And yet, owing to compelling political reasons, often states do not choose to wage war with maximum military force at the outset, but rather through the gradual application of increased levels of force.

Many political and military leaders understand the hazards associated with this incremental approach to warfare. Yet, it is still practiced. Why?

If a portion of our force is used initially to engage the enemy, then the enemy stands a greater chance of surviving the attack. When this approach does not achieve quick victory, it requires an upward revision of forces to achieve the original objective and a downward revision in our expectations for a rapid resolution. Increased commitment of forces requires increased commitment of political will. With the upward migration of force levels, both political and military leaders can find themselves drawn into a greater commitment, and perhaps an entirely different mission than originally planned. These are some of the hazards associated with the incremental approach to warfare. Airpower has its own unique set of incremental pitfalls, which are discussed later.

This advice against using the incremental approach applies specifically to war fighting, not deterrence. In deterrence, it is wise to proceed slowly. Consider what might have occurred during the Cuban missile crisis, for example, if either side had immediately pursued an aggressive military solution. The result might have provoked a world war. In deterrence, the incremental approach is frequently the correct approach.

*Operation Allied Force is an example of an air operation that succeeded in spite of the incremental approach. However, Allied Force was successful because it destroyed sufficient numbers of valuable enemy targets influencing enemy behavior, not because it employed an incremental buildup of force in doing so.

Given the arguments against the use of an incremental approach in war, why does the practice persist, especially with regard to the application of airpower? The previous section highlighted the reasons political leaders have seen fit, in certain situations, to modulate the application of airpower. Again, the main reasons include (1) the exposure of fewer personnel to immediate risk, (2) the lack of a requirement—in some cases—to saturate the enemy air defenses with large numbers of aircraft, (3) the limits placed on the application of force in wars with limited political aims, and (4) the opportunity to control the application of airpower during the natural pause afforded when aircraft return to base to rearm and refuel. When politicians commit less-than-maximum levels of destructive aerial power, unless the operation is 100 percent successful, they risk the necessity of gradually increasing force to achieve the original objectives. Enthusiasm for the measured application of force—which airpower affords—should not obscure its risk. There is a delicate balance between the military hazards associated with the incremental approach and the political imperatives to modulate the application of airpower.

There is a popular rationale favoring the incremental application of force that appeals to civilian democratic leaders involved in limited wars. The rationale presumes it is possible (particularly with airpower) to gradually increase the amount of force until an enemy finally submits. In a modern democracy, there are several attractions to this dial-up-the-pain approach. First, it requires minimum investment of political capital. Where support for overwhelming military action does not exist, this technique allows a political leader to begin an action after which, based on the domestic and enemy reactions, a leader either can increase the level of force—assuming the prospects for military success appear favorable—or can discontinue action without having committed significant resources. Should political resolve weaken at any point during an escalating application of airpower, further applications of force can be terminated. This allows political leaders maximum control with minimal risk.

Thus, one of the reasons the incremental application of airpower appeals to political leaders is that its application of minimum levels of force precludes the political risk of overreaching

the limits of the original objective. In an era when political leaders show sensitivity to the potential loss of popular domestic support, coalition consensus, and military lives, this rationale is simple enough to understand.

But, the presumed effect and the actual effect of the dial-up-the-pain approach to aerial war are very different. In contrast to the optimistic predictions of Giulio Douhet, when we use aerial warfare to strike off-battlefield targets in an enemy country, the most frequent effect on the morale of both the enemy leadership and populace is to stiffen, rather than weaken, their resolve. When US forces make their initial strike with minimum possible combat power, they compound this effect. First, this gives the enemy the best opportunity to favorably weather the attack. Second, it builds up the resistance of enemy leaders and populace to subsequent attacks, effectively providing them with a battlefield inoculation. Thus, when a second strike occurs, the enemy is better prepared, physically and psychologically, to survive the attack. The unintended effect of increasing the pressure can prolong the time, effort, danger, and uncertainty of the campaign. Operation Allied Force and the Rolling Thunder campaign in the Vietnam War demonstrate the effects of this phenomenon.*

Airpower leaders must recognize the political motives that favor an incremental approach and ensure political leaders understand the short-term political savings of striking an enemy with minimum aerial firepower may be offset by the long-term cost of protracted aerial campaigns. The tension in this balance results from the perceived political need, especially in limited wars, to determine exactly how much force is enough. Too little and we risk the incremental approach, with

*The shock and awe phase of Operation Iraqi Freedom in 2003 attempted, with arguable success, to apply this dictum of airpower theory. The degree of shock and awe produced may be debated; applying less force would only have produced less shock. This illustrated another potential reaction of the populace in war: If you can withstand the best the enemy can throw at you and survive (in this case the pre-advertised effects of the shock and awe campaign), then you have another flagpole around which you can always rally, which is exactly what the Iraqi government chose to do. Thus, perhaps the best lesson to draw from shock and awe is the one related to expectations. It may be better to let the bombs speak for themselves, rather than trumpeting their effects before they arrive.

all the inherent hazards just mentioned. Too much and we risk using more than the minimum necessary force to win. On the horns of this dilemma, politicians are tempted to select the former option. The correct choice, however, is often the latter. War is not an exact science, and the use of force is not a recipe that produces a predictable and consistent effect. War is a violent and unpredictable clash of wills that should only be used to resolve the political disagreements of states when other less extreme methods have proven ineffective. The unfashionable reality of the military instrument of national power is that, even in an era of “wiz bang” technology and precision-guided munitions, it remains a blunt and bloody instrument of force.

Notes

1. Robert Pape, “Why Japan Surrendered,” *International Security* 18, no. 2 (Fall 1993): 154.

Chapter 4

Military and Political Effects of Strategic Attack

One of the most visionary insights concerning the application of airpower in war occurred early in the twentieth century with the realization that the lateral limits of the traditional battlefield no longer applied. In theory, aircraft could strike targets anywhere within an enemy state. This idea led to the development of the concept of strategic attack, which postulated that by expanding the war to the enemy heartland, one could more efficiently subdue an enemy's will and his war-making capability. It took three decades before the destructive capacity of technology—most profoundly realized in the attacks on Hiroshima and Nagasaki—fully mirrored the destructive intent envisioned by early airpower theorists. This technological lag did not prevent efforts to test the principle of strategic attack before Hiroshima. The daylight precision bombing campaign against the Ruhr Valley, and the fire bombings of Dresden and Tokyo, attest to the determination with which aerial warriors attempted to translate the principles of strategic attack into decisive combat action before the advent of atomic weapons. Whether such attacks achieved the intended effect is another matter, which this paper addresses later.

In the second half of the twentieth century, the technology of extreme destruction exemplified by nuclear weapons exceeded the degree of force required to fight actual wars. The wisdom that restrained the use of nuclear weapons after Nagasaki did not necessarily alter the perceived efficacy of strategic attack; it simply changed the methods applied to accomplish the task. Other technologies, precision-guided munitions (PGM), for example, improved in the late twentieth century, in many ways supplanting the need for the extreme destructive effects of nuclear weapons. Between the Vietnam War and Desert Storm, the technological lag in the development of PGM, among other wartime tools, may have provided a plausible rationale to explain the disparity between the predicted

and actual effects of strategic aerial attack. Nonetheless, many war-fighting technologies—PGM, night vision goggles, global positioning system satellites, and joint stealth strike aircraft, to name a few—reached maturity in the 1991 Gulf War. The United States would rightly expect the Gulf War to vindicate the premise of strategic attack; and, from a technological perspective, it did. The fortunate confluence of superior technology, stark desert terrain, and (for the most part) clear weather allowed American and allied forces to destroy the preponderance of strategic off-battlefield targets called for by the architects of the Gulf War air campaign, with a few important exceptions.* The question, however, is not where the strategic targets were destroyed? The question is, did the destruction of these targets achieve the intended effect?

The theoretical underpinnings of strategic attack rely less on whether an attack destroys its target than it does on what the effect of the attack is intended to be. The 1991 Gulf War demonstrated the allies' ability to destroy strategic targets precisely and efficiently. However, whether destroying these targets hastened the achievement of the war aims or altered the outcome of the war, remains less clear.

The terms *political* and *strategic* are not equivalent in the context of this analysis of strategic attack. The distinction is subtle but important. *Political effects* refers to the responses by political leaders to wartime attacks, regardless of the type of target attacked. *Political targets* refers to targets attacked in war that do not contain an exclusively military character (like hydroelectric dams, bridges, factories, capitol buildings, and power transformers). Their destruction is intended to produce a specific political reaction from the leadership of the enemy state.

What is important is not the target but the intended effect. For example, if you destroy a bridge to prevent an ammunition train from reaching the front, then the intent of the attack is to produce a military effect, and the bridge would best be described as a military target. On the other hand, if you destroy the same bridge to pressure the enemy government into a specific political

*The most obvious exceptions were Iraqi nuclear facilities, Scud missile launchers, and, of course, Saddam Hussein himself.

reaction (like halting ethnic cleansing in Kosovo), then the same bridge would more accurately be described as a political target designed to produce a specific political effect. Of course, most targets contain a character that is neither purely military nor purely political but rather a combination of the two.

Strategic attacks refers to attacks carried out beyond the lateral limits of the traditional battlefield that are designed to achieve more than simply a specific tactical effect (like the destruction of a tank). These attacks may be carried out against targets containing either a political or military character but usually some combination of the two. Thus, the distinction between a tactical or strategic attack relates to the *scope* of the effect produced, while the distinction between a military or political target relates to the *character* of the effect produced.

The Premise of Strategic Attack

Since its inception, the central premise of strategic attacks has been to extend the application of force beyond the limits of the traditional battlefield and directly affect elements of the enemy state not traditionally placed at risk during war. The enemy's civil populace, leadership, and infrastructure supporting the war effort (including factories, transportation systems, and garrison military forces) are common examples of the types of targets deemed, during the last century, appropriate candidates to receive the destructive effects of strategic attack. To determine the firmness of the ground on which the principle of strategic attack rests, this paper examines the effects of striking each of these classes of strategic targets, beginning with the enemy civil populace.

Douhet's Argument that Attacking Enemy Cities Breaks Civilian Morale

Giulio Douhet was one of the first airpower theorists to advocate the use of aerial attacks against enemy civilians and enemy cities.¹ His thoughts continue to influence discussions regarding the merit of strategic aerial attack. In the aftermath of World War I, Douhet reasoned that an aircraft's range beyond the limits of

the traditional battlefield would, by definition, blur the distinction between combatants and noncombatants in future wars: "No longer can areas exist in which life can be lived in safety and tranquility, nor can the battlefield any longer be limited to actual combatants. On the contrary, the battlefield will be limited only by the boundaries of the nations at war, and all of their civilians will become combatants, since all of them will be exposed to the aerial offenses of the enemy."²

In a physical sense, Douhet was correct. Airpower's ability to range beyond the limits of the traditional battlefield *did* physically expose the enemy populace to potential aerial attack. But, this invites an important question: What is the effect of attacking the enemy's civil populace? Douhet believed that aerial attacks would inevitably cripple enemy morale, especially civilian morale.

How could a country go on living and working under this constant threat, oppressed by the nightmare of imminent destruction and death? How indeed! We should always keep in mind that aerial offenses can be directed not only against objectives of least physical resistance, but against those of least moral resistance as well. For instance, an infantry regiment in a shattered trench may still be capable of some resistance even after losing two-thirds of its effectives; but when the working personnel of a factory sees one of its machine shops destroyed, even with a minimum loss of life, it quickly breaks up and the plant ceases to function.³

Douhet's first mistake was to assume facts not in evidence. The bombing of enemy cities during World War II and later has often had an effect opposite to the one Douhet predicted. Rather than breaking civilian morale, attacks on cities often strengthen civilian morale.* Airpower leaders during World War II committed another mistake by placing continued faith in Douhet's predictions, despite their own firsthand evidence to the contrary. The determined resistance of British civilians during the London blitz should have informed Allied assumptions of the effects of applying airpower to break German civilian morale. Even the attacks

*This is true to a point. It is possible to devastate a city so completely that morale is crushed. It then begs the question of the response such an action provokes on the part of the rest of the enemy population. Hamburg and Dresden may have been pushed beyond the breaking point during World War II but German morale did not wane as an immediate result.

on Hiroshima and Nagasaki failed to conform to Douhet's predictions. The annihilation of two cities contributed, along with other factors, to Japan's decision to surrender. But the decision ultimately had little, if anything, to do with consideration of post-attack civilian morale, and everything to do with the recognition on the part of Japan's leaders of the staggering cost in terms of lives, suffering, and national treasure that Japan had borne, and would continue to bear, in subsequent atomic attacks. More recently, the effect produced by the terrorist attacks of 9/11 in their attack on a civilian target was to create (at least initially) a sense of American unity. Presumably, this was not the effect the attackers intended, which again speaks not only to the perils of attacking civilian targets, but also to the difficulty of accurately predicting political effects—even for the members of al Qaeda.

Douhet's Failure to Recognize Political Considerations over Military Expediency

Douhet's second mistake was to conceive of war in military, rather than political, terms. His assumption that enemy cities presented ripe targets for strategic attack committed the classic error of assuming that the development of a given military capability would proceed unchecked to the extremes of its destructive potential, unhindered by political oversight. As such, Douhet's belief that all future wars would be "total in character and scope" and that aerial attacks against cities would be conducted with maximum force, to include both chemical and biological agents, aptly foreshadows the extent of the violence employed at Hiroshima and Nagasaki. Nevertheless, it fails to accurately describe human behavior in all other levels of conflict short of total war.

Perhaps Douhet was half right. In total war, cities could conceivably find themselves devastated by war's destructive priorities—either literally, as Hiroshima and Nagasaki were during World War II, or figuratively, as Russian and American cities might have been during the cold war. But, the decision to apply destructive force on this level will be a political one, and it will mirror the character of the war's political aims and the extent to which the application of destructive military

power supports the war's overall goals. The fact that both America and Russia survived the 40 years of the cold war without a nuclear exchange demonstrates that possessing unlimited destructive power does not necessitate the use of that destructive power. It also illustrates the inappropriateness of attacking enemy cities as a viable aim, unless the political objective of the war is to annihilate the enemy state. In other words, a nation should consider annihilation of the enemy state only in the most extreme case.

Alternate Objectives of Strategic Attack

If we remove attacks on cities as an effective means of conducting a strategic attack, a wide range of potential targets remain. The classes of targets most frequently cited by aerial war planners typically include enemy leadership targets; command, control, and communication links; enemy infrastructure supporting the war effort (including factories, power grids, transportation systems, and stores of natural resources); and military forces outside the immediate battle area. The distinction regarding these objectives are truly strategic varies from situation to situation. Normally, enemy leadership can be characterized as a strategic target, the destruction of which has inevitable political effects. Military forces not engaged in the battle could present either a strategic or a tactical target depending on their location, disposition, ability to influence future decisive actions, and so forth.

Airpower theorists have devoted much attention to these classes of targets to enhance the focus of the premise and purpose of strategic aerial attack. Historical attempts to apply strategic attack abound. A few of the better-known examples include Allied attacks on German aircraft factories during the daylight precision bombing campaign, Allied attacks on German rail lines following Operation Overlord, the Linebacker II campaign against North Vietnam, the Israeli attack on Iraq's Osirak nuclear power plant, allied attacks on Baghdad during the 1991 Gulf War, North Atlantic Treaty Organization (NATO) attacks on Belgrade during Operation Allied Force, and al Qaeda's attacks on 9/11.

Over the last 50 years, improvements in technology have aided the ability to strike and destroy these categories of targets. Yet, the theoretical underpinnings of strategic attack rely less on whether an aerial weapon (regardless of whether it is a laser-guided bomb or a hijacked airliner) used to conduct an attack destroys its target than it does on the assumption of what the presumed effect of the attack will be. The question is, does the destruction of the target have the desired strategic effect upon the outcome of the battle as anticipated?

Strategic Attack against the Leader of an Enemy State

What is the strategic effect of targeting enemy leadership? If US forces kill the leader of an enemy state (setting aside for a moment the moral, legal, or ethical implications of doing so), the presumption of strategic attack is that these forces effectively decapitate the intellectual anima that contravenes our wartime aims. To the extent that the wartime intentions of an enemy leader may conflict with the majority will of the state that he or she leads, killing the leader may change the hostile intent inflated by the enemy state. But if the majority of the people strongly support the hostile actions taken by the enemy leadership, then killing the leader may have little effect on the degree of hostile actions subsequently waged. Decapitating the leadership of an enemy state in this case would simply permit the monster to grow another head.

Each situation is different. Attacking the enemy leadership may not always have the immediate strategic and political effect of forcing an enemy state to sue for peace. But, there are some situations in which killing an enemy leader would affect the course of war. If the Allies had been able to eliminate Adolf Hitler, for example, the United States cannot assume that Nazi aggression would have evaporated instantly. Although Hitler himself profoundly affected the course of World War II, there is no question that his premature departure would have (to some unknowable extent) affected many aspects of the subsequent course and conduct of the war. The course an enemy state takes under a new leader's direction is not necessarily a pre-

dictable one, and the United States should not assume the direction it takes would be beneficial. Ho Chi Minh, for example, died during the Vietnam War; yet, his death did not undermine North Vietnamese determination or war aims in any substantive way.

It is wise to weigh the moral, legal, and ethical implications of such an action, including the precedent set for reprisal attacks against American leaders in future conflicts. Killing an enemy leader and forcing a new leader to step forward may not always be the best course of action. Is it better to deal with the devil we know, or the devil we don't know? The answer depends upon the particular circumstances involved in each case.

Before leaving this subject, the precedent that is set by attempting to kill an enemy leader bears additional examination. The issue is complex and depends on the context of the conflict. Sometimes there are plausible reasons for taking such an action, for example, the Gulf War of 1991. In that conflict, the ability of American forces to put a PGM into the master bedroom suite of each of Saddam's palaces on night one of the war contained the powerful and morally defensible supporting rationale—had the attack succeeded—of saving American and Iraqi lives by eliminating the nexus of Iraqi aggressive intent and key decision making.

Additionally, Iraq's limited capacity to conduct credible attacks against American leadership no doubt mitigated American concerns of potential political reprisals. While each of these factors contributed to the US decision to attempt to eliminate Saddam at the outset of the 1991 and 2003 Gulf Wars, it is important to remember that the elements of that supporting rationale do not universally translate to every situation. A change in the balance of one of these decision elements could have swayed US decision makers to adopt an entirely different approach.

Thus, before a state considers attempting to kill an enemy leader, several issues bear careful scrutiny. First, the easy questions:

1. Do we physically have the ability to locate and kill the enemy leader?
2. To what extent does the enemy leader control, or contribute to, the aggressive intent of the enemy state?

3. To what extent is the enemy state reliant on its leader for key decision making?
4. Does the enemy possess the credible potential to conduct reprisal attacks?
5. Who would be the likely successor?
6. Do our wartime allies support this course of action?

And then, the tough questions:

1. To what extent would this action elevate the enemy leader's status to that of a martyr?*
2. Is the action morally justifiable? A soldier is certainly considered "fair game" in war, but is a politician considered fair game?
3. And the most important question: Beyond the scope of the current conflict, to what extent would such an action set the precedent for adversaries to assume this is an acceptable tactic to use against American leaders in future conflicts?

Unless the political arguments requiring such action prove overpowering, my own counsel from a military perspective would be to avoid targeting enemy leaders. To the extent that their loss in wartime may be the incidental byproduct of a broader attack may mitigate the dangers of the precedent.†

Strategic Attacks against Enemy Communication Links

A subset of the same theory that advocates that enemy leaders make potentially lucrative strategic targets is the morally

*Proof that nothing in war is easy—there is also the reverse question (encountered during the 2003 Gulf War): If we don't kill an enemy leader—i.e. Saddam—to what extent will he continue to instill fear among the populace and inspire his followers? Again, context is everything.

†Explicitly targeting the leadership of an enemy state is one area where I disagree with John Warden. There may be occasions where this approach is warranted, but these should be viewed as the exception rather than the rule.

less dubious (and therefore often politically more palatable) notion that forces effectively can decapitate an enemy state by severing the communication links between the enemy leader and the military forces he or she directs. This analogy, often used to illustrate the relationship of the leader to the state, is comparable to the relationship between a head and a body. The intended effect of severing the link between the two is to make the enemy military forces unresponsive to the will of the enemy head of state. This analogy contains several crucial oversimplifications. They are (1) that decapitation can be accomplished by severing key nodes or lines of communication, and (2) that decapitation will cause the enemy's efforts to be so undirected and uncoordinated as to render the enemy's military ineffective as a fighting unit.

Analogies provide clarity by explaining complex subjects in familiar terms. But, in the rush to embrace the clarity of the analogy, US forces can mistakenly assume that the subject being discussed behaves according to the rules that govern the behavior of the illuminating example rather than according to the rules and governances of the real world. This becomes more important as the degree of complexity multiplies, which is the case when describing an entity as complicated as a political state or as sanguine and multifaceted as war. Earlier I used the analogy of a typewriter to illustrate how a single controlling authority is often necessary to orchestrate attacks from different air bases. That analogy could prove misleading, however, if one were to assume (1) that the analogy does anything more than illustrate a point, (2) that the action of conducting an aerial attack is as simple as typing a message at a typewriter, or (3) that aerial warfare operates according to the rules that govern the mechanics of typewriting rather than according to the complex factors inherent in its own nature. Analogies demonstrate parallels. By doing so, they make it easier to comprehend the parameters of complex problems, but that does not make complex problems any easier to solve.

The military has become overly enamored with the analogy of "the body" to explain the intended effects of military force to civilian policy makers, so much so that an entire clichéd lexicon has arisen as a consequence. We speak of "blinding" the

enemy, of “crippling” him, of “decapitating” enemy leadership, of striking at an enemy’s “nerve center,” of “choking off” enemy supplies, and so forth. To explain the intended effects of our attacks, we sometimes mistakenly presume (or far worse, imply) that our attacks on an enemy state will have commensurately debilitating effects, as would corresponding forms of attack on a human body. Our mistake has been to believe the oversimplification of our own rationale.

The relationship between the enemy leadership and the enemy armed force is different from the relationship implied by the popular analogy of “the head to the body.” The problem is twofold, and it relates both to the ability to interfere with communication, on the one hand, and the assumed effects of that interference, on the other.

The easier problem to consider is the physical one concerning the ability of aerial attack forces to effectively destroy or disrupt the communication links between the enemy leadership and the enemy armed forces. Naturally, the form of the communication link depends on the technology of the day. From the time of the Peloponnesian War until 1793 (with the introduction of the French semaphore system), communication took the form of a runner on foot or on horseback. To combat the dangers of losing a messenger, leaders dispatched messengers in multiples.

One of the first combat uses of the telegraph in America occurred during the Civil War.* The telegraph provided instantaneous long-range communications between the Union and Confederate capitals and elements of their deployed forces. At the time, it was simple to cut communication links by cutting telegraph wires and a simpler task than cutting communication links in the current era. But this vulnerability did not affect the course of the Civil War, partly because of the speed with which armies moved in 1860–65, but more importantly because armies are trained to conduct autonomous operations in the absence of instructions from higher headquarters.

*The earliest example of a combat use of the telegraph occurred at the Battle of Solferino Magenta in 1859 during the Wars of Italian Unification. See “Battle of Solferino,” *Britannica Concise Encyclopedia*, online, Internet, 2 December 2004, available from *Encyclopædia Britannica* <http://concise.britannica.com/ebc/article?tocId=9379057>.

When Gen William T. Sherman conducted his march to the sea after the Battle of Atlanta, he was completely cut off from all communication with the Union capital for a period of several months. In fact, there is some supposition that he directed his own troops to cut the telegraph wires back to Washington once he received the approval to begin the march to the sea to prevent the receipt of any subsequent orders potentially countermanding the decision.

Can forces operate in the absence of guidance from higher headquarters? With some exceptions, they generally have the physical ability to do so.* The ability to communicate is essential. Breaks in communication are generally less debilitating, and generally of lesser duration, than the image decapitation implies. If you can sever all vertical communications between leadership and subordinates, you can force enemy military forces to operate on their last-known instructions. If you can sever all lateral communications between forces supporting one another, then you can make them fight in an uncoordinated fashion. In both cases, the enemy will fight at less-than-ideal capacity. But, more than likely, they will still fight. The questions then become (1) how long can you keep the communication lines severed? and (2) is it possible the enemy will have other means of communicating of which you are unaware?

In Operation Allied Force, NATO forces attacked television towers attempting to prevent President Slobodan Milosevic from communicating with the Serbian populace. The attacks frequently knocked out the television broadcasts for a few hours but never for any significant period. Attempts to sever communication links between lateral and higher headquarters units in the same conflict were met with almost no success due to the sheer volume of available communication methods for lateral units to communicate with one another. These methods included radios, landlines, fiber-optic lines, fax machines, and cell phones. In 1991, Mohammed Farah Aideed effectively foiled US efforts at intelligence collection in Somalia simply by using an old-fashioned method of battlefield communication (runners

*US nuclear forces currently require enabling codes from the national command authority before they can physically launch nuclear weapons.

carrying hand-written messages), which proved invulnerable to collection by overhead reconnaissance platforms.

Severing Communication Links

What is the merit of attempting to cut the enemy's ability to communicate, either vertically or laterally? While there is some measure of military merit to this method of attacking the enemy, the issue should not be overstated. We must consider several questions.

1. To what extent do the enemy forces rely on instructions from their national leadership, or higher headquarters, to successfully conduct military operations?
2. How long can the enemy forces operate independently of these instructions?
3. Is there a critical communication link, or series of links, that we have the physical ability to sever and, having done so, will actually deprive the enemy of the ability to communicate (either with enemy leadership or lateral supporting forces)?
4. Is the adversary well trained, adaptive, and decentralized? If so, he is probably less likely to be reliant on communications or centralized control.
5. What forms of backup communication might the enemy employ? It would be a mistake to discount the potential effectiveness of nontraditional or antiquated forms of communication, like cell phones, fax machines, wireless palm pilots, pagers, semaphores, bicycle messengers, and carrier pigeons.
6. How long will it take the enemy to repair the links once they have been cut?
7. If we cannot permanently cut a communication link, is there a critical but finite period during which we hope to cut communications to facilitate other operations?

8. How much risk do we run in assuming the enemy is operating in the dark if, in fact, he possesses backup forms of communication of which we are unaware?
9. At what point does the effect of denying the enemy the ability to communicate outweigh the intelligence value gained by monitoring the enemy's communications?
10. Is the enemy's ability to communicate essential to securing United States's political objectives in the conflict? Under the single integrated operational plan, for example, who on the other side would have been left to surrender, and by what means?*
11. Are the enemy's communications helping your cause more than hurting it? There may be cases where you don't want to cut the enemy's communication links. For example, Hitler's irrational orders to his field commanders in the latter phases of World War II often worked in his enemies' favor.

Due in part to the wide proliferation of available communications technology, and partly to the necessarily autonomous nature of military forces engaged in combat, any gains achieved by attempting to sever enemy communication links likely will prove of tactical, rather than strategic, utility. Sometimes, there are exceptions. But, in general, the strategic effect of disrupting or destroying enemy communication links is often overstated and should be viewed as a supporting element in an overall campaign rather than as a strategic objective in and of itself.

Strategic Attacks against Enemy Production Facilities and Wartime Stores

The focus of this paper now turns to the presumed strategic effect of attacking the enemy's wartime strength—while still at its source—rather than waiting for it to reach the battlefield. Destroying an enemy factory that produces wartime equip-

*This was the American nuclear attack plan developed during the Cold War for use in a nuclear war with the Soviet Union.

ment (like tanks, combat aircraft, or submarines) would be one example of striking the enemy's war-making capacity at its source. Another would be to attack the enemy's production facilities (or off-battlefield stores) of wartime consumables, like ammunition or fuel. The presumed effect of striking these war-making elements at their source is that, over time, it will cripple the enemy's ability to replace equipment or provisions.

Here the historical evidence offers mixed guidance. Allied attacks against German synthetic fuel reserves during the precision daylight bombing campaign of World War II, coupled with the Red Army's coincident seizure of the Romanian oil fields, had a devastating effect on Germany's ability to subsequently fuel its combat vehicles. On the other hand, Allied attacks against German aircraft factories proved less significant. By the latter phases of the war, Germany had sufficient numbers of aircraft, but insufficient numbers of trained pilots to fly them. The attempt on the part of the Allies to pursue several strategic attack options (against fuel reserves, aircraft factories, and ball bearing manufacture, for example) highlights the positive effects of using overlapping and redundant methods in war. While one attack might not have the desired effect, another might.

Another key consideration regarding attacks on production facilities and wartime stores is the time it takes these attacks to achieve their intended effect. By definition, an inherent delay exists between the moment a tank is produced at the factory and the moment it can physically reach the battlefield. Similarly, there is an inherent delay between the moment a factory is destroyed and the moment the product is missed on the battlefield. Consequently, an attack of this form makes the most sense when a state is engaged in a protracted struggle with the expectation that the enemy will exhaust his available wartime supplies of equipment and combat consumables and require the replacements the targeted factory produces. If there is little likelihood that the enemy will use up what he already has, then this form of attack will have little or no *military* effect on the outcome of the battle.

Before undertaking such attacks, this paper examines two remaining questions: (1) how much time is required for the particular effect we are trying to achieve to take place? and (2)

how long is the war going to last? If the time required to achieve the effect exceeds the expected (and more importantly, the sustainable) duration of the conflict, then the effect of the attack will be negligible in military terms.

There is always the possibility of achieving certain political effects by striking these categories of targets, even if military forces never feel the consequences. Consider this hypothetical example. Assume that we destroy an enemy's submarine factory even though maritime forces on either side are not playing a significant role in the conflict. While the military effect of such a destructive act may be inconsequential to the decision reached on the battlefield, the act may have very definite political effects. It might undermine the enemy's maritime capability in future wars; it might serve to demonstrate the resolve to conduct more widespread attacks or compel enemy decision making in other areas. Regardless of the method, the key is that the effects have become political, which is to say they are no longer intended to complement specific military actions on the battlefield, but rather designed to pursue broader goals that directly serve the political ends of the war—not facilitating the conduct of its military means. Thus, the extent to which effects are truly strategic depends on how we define them. Even if these forms of strategic attack under consideration do not sway the immediate outcome of the battlefield decision, it does not mean they are without merit in achieving a war's overall aims, owing to the political effects such actions may produce.

Strategic Attacks against Enemy Transportation Infrastructure

The decision to conduct strategic aerial attacks against the enemy's transportation infrastructure is another method of attempting to block enemy resources (like replacement equipment, troops, or combat consumables) from reaching the battlefield. While many of the same elements addressed in the section above apply, the differences are worth noting. Rather than destroying the goods themselves, in this case, the focus is on destroying the transportation system, or elements thereof, that convey these ar-

ticles to battle. While this may achieve the same result in the short term, such action also carries the long-term effect of denying US forces (or the civilian populace) access to the same transportation system at a future date.

Consider the effect of destroying a bridge. Our decision to destroy a bridge may stop an enemy resupply truck loaded with ammunition from reaching the battlefield. But in so doing, the decision may also preclude our own ability (or the ability of our allies) to use the bridge later. This could be significant if we plan to move into the area on the ground ourselves, either capturing enemy territory or recapturing US territory previously lost. It adversely affects the local civilian populace, and (depending on the degree of culpability we assign to the associated civil population) we may or may not wish to mitigate this effect.

One example of this effect occurred with the Allied destruction of the road and rail system in northeastern France before the D-day invasion. The destruction of this network greatly hindered (although it did not stop) German Panzer forces under Erwin Rommel from attempting to meet the Allied forces landing at Normandy. Damage to the transportation system did affect the Allies' subsequent progress on their march to Berlin, and it certainly affected the French civil populace, both for the remainder of the war and later.

Another example of this effect occurred with NATO attacks on the Danube bridges near Belgrade during Operation Allied Force in 1999. The destruction of these bridges had little-to-no military impact on Serbian military forces deployed in the province of Kosovo but after the war significantly affected road, river, and rail traffic up the Danube. The postwar effects of this destruction would be felt not just by the Serbians, but also by the Hungarians, the Czechs, and the Slovaks (two of which, ironically, are members of NATO). This is an example of a target's political value clearly superseding its military value. Did the destruction of the Danube bridges have the effect the NATO Allies intended? It is very possible. Were there significant costs subsequently associated with that destruction? There is a definite possibility.

Once again, a key point regarding this type of attack, and one that characterizes many of these forms of presumably strategic attack, is that effects on the battlefield are often both indirect and presumed. Indirection can be a virtue in the conduct of military operations, as both Sun Tzu and Liddel Hart have argued.⁴ But, the presumption of a military effect, and the inability to quantify that effect, is a weakness. If we successfully blow up a bridge but don't have the slightest idea of the extent to which its destruction has hindered the enemy's ability to maneuver forces or materiel to the battlefield, then it is hard to know whether the effect of destroying the bridge warranted the expense and risk of the attack. If the bridge is located at a choke point, there may be good reasons for destroying it. If there are many bridges in the area, then the effects of its destruction will probably have far less military influence on the outcome of the battle. In this case, any gains achieved by such destruction will more likely be of a political rather than a military character, as the example of the Danube bridges demonstrates.

Strategic Attacks against Enemy Military Forces not Engaged in Battle

The final category of targets this paper considers under the umbrella of strategic attack concerns enemy military forces not currently engaged in the battle. These forces can take many forms. They might be fully equipped forces maneuvering outside the immediate sphere of the battle area as they prepare to enter the fray at some position of advantage. They might be replenishment forces transiting to the battlefield to replace forces already consumed by combat attrition. They might be forces held in reserve in anticipation of exploiting other combat actions. They might be forces recently removed from battle due to combat exhaustion, or they might be garrison forces located in an entirely different part of the world. The circumstances may vary. The questions to consider are (1) do these forces constitute legitimate strategic targets? and (2) what effect will their destruction have on the outcome of the battle?

In broad terms, enemy military forces—more than any other single resource possessed by the enemy state—constitute legitimate targets in time of war, both in the sense that their destruction specifically affects the enemy's ability to employ its military instrument of national power and more broadly in the sense that military forces consciously and correctly understand that they are always “fair game” in the violent prosecution of war. Soldiers appreciate, in ways civilians do not, that a time may come when the sacrifice of their lives may be required to ensure the achievement of national objectives.

Beyond the immediate limits of the battlefield, some military forces inevitably present more appropriate targets than others do. The list of military forces in the preceding paragraph illustrates this point. Attacking maneuvering forces, replenishment forces, or reserve forces produces the possibility of directly influencing the outcome of the battle under way. However, the value of attacking garrison forces outside the immediate battle area may vary according to their proximity and appropriateness to the battle at hand. Attacking forces in a sector adjacent to the one engaged would be entirely appropriate. Attacking forces expected to soon be available (a good example might be American troops boarding a transport aircraft in the United States prior to deploying overseas) would be an equally appropriate target from an enemy perspective. On the other hand, attacking a US nuclear missile silo (in the context of a limited war in another hemisphere) would be inappropriate in a limited conventional scenario. If an enemy believed, however, that the United States might resort to the use of nuclear weapons, then an attack on US missile silos might be appropriate.

Military forces embody the blunt instrument of political discourse; as such, they always retain a degree of legitimacy as potential targets, regardless of their immediate locale. Garrison forces in one theater, like Korea, might be unlikely to immediately influence a battle in another hemisphere, like Iraq, but this does not mean such forces should consider themselves immune from attack. While an attack on forces in another theater may have no immediate military effect on a battle, such an attack might be intended to achieve an entirely political effect like vengeance, visibility, or the attrition of an adversary's will. While

the United States might not choose to attack an enemy's garrison military forces in another theater, we would certainly be unwise to expect our enemies to be similarly accommodating.

If Strategic Attack Does Not Warrant the Overriding Focus of Aerial Warfare: What Does?

Of the potential targets available to receive the destructive effect of airpower's fury in time of war, none *in military terms* warrants airpower's overriding focus more than fielded enemy forces engaged in combat against friendly forces. On its surface, this may appear to run counter to the arguments espoused during the last 100 years of airpower theory.* The obvious objections to this statement are (1) that this is an area that already receives the destructive attention of surface forces, like the army, and (2) that this recidivist focus on targets of an entirely localized military character fails to capitalize on airpower's inherent ability to range beyond the limits of the traditional battlefield to strike targets in other parts of the enemy's territory.

Both of these objections are correct. However, the operative words in the thesis statement of this section are "in military terms." If the focus is on influencing the military (as opposed to the political) outcome of the battle, then the place that airpower will *always* have the greatest effect—in military terms—will be at that time and place when its destructive effects are directed against the enemy military forces engaged in the battle. That is not to say that attacks on other classes of targets beyond the limits of the traditional battlefield do not warrant airpower's destructive attention, only that the effects engendered will be of an increasingly political rather than military character whenever the targets themselves are not of a military form and posing a direct threat to friendly forces.

The way that airpower has the most direct effect on the outcome of the military battle is by directing its efforts against the enemy forces engaged in the military contest at hand. That air-

*This is true with the important exception of Robert Pape.

power has the additional ability to affect other types and classes of targets beyond the limits of the traditional battlefield requires that airpower conform to both the political, as well as the military, imperatives dictated by the character and context of the conflict to an extent that other forms of warfare generally do not.

Notes

1. Giulio Douhet, *The Command of the Air* (New York: Coward-McCann, Inc., 1984).
2. Ibid., 9–10.
3. Ibid., 22–23.
4. Sun Tzu, *On War*; and B. H. Liddell Hart, *Strategy: Second Revised Edition* (New York: Praeger, 1968).

Chapter 5

The Realities of War

War is not conducted by military means alone. As Clausewitz correctly stated nearly 200 years ago, “War is simply a continuation of political intercourse, with the addition of other means.”¹ Yet, the addition of military means does not necessarily imply or equate to the subtraction of other means. Before states resort to force to solve their problems, they normally apply other less violent instruments of national power (diplomatic, economic, cultural, informational) to achieve their aims. Admittedly, the reason a state most often resorts to the blunt instrument of military force is that other instruments of national power have not achieved their aims. When the leadership of a state makes the decision to cross the threshold from nonviolent to violent measures to achieve its national objectives, it does not suspend the application of other nonviolent instruments of national power used up to that point.

In war, all available instruments of national power are generally brought to bear on the enemy state to some greater or lesser degree. The violent character of war can alter, constrict, or sometimes suspend the effectiveness of nonviolent instruments of national power. But it can sometimes increase their effectiveness as well. A naval blockade executed in concert with a trade embargo illustrates how the military and economic instruments of national power can complement one another. A strongly worded demarche underscored by the bombing of an enemy capital illustrates the complementary effect of the military and diplomatic instruments. An attack on the enemy’s key telephone, radio, and other communication circuits demonstrates the coincident interplay of military and informational instruments of power.

Thus, war is the continuation—not the suspension—of politics, with the addition of other means. One of the strengths of airpower lies in its ability to influence and complement other instruments of national power as they are brought to bear in confluence against the enemy in time of war. Airpower is not the only form of warfare that can influence other instruments

of national power. The example of the naval blockade mentioned a moment ago illustrates that point. But by virtue of its ability to strike anywhere within the sphere of the enemy's territory, airpower typically retains a more broad-ranging ability to influence other instruments of national power in the conduct of war than other military means. This influence is not exclusive, merely a geographic reality. As other military services develop force application methods that can range anywhere within the enemy's territory (with cruise missiles, for example) their ability to influence other instruments of national power may become just as great. In reality, a force application tool—like a cruise missile launched from a navy ship or an army vehicle—is still a form of airpower regardless of the lineage of its parent service, and the political constraints placed on its application will be no different.

The Unintended Consequences of Asymmetric War

There is an elegant symmetry and simplicity in examples of warfare where similar forces directly engage one another, including, for example, a soldier fighting another soldier or a ship fighting another ship. If the US forces recognize this form of warfare as essentially symmetric, then asymmetric warfare refers to those occasions where forces attack elements unlike themselves, including for example, a ship performing coastal bombardment of a fortified position or an aircraft attacking a munitions factory. Asymmetry can also refer to military forces attacking essentially nonmilitary (or dual-use) targets, like power plants or railroad yards. Asymmetric warfare is not new, but in recent years—due to the proliferation of both technologies and additional means for conducting it—military theorists have seen fit to more fully codify its parameters. Airpower's ability to strike targets anywhere within an enemy state has had the inevitable consequence of making airpower a frequent weapon of choice for the conduct of asymmetric war.* Actually, it's difficult to imagine how this consequence could have been avoided.

*The use of hijacked airliners to attack the Pentagon and the World Trade Center represents an example of asymmetric aerial warfare elegantly simple and diabolically ruthless.

Over the last century, airpower has provided military planners with potentially unlimited numbers of targets (essentially anything within the lateral limits of the enemy state). Therefore, traditional targeting philosophies of directing force against force have evolved in response to the geographic reality that has allowed the direction of military force against both military and nonmilitary targets. Beginning with the writings of Douhet, and continuing almost without interruption until the present, airpower theorists have embraced the assumed wisdom of applying force against the enemy in asymmetric ways. That is not to say airpower theorists do not appreciate the need to deliver force against like force. The USAF mantra of air superiority as a precondition for battle amply testifies to the recognition of that traditional war-making requirement. But in assessing airpower's ability to provide disproportionately favorable leverage in the coercion of an enemy state, the assumption has been, and largely remains, that this effect will be best achieved by striking strategic targets that in turn trigger political effects, and that the preponderance of these targets (as discussed earlier) are usually not specifically military in character.

Asymmetric warfare, often exemplified by the asymmetric application of airpower, has created an unintended consequence. It is axiomatic in warfare to fight fire with fire. As such, US forces can hardly blame our enemies if they have found themselves forced to counter our use of asymmetric warfare with asymmetric methods of their own. The reason they often adopt such an approach is obvious if we consider it from their perspective. If we use airpower to conduct an asymmetric attack against an enemy's civil population, do we not invite the enemy to attack our civilian population as well? Recall the city-busting calculations of the Cold War, for a moment. When there is parity of capability, asymmetric attack invites a like counterresponse. What happens if our enemies do not enjoy the same degree of technological sophistication we do? If we use technologically dominant weapons of war to attack a far less developed nation, we may have achieved the apotheosis of the asymmetric application of airpower. However, what kind of reaction are we likely to provoke? What course of action should we expect from an enemy who finds himself unable to directly challenge us on the battle-

field? Often the enemy selects asymmetric methods of his own. Terrorism and guerilla warfare are two popular forms of asymmetric warfare. Another potential form of asymmetric warfare would be an adversary's use of biological or chemical weapons. Slobodan Milosevic's acceleration of ethnic cleansing in Kosovo in response to NATO attacks during Operation Allied Force is another example of asymmetric warfare. While Americans are often quick to condemn such actions on the part of our enemies, we should hardly be surprised to recognize the converse elements of our own paternity in their developmental lineage.

Does this mean US forces should avoid conducting asymmetric warfare? Not at all. It simply means that US forces must do so with eyes open. Asymmetric warfare has its strengths. The US military knows this, having practically elevated asymmetric warfare to an art form. But this form of warfare contains hazards as well.

Asymmetric warfare, especially when conducted against non-military targets, requires the US military to determine the exact effect we are trying to achieve. Once the US military has designed our military methods to achieve these political goals, we then face the difficult task of determining how to measure the success of our actions. For example, it is easy to say that US military intends to bomb an enemy's capital to compel him to do our will. But establishing a measurable linkage between the weapons employed against off-battlefield targets and the subsequent action taken by the enemy is much more difficult. How do we know which effects have actually influenced the enemy's behavior? As we assess an ongoing conflict, absent the decisive barometer of a traditional military battle, how do we know which of the actions we have taken actually force the enemy to do our will?

Does Victory on the Battlefield Determine the Victor in War?

As the US military attempts to ascertain the elements that most effectively contribute to success in war, it must begin by considering the fundamental issues of both *how* we attack the enemy and *where* we attack the enemy. First, regarding the how: if we bring several instruments of national power to bear

against an enemy, which of the instruments applied—economic, informational, diplomatic, or military—actually determines victory? Second, regarding the where: as the physical limits of the battlefield have become less clearly defined, is military victory determined by the attacks waged and won on the battlefield itself, or by the attacks executed elsewhere within the enemy's territory? These questions lead to a third and even more basic question: is it still necessary to achieve victory in battle to achieve victory in war?

National Power in the Achievement of Victory

When wars are fought using a traditional military force against another military force, there is no question that the battlefield decision ultimately and directly determines the achievement of victory. This explains why traditional military theorists have so consistently urged the wisdom of massing military forces at the necessary time and place to achieve decisive victory in battle. How relevant is this model in the current age? When military leaders bring the instruments of national power on an enemy—enabled by recent advances (technological and otherwise) like the Internet, cell phones, reconnaissance satellites, access to International Monetary Fund loans, and United Nations' sanctions—all the while operating under the unblinking eye of worldwide media coverage, how do we determine which of the instruments of national power applied against the enemy actually wins the war? How do these instruments interact? Does one instrument alone determine victory, or some combination of the instruments applied? And, among the instruments of national power, what in the relative order of merit ascribed to the military instrument, either superior or subordinate, is the ultimate determination of victory?

In certain respects, when the instruments of national power are applied in war, their interaction resembles a game of cards.* If we assume the card players assembled at a table represent different nations at war, and that the table represents the battlefield, then the cards symbolize the instruments of national power

*Specifically, card games like bridge, pinochle, or whist.

at the disposal of the countries involved in the game. The military instrument of national power, owing to the destructive mandate of violence, typically assumes the quality of a trump suit. Thus, each nation at war uses the various cards available to win the game. When like suits are played against one another, the stronger card wins. When trump is played against trump, the stronger trump wins. When trump is played against another suit, trump usually wins—unless the power of the original suit played in some way overwhelms, surpasses, or undermines the military instrument of its rival (in the manner of a wild card). In this way, the instruments of national power are each brought to bear by the nations involved in war. Some instruments will carry greater effect, others less, depending on their inherent strength and the skill with which they are played.

Is it possible for a nation to successfully wage war without significant military forces, owing either to the overwhelming strength of some other instrument of national power, or some inherent weakness on the part of its opponent? The case of North Vietnam is an instructive example. By many of the traditional yardsticks for determining military victory, one might assume North Vietnam lost the war. They lost 20 times as many soldiers in the conflict as did the United States. The north possessed an inferior military instrument (compared to the United States), but North Vietnam managed—either through good planning or good luck—to render US military strength ultimately irrelevant by undermining the will of the United States to continue the war (or at least by capitalizing on the effects of its decay). While the military instrument of national power is generally preeminent in the determination of victory, depending on the circumstances of the conflict, it is not inevitably so.

Consequently, the analogy of a card game, to illustrate the interaction of the instruments of national power, is an imperfect one. I use it merely to demonstrate some of the ways in which these instruments interact during war. The analogy is not intended to imply that all military units are exactly alike, or that the rules of war are necessarily codified and accepted by all the participants, as they are by the participants in a game of cards. To suggest otherwise would be to adopt a mechanistic Jominian view, and that is not my intent. To further examine the degree to

which military success in war depends on specific military success on the battlefield now requires a more precise definition, in the current age, of the term *battlefield*.

The Fractured Battlefield

That military victory typically remains a prerequisite for victory in war does not provide unequivocal insight into whether military action contributes more definitively to the achievement of war's aims when it is conducted on the traditionally recognized limits of the battlefield. To fully explore this issue requires an examination of the battlefield in terms relevant to the realities of the present, a task complicated by the rising tide of threats to both military forces and nations. The possible range of combat actions today includes cyber attacks, terrorism, and weapons of mass destruction, all of which can be directed at civilian as well as military targets. The threat of conventional kinetic attack remains just as widespread and lethal. Any attempt to define the term *battlefield* must therefore recognize these realities. Exploring the parameters of this question begins by identifying the extremes that the current battlefield clearly is not.

At one end of the spectrum is the classic definition of the battlefield each of us learned in school. Borodino, Jena, Chancellorsville, Gettysburg, Verdun, the Battle of Britain, Guadalcanal, the Battle of Midway, and El Alamein all contain the elements associated with classic battlefields. The battlefield in this context is a specific and definable area in which military forces face opposing military forces. With few exceptions, the military forces are the only personnel placed directly at risk. Civilians are largely absent. Any damages inflicted on civilian institutions and infrastructures are normally minimal because the sites of the battles are usually situated away from civilian population centers. In this construct, the responsibility for victory, and the terms of its definition, rest clearly on the shoulders of the military combatants and the direct result of their efforts. There is no question, in this model, that winning the war requires military victory on the battlefield. In these cases, we circumscribe the limits of the battlefield as the

area defined by the zone in which military forces engage one another with whatever instruments of deadly force their nations and their ingenuity have provided them.

The other end of the spectrum would be a battlefield redefined to include all of the territory possessed by the nations at war. The argument for expanding our definition to include the entire land-mass of the belligerents involved (plus all the navigable oceans of the world) proceeds from the assumption that the ability to attack any part of an enemy's country or anywhere on the high seas translates every inch of the enemy's territory—and by reflexive extension the territory of our own state—into a war zone. In this construct, civilians and civilian institutions would bear measures of risk equivalent to those of military forces, owing to the lack of any definitive demarcation between the two. There are times when civilians bear the brunt of measures of violence normally accorded strictly to military forces (the World Trade Center attack on 9/11 and the Tokyo fire bombings of World War II come to mind). However, such examples do not merit the reclassification of the whole. Any redefinition of the battlefield will lie between these two extremes.

The definition of the modern battlefield that I propose is that the battlefield is anywhere—in any medium—that military forces apply the destructive mandate of violence against an opponent to achieve, or contribute to the achievement of, a larger political aim.* In a geographic sense, this means that the traditional battlefield has fractured into a number of battlefields—some small and some large—depending upon the range and scope of the conflict. A visual image to describe the fractured battlefield would be a piñata that has spilled out the violent guts of its character across the enemy's landscape, and depending on the situation, possibly across our own territory as well.

The battlefield is therefore comprised of clusters or pockets wherein the destructive mandate of violence supersedes other competing methods of decision. The battlefield may contain a

*As a point of clarification, I use the word *battlefield* deliberately, rather than the term *battlespace*. I do this out of respect for the history of the term. *Battlefield* conjures a specific image of confrontation and decision. I find the term *battlespace* arcane and indeterminate. Whatever narrow definitional accuracy I may have surrendered in the process is, I believe, sufficiently counterbalanced by the linguistic imperative of operating in the realm of actual, opposed to artificial, vernacular.

central land battle area surrounded by smaller ancillary battle areas. Or, there may be no major ground battle area at all, just a series of dispersed battles, which together comprise the whole. In addition to the geographic distribution of violence, there is also a distribution of violence over time. The clusters and pockets of the fractured battlefield may flare up in brief conflagrations of violence, and then subside. An example would be a wave of aircraft conducting a raid on an enemy's capital. For a few moments in the skies over the capital, there may be a deadly contest between the attacking aircraft and the defending fighters or surface-to-air missiles. But when the raid ends, the spasm of violence subsides.

The fractured battlefield pulsates with the ebb and flow of violence. In the area of a major land battle, the character of the conflict might closely resemble the character of the battlefields of the past. In other areas, the character of the battlefield may be different, and the tools of war may be asymmetrically applied; the military consequences of the various actions are often less important than the political effects; and the application of violence may be one-sided or two-sided, depending on the effectiveness and alacrity of the defense. To some extent, each side selects its own set of clusters and pockets according to the military and political objectives it seeks. Thus, we will choose some of the areas of conflict; the enemy will choose others. Sometimes offensive forces will meet with significant resistance, sometimes none at all. Sometimes defensive forces will be continuously engaged. Sometimes they will find themselves waiting for an attack that never comes.

Another element of the fractured battlefield centers on the earlier discussion regarding the military versus political import of targets as we proceed further from the lateral limits of the conventional battlefield. If the fractured battlefield is a galaxy of small mosaics overlaid on a map of the relevant territory, there might be a concentration of violence near the center, perhaps indicating the location of a traditional ground battle. Expanding outward from the center will be numerous additional areas in which the enemy states meet on violent terms. As the distance from the main battle area increases, the relative political value of each action may increasingly supersede

the military effect that a similar attack would have on the main battle area. If the United States were to paint the military and political effects of battle as red (for military) and blue (for political), then what we would see on our overlay would be a galaxy with a red core, with the individual mosaics gradually transitioning from red to blue as they move further outward from the center. Here are a few items of clarification: there may be multiple main battle areas, and they may shift position over time. Additionally, there may not always be a recognizable hot center of traditional ground combat (as during Operation Allied Force), just a series of discrete individual actions of violence scattered across the map.

Therefore, when this paper addresses the question posed at the beginning of this section (whether military action contributes more definitively to the achievement of war's aims when it is conducted on the traditionally recognized limits of the battlefield), it relies on the following logic as a guide; namely, that the degree to which specific military action will be required to achieve overall victory in war ultimately varies in relationship to the degree to which either military or political targets have been selected to receive the focus of war's effects. In a visual sense, if readers go back to the image of red (military) and blue (political) mosaics scattered across the map of the battle area, the preponderance of either one or the other should make it graphically apparent exactly where success is required and whether the measure of that success will necessarily be military or political.

If most of the violence is localized at the point of a traditional force-on-force battle, then straightforward military victory will usually be essential to achieve victory. On the other hand, if violence is scattered throughout the belligerent states without ever congealing into a significant force-on-force battle, then the cumulative political effects—both good and ill—of the individual pockets of violence will typically determine whether victory is achieved, and the relevance of the associated military effects on the terms of the decision will be correspondingly diminished.

What does this mean for the war fighter? It means that in a traditional force-on-force battle, military victory is essential, as it always has been. In cases where military forces use weapons to achieve political effects, it means that political vic-

tory (sometimes defined as no civilian casualties, no friendly losses, or other directives often patently at odds with the nature of the destructive instrument being employed) may be determined by the degree to which military forces have adhered to political criteria in the conduct of war. As such, political effects will be more important than military effects. Success in these situations will be defined by the degree to which military forces have employed the destructive arts in accordance with political directives, rather than according to the traditional military determinism of “kill and prevail.”

Limited Political Objectives Confront Military Consequences

Among practitioners of the military art, there is a grim understanding that victory is an elusive—perhaps impossible—goal when political objectives conflict with military means. Existing among the members of the military at times is a fleeting temptation to throw off the tethers of political oversight to more effectively employ military means in the conduct of war. But effectiveness in such cases is inevitably defined in narrow utilitarian terms predicated on the destructive capacity of the military instrument at hand without reference to the wider context of the situation. Military forces can take small comfort in the irony that the greater the national interest, the more straightforward the military mission. Conversely, the less there is at stake, the more difficult the task. The difficulty arises because military force is an instrument of violence. By definition, violence is often at odds with the advocates of political objectives who are enamored of the ability of military force to influence an enemy's behavior but are unwilling to bear the costs measured in human blood. In this context, military planners should be surprised to see the appeal of a “surgical strike” from the perspective of civilian policy makers who would prefer to deny the darker characteristics attendant to the use of military force. The allure of battle without bloodshed contains a compelling, if intuitively disingenuous, appeal. The next section focuses on whether this goal is attainable or unrealistic.

Battle without Bloodshed

The potential to conduct battle without bloodshed—meaning battle without significant friendly losses—is a concept that has gained momentum in the last few years by the fortuitous confluence of recent technological advances combined with the good luck of recent history.* While technology and history can prove a powerful combination in debates about the future of warfare, military planners would be wise to temper their conclusions. Technology is not the answer to every problem, and the lens of recent history is distorted by the overestimation of importance military planners append to the era that we know. Before military planners race to any conclusions about the feasibility of conducting battle without bloodshed, they need to consider the twin issues of technology and history on which this proposition rests.

Americans frequently herald technology as a quintessential element of US military might. An over reliance on its qualitative advantages, however, and a misinterpretation of its effects could just as easily render it a quintessential American weakness. While technology in recent years has unquestionably provided the American military the ability to develop advantages of quality over quantity on the battlefield, it has also undercut by corresponding degrees our recognition of certain realities of war. Technology has facilitated our ability to kill with greater precision and discrimination. It has allowed us to defend more efficiently. But it has also led us to believe that the attendant changes in destructive efficiency have somehow fundamentally altered the character of war. As we have developed the ability to weed out some of the unfortunate consequences of collateral damage in the process of killing, we sometimes come perilously close to believing that we can weed out killing altogether from the prosecution of war. This is a dangerous assumption to make, and one quickly trampled in reality's dust every time America's vital national interests are on the line and it finds itself confronting both a significant and ruthless adversary.

*Up to, but not including, America's invasion of Iraq in 2003.

Technology (which I will discuss more extensively in the next section) is only one of the culprits that has led many civilian and military theorists to the myopically utopian conclusion that battle without bloodshed is a reasonable and realistic goal in war. The other culprit is history. The opportune confluence of America's advancing technologies and diminishing opponents since the Vietnam War form the basis for this rationale. The fortuitous by-product of American interventions in the late twentieth century against the military weaklings of Grenada, Panama, Iraq, and Serbia has been a consistently low American body count (setting aside the on-paper potential cataclysm of the Cold War). While low American body counts have proven admirable as a by-product, we do ourselves a disservice to lay them out as an expectation or precondition of American involvement in war. We would be better served to view the relatively low casualty rates in these skirmishes in the context of what actually occurred. In each case, America directed the brunt of its first-rate military might against what were, in all fairness, third-rate opponents. The low casualty rates were fortunate, but not predictive of what would occur in a major war against an opponent who did not either take the American blows on the chin, or simply surrender the moment we crossed his border. The activities on 9/11 brought this inevitable reality of war back into sharp focus.

Prior to 9/11, Americans often obsessed over the concept of "casualty-free" warfare.* Such angst proved less evident immediately after that attack, but later resurfaced during American op-

*The US military occasionally has to work through phases (as it did in the late 1990s) in which force protection becomes more important than mission accomplishment. This is usually driven by the wounds of comparatively small (although nonetheless tragic) events. For America the most significant of these to occur during the 1990s were Somalia, Khobar Towers, and the USS *Cole*. By contrast, large-scale events (like 9/11) bring mission accomplishment as a priority back to the forefront. The interplay of these issues is a function of the context of the times. World War II offers an interesting parallel. It would be inconceivable to imagine Gen Dwight D. Eisenhower subordinating mission accomplishment to force protection for his troops conducting the landings on the Normandy beaches. That didn't mean he cared about his troops less, only that the mission to be accomplished was more important. Ultimately, whenever America's vital national interests are at stake in war, mission accomplishment receives the military's overriding focus, and force protection returns to its more appropriate status as an element of overall strategy, rather than over inflating to the point of becoming an end in itself.

erations in Iraq in 2003. Nonetheless, it is worthwhile to investigate the source of this recurring obsession, especially when so many people continue to describe the future as a world largely populated by the bloodless surrogates of unmanned aerial vehicles, remote sensors, and cyber warfare.

The assumption at the core of this vision is that the trends of recent technology and history represent a fundamental change in the character of war, and therefore battle without bloodshed may be entirely possible. The reality of war—inconvenient and barbaric as it may sound—is that war is an act of violent coercion. This process requires military planners to break things and kill people. Violence and danger are central and inevitable ingredients in the formulation of war. Methods of warfare change, but the nature of war—to include its risk, danger, and uncertainty—remain the same. The violent act of warfare makes the result impossible to predict. As there is an element of chance involved in the conduct of war, so too is there an element of chance inherent in the outcome. It is possible to stack the deck in our favor (by building and training better and stronger fighting forces), but overwhelming advantages of scale are not always feasible when facing a true peer competitor. Because it is impossible to conduct risk-free war, it is impossible to eliminate bloodshed from war. We can make adjustments, certainly. We can provide our troops with bulletproof vests. Military planners can coat the exterior of our airplanes with radar absorbing material. But they cannot gloss over the fundamentally violent character of war.

The question remains whether it is possible to minimize human bloodshed in war (especially friendly losses) by entirely replacing men with machines on the battlefield. With the advent of cruise missiles and unmanned aerial vehicles (UAV), it sometimes seems we are attempting to do just that. At present, these unmanned instruments represent only a small part of the overall arsenal and architecture of war. But consider the logical extension of this potential transformation. Imagine if military planners were to replace piloted airplanes entirely one day with UAVs. On the ground, imagine if we replaced all tanks with remotely piloted land vehicles. Imagine if we replaced all ships with remotely piloted floating and submersible islands capable of inflicting the same damage a carrier battle group can today. Set

aside the questions of technical feasibility for a moment, while this paper considers issues that are even more fundamental.

Let us assume that in such a scenario we find ourselves fighting a peer state with technical abilities similar to our own and that both sides involved in the conflict decide to use their machines to fight the machines of their competitor. In this hypothetical situation (with no human lives directly at stake on either side), consider some basic questions about the nature of war:

1. Can the terms of violent international decision making be delegated to the bloodless interaction of mechanized proxy? Is this war? Or is it simply an expensive game of remote control demolition derby?
2. What would the emotional stake of the American people be in such a conflict? Do they care if we lose a few machines, or if we destroy a few machines belonging to an enemy? How important is it to secure the will of the people in the conduct of war? If we do not require the support of the people to conduct purely mechanized warfare, do we require their consent? Does our enemy?
3. How do we define victory in a machine-verses-machine scenario? What happens, for example, when the machines on one—or both—sides are destroyed? Do we progress (or regress) to man-versus-machine warfare as a necessary branch and sequel to the original plan?
4. If the machines of one side are victorious, to what extent are the humans on the other side bound by the consequence of the decision?

These questions relate to a situation in which we face a peer competitor who chooses to fight on the same terms. Now consider what happens when we face a less-accommodating enemy, one either unable or unwilling to match our technological prowess in kind.

1. In this situation, would we use unmanned aerial vehicles to attack conventional targets (like truckloads of “freedom fighters” armed with nothing more than AK-47s, for

example), understanding that to do so would inevitably result in enemy casualties?

2. If we select this method of waging war, how would an enemy respond? Recall the earlier discussion of the unintended consequences of asymmetric war. If we remove US combatants from the battlefield, what choice does a ruthless and determined enemy have if he wishes to draw American blood, other than to strike at Americans less protected? The list would include American civilians, for example.

War is the controlled application of violence in the pursuit of overarching political goals. The consequence of the application of violence is that in war we break things and kill people. Our enemies attempt to do the same. More important for a ruthless enemy than conforming to arbitrary definitions of what constitutes a legitimate combatant will be his determination to respond in kind by drawing American blood. A US aversion to casualties—and the determination of our enemies to exploit this weakness—gives us some indication of how our enemies might react in future “machine-versus-freedom-fighter” scenarios.

If military planners pursue this line of reasoning to its extreme, we reach a point where we have to ask ourselves if attempting to remove all risk to the American war fighter is, in fact, in the best interest of the American people. Traditionally men and women have joined the military because they have been willing to risk their lives in the defense of their country. If we remove all risk to the American war fighter—as noble as that sounds in the abstract—have we inverted our priorities? At what point does it become safer to join the military rather than to remain a civilian? In a military where one of the stated objectives is to strive for risk-free warfare, is bravery or cowardice the more compelling motive for service to one’s nation?

The trappings, technology, and outward characteristics of war may change, but the fundamental essence of war does not. War remains a violent clash of wills in which each state struggles to emerge victorious. The higher the stakes, the more ruthless the pursuit of victory becomes. To believe military planners can remove the elements of danger and risk (and thereby American

bloodshed) from war is folly. The lives sacrificed, or placed at risk, in the achievement of victory form an intrinsic element in the nature of war. Danger and risk are indivisible from war, and as part of war's violent character, they necessarily underpin the consequence of war's decisions, and define the nature of victory.

The Impact of Technology on War

The previous section examined how technology and recent history have given impetus to the debate regarding the assumed wisdom and presumed feasibility of conducting battle without bloodshed. Now the discussion turns to technology and the ways it shapes and affects warfare overall. The thesis of this section can best be summed up by this statement: while technology has significantly affected, and will continue to affect, the conduct of war, it has not fundamentally altered the character of war.

When military planners review the pace of technological advances in the twentieth and twenty-first centuries, they should hardly be surprised to observe so many experts predicting radical military changes to the character of war based on the application of new technologies. Sometimes these changes have been profound, as witnessed early in the last century with the introduction of the airplane, the submarine, and the tank. The introduction of these new machines did not fundamentally change the character of war; it merely altered the method of its application. In fact, a close look reveals that technology can sharpen the tools at hand, and sometimes provide us with new tools, but technology does not change the character of the job that remains to be done.

The allure of technology sometimes blinds military planners. It is probably inevitable, knowing human nature, that people would like to believe that every technological breakthrough provides a universal panacea to the messy realities of war. But such universal panaceas are the wartime equivalent of "get-rich" schemes. Perhaps the most famous of these technological infatuations occurred in the decades following World War II with the development of the atomic bomb. The incredible power of nuclear weapons revolutionized how we thought about future wars. Politicians, generals, and academics believed future wars would

involve exchanges of nuclear weapons. The sheer power they unleashed made their use appear inevitable, and simultaneously nuclear warfare eclipsed in principle and precedent all other forms of warfare.

America required the combined experiences of the Korean and Vietnam Wars to reawaken its military experts to the continued applicability, relevance, and necessity of conventional war-fighting skills, even in a nuclear age. While nuclear weapons did force us to view the potential outcomes of war in a new way, to the good fortune of the globe they did not change the ways in which the superpowers fought wars. The reason is easy enough to appreciate. Even the bitterest enemies have been unable to construe mutual destruction on a planetary scale as consistent with any definition of victory (at least so far). And so, warfare has evolved. Or, some might say, regressed, into more traditional forms.

In the early twenty-first century, technology has again captured the imagination of military theorists. Not surprisingly, traditional war-fighting skills are sometimes held hostage to these perceived technological panaceas, both in terms of the resources they consume and the war-fighting focus they receive. The brilliant effects of these silver-bullet technologies sometimes flash blind both their advocates and audiences. Because they are unanticipated and new, we presume to apply their advantages to all situations with equal effect. Only with time, clear reasoning, and the hard knocks of real-world experience does it become apparent that the application of each new technology merely provides the war fighter with a new or sharper tool—not a new job.

Two of these silver-bullet technologies, much discussed in recent years, provide excellent examples. One is the notion of cyber warfare, conducted by computers. The other is the notion of space warfare, conducted by satellites from outside the Earth's atmosphere. Just as nuclear warfare mistakenly appropriated the military's intellectual focus during the early decades of the Cold War, so have the proponents of space and cyber warfare attempted—though to this point with somewhat less effect—to subordinate the war-fighting focus of more traditional paths to the particular domain of either the Internet

or space. Their inroads have proven less successful than those of the nuclear theorists, for three reasons: (1) the quantum leap in destructive capacity created by nuclear weapons surpasses by several measures of magnitude the evident (if not the implied) destructive effects of either space or cyber warfare; (2) the increased pragmatism (some might say skepticism) of the military itself resulting from the bitter experience of having already subordinated its intellectual history to the dubious surrogate of nuclear obsession; and (3) the potential across-the-board effects of cyber and space warfare on allies and enemies alike, as well as on both military forces and civilians. Of these three reasons, the third will likely prove the most significant in terms of guiding future US policy on the issue, and this paper examines it later in detail.

The zealots of cyber war postulate that future wars might be conducted entirely by computer. The soldiers combating one another, in such a scenario, would not be actual flesh and blood, but merely the ones and zeros of digital information as adversaries attempt to hack into each other's computers, changing financial, medical, utility, training, readiness, and other records. The assumption underlying this concept is that by controlling and manipulating information, military planners can force an adversary to do our will without spilling blood in the ways required by more traditional forms of war. More seasoned proponents of cyber warfare see it as a means of enabling or augmenting other, perhaps more traditional, forms of wartime coercion and influence.

Space warfare, by comparison, envisions the application of force against targets on Earth from the high ground of Earth orbit, and as occasion may require, against the satellites of an enemy state. For space warfare, the kill-mechanisms (whether kinetic weapons or beam weapons) are more traditional than the proposed weapons of cyber warfare. What is novel is the medium from which such force would be applied, the parameters of which are currently circumscribed not by physical limits, but by policy. Whether such limits are more difficult to broach than the physical limits and challenges of achieving Earth orbit remains to be seen. In any case, with both cyber warfare and space warfare technical feasibility is not the issue. The

ability to attack a computer network or employ a weapon from space is a straightforward technical matter well within the realm of current technology. But, similar to nuclear weapons before them, the mere technical ability to create and employ such weapons does not automatically confer or imply either the wisdom or necessity of doing so. In this case, technical feasibility encounters a road fraught with nontechnical obstacles. This paper examines the war-fighting implications of each.

Why Cyber Warfare Will Likely Remain an Adjunct to More Traditional Forms of War

The supposition that America might conduct future warfare by computers unfortunately proves as singularly naive as the assumption that we might, at one extreme, conduct all future wars with nuclear weapons, or that at the other extreme we might be able to conduct all future wars without bloodshed. There is no question that computers, and the ability to manipulate data that they provide, have proven (and will continue to prove) a critical and influential enabling instrument in the prosecution of war. There is also no doubt that in some situations (like shutting down a power grid or disrupting transportation infrastructures) the wartime effects of cyber warfare could be potentially devastating, on a scale equivalent to—or potentially greater than—nuclear weapons. However, unlike nuclear weapons, cyber warfare might also provide the possibility of conducting more discrete attacks—such that its effects might be specifically targeted and contained. While there is no question as to the potential technical feasibility of conducting such cyber attacks, the political consequences of doing so loom so large as to inevitably require proportions of civilian oversight and control equivalent to those already applied to the conduct of aerial warfare.

Cyber warfare will likely remain an adjunct to more traditional forms of warfare for several reasons—some of which spring from the nature of war, some of which spring from the nature of politics, and some of which spring from human nature itself. The first reason is the necessary conformity and subordination of cyber warfare to the nature of warfare itself.

The first flaw in the cyber warfare argument involves the assumption that its offensive potential will proceed unchecked, that other nations—or even transnational groups—will resort to cyber warfare attacks and that our inability to defend against them will require an appropriate response. This supposition overlooks one of the most basic principles of war, that no advantage proceeds universally unchecked. Each offensive capability generates a defensive response. The effect is just as true in cyber warfare as any other form of warfare. As offensive cyber technologies grow, defensive responses grow to counter them. The concern about America's vulnerability to cyber attack and our estimation of the adversarial proclivities of our potential enemies assumes that the current advantages of cyber technology exist in a vacuum. They do not.

Consider the parallel misapprehensions regarding the debut of stealth technology. For a time, some experts viewed the introduction of stealth technology (which reduces an aircraft's radar signature) in similarly overstated ways. Initially, they believed stealth technology would revolutionize future warfare. Later, common sense and counter technologies caught up with their enthusiasm. Over time, they reached the more mature judgment that future combat aircraft would incorporate greater or lesser degrees of stealth technology as a matter of course, not because stealth had revolutionized warfare, but because the associated advantages offered a recognized baseline capability for future aircraft that optimized the odds for survival in a high-threat environment. The delirious terms used by certain advocates to describe the hypnotizing approach of the coming cyber wars echo the enthusiastic, but overstated, reception afforded stealth technology a decade before. In each case, the technologies ultimately have to exist outside the vacuum of theory. Counter technologies continue to evolve. Advantage is finite, both as a matter of degree and as a function of time.

Another reason cyber warfare will remain an adjunct to traditional war is a political one. In this respect, it parallels the limitations of nuclear and space warfare. These limitations have nothing to do with the potential destructive power of the systems involved, and everything to do with the broader political conse-

quences of their use. Despite the massive preparations during the Cold War to employ nuclear weapons, the enormous and mutually destructive consequence of using these weapons proved to be the greatest incentive to exercise restraint. Both the precedent and potential destruction associated with their employment makes the risks associated with their use greater than any potential gain.

The broader political risks associated with offensive cyber warfare are just as great. For example, any nation to engage in deliberate attacks against the banking or financial system of an adversary nation invites a like attack against their own systems and inevitably blurs the line, in politically untenable ways, between combatants and civilians. This is not to say that this couldn't happen, to do so requires the context of total war, as in the example of Sherman's march to the sea. In that case, the totality of the American Civil War finally overflowed the cup of more traditional battlefield confrontations, spilling the blood and treasure of the Confederate civil populace in the process. In World War II, the context of total war precipitated the development (and afforded the moral maneuvering room) to employ atomic weapons against Hiroshima and Nagasaki. State-sponsored cyber war parallels these two predecessors in terms of precedent and application. This is not to say that smaller anarchist, terrorist, and trans-national organizations may not subject states to cyber attacks. Therefore, states will continue to refine their defensive systems to protect against cyber attack. But the theory postulated by the prophets of cyber war—that states will confront states through purely computerized warfare—ignores the broader political and social reality.

Still another reason cyber war will remain relegated to a supporting role in war involves the nature of warfare itself. Those who argue that computer warriors will conduct warfare via computer keyboard overlook the ruthless parameters of human aggression demonstrated throughout history. The fact that people have, for thousands of years, fought to the death in battle—for the sake of their cause, country, or comrades—provides ample testimony to the price in blood at stake in war. To argue that war could become a digital and bloodless enterprise overlooks the imperatives of human history—including our own recent history. It

also does no small disservice by fostering the buoyantly over-optimistic assumption that it is permissible, perhaps even desirable, to set aside traditional war-fighting skills in favor of developing presumably “revolutionary” technologies.

Technology is merely a tool, not an end in itself. It hones our ability to conduct war. It does not change the nature of war. We should be skeptical of the proponents of any technology who presume to provide people with a universal panacea to supplant and supersede the messy realities of combat. It is attractive to imagine there is a silver bullet that can obviate the necessity of war, rendering the violent clash of wills and the attendant human suffering unnecessary. Such utopian fantasies are dangerously shortsighted. The truth is that nothing is more complex or dangerous than war. To put aside hard-won experience in favor of a transitory technological fad is to invite disastrous results any time we face a ruthless and clever adversary.

To this point, this discussion has focused on cyber war, but the issues discussed apply in certain ways to the concept of space warfare as well. One area that requires further examination concerns the effects of both cyber and space warfare on members of the world’s civil populace. This characteristic significantly increases the political character of any targets so engaged, and parallels, in fact surpasses, the political concerns with regard to targeting already discussed in connection with aerial warfare.

The Political Character of Space and Cyber Targets

Just as airpower’s ability to range throughout an enemy state increases the political character of targets away from the immediate zone of a major ground battle (as discussed extensively in chapter 3), so too does the ability of cyber and space attacks to potentially range throughout the limits of the enemy state dramatically increase the resulting political character of targets potentially engaged by computers or satellites. The political considerations governing and limiting the application of airpower in war are further magnified in their application to the potential arenas of cyber and space warfare. For this reason, cyber war-

fare and space warfare are not impossible, simply improbable, from a political standpoint, and the favorable criteria for their application in war become therefore correspondingly less likely to occur.

As the exponential difference between the friction associated with the medium of aerial warfare and surface warfare has permitted aerial warfare to range throughout the territory of an enemy state, the further and even more profound decrease in friction associated with the vacuum of space and the near-light speeds of computer processing permits space and cyber weapons to range around the world. The physics of orbital mechanics and the infrastructure of the Internet limit this efficacy. As every nation in the world relies (to some greater or lesser extent) on computers to perform or enhance the work of its government and citizens, every nation also falls under the orbital shadow of satellites. The frequency and altitude of the revisit times vary depending on the parameters of the satellite's specific orbital path, just as the degree of reliance on computers varies. A weapon in orbit hangs as a potential Sword of Damocles over every nation—ally and enemy alike—and requires more than military discretion in the application of its force.* A computer attack that can travel anywhere on the globe in seconds requires similar measures of oversight for the reason that its application can also affect, possibly even more insidiously, allies and enemies alike. The necessity for restraint in this case likely parallels the circumstances that would require the use of biological weapons. The effects may have unintended consequences in terms of secondary effects on the target population and ricochet effects on the originating state.

Again, space warfare and cyber warfare are not impossible precedents in war, but—as offensive components of war—the political barriers to their actual use represent a high threshold on the spectrum of force application. The precedents and limitations on their use will likely prove similar to those reserved for

*An exception to this case would include defensive measures in time-critical situations. An example might include a space-based missile defense system designed to defend against intercontinental ballistic missiles. In such situations, specific rules of engagement laid out beforehand would likely specify those situations in which the military would be authorized (and expected) to employ space weapons without more specific prior political approval than the criteria enumerated in the rules of engagement.

the employment of weapons of mass destruction as chemical, biological, and nuclear weapons. This is not to say that we should be ignorant of the capabilities these technologies bring to the battlefield, but we should couch our understanding in the political realities attendant to their use. Cyber warfare and space warfare represent neither panaceas that obviate the realities of more traditional forms of warfare, nor arcane impossibilities that stand no potential for employment in the context of a total war. Defensive capabilities against these technologies warrant our attention. Offensive capabilities along these lines deserve a distinctly more “back-burner” focus, cognizant of the realities attending their employment.

Deception in a Transparent World

This analysis began with the understanding that the study of war is a necessary prerequisite to the study of aerial warfare. As this discussion moves to the final area of this analysis, it returns full circle to an issue of larger significance to affect all militaries that serve in democratic societies. The issue concerns the wartime relationship between the military and the media. The true revolution in military affairs has less to do with the enabling technologies adopted by the military in recent years and much more to do with the explosion of instantaneous worldwide media reporting and the transparent world in which the military increasingly operates. As this transparency grows, US military planners need to consider its war-fighting implications. We also need to acknowledge, and have the maturity to accept, the (sometimes) differing perspectives of both the military and the media in a free society.

At its core, the wartime tension in modern society between the military and the media is irreconcilable. This is because of the emphasis each institution places on the need for either deception or truth. Unless these requirements change, the tension between the two is unlikely to change. To appreciate the nature of the relationship between the military and the media, US military planners must examine the role played by deception and truth in each institution. This paper considers the military perspective first and the media perspective second.

To practice the art of war is to practice deception. In *The Art of War*, Sun Tzu recognized this 2,400 years ago. Military forces use deception to gain an advantage over the adversary: hide weakness, mask strength, appear at unexpected times or in unexpected places, distract an enemy from a main attack, or force him into a trap. Deception can make a weak army appear strong, or a strong army weak. Simply put, a military force that does *not* employ deception in war is a force no greater than the sum of its parts. Deception multiplies uncertainty. It requires an enemy to plan for uncertain possibilities. In responding to these possibilities, deception requires the enemy to dilute both force and focus, which can, in turn, reveal potential weaknesses. From our recognition of the enemy's weakness, victory may be born. While deception alone does not generally decide the outcome of war, it remains a powerful constituent in the congress of its conduct.

The mission of the media is to report the truth. Despite the limitations that bias, lack of experience in military affairs, all too-brief sound bytes, and what incessant deadlines impose, the media's mission nevertheless remains to tell the truth. Or put another way, it is to explain the obtuse; to reveal the concealed; to open the closed; to make transparent the opaque. The media endeavors to do so fairly, objectively, and accurately (to the extent it is able), but mostly—promptly. The media strives to be fair by maintaining balance in the stories it reports. In practical terms, this means it reports each of the views on the various sides of an issue. While most would agree the media in a free society has its share of problems, few would advocate the media's subordination to the role of government mouthpiece or otherwise structurally restricting it from reporting the truth. Military planners may disagree with the methods the media sometimes employs, but they appreciate the principle of freedom of speech, fully cognizant of its role as instrumental safeguard to the process of liberty.

But how do military planners reconcile this predisposition toward the wartime practice of deception on the part of the military and the pursuit of truth on the part of the media? On the one hand, if we adopted a universally military perspective, all information in war concerning the capability, deployment, and disposition of friendly forces (except what we expressly wanted the

enemy to hear) would be withheld from the media and the public at large under the presumably necessary opacity of "classified information vital to national security." Unpleasant information (delivery problems at the chow hall, for example, that force the troops to go hungry) could similarly be withheld inasmuch as this information might reveal a potential weakness an enemy could attempt to exploit. Although military leaders might prefer to maintain an information choke hold on the media in times of war, such a view is decidedly impractical in a transparent and information-saturated world.

However, consider the opposite perspective. Imagine what would happen if the military fully complied with the media's desire for wartime information. What would the result be if military leaders briefed the media on the exact location, capability, and strengths and weaknesses of their forces? What would happen if the military advised the media in advance of exactly when and where significant operations would occur? And (in the most extreme example) what are the consequences of allowing the media to film combat operations in progress, relaying the unedited images instantaneously around the world as they occur?

The answer is complex and depends on the situation. The reporters waiting with spotlights on the beaches in Somalia as the Navy Seals came ashore in 1992 caused consternation but, ultimately, did not affect the success of the initial humanitarian mission in Somalia. The reporters broadcasting live from Tel Aviv during the Iraqi Scud missile attacks on Israel during the 1991 Gulf War raised questions about the ability of Iraqi commanders to re-target near misses based on the intelligence provided by real-time reporting. Embedded reporting in the 2003 invasion of Iraq demonstrated the power of the news media to profoundly affect the degree to which Americans back home supported the war, by relaying it to them first-hand. Any sacrifices to operational security in the process appear to have been sufficiently outweighed by the buttressing of domestic political support for the operation, at least during its initial phases.

What is required in wartime is a balance between the military's need to practice the art of deception and the media's need to report the truth. Time is often the enemy with regard to this issue.

It is a delicate balance to withhold information until it is no longer useful to the enemy, while still providing it to the media in time for it to still be relevant and newsworthy. A compromise that achieves this balance gives the military the best chance to defeat the enemy, while giving the media the best opportunity to keep the public fully and accurately informed.

The military understands the importance of public support for the prosecution of war, but sometimes forgets the powerful (and often positive) role the media plays in generating and maintaining that public support. Deception is an appropriate weapon against the enemy, but not against the media and not against the public they inform. The public must be able to trust the military implicitly or the resulting cynicism rapidly corrodes the protective veneer of patriotism.

Of course, finding an arrangement that meets the wartime needs of both the military and the media is much easier said than done.* As a starting point, each side needs to recognize the legitimate rights and concerns of the other. From that point of departure, an arrangement needs to be established appropriate to the situation at hand, with the understanding that every conflict is different. In cases where overwhelming superiority is brought to bear against a weaker enemy, the need for truth may outweigh the need for secrecy. Conversely, facing a formidable opponent with national survival at stake, truth may take a back seat to the operational necessities of secrecy and deception. The stakes for miscalculation in either situation are significant. If a deadline is met but surprise is lost (and with it American lives), then the cost of truth is too high. But if truth is muzzled for the sake of knee-jerk paranoia, then the informed support of the populace is lost, and that is also a price too high to pay.

Notes

1. Clausewitz, 731.

*The use of embedded reporters during Operation Iraqi Freedom in 2003 is proof that such a balance—appropriate to the situation—can be achieved.

Chapter 6

Concluding Thoughts and Overarching Themes

This paper has examined the art of aerial warfare. It has identified the role that airpower plays in conjunction and combination with the other instruments of war and, in a larger sense, the extent to which airpower in war operates within the framework of a political construct. This approach is unique in that most airpower theorists tend to examine the wartime application of airpower in military terms. They believe this is what airpower can do when political considerations are set aside. My point, however, is that you cannot set aside political considerations.

The purely abstract and unconstrained military potential of airpower has very little real-world utility, except as a method to gauge the possible effect of airpower in cases of total war when (presumably) unlimited objectives would be afforded the application of unlimited means.* In every situation short of total war, some greater or lesser degree of political restraint will be placed on airpower's application. Therefore, to discount the political realities of the wartime environment in which airpower must operate is to ignore the reality of war. To do so is to fixate on the military element of war without regard to the influences of either political reason or popular will. But as Clausewitz cautioned: "A theory that ignores any one of [these three elements] or seeks to fix an arbitrary relationship between them would conflict with reality to such an extent that for this reason alone it would be totally useless."¹ This explains the all too common disparity between the unlimited possibilities of abstract airpower theory and the circumscribed reality of actual war.

War specializes in unpleasant realities. Occasionally, we try to overlook these realities (often inadvertently, although sometimes deliberately) when we focus on the fads of the latest

*September 11th provides an apt example (from the terrorist's perspective) of just such a confluence of absolute political objectives and unlimited military means.

technological innovations and forget the less-pleasant insights provided to us by experience. Throughout our examination of the art of aerial warfare, we have seen a number of themes recur that illustrate these realities.

The compendium of themes that follow make up the conclusion of this work. The observations they contain are neither astonishingly subtle nor astoundingly insightful; they are merely accurate, even obvious. Sometimes, however, we *need* to be reminded of obvious things, especially in an age when so many people would like to believe war could be waged as an enterprise devoid of both bloodshed and risk. The issues that follow are many of the ones discussed through the course of this essay. Although this compendium is by no means complete in its subject or scope, it provides a concise reminder of some of the more significant elements that make up the character of war.

The following themes move from the broad to the specific, beginning with general issues of war and ending with issues that concern airpower.

1. The conduct of war always remains subordinate to the overarching requirements of political aims. War is an instrument of politics, regardless of the form it takes, or the nature of the groups involved.
2. Victory in war is defined by the achievement of political goals. Military goals contribute to the achievement of victory to the extent they complement political aims.
3. Violence, danger, and chance are inherent and inextricable elements of war. War is a gamble. It cannot be reduced to a mathematical formula that (assuming we fulfill certain preconditions) produces predictable and foreknowable results.
4. Every war is different. Every enemy is different. Every war requires a unique strategy appropriate to the situation to succeed. In determining the strategy most likely to produce victory, context is all.
5. Technology is merely a tool, not an end in itself. It hones our ability to conduct war. It does not change the nature of war. Technology can sharpen the tools at hand, and sometimes it can provide us with entirely new tools, but

technology does not change the job that needs to be done.

6. Airpower is less constrained by the physical dimensions of the traditional battlefield, but it is fully and completely constrained by the political dimensions of the objectives underlying the conflict.
7. The ability to accurately predict political effects resulting from military action is a problematic enterprise. Assessments of such effects differ fundamentally from those required to determine purely military effects on a traditional battlefield. The problematic aspect of determining these effects, notwithstanding political effects, may supersede in importance the military effects of the conflict on the overall outcome of war.
8. In general, the greater the distance airpower ranges beyond the lateral limits of the traditional battlefield, the greater the political effect—and the less the military effect—a particular application of airpower is likely to have on the outcome of the conflict.
9. The effects of strategic attack are primarily political. Only when the duration of war exceeds the period required to deny or interrupt the enemy's ability to rearm or reprovision because of attacks on the US will the military effects of strategic attack significantly impact the outcome of war.
10. Of all the potential targets available to receive the destructive effect of airpower's fury in time of war, none—in military terms—warrants airpower's overriding focus more than enemy forces engaged in combat against friendly forces. Other targets warrant airpower's destructive attention, but the effects engendered by such attacks will be of an increasingly political (rather than military) character whenever the targets are not of a purely military form and directly threatening friendly forces.

The primary advantage of peace is that it affords the opportunity, for those of us who practice the profession of arms, to prepare ourselves for war. No component of that preparation

is more vital to the result of victory than the effort we expend in studying the elements and consequences of war. We safeguard our society by applying what we have learned to unforeseen events, such that by force of arms we are prepared to triumph and prevail in any contest the nation enters. Part of the study that we make encompasses our due subordination to the civilian leadership we serve. By whatever modest increment this essay contributes to a better understanding of the art of aerial war, and the role it necessarily plays as an instrument of politics, it has served its purpose.

Notes

1. Clausewitz, 101.

The Art of Aerial Warfare

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