

THE MORAL AND ETHICAL IMPLICATIONS OF
PRECISION-GUIDED MUNITIONS

BY
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DISCLAIMER

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ABSTRACT

Aerial precision is airpower's modern contribution to the just war tradition. The fundamental purpose of this analysis is to examine the ethical and moral implications of this statement and identify some of the inherent dilemmas resulting from it for political decision makers and military strategists. In addition, likely trends and characteristics of American airpower in the twenty-first century are examined. In a world where international relations are dominated increasingly by pragmatism, this study recognizes the importance of moral virtues and ethical reasoning in political and military affairs.

This work explores the relationship between one of the most significant military capabilities to emerge in the past century, namely aerial precision-guided munitions, and the just war tradition. The thesis is straightforward: specifically, there are moral, social, and political dilemmas associated with a "perfect" aerial precision capability and influenced by the just war tradition that may not be readily apparent to political decision makers and military strategists. This work examines the historical development of aerial precision since World War I and the emergence of the just war tradition and international law since 1625. It then identifies specific dilemmas associated with the two sorts of judgments required by the just war tradition, namely *jus ad bellum* and *jus in bello*, and explores the ramifications of these dilemmas for consideration by future airpower strategists. The aim of this study is to encourage moral and ethical reflection by politicians and strategists at all levels. The issues at hand are aerial precision doctrine, the predominant use of precision-guided munitions as the modern aerial weapon of choice, and the influence of the just war tradition on strategic decisions.

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CHAPTER 1

INTRODUCTION

In all likelihood, the moral inhibitions of commanders will limit future American air offensives.

Mark Clodfelter (1989)

Precision technology has a strategic effect and people haven't yet realized how profound it is.

Michael Russell Rip (2002)

The increased reliance on precision weapons is not a substitute for critical self-scrutiny and moral self-reflection.

*Kenneth Roth
Human Rights Watch (2002)*

Aerial precision is airpower's modern contribution to the just war tradition. The fundamental purpose of this work is to examine the ethical and moral implications of this statement and identify some of the inherent dilemmas resulting from it for political decision makers and military strategists. In a world where international relations are dominated increasingly by realism, this study recognizes the importance of moral virtues and ethical reasoning in political and military affairs. Although realism, from Thucydides to the present-day, does not deny the presence of moral and ethical factors in international affairs, it allows little room for moral and ethical reasoning, focusing instead on the all-encompassing quest for power and national security at all costs. Realism is the true nemesis of moral reflection.

This work explores the relationship between one of the most significant military capabilities to emerge in the past century, namely aerial precision-guided munitions (PGMs), and the just war tradition. The thesis is straightforward: specifically, there are moral, social, and political dilemmas associated with a "perfect" aerial precision capability and influenced by the just war tradition that are not readily apparent to political decision makers and military strategists.¹ To support the thesis, this work examines the historical development of aerial

¹ *Perfect aerial precision* is defined in this work as the ability to strike a target with theoretical certainty, exactness, and intensity to achieve the desired military effect with optimized economy of force and no collateral or unintended damage. See Jeffrey A. Jackson, "Global Attack and Precision Strike," in *Air and Space Power in the New Millennium* eds. Daniel Gouré and Christopher M. Szara (Washington, D.C.: Center for Strategic & International Studies, 1997), 108.

precision since World War I and the emergence of the just war tradition and international law since 1625. It then identifies specific dilemmas associated with the two sorts of judgments required by the just war tradition as invoked modern-day, namely *jus ad bellum* and *jus in bello*, and explores the ramifications of these dilemmas for consideration by future airpower strategists.²

Airpower refers to more than a straightforward military capability.³ More importantly, as historian Tami Davis Biddle suggests, it also refers to an important idea. The most dramatic manifestation of this idea is precision aerial bombing.⁴ Today, aerial precision is a cornerstone of US aerial bombing doctrine. One could even argue that such has always been the case. For the first seventy years of military aviation history, however, aerial bombing doctrine and the promise it reflected often outpaced technological capabilities. A proven precision bombing capability remained unattainable technologically. Airpower's efficacy was severely limited by the difficulty of putting free-falling munitions on targets. It is only within the last thirty years that technology began to reach a level of parity with doctrine and the promise of airpower. When laser-guided bombs dropped the Thanh Hoa and Paul Doumer bridges in North Vietnam in May 1972, a true US precision bombing capability finally had emerged. It is my contention that, in the last four years in particular, the aerial precision capability of the U.S. has begun to surpass its doctrine for the use of such weapons, specifically in the moral domain. Aerial precision accuracy is now measured in feet not miles and by its ability to strike individual building windows not railroad yard acreage. Therefore, the U.S. would do well to heed I.B. Holley's warning, published in 1953, "To adopt a new weapon without a new doctrine is to throw away advantage."⁵

Chapter Two of this work examines the history of aerial precision weapons with particular emphasis on the relationship between technology, doctrine, and morality. I.B. Holley's *Idea and Weapons* remains the seminal work in the field with regard to the relationship

² Translated as the justice of war and justice in war, respectively.

³ The compound noun *airpower* is spelled purposefully in nonstandard solid styling to emphasize that words are powerful and that our lexicon should be open to new words that help develop air-mindedness. See Phillip S. Meilinger, "Towards a New Airpower Lexicon or Interdiction: An Idea Whose Time Has Finally Come," *Airpower Journal* VII, no. 2 (Summer 1993): 39-47, for additional insights into the use of words and air-mindedness.

⁴ Tami Davis Biddle, "Air Power," in *The Laws of War: Constraints on Warfare in the Western World*, ed. Michael Howard, George J. Andreopoulos, and Mark R. Shulman (New Haven, Conn.: Yale University Press, 1994), 140.

⁵ I.B. Holley, *Idea and Weapons* (New York: Yale University Press, 1953; reprint, Washington, D.C.: US Government Printing Office, 1997), 15 (page citations are from the reprint edition).

between technology and doctrine. Two of Holley's maxims, in particular, stand out for the purposes of this work. First, Holley writes, "The methods used to select and develop new weapons and doctrines concerning their use will have an important bearing upon the success or failure of armies [and air forces]—and of nations."⁶ Second, "The pace at which weapons develop is determined by the effectiveness of the procedures established to translate ideas into weapons."⁷ The history of US aerial precision weapons development in this work demonstrates clearly the presence of a moral component within Holley's concepts of 'ideas' and 'methods' as expounded in the above maxims.

Airpower today is one of the most dominant means of employing military force. With the horrid memories of trench warfare and stalemate cemented firmly in the psyche of military thinkers following World War I, airpower was soon viewed as a savior in the form of a quicker and less brutal way of waging warfare. These kinds of claims have continued up through the present-day.⁸ Much of the justification for such claims has been and remains today based on the just war tradition.

Chapter Three of this work considers the whole of religious and secular just war thought throughout history and international law to arrive at a succinct summary for future airpower strategists of what is best described as the just war tradition. The just war tradition is not theory, doctrine, strategy, or even law. A 'tradition' is a dynamic set of ideas and ideals informed by many sources that influences the behavior of persons and nations. The just war tradition provides a moral framework for defining and assessing the use of force. It is not always authoritative in a legal manner. It is, however, authoritative in the Western moral domain. As a primer, Michael Walzer captures the basic concepts of the just war tradition in his now classic book, *Just and Unjust Wars*:

The moral reality of war is divided into two parts. War is always judged twice, first with reference to the reasons states have for fighting, secondly with reference to the means they adopt. The first kind of judgment is adjectival in character: we say that a particular war is just or unjust. The second is adverbial: we say

⁶ Ibid., 5-6.

⁷ Ibid., 19.

⁸ See Chris Finn, "The Broader Implications of the Increasing Use of Precision Weapons," *Royal Air Force Air Power Review* 4:1 (Spring 2001): 34-56, for an excellent modern presentation of these claims.

that war is being fought justly or unjustly ... *Jus ad bellum* requires us to make judgments about aggression and self-defense; *jus in bello* about the observance or violation of the customary and positive rules of engagement.⁹

Without question, the foundation on which the just war tradition has been built over the years is distinctly religious. Its formative roots can be traced back to the early Catholic Church and the writings of Saints Augustine and Thomas Aquinas. However, in 1625 with the publication of his *The Rights of War and Peace*, the Dutch scholar Hugo Grotius refined the just war tradition in order to remove its religious foundation. According to Grotius, the ethical guidelines for war are based on rational and secular reasoning and are no less valid with or without the presence of God or religion. While recognizing that religion continues to play a major role in the evolution of the just war tradition, this work is confined to the legal-rational justifications of the tradition. This view allows for the introduction of international law and the laws of war that emerged in the nineteenth and twentieth centuries as part of the thesis. This is also the predominant view found in most reputable Western literature on the subject over the past twenty-five years.

Chapter Four composes the heart of this work. Within it, three possible moral, social, and political dilemmas created by a perfect aerial precision capability are identified and discussed at length. These dilemmas are derived directly from both the *jus ad bellum* and *jus in bello* judgments required by the just war tradition. They demand full consideration by future strategists.

Chapter Five summarizes this work and identifies likely dominant characteristics of American airpower in the twenty-first century. If Mark Clodfelter's observation, used as an epigraph to this introduction, is valid, then the conclusion of this thesis provides future airpower strategists and political decision makers with a starting point from which to examine their moral inhibitions. Aristotle believed that practical wisdom was the demonstrated ability to discern the particulars of any situation. It was the informed thought before any act and not the act itself that spoke to the practical wisdom of the decision maker. The dilemmas that could result from a perfect aerial precision capability are most certainly worthy of the level of discernment Aristotle so passionately believed in.

⁹ Michael Walzer, *Just and Unjust Wars*, 3d ed. (New York: Basic Books, 1977), 21.

Of particular note, this study is written within the confines of certain political and philosophical boundaries. It highlights an important distinction between two specific moralities of force—principled realism and amoral realism.¹⁰ The former provides for the use of military force in accordance with the just war tradition. On the whole, the latter does not. According to Mark Amstutz's typology, there is a third morality of force: pacifism. This approach outright prohibits the threat or use of force. Pacifists hold that violence is never a morally legitimate means to provide for national security.¹¹ Although an important political tradition, pacifism provides little or no help to the airman or politician struggling with the moral issues within the just war tradition or planning military action. Therefore, this work will not consider it.

The distinction between principled realism and amoral realism is a key element of this study. Briefly, amoral realism assumes not only that war and violence are legitimate instruments of policy but also that moral and ethical concerns do not constrain them.¹² Its creed is best described as, "Win at all costs!" This political philosophy is best exemplified by the Athenian siege of Melos during the Peloponnesian War as described by Thucydides. The crusades of the Middle Ages are also examples of amoral realism. More recently, one could argue that the Allies' unconditional surrender doctrine during World War II exemplified this form of realism. The current war on terrorism and Al-Qaeda and the connotations of jihad and holy war also have an amoral component. While amoral realism is not the dominating political philosophy of our time, it is the indiscriminate movement between it and principled realism that demands attention.

Practical or principled realism represents the intermediary position between the extremes of pacifism and amoral realism. This political approach holds that war is always subject to moral and ethical standards.¹³ Here is where the just war tradition is applied modern-day. Principled realism emerged in earnest following World War II. It reflects the great Western disdain for the images of uncaring, rampant destruction so prevalent throughout the world in 1945. It represents the predominant political philosophy within which airpower strategists and political decision makers make decisions both today and tomorrow. Therefore, it is the major framework for this work.

¹⁰ See Mark R. Amstutz, *International Ethics: Concepts, Theories, and Cases in Global Politics* (Lanham, Mary.: Rowman & Littlefield Publishers, Inc., 1999), Introduction and Chapter 5, for an in-depth examination of the relationship between realism and the ethics of force and a full description of his moralities of force typology.

¹¹ *Ibid.*, 94-5.

¹² *Ibid.*, 96-7.

¹³ *Ibid.*, 99.

William Arkin, a nationally syndicated columnist on military affairs, recently asked the following question, “Are we as smart as our weapons?” His answer is insightful. Arkin writes, “The question is whether we have the right policies, wisdom, targeting, and understanding of our capabilities to be able to wage war in the right way.”¹⁴

In conclusion, the aim of this study is to encourage moral and ethical reflection by politicians and strategists at all levels. The issues at hand are aerial precision doctrine, the predominant use of PGMs as the modern aerial weapon of choice, and the influence of the just war tradition on strategic decisions. It is my hope that this work fosters better, more just, and well-discerned military and political judgments by those who read it.

¹⁴ Quoted in Howard Kurtz, “Explosive Analyst; William Arkin, Giving Opinions Left and Right,” *Washington Post* 24 May 2002: C1.

CHAPTER 2

AERIAL PRECISION DEVELOPMENT: PAST, PRESENT, AND FUTURE

By exercising the precision, which is the keynote of America, we mean that we carefully select and, to the best of our ability, hit the precise spot which is most vital to the enemy.

Papers of Frederick L. Anderson (1943)

In war, the main idea is to get the bombs on the target.

Curtis E. LeMay (1965)

*Thank God that we have got
Precision engagement and they have not.*

*Price T. Bingham's play on words of Hilaire
Belloc's famous Maxim ~~g~~Gun lyric (1997)*

The pursuit of aerial precision is almost as old as the airplane itself. Throughout this elusive quest, American airmen faced two significant challenges with regard to weapons development. First, according to I.B. Holley, “The pace at which weapons develop is determined by the effectiveness of the procedures established to translate ideas into weapons.”¹⁵ Second, according to Dennis Drew, US airmen, while renowned for their deep fascination with technology and mental toughness in combat, have never been known for their academic prowess. Rather, they have succeeded time and again as “doers” and not as introspective “thinkers.”¹⁶ As a result, the evolution of aviation and weapons technologies since 1903, particularly the ~~pursuit~~ and-development of an aerial precision capability using precision-guided munitions (PGMs), is best characterized as haphazard and disorganized at worst; as an arduous, overdue, and ultimately successful process at best.¹⁷ Either way, specific dilemmas surrounding the use of PGMs emerged along the way, and remain today. Like all weapons, PGMs have shortcomings.

Through the first half of the twentieth-century, the pursuit of a robust aerial precision capability was a major if unrealized goal of airpower theorists and tacticians the world over.

¹⁵ I.B. Holley, *Ideas and Weapons* (New York: Yale University Press, 1953; reprint, Washington, D.C.: US Government Printing Office, 1997), 19.

¹⁶ Dennis M. Drew, “U.S. Airpower Theory and the Insurgent Challenge: A Short Journey to Confusion,” *Journal of Military History* 62 (October 1998): 831.

¹⁷ PGMs are generally characterized as weapons possessing terminal guidance systems. The term is often applied to a wide variety of weapons ranging from air-to-air missiles to terminally guided artillery shells to wire-guided torpedoes. In this work, the term represents aerial delivered munitions to include air-to-ground missiles and so-called “smart” bombs be they electro-optical, infrared, laser, or Global Positioning System (GPS)-guided.

Some of the hurdles airpower needed to overcome included limitations of basic aerodynamics, distance, geography, night operations, weather, guidance, and underground or bunkered facilities. Such technical difficulties, it was widely perceived, could be overcome with dedicated funding and sustained scientific research and development.¹⁸ The payoff was a more lethal, efficient, and effective weapon, and the cost-utility argument was compelling. Area bombing, while potentially devastating, would never have the political, economic, and military advantages of mass precision bombing.

The tougher challenge, and the major focus of the present work, was to overcome ethical injunctions against engaging noncombatants. Indiscriminant area bombing causes broad collateral damage, and blatantly disregards declared American moral virtues, including the dignity and natural rights inherent in every individual. While the move to total war began before the Wright brothers, the traditional moral sanctuary of noncombatants was increasingly violated largely with the rise of airpower's capacity for strategic bombing. Things [slowly](#) began to change, [however](#). When both the Thanh Hoa and Paul Doumer bridges in North Vietnam were dropped by precision aerial bombardment during Linebacker I in 1972, PGMs made their first [significant](#) mark in the official history of military aviation.¹⁹ Air warfare would never be the same. All US wars since have sought to [maximize](#) the advantages of aerial precision through the use of PGMs. Operations Desert Storm, Allied Force, and, most recently, Enduring Freedom [and Iraqi Freedom](#), all were fought using increasing amounts of aerial precision weapons.²⁰ Even recent limited US military actions, such as Operations Eldorado Canyon and Desert Fox, were characterized by the same increased reliance on PGMs.

Today, in 2003, scholars display an unprecedented level of confidence in aerial precision when they [forward](#) bold claims such as, "GPS technology and precision engagement doctrine are

¹⁸ See David R. Mets, *The Long Search for a Surgical Strike: Precision Munitions and the Revolution in Military Affairs* (Maxwell Air Force Base, Ala.: Air University Press, 2001).

¹⁹ Prior to April 1972, the Thanh Hoa Bridge had been dubbed "the bridge that would never go down" by US military planners. See Richard G. Davis, "Strategic Bombardment in the Gulf War," in *Case Studies in Strategic Bombardment* ed. R. Cargill Hall (Washington, D.C.: US Government Printing Office, 1998), 529.

²⁰ Sources vary widely on the exact percentages of PGMs used during each conflict. For the purposes of this thesis, it is sufficient to recognize the growth of PGM usage since 1991 as follows: Desert Storm: 5-10%; Deliberate Force: 69%; Allied Force: 35%; and Enduring Freedom: 60-70%. Estimates of the percentage of PGMs to be used in the war with Iraq to oust Saddam Hussein and cause a regime change range as high as 90%; see Hunter Keeter, "Pentagon Estimates PGM Use in Possible War with Iraq," *Defense Daily*, 6 March 2003.

now the centerpieces of US aerospace power.”²¹ There is strong recognition among these scholars that aerial precision has transformed airpower to such an extent that the idea of designating airpower as the supported force and ground and sea power as the supporting forces in future military operations is now plausible.²²

Precision engagement is a tool of US combat capability. The story of how “technology-to-warfighting” [became identified](#) as a US Air Force (USAF) core competency, and [why](#) the USAF [now relies](#) on precision almost exclusively during aerial military actions, is [just](#) as important as [its extended](#) pursuit of a perfect aerial precision capability [for military effectiveness](#).²³ The significant challenges faced by all airmen, particularly those identified by Holley and Drew, are evident throughout the history of PGM development. This is especially true when one examines the inevitable trade-offs both politicians and air strategists alike are forced to make between moral constraints and military necessity during the history of airpower and the pursuit of aerial precision. Aerial precision and the uniquely American way of war, constrained as it has become over time by a definite moral sanctuary, have been, are now, and will remain inextricably linked.

Aerial Precision Development in Total War

The history of strategic bombardment and the pursuit of aerial precision [began](#) in World War I when military planners faced [an array of](#) unanswered questions surrounding the new invention known as the airplane. How were these untested flying machines to be integrated into existing military structures? How were planners to envision and execute aerial bombing of an enemy?²⁴ And, most importantly, would military aviation actually work during the fog and friction of war?

At the conclusion of the Great War, more questions remained than answers. [During](#) the interwar years, airmen at the US Army Air Corps Tactical School (ACTS) began to think [rigorously and systematically](#) about the airplane’s capabilities and its future potential. The World War II military aviation experience validated the claims of many, but the [attainment](#) of

²¹ Michael Russell Rip and James M. Hasik, *The Precision Revolution: GPS and the Future of Aerial Warfare* (Annapolis, Md.: Naval Institute Press, 2002), 5.

²² Mets, xii. Also see Benjamin S. Lambeth, *The Transformation of American Air Power* (Ithaca, N.Y.: Cornell University Press, 2000).

²³ See James G. Roche, “The Secretary’s Vector,” Department of the Air Force, 14 January 2003.

²⁴ Tami Davis Biddle, *Rhetoric and Reality in Air Warfare: The Evolution of British and American Ideas about Strategic Bombing, 1914-1945* (Princeton, N.J.: Princeton University Press, 2002), 3.

[effective](#) aerial precision remained elusive, unfulfilled, and subordinate to the [desire for](#) unconditional surrender of the enemy. From 1910 through 1945, [despite relentless](#) pursuit of an aerial precision capability [to fully realize the potential of airpower](#), the leap from ideas to weapons never was made successfully. By the 1950s, [highlighted by the imposition of nuclear weapons](#), the ability to [unerringly](#) hit the desired target with the [no more than the](#) desired effects became a [moral imperative, a preferred](#) alternative to indiscriminate and destructive [area bombing](#).

World War I

During World War I, the airplane proved its worth in various tactical roles such as reconnaissance, artillery spotting, and air-to-air combat. However, strategic bombing was largely ineffectual in breaking the stalemate of trench warfare. What did emerge from the World War I experience were two important themes in the future development of aerial precision. First, the airplane, according to John Morrow, “intensified man’s dependence on technology.”²⁵ Once the inherent problems of underpowered engines and aerodynamic failures were overcome, there remained the issue of aerial weapons—machine guns, bombs, and rockets—to make airpower more effective. If the nation’s treasury was going to fund a military air force, then this significant investment demanded results.

Second, there emerged an unrelenting sense of capturing, harnessing, and unleashing the airplane’s full strategic potential to achieve successful political outcomes and victory in war. Most nations, to include the U.S., adopted a very optimistic view of strategic bombing. Without any realistic assessment of what bombers could actually do after their marginal World War I combat performance, speculation on the ability of airpower to force enemy capitulation by bombing cities, destroying important war industries, and degrading the morale of the whole population abounded. [While](#) there was no consensus on the role airpower would play in war [before](#) 1914, one [began](#) to emerge by 1919. Significantly, [many](#) airmen now believed that strategic bombing could be used to critical [and decisive](#) effect in war. Modern industrial nations had exploitable weaknesses due to their complexity and interdependence. [Disruption of the industrial base, it was presumed, would rapidly knock the state out of any modern war](#). Airpower was seen as the chosen instrument to affect these key vulnerabilities. [Essentially, aerial](#)

²⁵ John H. Morrow, Jr., *The Great War in the Air: Military Aviation from 1909 to 1921* (Washington, D.C.: Smithsonian Institution Press, 1993), 366.

[bombardment was viewed as extremely long-range artillery](#). Airpower doctrine had begun to emerge in earnest. However, the technology and weapons to achieve these desired effects did not yet exist.²⁶

Throughout the World War I experience, moral issues surrounding the use of strategic airpower percolated mostly below the surface, but did materialize from time to time. [Although the Kaiser's moral inhibitions to bombing anything other than military targets were well known, others, like England's](#) Air Marshal [Hugh](#) Trenchard, extolled long-distance bombing for its “maximum moral effect” of “sustained anxiety.”²⁷ Yet, there was a growing [sense](#) that “air-delivered frightfulness” was not [only undesirable](#), it [might be](#) immoral.²⁸ A [prominent](#) attitude at the time was that people who wage war did not lose their humanity or moral obligations because of the activities they engaged in. Gianni Caproni and his chief scribe, Nino Salvaneschi, were well aware of these prevalent moral inhibitions. Part of Caproni's strategy for selling his new bomber to the Americans as they entered the war was to call on the Allies to “abandon all sentiment” and embrace the bomber as an “arm of death.”²⁹ For Caproni, “carnage and the extermination of non-combatants” were the lesser of two evils—the other being defeat.³⁰

Just before the war ended, US Secretary of War Newton D. Baker downplayed strongly any future role for strategic bombing in his annual report to Congress. He wrote that the direct damage inflicted by aerial weapons was “relatively small” and had “no appreciable effect.”³¹ Strategic bombing, the secretary believed, should therefore be outlawed on “the most elemental ethical and humanitarian grounds.”³² It obviously was not, but [the](#) larger issue remained. Was strategic bombing immoral in and of itself, or was it immoral because it could not hit targets precisely?

The Interwar Years and the Air Corps Tactical School

The quest for aerial precision was strengthened by the writings of airpower theorists and

²⁶ Morrow, 377-8; and Biddle, 67-8.

²⁷ Quoted in George H. Quester, *Deterrence Before Hiroshima: The Airpower Background of Modern Strategy* (New Brunswick, N.J.: Transaction Books, 1986), 48. Numerous anecdotes about the Kaiser's supposed moral inhibitions can be found throughout both Chapters 2 and 3 of Quester's book.

²⁸ Ibid., 48.

²⁹ Ibid., 41.

³⁰ Ibid.

³¹ Holley, 170-1.

³² Ibid.; and Biddle, “British and American Approaches to Strategic Bombing: Their Origins and Implementation in the World War II Combined Bomber Offensive,” *The Journal of Strategic Studies* 18, no. 1 (March 1995): 109. Biddle adds that Secretary Baker thought strategic bombing was “immoral.”

the actions of military aviators during the interwar years. Douhet published his *The Command of the Air* in 1921. Mitchell and his airmen successfully sank the *Ostfriesland* that same year. Certainly one had to be precise in order to sink a battleship with aerial weapons, but the airpower debate remained overshadowed by questions surrounding the [category](#) of targets [appropriate](#) for airpower, and not whether one could actually hit them. In addition, airpower theory immediately following the war was founded primarily on the precondition that civilians would be less able to withstand aerial attack than soldiers.³³ This view became especially dominant throughout British aerial bombardment doctrine between the wars.³⁴ [Because of the anticipated nature of the target, it](#) also inhibited the development of any specific aerial precision capability because one did not need [a great deal of](#) technology and precision to bomb a city indiscriminately. Notes from the League of Nations General Disarmament Conference of 1932 reflected one of the most prevalent signs of the times. In one document, a French diplomat wrote, “The cruelty of war does not vary according to the perfection of the material.”³⁵

The critical development of aerial bombardment doctrine during the interwar period was centered on the questions of who and what to bomb and for what effect. Airmen in Great Britain and the U.S. were keenly aware of the importance of doctrine development. Holley captures this sentiment when he writes, “To adopt a new weapon without a new doctrine is to throw away advantage.”³⁶ The key differences between British and American doctrine, or lack thereof, illustrate the problem clearly. The British focused primarily on the social ramifications of strategic bombing. For them, the moral effect of airpower seemed intuitive. It was the primal fear of vulnerability that airpower could exploit. Oliver Stewart, writing in a British military journal, is representative of the dominant British view at the time that any attempt to distinguish between force or military targets and value or civilian targets in air warfare held little worth. He advocated a doctrine of “central shock” characterized by “direct attacks upon the enemy’s centres of government, population, and industry.”³⁷

For American airmen, particularly those who thought, wrote, and taught at the ACTS, the focus of their strategic bombing doctrine was on the specific nature of the damage that could be

³³ Morrow, 378.

³⁴ This is a major theme throughout Biddle’s essay, “British and American Approaches to Strategic Bombing: Their Origins and Implementation in the World War II Combined Bomber Offensive.

³⁵ Quoted in Quester, 59. See League of Nations, *Documents* (Series IX, Vol. 10, 1933), 258-9.

³⁶ Holley, 15.

³⁷ Oliver Stewart, “The Doctrine of Strategic Bombardment,” *Journal of the Royal United Service Institution* (February 1936): 98; quoted in Quester, 91-2.

imposed on any given target or target system.³⁸ There emerged no US consensus following World War I on the meaning or significance of the moral effect of strategic bombing.³⁹ American airmen therefore preferred to concentrate their efforts predominantly on the potential material effects of aerial bombardment.⁴⁰

In the spirit of Drew's description of airmen as doers, ACTS officers possessed an optimistic faith in technology.⁴¹ During the 1930s when faster, larger bombers and the [Speery and Norden bombsights](#) became available, they began to place a high premium on bombing accuracy.⁴² The analytical approach taken by the ACTS faculty was statistical and model-driven rather than empirical. At the time, their thesis question looked something like the following: How can airpower undermine efficiently the integrity of an enemy's war economy by attacking specific targets crucial to the functioning of that economy? The ACTS economic view of bombing came to be known as the industrial web theory.⁴³ Aerial precision was the key to the efficiency and success of the ACTS theory. Key nodes of an enemy's economy, viewed as a network of connected and interdependent systems, would be targeted for destruction using precision bombing.⁴⁴

The industrial web theory developed at the ACTS during the interwar years represents a watershed moment in aerial precision development. Putting aside the validity of the theory as beyond the scope of this work, it was clear then that any chance for success depended on the requirement for an unprecedented level of intelligence information. What these key nodes were and how they would be destroyed were questions that could only be answered with sound intelligence discerned by competent and trained intelligence analysts. Then as today, an aerial precision capability demands and is linked inextricably to precision intelligence.

As war loomed in Europe and in the Pacific, the American preoccupation with science

³⁸ Biddle, *Rhetoric and Reality*, 128-30.

³⁹ Holley, 157. Holley attributes this to the relatively small body of experience US airmen had to draw upon following World War I and the inability of those who did see combat to articulate effectively about their experiences.

⁴⁰ Biddle, *Rhetoric and Reality*, 130.

⁴¹ Officers at the US Air Corps Tactical School, located at Maxwell Air Force Base, Alabama, during this time included: Kenneth Walker, Donald Wilson, Laurence Kuter, Haywood Hansell, and Claire Chennault.

⁴² John Buckley, *Air Power in the Age of Total War* (Bloomington, Ind., Indiana University Press, 1999), 79.

⁴³ Donald Wilson, Maj Gen (ret), "Origins of a Theory of Air Strategy," *Aerospace Historian* 18 (Spring 1971): 19. Wilson, an excentric ACTS faculty member, later claimed full credit for devising the industrial web theory. In his autobiography, he stated, "War plans for the air offensive in Europe were based on my theory." See *Wooing Peponi* (Monterey, Calif.: Angel Press, 1973), 239.

⁴⁴ *Ibid.*, 80; and Biddle, *Rhetoric and Reality*, 131.

and technology set the nation on a course in pursuit of precision bombing at all costs. This differed significantly from the British approach to strategic airpower at the time. It is clear that as early as 1939, American airmen recognized the potential for airpower to be decisive in the coming war. Yet, despite these [biases](#), the capability to achieve true aerial precision did not exist. World War II would prove that the expectations of the ACTS airmen were not realistically achievable.

In the history of aerial precision development, the importance of the interwar years is clear. Technological advances, scientific invention, and an “overarching enthusiasm” for [developing](#) precision bombing during the period influenced the American way of war.⁴⁵ Most significantly, as historian Tami Davis Biddle rightly concludes, these developments “dovetailed not only with the existing emphasis on careful selection of targets, but also with the requirements of prevailing moral and ethical strictures.”⁴⁶ While acknowledging the failure of airpower theorists to gauge correctly what was technically possible in 1939, it was nonetheless this strong perception of what airpower *could* achieve in warfare both morally and ethically that became forever lodged in the American psyche. Reinforced by World War II experience, this airpower creed remains today, and [airmen](#) profess faith in it through increasing use of aerial precision weapons.

World War II

During World War II, aerial precision [was regarded differently in](#) the European and Pacific theaters of operations. In fact, there was little or no strategic bombing in the Pacific before the end of 1944. Therefore, this work examines each theater separately. In Europe, the Combined Bomber Offensive (CBO) had two distinctly different doctrinal components. The Royal Air Force (RAF), generally speaking, conducted medium-to-low altitude night area bombing as a result of the severe losses RAF Bomber Command suffered in daylight in the first half of 1940. In 1941, the smallest target RAF Bomber Command could find and strike was a large city. By 1943, with improved navigational and electronic aids, Bomber Command could

⁴⁵ Buckley, 139; and Biddle, *Rhetoric and Reality*, 161-4. Michael Sherry goes further when he describes US strategic bombing doctrine as driven primarily by “technological fanaticism.” In my view, Biddle’s description is a more accurate description of the prevailing mood entering World War II. See Michael Sherry, *The Rise of American Air Power: The Creation of Armageddon* (New Haven, Conn: Yale University Press, 1987).

⁴⁶ Biddle, *Rhetoric and Reality*, 161.

concentrate attacks tactically at night against urban and industrial areas with great effect.⁴⁷

Throughout the CBO, however, aerial precision remained a low priority for the British in their pursuit of a “general area bombing policy.”⁴⁸

The US Army Air Forces (USAAF) strategic bombardment doctrine reflected its ACTS roots. Beginning in 1942 and lasting throughout the CBO, the USAAF conducted high-altitude daylight precision bombing using Boeing B-17 Flying Fortress and Consolidated B-24 Liberator bombers equipped with the Speery and Norden bombsights. Their targets were predominantly the industrial web of Germany.⁴⁹ Biddle describes the American doctrine succinctly as “a selective bombing policy.”⁵⁰

In Europe, American airmen purposely avoided elevating the effects of bombing on civilian morale to a “privileged rhetorical position” like their British counterparts did. They chose instead to stress, in the most straightforward manner possible, the potential material effects of aerial strategic bombardment.⁵¹ In the words of Lieutenant General Ira C. Eaker, a USAAF commander in Great Britain during the CBO, the strategic bomber would not be indiscriminately thrown at “the man in the street.”⁵² However, in retrospect, American precision bombing, as executed during World War II in Europe, is better described as an attempt to destroy the enemy’s morale, not by terror bombing, but by the “cumulative effect of having its means of carrying on the conflict destroyed.”⁵³ This reflects the primary goal of the ACTS industrial web theory of strategic bombardment. Taking into account this definition, it is clear US airpower did actually target the morale of the German population, both civilian and military, and to great decisive effect.⁵⁴

World War I had revealed the potential of airpower while also exposing its primary weakness—accuracy. Without precision, the enemy still had significant [physical](#) sanctuaries and

⁴⁷ W.A. Jacobs, “The British Strategic Air Offensive Against Germany in World War II,” in *Case Studies in Strategic Bombardment*, 166-7.

⁴⁸ Biddle, “British and American Approaches to Strategic Bombing,” 91.

⁴⁹ Stephen L. McFarland and Wesley Phillips Newton, “The American Strategic Air Offensive Against Germany in World War II,” in *Case Studies in Strategic Bombardment*, 184.

⁵⁰ Biddle, “British and American Approaches to Strategic Bombing,” 91.

⁵¹ Biddle, *Rhetoric and Reality*, 159.

⁵² Quoted in McFarland and Newton, 184.

⁵³ Stephen L. McFarland, *America’s Pursuit of Precision Bombing, 1910-1945* (Washington, D.C.: Smithsonian Institution Press, 1995), 3-4.

⁵⁴ The *United States Strategic Bombing Study* concluded, “Allied air power was decisive in the war in Western Europe.” See *United States Strategic Bombing Survey* (1945; reprint, Maxwell Air Force Base, Ala.: Air University Press, 1987), 37.

airpower was “more bluster than power.”⁵⁵ Often characterized as America’s first top-secret military project, the Norden bombsight is significant in the history of aerial precision development because it represents the embryonic stage of a special American way of war. Its manufacturer spoke confidently of its ability to drop a “bomb into a pickle barrel.” This was a very appealing image to Americans, military and civilian alike. It empowered an ideal of precision that always hit the guilty and never the innocent. It illustrated the American hunger for technological achievement. And, most importantly, it satisfied a deep-seated, uniquely American perceived need for achieving and maintaining the moral high ground through “self-imposed restraint.”⁵⁶ The roots of the modern moral sanctuary that our enemies exploit today first germinated here during the CBO.

History has not been kind to the Norden bombsight as a successful aerial precision mechanism. In hindsight, the results of strategic bombardment by B-17s and B-24s equipped with it were certainly less than precise. “Its achievements,” according to Stephen McFarland, “remain the stuff of mythology.”⁵⁷ ‘Precision bombing’ proved to be a very artful expression of the times.

At the Casablanca Conference, General Eaker stated [flatly](#), “Day bombing is point bombing.”⁵⁸ This characterization reflected the American belief that daylight bombing was more precise than British night bombing. However, as previously stated, precision and accuracy were relative terms in 1942.⁵⁹ As early as 1941, the US Air War Plans Division (AWPD) had calculated the [likelihood](#) of success in an attack against a target 100 by 100 feet in size by Norden bombsight-equipped B-17s. The likelihood of at least one hit by a combat wing of fifty-four aircraft dropping a total of 108 bombs was only seventy-five percent.⁶⁰ Throughout the CBO, USAAF bombers never even approached this optimistic pre-war AWPD precision estimate. [Indeed](#), most post-war examinations of bombing precision were framed in reference to the percentage of bombs that landed within 1,000 feet of their aim points and not in terms of the

⁵⁵ McFarland, 3.

⁵⁶ Ibid., 5-6; and Phillip S. Meilinger, “A Matter of Precision,” *Foreign Policy Magazine*, March/April 2001, n.p., on-line, Internet, 26 November 2002, available from http://www.foreignpolicy.com/issue_marapr_2001/meilinger.html.

⁵⁷ McFarland, 6.

⁵⁸ W. Hays Parks, “‘Precision’ and ‘Area’ Bombing: Who Did Which, and When?” *The Journal of Strategic Studies* 18, no. 1 (March 1995): 147.

⁵⁹ Even today the British have a saying that during World War II the RAF area bombed area targets while the USAAF area bombed precision targets. Conversation with Dennis M. Drew, 25 March 2003.

⁶⁰ Ibid.

percentage of bombs that actually hit their desired aim point or target.

Various sources make widely differing claims about the level of USAAF precision during the CBO. The accuracy of these claims is beyond the scope of this work. The following descriptions of USAAF CBO bombing results suffice to demonstrate that aerial precision during World War II was anything but precise. Historian Richard Hallion presents the low-end figure. In the fall of 1944, only seven percent of all bombs dropped by Eighth Air Force B-17s hit within 1,000 feet of their aim point.⁶¹ Jurist W. Hays Parks puts the number during the same timeframe at thirty percent.⁶² If the scope of the inquiry is narrowed further, the numbers do not improve. According to Parks, between May 1944 and April 1945, USAAF bombing of German synthetic oil targets resulted in only thirteen percent of all bombs impacting within 1,000 feet of their aim points.⁶³

By modern standards, it is clear that ‘precision bombing’ was not an accurate description of American efforts during the CBO. Of note, it was more precise than aerial bombardment during World War I. American attempts at aerial precision during World War II were hindered by a number of factors. These included the pervasive cloud cover over Germany thus inhibiting visual bombing, formidable German anti-aircraft flak and fighter air defenses, and the operational limitations of the Norden bombsight despite its promise demonstrated during [testing in a pre-war controlled environment](#).⁶⁴ By late 1944, General Hap Arnold, the overall USAAF commander in Washington, D.C., directed the first nonvisual bombing missions in response to the less than precise results. These missions were flown using a combat box of eighteen to twenty-one B-17s with the assistance of various instrument-bombing aids.⁶⁵ Despite these and other measures, American strategic bombing of Germany never achieved precise results. A 1990 USAF study, “Air Power Lethality and Precision: Then and Now,” summarized aerial precision during the CBO as follows: It took 3,024 aircraft carrying 9,070 bombs to achieve a circular probable error (CEP) of 3,300 feet.⁶⁶ In retrospect, however, the inability of the USAAF to

⁶¹ Richard P. Hallion, “Precision Guided Munitions and the New Era of Warfare,” Air Power Studies Centre Paper No. 53, 1995, n.p., on-line, Internet, 26 November 2002, available from <http://www.fas.org/man/dod-01/sys/smart/docs/paper53.htm>.

⁶² Parks, 167.

⁶³ *Ibid.*, 166.

⁶⁴ Biddle, *Rhetoric and Reality*, 223-4.

⁶⁵ *Ibid.*, 228-9.

⁶⁶ Hallion, n.p., Internet. The 1990 HQ USAF/XOX study used the following case study parameters: a ninety percent hit probability on a target measuring 60 x 100 feet using 2,000-pound bombs dropped from medium altitude. This same scenario will be used throughout the remainder of this chapter. CEP is defined as the radial distance from

achieve precise results did not inhibit ultimate victory in Europe or the Pacific.

USAAF operations in Europe contrasted sharply with the American strategic bombing of Japan. Like their counterparts in Europe, airmen in the Pacific struggled to achieve precise results. As in Europe, however, aerial precision eluded them. For example, in the summer of 1944, forty-seven Boeing B-29 Superfortress bombers using Norden bombsights dropped 376 bombs on the Yawata steel works in Japan. Only one plane hit the target, [and then](#) with only one of its bombs. This single 500-pound bomb represented only one quarter of one percent of the total bombs expended during this particular mission.⁶⁷

Historian Conrad Crane notes correctly that the strategic bombing doctrine in each theater during World War II was shaped by both “military necessity” and the “individual personality of each commander who defined that necessity.”⁶⁸ In the Pacific, Major General Haywood S. Hansell, Jr commanded XXI Bomber Command initially. Hansell insisted on deploying his bombers against only precision targets during daylight operations. He maintained that industrial and military installations remain the focus of his operations. He opposed forcefully any suggestion that his bombers conduct area attacks on cities and civilians as the swiftest path to victory.⁶⁹

The problems Hansell faced while attempting to execute a precision bombing doctrine in the Pacific were formidable. They included abnormally high B-29 abort and accident rates, the nature and location of Japanese industrial web targets, and severe [\(and previously unknown\)](#) jet stream winds aloft. In the end, these problems proved insurmountable for Hansell. Faced with the need for a more expedient and pragmatic bombing policy in the Pacific to appease US political leaders, Arnold relieved Hansell of his command in January 1945, replacing him with Curtis E. LeMay. Once Hansell left the Pacific theater, [there was little if any opposition to the abandonment of precision bombing efforts. LeMay, who](#) had [commanded precision bombing strikes in Europe](#) during the CBO, saw the low-altitude, area incendiary bombing of Japanese cities as the “best method for ending the war quickly, saving American lives, and demonstrating

a target inscribing an imaginary circle with an area large enough so that fifty percent of the bombs dropped fall within it. See David E. Michlovitz, “Precision-Guided Munitions,” in *The Oxford Companion to American Military History* ed. John Whiteclay Chambers II (Oxford: Oxford University Press, 1999), 557.

⁶⁷ Hallion, n.p., Internet.

⁶⁸ Conrad Crane, *Bombs, Cities, and Civilians: American Airpower Strategy in World War II* (Lawrence, Kans.: University of Kansas Press, 1993), 7.

⁶⁹ Charles Griffith, *The Quest: Haywood Hansell and the American Strategic Bombing in World War II* (Maxwell Air Force Base, Ala.: Air University Press, 1999), 17-9.

a true victory through airpower.”⁷⁰

Military necessity, growing American war-weariness, and LeMay’s personality all contributed to the slide toward total war in the bombing of Japan. LeMay decided on the “bombing of Japanese cities as the solution to his operational problems” after Washington proposed the idea.⁷¹ The temptation to abandon an aerial precision doctrine in favor of the incendiary bombing Japanese civilians for psychological effect [in addition to the massive disruptions of industrial production](#), proved too hard to resist for politicians and military commanders alike. The moral decision to use atomic weapons did reflect ultimately the honest discernment of the particulars of military necessity in the Pacific by decision makers, most notably by President Harry S. Truman. However, it also represented the purposeful [subordination](#) of emerging aerial precision doctrine—and [perhaps](#) the moral high ground [as well](#)—in favor of victory.⁷²

Despite its [spectacularly lethal](#) conclusion, the World War II experiences of American airmen left their mark on the process of aerial precision development. [Although they undoubtedly believed area bombing shortened the war and in the long run saved lives](#), the [lasting](#) images of uncaring, rampant destruction in both Europe and Japan were not the ones most airmen wanted to endure in the minds of the American people. As Crane observes correctly:

An impartial observer must conclude that in general most American airmen did the best they could to win the war with consistent application of a doctrine that favored military and industrial targeting over terror bombing. Their *intent* [emphasis added] was to spare noncombatants, and they succeeded better than many historians are willing to concede.⁷³

Following World War II, the “US ability to bomb civilians swelled, but the practice of doing so diminished.”⁷⁴ The American way of war remained grounded in the concepts of aerial precision and the pursuit of precision bombing. The moral and ethical strictures in doctrinal literature today reflect an emphasis on aerial precision that evolved directly from “the effort and

⁷⁰ Crane, 161.

⁷¹ Ibid., 11.

⁷² It can be argued that there is no higher morality than saving hundreds of thousands of American and Japanese lives by using atomic bombs against Japan in 1945. The difficulty is judging decision makers based on what they knew at the time. In this regard, this remains an open question.

⁷³ Ibid., 10.

⁷⁴ Sherry, “Bombing of Civilians,” in *The Oxford Companion to American Military History*, 87.

intent of experience in World War II.”⁷⁵ At the dawn of the nuclear age, the question then became: How might bombing serve American purposes in a way more discrete than simply piling up further destruction while obviating further American sacrifices?⁷⁶

Aerial Precision Development in Limited War

In the five years between the end of World War II and the beginning of the Korean War, little money and even less attention were applied to the development of aerial precision weapons. This, in and of itself, is not at all remarkable given the massive demobilization efforts ongoing post-World War II and the US nuclear monopoly at the time. In addition, the USAF, now an independent and coequal service with the US Army and US Navy, was still trying to find its bearings and grapple with the emergence of many new technologies. These included the transition from reciprocating engines to jets, and to rapidly developing missile technologies.⁷⁷

At the Eglin Proving Ground in northern Florida, work did continue on the precision guidance systems first conceived during World War II. There were two main efforts, both concentrating on visually guided, radio-directed guidance systems for aerial bombs. The AZON guidance package was controlled in azimuth only. The RAZON was controlled in both range and azimuth. Once released, the bombardier controlled these weapons individually.⁷⁸ These bombs represented the first practical attempts at a technically feasible aerial precision capability. However, these efforts fell woefully short of expectations. AZON, RAZON, and TARZON, a 12,000-pound version of RAZON, guided bombs were considered operational test and evaluation weapons rather than standard in-the-inventory-ready-to-go aerial precision options.⁷⁹

From 1945 until at least 1982, the USAF maintained a clear if delicately balanced subordination structure with regard to its strategic and tactical air forces.⁸⁰ As directed by the Commander-in-Chief, the former were charged primarily with the nuclear delivery mission, generally thought to be the more crucial mission. Fear of complete and assured nuclear destruction, in part delivered through strategic bombers, was believed the only guarantee of US

⁷⁵ Crane, 11.

⁷⁶ Sherry, *The Rise of American Air Power*, 303-6.

⁷⁷ Mets, 13-4.

⁷⁸ Mets, “Stretching the Rubber Band: Smart Weapons for Air-to-Ground Attack,” in *Technology and the Air Force*, ed. Jacob Neufeld et al. (Washington, D.C.: US Government Printing Office, 1997), 124-6.

⁷⁹ Hallion, n.p., Internet. See note 18.

⁸⁰ See especially Mike Worden, *Rise of the Fighter Generals: The Problem of Air Force Leadership, 1945-1982* (Maxwell Air Force Base, Ala.: Air University Press, 1998) for a very detailed analysis of the evolution of the primacy of fighter generals in the USAF due to the growth of limited wars like Vietnam.

[national survival](#). The latter stressed both air-to-air and air-to-ground missions unique to the circumstances of their employment—useful, [to be sure, but not as large a part of the calculation of vital national interests](#). [Thus](#), tactical air forces almost always played a secondary role to strategic bombers.

[At](#) the height of the [Cold War](#), the two superpowers reached nuclear parity. Then, as the Cold War drew [to](#) a [close, the two superpower’s nuclear inventories were drastically reduced and relative influence shifted](#). [With the specter of nuclear war reducing the likelihood that it would ever be fought, in a real sense the world became safer for limited war](#). [And limited war was the realm of tactical air](#). Mike Worden concluded that the “insularity and narrow doctrinal focus of Strategic Air Command” especially during limited wars contributed directly to the rise of fighter generals as USAF leaders in the post-Vietnam era.⁸¹ Tactical air operations and limited war were inextricably linked. [Indeed, it was tactical air operations that had the clearest need for PGMs](#). [As the old saying goes](#), close only counts [in horseshoes and nuclear war](#). [When trying to limit collateral damage and prevent escalations that could lead](#) to an all-out nuclear exchange, aerial [precision engagements became essential to political aims](#). Most important [then](#), to the development of a true aerial precision capability, was the concept of limited war.

All wars [in the modern era](#) have been limited by political restraints, [though the two World Wars of the twentieth-century and their attendant](#) ferocity, unlimited stakes, and sense of complete victory (clearly in evidence with the strategic bombing campaigns) [approached in reality the levels of violence that the term total war invokes](#). [Total nuclear war has always been, thankfully, contained within the realm of theory](#). The [definition of what war in practice really is](#), according to Clausewitz—[“an extension of politics by violent means”](#)—always requires political [limitations short of total war, even in the World Wars](#).⁸² [Thus](#), PGMs were developed primarily to fulfill limited war mission [aims](#) efficiently. As historian David Mets observed, “The coming of the United Nations and atomic bombs did not portend eternal peace and brotherhood.”⁸³ Subsequent US military actions in Korea, Vietnam, Libya, Panama, and Iraq saw the gradual development of electro-optical (EO), infrared (IR), and laser-guided weapons that by 1991 gave the U.S. its first true aerial precision capability.

⁸¹ Worden, 236.

⁸² Carl von Clausewitz, *On War*, ed. and trans. Michael Howard and Peter Paret (Princeton, N.J.: Princeton University Press, 1976), 87.

⁸³ Mets, *Surgical Strike*, 15.

The devotion of American airmen to a precision bombing doctrine during World War II established an important precedent for future limited war air operations during [and since](#) the Cold War. The moral [ambiguities](#) of World War II [strategic bombing further](#) influenced the development of precision doctrine. By the Persian Gulf War in 1991, technological capability appeared to match theoretical precision [preferences](#) for the first time. It was now possible to use a PGM to hit a given target with [such](#) a high degree of confidence [in achieving](#) a desired effect [that these operations were dubbed surgical strikes](#). Another airpower sanctuary was overcome, but [in](#) other [meaningful ways](#) the moral sanctuary [increased](#). It would soon be apparent that the more aerial precision the U.S. was capable of, the more morally repugnant became the associated collateral damage.

[If, as was earlier cited, the advance of a new technology without an operational doctrine makes it worse than useless, the advance of a doctrine without an operational capability is equally moot.](#) This was the case during the Korean War. [The chronicle of the rise of true aerial precision resumes](#) in 1950.

Korean War

Many strategic and political factors during the Korean War restricted the area of operations and limited the use of air assets throughout the conflict. Fear of a larger war with the Soviet Union and China represented the greatest restraint on airpower. Without any proven aerial precision technologies beyond AZON, RAZON, and TARZON, airmen were forced to revisit the question of military necessity and the utility of urban strategic bombing just as they had during World War II.

American airpower was [heavily](#) restricted [as to the geographic regions targetable in this limited war, not so much as to the targets within them.](#) [Accordingly,](#) it was applied in a variety of ways in different scenarios to achieve multiple objectives. [With the war going well, and perhaps sensitive to](#) accusations of indiscriminate bombing, the US Far Eastern Air Forces (FEAF) Bomber Command B-29s were forced to stand down just four months into the war, because of a lack of suitable targets south of the Yalu River separating China and North Korea.⁸⁴ After Chinese intervention in the conflict, these [restrictions were eased, and](#) strategic bombers concentrated on the interdiction of enemy lines of communication using somewhat unreliable

⁸⁴ Crane, 148.

AZON and RAZON bombs to cause real mayhem in the enemy rear areas.⁸⁵ In May 1953, strategic bombing attacks took place successfully on North Korean hydroelectric plants and irrigation dams.⁸⁶ FEAF bombers were also able to conduct successful night attacks on North Korean airfields using the short-range navigation or SHORAN system that used radio-frequency transmission to direct B-29s to targets they could not see due to darkness.⁸⁷ A FEAF directive for Operation Pressure Pump, a concentrated attack on thirty military objectives in and around the North Korean capital of Pyongyang, [is representative of](#) the strategic bombing doctrine as practiced during the Korean War:

Whenever possible, attacks will be scheduled against targets of military significance so situated that their destruction will have a deleterious effect upon the morale of the civil population actively engaged in the support of enemy forces.⁸⁸

In the end, the Korean War highlighted the inability of the USAF to conduct decisive operations in a limited war, and did little to stimulate the kind of dramatic technological changes needed to develop a true aerial precision capability. Korea was, however, a more precise war than World War II. Airpower, according to a 1990 USAF study, did achieve a CEP of 1,000 feet using 550 aircraft carrying a total of 1,100 bombs.⁸⁹ Airpower also demonstrated several important innovations during the war, namely in-theater tactical airlift with the C-119 Flying Boxcar, and parachute bomb deliveries for improved accuracy.

And, while meager, the moral sanctuary was present during the Korean War. Even when given the approval by General Douglas MacArthur to use incendiary bombs to attack North Korean civilian morale, FEAF commanders chose not to do so.⁹⁰ The moral and ethical constraints on American airmen remained strongly influential. Most significantly, strategic bombing operations in Korea did focus attention on the “increasing military, public, and diplomatic demands for accuracy in bombing operations in urban areas.”⁹¹ The war in Vietnam, like Korea, would also be limited by severe political constraints and characterized by an increasing demand

⁸⁵ Mets, “Stretching the Rubber Band,” 129.

⁸⁶ Crane, 150.

⁸⁷ Thomas C. Hone, “Strategic Bombing Constrained: Korea and Vietnam,” in *Case Studies in Strategic Bombardment*, 482.

⁸⁸ Quoted in Crane, 148.

⁸⁹ Hallion, n.p., Internet.

⁹⁰ Hone, 490.

⁹¹ Crane, 150.

for aerial precision. Only the President could change the former. For the first time, PGMs would enable the latter demand to be met successfully.

Vietnam War

The Vietnam War remains a very controversial episode in American military history. Benjamin Lambeth states succinctly the conclusions of many historians and political scientists when he says, “There is no denying that the American defeat in Southeast Asia was, first and foremost, a product of flawed strategy.” At the same time, there were “significant deficiencies in the character of the American air weapon.”⁹² That said, during this war, the first true American aerial precision capability emerged finally in the form of EO, IR, and laser-guided PGMs. These weapons, according to a commander of Seventh Air Force in Vietnam during the war, “truly brought a new dimension to the employment of airpower.”⁹³

When American airpower was first unleashed in Vietnam in 1964 with Operation Barrel Roll and Operations Flaming Dart and Rolling Thunder in 1965, its PGM inventory was extremely limited. In the early 1960s, the US Navy (USN) had developed the Bullpup guided aerial bomb in response to the losses naval aircraft suffered during air-to-ground attacks in Korea. It was a rocket-powered weapon based on RAZON guidance technology. The USN also developed the Walleye EO-guided 1,000-pound bomb that was little more than a television camera mounted on the bomb’s nose. As the munition descended, the camera relayed the bomb’s view to a monitor viewed by a weapons officer who could either remotely steer the bomb by electronically controlling its tail fins or engage an autonomous launch-and-leave mode after target lock-on.⁹⁴ The Bullpup and Walleye munitions represented the only aerial precision weapons in the USAF and USN inventory at the beginning of the Vietnam War.⁹⁵ Both proved effective under the right conditions, but were very difficult to employ, susceptible to the weather sanctuary, and expensive to produce and procure.⁹⁶

Rolling Thunder was significant in the evolution of aerial precision because, according to Conrad Crane, it “drew directly on precision bombing doctrine to target North Vietnam’s vital

⁹² Lambeth, 13.

⁹³ William W. Momyer, *Air Power in Three Wars: World War II, Korea, and Vietnam* (Washington, D.C.: US Government Printing Office, 1978), 213.

⁹⁴ Michlovitz, 557.

⁹⁵ Mets, *Surgical Strike*, 21-2.

⁹⁶ Ibid., 28; and Mets, “Stretching the Rubber Band,” 131.

economic and military centers and to destroy its capacity to wage war.”⁹⁷ A combination of the political constraints of limited war, a gradualist approach to airpower application, the nature of the enemy’s will to fight, and North Vietnam’s agrarian economy and insurgency tactics all contributed to the failure of Rolling Thunder.⁹⁸ Yet, when pressed for an initial air strategy in Vietnam, airmen defaulted back to the industrial web theory and precision bombing doctrine first espoused at the ACTS in the 1930s.

It would not be until 1972, during Linebacker I, that PGMs would enable [precision-delivered](#) airpower to become an effective and efficient instrument of American national military power. Many technological and organizational developments took place between 1964 and 1972 that enabled the eventual emergence of PGMs and changed the nature of [American](#) air warfare. It was a long developmental process because the USAF, unlike the USN, entered the Vietnam War without having made any significant changes in its doctrine, technology, and organization. While jet aircraft had advanced significantly since the introduction of the North American F-86 Sabre during the Korean War, the air-to-ground armament for these jets had not kept pace and lacked an equivalent level of sophistication.⁹⁹

The need to destroy precision targets such as bridges had driven development of rudimentary guided bombs in World War II. Korea accelerated this interest. By 1972, the failure of Rolling Thunder and an increased concern to limit collateral damage and noncombatant casualties ushered in the first aerial precision era. Linebacker I was highlighted by the first-ever sustained use of laser-guided bombs (LGBs). This newfound precision capability also led to a reduced level of risk for US forces. It was here, during Linebacker I, that American airmen first passed the point where they could contemplate using [precision airpower for strategic effect, finally breaking its reliance on the far less restrained bombing of World War II and Korea. Now precision bombardment could be integrated into the strategic plan, and not used solely as a contextually opportunistic option.](#)

As early as 1964, USAF, Texas Instruments, and Martin Marietta engineers began to investigate using laser energy to guide bombs more accurately. In July 1966, operational testing began using the first prototype LGBs. Under optimum weather conditions, the CEP for these

⁹⁷ Crane, 152. Of note, the original “ninety-four target” air campaign aimed at destroying North Vietnam’s capacity to wage war was not Rolling Thunder. The latter was an air campaign designed in Washington, D.C.

⁹⁸ Ibid, 152-3; and Mets, *Surgical Strike*, 25.

⁹⁹ Mets, *Surgical Strike*, 23.

new LGBs was shown to be only thirty feet. By 1968, LGBs were being tested in Laos and South Vietnam. However, it would not be until the moratorium on bombing North Vietnam was lifted in 1972 that the aerial precision revolution could actually begin in earnest.¹⁰⁰

Nicknamed Paveway, LGBs involved an attacking aircraft firing a laser designator to paint the target.¹⁰¹ The bomb then homed in on the beam of monochromatic, single-frequency light using a laser-seeking unit mounted in the nose of the free-fall weapon. LGB employment varied with the type of target requiring destruction. If self-lasing, a single aircraft could both release the weapon and guide it using a designator that swiveled under the aircraft. Buddy lasing required two aircraft, one to drop the bomb and one to laser the target. While susceptible to clouds and high atmospheric moisture levels that refracted the laser designation off the desired target, LGBs consistently displayed a CEP of thirty feet in Vietnam.

In April 1972, President Nixon authorized Linebacker I to achieve his “peace with honor” objective by wrecking North Vietnam’s war-making capacity.¹⁰² These so-called smart bombs became the airpower weapon of choice to accomplish the President’s objective. PGMs provided an unprecedented level of aerial precision. What had previously required hundreds of sorties and bombs (for often ineffectual results) now took considerably less, and often achieved significant effects. Between April 1972 and January 1973, 400 North Vietnamese bridges were destroyed or damaged using only 4,000 LGBs.¹⁰³ Linebacker air operations also supported friendly ground forces by exploiting the newfound accuracy of LGBs against enemy armor. More than seventy percent of the enemy tanks destroyed or damaged during the North Vietnamese Easter Offensive in April and May 1972 were the result of aerial precision attacks.¹⁰⁴

The efficiency of PGMs did not escape the attention of airpower planners. PGMs allowed for markedly reduced strike packages consisting of two or three four-ship flights. They also allowed for safer release altitudes above the effective ranges of most enemy anti-aircraft

¹⁰⁰ Vernon Loeb, “Bursts of Brilliance,” *Washington Post*, 15 December 2002, n.p., on-line, Internet, 16 December 2002, available from <http://www.washingtonpost.com/wp-dyn/articles/A36897-2002dec10.html>.

¹⁰¹ The following description of Paveway LGB operations is drawn from Hone, 509-10; Michlovitz, 557; and Mets, “Stretching the Rubber Band,” 130.

¹⁰² Mark Clodfelter, *The Limits of Airpower: The American Bombing of North Vietnam* (New York: The Free Press, 1989), 177.

¹⁰³ John Darrell Sherwood, “U.S. Air Operations in the Vietnam War,” in *The Oxford Companion to American Military History*, 769; and Thomas A. Keaney and Eliot A. Cohen, *Revolution in Warfare? Air Power in the Persian Gulf* (Annapolis, Md.: Naval Institute Press, 1995), 191.

¹⁰⁴ Lambeth, 27.

artillery systems that were the primary threat to American aircraft during Vietnam.¹⁰⁵ The ninety-five percent reduction in the number of sorties required to destroy a given target was notable because dramatically lower aircraft and aircrew loss rates accompanied it.¹⁰⁶

From April through October 1972, 155,548 tons of bombs fell on North Vietnam. This represented only one-fourth of the total tonnage dropped during Rolling Thunder. Yet, the resulting damage and destruction of the seven-month air campaign exceeded that of the three-year Rolling Thunder campaign by a factor of three.¹⁰⁷ These results represented as “revolutionary a development in military air power as the jet engine” in large part due to the increasing use of LGBs.¹⁰⁸

By the end of the war in 1975, the U.S. had dropped more than 28,000 Paveway LGBs in Southeast Asia. This represented less than one percent of the 3.3 million bombs dropped during the entire war.¹⁰⁹ However, the most significant impact of the introduction of PGMs in Vietnam is readily apparent in the 1990 USAF case study. In Vietnam, forty-four aircraft dropping only 176 bombs now achieved a CEP of 400 feet. The PGM revolution had begun. In the thirty years since World War II, bombing CEPs had been reduced eight-fold while the number of aircraft and bombs required to achieve a 400 feet CEP had decreased by factors of seven and ten respectively.¹¹⁰

The American public, post-Watergate and Vietnam, took little notice of the potential benefits of an aerial precision capability like LGBs. However, the success of PGMs made a substantial impression throughout the US military, particularly among airmen. Programs were soon initiated to improve laser, EO and IR aerial precision technologies.¹¹¹

Above the surface, the Vietnam War suggested many possible lessons for the future of airpower. Among them, bombing accuracy was much improved. Consequently, indiscriminate attacks on civilian [targets could be drastically reduced without sacrificing strategic effects](#). More sophisticated enemy air defenses increased the need for more support aircraft to protect the bomb droppers during their missions. Limited resources, therefore, diminished the number of bombers

¹⁰⁵ Ibid., 26-7.

¹⁰⁶ Chris Finn, “The Broader Implications of the Increasing Use of Precision Weapons,” *Royal Air Force Air Power Review* 4, no. 1 (Spring 2001): 36.

¹⁰⁷ Clodfelter, 166-7.

¹⁰⁸ Former USAF Historian Richard P. Hallion quoted in Loeb, n.p., Internet.

¹⁰⁹ Ibid.

¹¹⁰ Hallion, n.p., Internet.

¹¹¹ Mets, *Surgical Strike*, 29; and Loeb, n.p., Internet.

available to deliver ordnance. PGMs increased bomber effectiveness to compensate for the number of required support aircraft to ensure greater chances of mission success. Finally, PGMs were adversely affected by poor weather and restricted visibility, especially at night without additional visual aids such as low-light level television.¹¹²

Below the surface, some additional lessons remained ambiguous. PGMs had social, political, and moral ramifications that would begin to emerge over time. According to General Momyer, he first experienced the political pressure to avoid collateral damage during the Vietnam War.¹¹³ These kinds of pressures would increase in the years to follow. Air warfare in Vietnam did not validate aerial precision doctrine or ease the selection of urban targets, but it foretold many future dilemmas. Arguments for the decisive potential of airpower percolated among professional military circles. But at what cost?

Lambeth is correct when he states that PGMs in Vietnam “offered a telling preview of future possibilities.”¹¹⁴ The legacy of American airpower in Vietnam was in its potential. Ideas would soon become new weapons with the potential for defeating an enemy not through the classic imposition of brute force, but rather through an unprecedented reliance on aerial precision. One significant dilemma loomed ever-present in the background for American airmen. In all likelihood, as Clodfelter describes the post-Vietnam world, the moral inhibitions of commanders would limit future American air offensives.¹¹⁵

Desert Storm

Between 1975 and 1991, the USAF was extremely slow to address the doctrinal implications of this new level of aerial precision and accuracy. Holley’s warning about the difficulty of translating ideas to weapons and Drew’s characterization of airmen as doers and not thinkers both rang true. While the USAF did upgrade its PGM technology with further improvements in the Paveway LGB system, it failed to equip the major portion of its combat aircraft with LGB delivery capability. At the beginning of the Gulf War, only the General Dynamics F-111F, the Lockheed F-117 stealth fighter, and the McDonnell-Douglas F-15E Strike Eagle had the capability to drop and guide LGBs.¹¹⁶

¹¹² Mets, *Surgical Strike*, 26-7.

¹¹³ Momyer, 227.

¹¹⁴ Lambeth, 53.

¹¹⁵ Clodfelter, 206.

¹¹⁶ Davis, 529-30.

The General Dynamics F-16 and Fairchild Republic A-10 fighter aircraft did have the capability to launch the AGM-65 Maverick air-to-ground missile against enemy armored vehicles and tanks. Maverick missiles came in three guidance variants, EO, IR, and laser-guided. While considered tactical PGMs, these munitions reflected the Cold War era procurement policies of the 1980s driven by fear of a Soviet invasion of Central Europe.

When the Gulf War began in January 1991, the primary PGMs in the USAF inventory were Maverick missiles and Paveway II and III LGBs. The LGBs, known as guided bomb units or GBUs, featured improved [laser](#) guidance, maneuverability, and low-level launch capabilities [compared](#) to the Vietnam era Paveway I series.¹¹⁷ Despite these improvements, aerial precision in Desert Storm would remain subject to the weather sanctuary.

Desert Storm was characterized by conventional bombing of pinpoint targets. There were few limitations on the targeting of military and economic objectives. Military commanders and political leaders countered quickly unsubstantiated claims of indiscriminate bombing, such as the Baghdad Al Firdos bunker incident.¹¹⁸ As Crane describes it, “theory, practice, and ethics seemed to merge in a clean and decisive air campaign” that stressed the avoidance of both noncombatant and friendly casualties.¹¹⁹

In the Gulf War, more than 15,000 LGBs and Maverick missiles were expended. Of particular note, 333 Tomahawk Land-Attack Missiles (TLAMs) and conventional air-launched cruise missiles (CALCMs) were also used during Desert Storm.¹²⁰ These cruise missiles represented the latest in aerial precision technology. Costing over \$1 million each, TLAMs and CALCMs used terrain-mapping technology in conjunction with an inertial navigation system (INS) to find and strike their targets precisely making the mission planning process exceedingly complex and inflexible.

LGBs, Mavericks, and cruise missiles comprised less than ten percent of the total bombs

¹¹⁷ Ibid., 529.

¹¹⁸ Two F-117 stealth fighters attacked this facility with two laser-guided GBU-27 bunker busting bombs on 13 February 1991. Intelligence assessments held that the Al Firdos bunker was a command and control facility for the Iraqi Intelligence Service. Post-war assessment did confirm the bunker was also being used as a hideout for senior Iraqi government officials and their families. At least 408 Iraqis were killed. See Michael R. Gordon and Bernard E. Trainor, *The Generals' War: The Inside Story of the Conflict in the Gulf* (Boston, Mass.: Little, Brown and Company, 1995), 324-9. Over ten years later, one journalist characterized the strike on the Al Firdos bunker as “the single most lethal incident for civilians in modern air warfare.” See Scott Peterson, “Smarter Bombs Still Hit Civilians,” *Christian Science Monitor*, 22 October 2002.

¹¹⁹ Crane, 154-5.

¹²⁰ Keaney and Cohen, 191.

expended, [but they accounted for more than seventy-five percent of the significant damage achieved during the war.](#)¹²¹ By way of comparison, approximately 210,000 unguided bombs were dropped during Desert Storm.¹²² Aerial precision did come at a high price in the Gulf War, [however](#). Approximately \$2.2 billion of munitions of all types were dropped on Iraq and Kuwait during Desert Storm. PGMs made up over \$1.3 billion of that total or sixty percent.¹²³

The impact of the aerial precision capability [in](#) the Gulf War was considerable – [some](#) even said revolutionary.¹²⁴ [Four major impacts of lasting significance are highlighted here.](#) First, PGMs in Desert Storm changed radically the USAF approach to both strike package planning and targeting methodologies. USAF planners used force packaging as they had during Vietnam. However, a true aerial precision capability allowed smaller packages of bombers to strike multiple aim points as opposed to a single, large package bombing just one aim point.¹²⁵ For senior USAF generals, this method of force packaging using air shaft accuracy gave new meaning to the term mass. Fewer weapons now delivered so much for so little. Two F-117s with four bombs could do in Desert Storm what 600 B-17s with 3,000 bombs could not do during World War II. Airpower using PGMs was seen as “a war-winning strategy for the future.”¹²⁶ The aerial precision capability of American airpower reduced drastically the number of sorties needed to destroy a target thus opening up a new option of simultaneous versus sequential attack. The concept of “massing firepower in time” was highly appealing to many airmen as an antithesis to the gradual application of airpower during Vietnam.¹²⁷

Second, PGMs, with their improved accuracy and penetration capability, challenged the underground sanctuary for the first time.¹²⁸ Iraq’s extensive system of underground bunkers and hardened aircraft shelters were vulnerable only to PGMs with a penetrating warhead. These targets were vital to the overall military strategy of the coalition, and LGBs [proved a](#) successful

¹²¹ Lambeth, 160.

¹²² Ibid.

¹²³ Keaney and Cohen, 280-1. Appendix 2, Table 32: Desert Shield/Storm: Total USAF, USN, and US Marine Corps Weapons Cost and Utilization (FY90/91\$) is used to calculate these figures.

¹²⁴ Mets, “Stretching the Rubber Band,” 131.

¹²⁵ Davis, 531.

¹²⁶ Buster C. Glosson, “Impact of Precision Weapons on Air Combat Operations,” *Airpower Journal* (Summer 1993): 5-9.

¹²⁷ Mets, *Surgical Strike*, 38. See also John A. Warden III, “The Enemy as a System,” *Airpower Journal* (Spring 1995): 40-55.

¹²⁸ The overall accuracy of PGMs during Desert Storm is difficult to compute. A commonly cited figure is fifty percent of LGBs achieved direct hits on their intended aim points. See Mets, “Stretching the Rubber Band,” 131.

means for destroying them.¹²⁹

Third, the Gulf War demonstrated the need to carefully consider collateral damage, [total casualties \(combatant and non-combatant\)](#), and the impact of instant television coverage of military operations. Iraqi military casualties totaled an estimated 25,000 to 65,000. Over 86,000 Iraqi soldiers surrendered during the conflict. Coalition military casualties totaled only 385.¹³⁰ Most significantly, human rights organizations estimated the number of Iraqi noncombatant deaths at 2,300.¹³¹ Yet, the illusion of perfect aerial precision caused many to conclude the latter figure was too high. PGMs made the physical task of destroying targets without collateral damage less difficult than at any time in US military history. However, the penalties for *any* collateral damage or noncombatant loss of life grew steadily as the century waned.¹³² Aerial precision in the Gulf War did not overcome the growing influence of the moral sanctuary in the world community.

Fourth, despite their improved capabilities, PGMs remained vulnerable to the weather sanctuary. Laser designation was hindered by overcast skies, fog, and smoke and accuracy suffered as a result.¹³³ Airmen would soon begin to translate ideas into weapons in order to overcome the weather sanctuary.

Desert Storm was a war where a poorly led Third World force was broken by a technologically superior air force.¹³⁴ Some even said Iraq was defeated by airpower.¹³⁵ [Regardless](#) of these kinds of grandiose statements, American airmen demonstrated their strong belief in the potential of aerial precision doctrine first envisioned at the ACTS sixty years earlier. Aerial precision technology in the Gulf War represented a further evolution of modern airpower and contributed decisively to the coalition victory.

However, as Keaney and Cohen point out, some caution was indicated. A sterner test against a more capable adversary may be the only scenario from which conclusive judgments about airpower and aerial precision in Desert Storm could be drawn.¹³⁶ [In the end](#), this war

¹²⁹ Keaney and Cohen, 192.

¹³⁰ Anthony H. Cordesman, "Persian Gulf War," in *The Oxford Companion to American Military History*, 546.

¹³¹ Meilinger, n.p., Internet.

¹³² Mets, *Surgical Strike*, 39.

¹³³ Keaney and Cohen, 193.

¹³⁴ Crane, 157.

¹³⁵ After the war, USAF Chief of Staff Merrill A. McPeak remarked, "My private conviction is that this is the first time in history that a field army has been defeated by air power." Quoted in Crane, 155-6.

¹³⁶ Keaney and Cohen, 209.

demonstrated the emergence of a [new](#) moral sanctuary open to exploitation by the enemy. In an age of instant television coverage, American airmen clearly displayed a strong concern to keep American casualties to an absolute minimum and those of noncombatants relatively low. Indeed, the degree of concern about enemy losses by Americans, in general, though certainly less strong, was nonetheless pronounced. The great attraction of aerial precision after Desert Storm was its promise of low casualties and bloodlessness. What remained to be seen was the degree to which this attraction would become “a distinctive feature of the new American way of war.”¹³⁷

Aerial Precision Today

Desert Storm was a distinct transition point in aerial precision development from a variety of aspects. [Operation Deliberate Force in 1995](#) was [far more than an](#) affirmation of the Gulf War experience. Technologically, culturally, and morally, aerial precision now represented a new American way of war. American airpower did remain linked to the theories first espoused at the ACTS, [however](#), the actual results of precision bombing on the ground and the moral and ethical dilemmas that emerged after Desert Storm were worlds apart from the CBO and the incendiary bombing of Japanese cities. Deliberate Force, Allied Force, and the ongoing operations known as Enduring Freedom and Iraqi Freedom all represent important chapters in the evolution of modern aerial precision.¹³⁸

Deliberate Force

While described as revolutionary during Desert Storm, the use of PGMs and modern aerial precision doctrine emerged in full during Operation Deliberate Force. Deliberate Force was the North Atlantic Treaty Organization air campaign conducted between 30 August and 20 September to advance the cause of peace in the Balkans region. It was the first air campaign in history to employ more PGMs than unguided bombs.¹³⁹

The overall numbers are noteworthy. Sixty-nine percent of all bombs expended during

¹³⁷ Ibid., 213-6.

¹³⁸ Operations Enduring Freedom and Iraqi Freedom are ongoing as of this writing. Therefore, this work will not examine them in great detail except to say that the Joint Direct Attack Munition (JDAM) remains the PGM of choice in both of these operations. Estimates of the overall use of PGMs, to include JDAM, in each operation range as high as 90%. At present, Enduring Freedom has been called “the most precise war in history” by US Army General Tommy Franks, the overall commander of the operation. See Sharon Weinberger, “Franks: Future Conflicts May Call for Different Force Mix,” *Aerospace Daily*, 20 February 2002, n.p., on-line, Internet, 20 February 2002, available from <http://ebird.dtic.mil/Feb2002/e20020220mix.htm>.

¹³⁹ Richard L. Sargent, “Weapons Used in Deliberate Force,” in *Deliberate Force: A Case Study in Effective Air Campaigning* ed. Robert C. Owen (Maxwell Air Force Base, Ala.: Air University Press, 2000), 257.

Deliberate Force were PGMs. The proportion of PGMs employed during this 22-day air campaign was more than eight times greater than the percentage of PGMs used during Desert Storm.¹⁴⁰ The PGM to non-PGM ratio in Deliberate Force was 2.3:1, compared to a ratio of only 1:11.5 during the Gulf War four years earlier.¹⁴¹ Based on USAF Historical Support Office statistics, the average number of PGMs per aim point destroyed was 2.8. The average number of attack sorties per aim point destroyed was just 1.5.¹⁴²

The types of PGMs available for use during Deliberate Force had not changed significantly since Desert Storm. LGBs remained the aerial precision weapon of choice. What had changed dramatically was the number and types of aircraft now capable of employing PGMs. New block variants of the Grumman F-14, the F-16, and the McDonnell-Douglas F/A-18 could now employ PGMs. Weapons delivery systems had improved but development of the precision munitions [slowed](#) for the time being.¹⁴³

If Deliberate Force represents the emergence of modern aerial precision doctrine, then the most significant aspect of this new doctrine centered on casualty avoidance. This aspect of the doctrine remains with us today. Aerial precision had advanced to the point where friendly aircrew and aircraft survivability became paramount. A dependable aerial precision capability strengthened the obsession of American airmen to negate collateral damage and noncombatant casualties. It also allowed air commanders to express an unprecedented level of concern for the safety and survivability of their airmen. This is the legacy of Deliberate Force. General Michael Ryan, the combined force air component commander during Deliberate Force and later USAF Chief of Staff, believed strongly that no target was worth the loss of life of one of his airmen.¹⁴⁴

Deliberate Force, according to the editor of the only definitive study of the operation, was a “restrained peace operation strategically, but tactically it was an energetic operation characterized by the employment of technologically cutting-edge air forces.”¹⁴⁵ True enough, but the obsession displayed by American airmen to avoid enemy and friendly casualties and limit collateral damage foretold accurately the ramifications of air warfare that relied predominantly on PGMs and aerial precision still very much vulnerable to the weather and moral

¹⁴⁰ Ibid.

¹⁴¹ Ibid., 270.

¹⁴² Quoted in Hallion, n.p., Internet.

¹⁴³ Sargent, 271.

¹⁴⁴ Ibid., 273.

¹⁴⁵ Foreword in *Deliberate Force*, xx.

sanctuaries.

Allied Force

Behind the scenes, work on an all-weather capable PGM began soon after Desert Storm. General McPeak also stressed the importance of low cost in the development of all-weather PGMs recognizing the limited financial resources available for the USAF budget in a post-Cold War world. By 1996, what emerged was the “Ford Mustang of smart bombs.”¹⁴⁶ As revolutionary as the LGB was in Vietnam and Desert Storm, the Joint Direct Attack Munition, or JDAM, would exceed this revolutionary threshold during Operation Allied Force. The USAF purchased its first JDAM from Boeing Corporation in 1998 at a cost of \$27,000 per munition.¹⁴⁷

JDAM guidance depends in large part on the Navstar Global Positioning System (GPS) constellation of twenty-nine satellites operating at semisynchronous altitude above the Earth. GPS signals are available continuously worldwide at any altitude in any weather.¹⁴⁸ In order to hit a target, the JDAM is simply programmed with the target location coordinates and released within its operational aerodynamic limits from medium-to-high altitude. JDAM also possesses back-up INS guidance. The accuracy of the 2,000-pound bomb is said to be less than 15 feet.¹⁴⁹

Approximately 650 JDAMs were dropped on Serbia during the 79-day air campaign in 1999.¹⁵⁰ The new Lockheed B-2 stealth bomber was the primary carrier of this latest PGM. The B-2 was capable of dropping eighteen JDAMs per mission. This capacity represented a major development in the history of aerial precision development. Where in the past the question had always been, “How many aircraft will it take to destroy a single target?,” the key question now became, “How many targets can one aircraft destroy on a single mission?”¹⁵¹

Philip Meilinger, a noted airpower scholar, has observed, correctly [in my view](#), that

¹⁴⁶ Loeb, n.p., Internet.

¹⁴⁷ Mark Thompson, “The Tools of War,” *Time*, 21 October 2002, n.p., on-line, Internet, 15 October 2002, available from <http://ebird.dtic.mil/Oct2002/e20021015tools.htm>. JDAM sales could reach over \$6 billion with the US buying over 250,000. See David A. Fulghum, “JDAM Sales Expected to Reach \$6 Billion,” *Aviation Week & Science Technology*, 28 October 2002, n.p., on-line, Internet, 28 October 2002, available from <http://ebird.dtic.mil/Oct2002/s20021028jd.htm>.

¹⁴⁸ Rip and Hasik, 10.

¹⁴⁹ Loeb, n.p., Internet.

¹⁵⁰ John Hendren, “Afghanistan Yields Lessons for Pentagon’s Next Targets,” *Los Angeles Times*, 21 January 2002, n.p., on-line, Internet, 22 January 2002, available from <http://ebird.dtic.mil/Jan2002/e20020122yields.htm>.

¹⁵¹ Meilinger, “Airpower: Observations from the Past Decade,” *Royal Air Force Air Power Review* 4, no. 1 (Spring 2001): 61.

airpower is targeting and targeting is intelligence.¹⁵² Nowhere is this [more apt](#) than in the employment of PGMs, and particularly in the employment of JDAMs. Allied Force demonstrated the criticality of this axiom. PGMs have a voracious appetite for timely, accurate, all-source, and fused intelligence. The primary weakness of modern aerial precision is the lack of [timely and](#) accurate [target](#) intelligence. Witness the B-2 bombers that dropped five JDAMs on the Chinese Embassy in Belgrade during Allied Force. US intelligence analysts believed they were targeting a Serbian arms export agency but their information was woefully wrong. The JDAMs hit the target they were sent after. The other side of the intelligence coin is known as the “empty building syndrome.”¹⁵³ PGMs that destroy a target without the desired effect are of limited utility in the age of modern precision.

Allied Force and the surgical nature of GPS-guided bombs continued the trend of intolerance for collateral damage and casualties on all sides by American airmen. Many, like Michael Ignatieff, have pointed to the unsubstantiated restrictions on the minimum allowable operating altitude of coalition aircraft during Allied Force as evidence of this obsession.¹⁵⁴ Again, the numbers heighten this tension. Human rights groups place the number of noncombatant deaths during Allied Force at approximately 500.¹⁵⁵ There were no coalition deaths during the entire air campaign.

The legacy of Allied Force, dubbed “strategic bombing lite” by one respected journalist, as of this writing, appears to be two-fold.¹⁵⁶ First, Allied Force empowered what William Arkin calls “perfect war expectations.”¹⁵⁷ Just thirty-five percent of the 23,000 bombs dropped during Allied Force were PGMs.¹⁵⁸ Yet, a very strong perception emerged following the campaign that airpower, due to the unprecedented level of demonstrated aerial precision, was the “most discriminate, prudent, and risk-free weapon in our arsenal.” Therefore, it should always be “our

¹⁵² Meilinger, *10 Propositions Regarding Air Power* (Washington, D.C.: Air Force History and Museums Program, 1995), 20.

¹⁵³ Rip and Hasik, 421.

¹⁵⁴ Michael Ignatieff, *Virtual War: Kosovo and Beyond* (New York: Metropolitan Books, 2000), 97. Also see Ignatieff, 161-4, for a detailed analysis of the moral implications of such employment altitude restrictions, if ever actually imposed.

¹⁵⁵ Meilinger, “A Matter of Precision,” n.p., Internet.

¹⁵⁶ Ignatieff, 96.

¹⁵⁷ William Arkin, *Los Angeles Times*, interviewed by author, 10 October 2002.

¹⁵⁸ Finn, 40. This decrease when compared to Deliberate Force is due largely to the increased participation of non-PGM capable coalition aircraft during the air campaign.

weapon of first resort.”¹⁵⁹

General Wesley Clark, the former Supreme Allied Commander, Europe, during Allied Force, is on to something significant when he describes the “key characteristic of modern war” as the potential for seemingly insignificant tactical events during war to pack a huge political wallop.¹⁶⁰ This is the second legacy of Allied Force. High-speed global communications and PGMs have changed the old separations between political leaders and the echelons of military command. PGM-capable aircraft are more controllable than tanks, artillery, and infantry. Therefore, politicians can now take a more active role in directing the pace and conduct of military operations.¹⁶¹ As demonstrated during Allied Force, the development of aerial precision has had important ramifications on what historian John Keegan calls, “the changing face of war.”¹⁶² As US military operations continue in Afghanistan, Iraq, and worldwide during the global war on terrorism, the larger effects of aerial precision continue to build.

Future Aerial Precision Development

An intense drive toward a perfect aerial precision capability [characterizes](#) modern US weapons improvements and military doctrine. [Several](#) new aerial precision weapons are in development. Smaller versions of the current JDAM are just around the corner. Five hundred and 1,000-pound small diameter JDAMs will better limit collateral damage. There [is](#) even a 500-pound version filled with concrete instead of explosives to dramatically limit the physical effects of the munition. The Joint Air-to-Surface Stand-off Missile is a GPS-guided cruise missile with an endgame IR seeker programmed to recognize specific features of an individual target. The Joint Stand-Off Weapon is a GPS-guided glide bomb with triple the range of the current JDAM. The Sensor Fuzed Weapon consists of forty mini-projectiles that are released at high altitude. Each projectile is IR or laser-guided. The IR guidance seeker is particularly precise because it actively looks for preprogrammed battlefield IR signatures. These weapons are within one to three years of becoming fully operational.¹⁶³

Long-term, the Low Cost Autonomous Attack System is a precise system that possesses

¹⁵⁹ Meilinger, “Precision Aerospace Power, Discrimination, and the Future of War,” *Royal Air Force Air Power Review* 4, no. 3 (Autumn 2001): 25.

¹⁶⁰ Wesley K. Clark, *Waging Modern War: Bosnia, Kosovo, and the Future of Combat* (New York: Public Affairs, 2001), 11.

¹⁶¹ *Ibid.*, 8-11.

¹⁶² John Keegan, “The Changing Face of War,” *Wall Street Journal*, 27 November 2001.

¹⁶³ Loeb, n.p., Internet.

the capability to loiter over the battlefield while looking to acquire a target. Target identification involves what are known as automatic-target-recognition algorithms computed by an onboard miniature computer. While still in the developmental stage, this weapon represents a major leap to autonomous targeting theoretically eliminating the human from the decision making loop. What we now call smart bombs could soon be dubbed brilliant bombs.¹⁶⁴

Many other weapons have perfect aerial precision applications in theory. These include high-powered microwave weapons and other directed-energy technologies, the so-called Robust Nuclear Earth Penetrator, and air-delivered “sleeping” unattended ground sensor weapons to name just a few. The potential for a perfect aerial precision capability to achieve desired effects is nothing short of unlimited.

Conclusion

Less than 100 years after the first airplane took to the sky, aerial precision has become the dominant theme of airpower and perfect aerial precision remains the vision of the future for airmen. Born in the minds of American airmen and visible in their intent to consistently achieve the most precise and effective bombardment possible, the ideal of perfect aerial precision [is](#) a goal yet to be reached. —Precision has enabled airmen to overcome many sanctuaries, [predominantly](#) night and weather [operations](#), and underground facilities to a more limited degree. Lambeth states, “American airpower has been transformed over the past two decades to a point where it has finally become truly strategic in its potential effects.”¹⁶⁵ Yet, moral sanctuary [remains](#).

¹⁶⁴ Ibid.

¹⁶⁵ Lambeth, 298.

CHAPTER 3

AIRPOWER AND THE JUST WAR TRADITION

War is an instrument of rational, civilized men with a function, the preservation of society. It is the condition of those contending by force.

Hugo Grotius (1625)

It's more immoral to use less force than necessary, than it is to use more. If you use less force, you kill off more of humanity in the long run because you are merely protracting the struggle.

Curtis E. LeMay (1965)

War is always judged twice, first with reference to the reasons states have for fighting, secondly with reference to the means they adopt.

Michael Walzer (1977)

Introduction

The just war tradition is not a single or unified theory, doctrine, strategy, or even codified law. It is a dynamic set of ideas and ideals informed by many religious, legal, and historical sources that influences the behavior of persons and nations. At its most fundamental level, the just war tradition provides a moral framework for state-level decision makers to determine under what conditions and by what means the use of force is morally and ethically permissible.¹⁶⁶ It forms the basis of the Western moral domain that restricts the killing of human beings during war. James Childress asserts that because “it is a prima-facie wrong” to injure or kill others, war demands an even higher level of justification.¹⁶⁷ According to J. Bryan Hehir, a contemporary just war scholar and, presently, director of Catholic Charities USA, the just war tradition “begins with a *presumption* against the use of force and then admits the possibility of *justifiable exceptions* to the presumption.”¹⁶⁸ The force of moral reasoning identifies the exceptions that override the presumption. Most importantly, the tradition “attempts to hold together two claims for those with national responsibility; to protect the lives of citizens through national security and

¹⁶⁶ James Turner (J.T.) Johnson defines the just war tradition somewhat differently as “a body of moral, legal, and political wisdom that has developed over the history of western culture on the justification or armed force and the limits of justified use of such force.” See “Just War in the Thought of Paul Ramsey,” *Journal of Religious Ethics* 19, no. 2 (Fall 1991): 183.

¹⁶⁷ James F. Childress, “Just-War Theories: The Bases, Interrelations, Priorities, and Functions of their Criteria,” *Theological Studies* 39, no. 3 (September 1978): 433.

¹⁶⁸ J. Bryan Hehir, “The Moral Calculus of War: Just but Unwise,” *Commonweal* 118, no. 4 (22 February 1991): 125. Original author’s emphasis included.

the responsibility to use national security forces morally.”¹⁶⁹

Presently, the just war tradition requires two different kinds of moral judgments, namely *jus ad bellum* and *jus in bello* decisions.¹⁷⁰ Political philosopher Michael Walzer describes these mandatory moral judgments succinctly: “War is always judged twice, first with reference to the reasons states have for fighting, secondly with reference to the means they adopt.”¹⁷¹ The notion of the just war tradition is inevitable in Western society. “You can’t send soldiers into battle or order them to kill,” contends Walzer, “without being able to justify those actions in moral terms—to yourself, to fellow citizens, and to the world.”¹⁷² The great difficulty, according to Hehir, is that “the realm of war is not hospitable to moral limits.”¹⁷³ The just war tradition, then, serves as a moral compass for decision makers. It is used before one acts, reviewed continuously during war, and assessed retrospectively after a war. The great strength of the just war tradition is that “it changes as the concept of warfare changes.”¹⁷⁴

According to J.T. Johnson, in broadest form, the *jus ad bellum* thematic branch of the just war tradition has to do with when it is just to enter war and resort to military force. Historically, this branch has developed into a set of seven criteria: just cause, right authority, right intention, proportionality of ends, last resort, reasonable hope for success, and the aim of peace.¹⁷⁵ The *jus in bello* branch deals with which methods of force are justifiable during war and to what effect these methods are used. The *jus in bello* criteria are defined by two primary concerns. The first is “discrimination or avoiding direct, intentional harm to noncombatants,” the second is “proportionality of means or avoiding needless destruction to achieve justified ends.”¹⁷⁶

Modern legal expression of the *jus ad bellum* just war tradition criteria is found, for

¹⁶⁹ Donald L. Davidson, “The Just-War Criteria: A Contemporary Description,” in *Nuclear Weapons and the American Churches* (Carlisle Barracks, Pa.: Strategic Studies Institute, no date), n.p., on-line, Internet, 11 December 2002, available from http://www.uwosh.edu/departments/military_science/spring/158-1131.html.

¹⁷⁰ Translated as the justice of war and justice in war, respectively.

¹⁷¹ Michael Walzer, *Just and Unjust Wars*, 3d ed. (New York: Basic Books, 1977), 21.

¹⁷² Quoted in K.L. Woodward, “Ancient Theory and Modern War,” *Newsweek*, 11 February 1991, on-line, EBSOHost, 22 January 2003.

¹⁷³ Hehir, “Kosovo: A War of Values and the Values of War,” in *Kosovo: Contending Voices on Balkan Intervention*, ed. William Joseph Buckley (Grand Rapids, Mich.: William B. Eerdmans Publishing Company, 2000), 405.

¹⁷⁴ Chance Hunter, “Rethinking Just War,” *Ethics News & Views* 11, no. 1 (Fall 2001): n.p., on-line, Internet, 11 December 2002, available from <http://www.emory.edu/ETHICS/news/2002/fall/hunter.htm>.

¹⁷⁵ Within the just war tradition, the terms “criteria” and “principles” are often used interchangeably. With the notable exception of the “principle of double effect” to be discussed later in this chapter, I will resist this interchange. When I speak of just war criteria, I mean a specific or codified set of rules of conduct by which the decision to go to war and the means employed during the war may both be evaluated.

¹⁷⁶ J.T. Johnson, *Morality and Contemporary Warfare* (New Haven, Conn.: Yale University Press, 1999), 27-38.

example, in the United Nations Charter. The *jus in bello* just war tradition principles of discrimination and proportionality can likewise be found within international law that establishes noncombatant immunity as a right and noncombatant protection as the responsibility of all belligerent parties engaged in the use of military force. A “beyond-the-rhetoric” and detailed understanding of the historical development of the two just war tradition thematic branches is a prerequisite for decision makers and airpower strategists who must assess, decide, and act in this age of modern warfare and aerial precision.

This chapter considers the history of the just war tradition and the emergence of related international law in the nineteenth and twentieth centuries to arrive at a succinct summary of the moral and legal domains that influence the decision to use force and the use of force in and of itself with an airpower emphasis. The persons described within are treated as windows to a larger absolute and not as members of a continuous stream of thinkers and practitioners whose sequential contributions created the just war tradition writ large. Walzer writes that the central principle of the law of war is “soldiers [or airmen] have an equal right to kill.”¹⁷⁷ This chapter is an effort to think through the requirements of two interconnected questions for airmen. When can they kill and whom can they kill? An informed understanding of the just war tradition and related international law is necessary prior to the examination of the moral, social, and political dilemmas associated with a perfect aerial precision capability discussed in subsequent chapters of this work.

Augustine and Thomas Aquinas: Religious Foundations of the Just War Tradition

Ethical judgments about war date back at least to the classical Greeks and Romans. In those eras, the ethics of war were widely seen as relevant when a people aimed to accomplish three things: to go to war, to prosecute it successfully; and to remain a civilized, moral people in the process. For example, Roman senator and scribe Cicero argued that there was no acceptable reason for war outside of just vengeance, self-defense, or the defense of honor.¹⁷⁸ He based his arguments on the assumption that human nature and reason predisposed society against war, and that there was a fundamental code of behavior for all peoples and nations engaged in war. Cicero was the first to link universally applicable rules of natural law to just causes for going to

¹⁷⁷ Walzer, 41.

¹⁷⁸ “The Theory of the Just War,” BBC Online, no date, n.p. on-line, Internet, 16 February 2003, available from <http://www.bbc.co.uk/religion/ethics/war/justconduct2.shtml>.

war, a principle to be taken up by the Dutch Jurist Hugo Grotius some 1,600 years later.¹⁷⁹

Saint Augustine of Hippo first enunciated a complete doctrine of just and unjust war in the fourth century. Following the emperor Constantine's official declaration of Christian tolerance and his deathbed conversion, Augustine emerged as "the great coordinator of Christian doctrine upon peace and war."¹⁸⁰ His distinction between just and unjust wars was not new; however, his conclusion that general ethical standards and not simply the ambitions of the prince or ruler were the true guiding forces on the decision to go to war and the conduct of the war itself was innovative. The just war tradition first began to emerge in earnest as a political and philosophical force with Augustine's efforts.¹⁸¹

Augustine's essential contribution to the just war tradition is found in his "Letter to Count Boniface," where he writes: "We do not seek peace in order to be at war, but we go to war that we may have peace."¹⁸² For Augustine, the only just reason to go to war was the desire for peace. This became and remains the foundation of the just war tradition *jus ad bellum* criteria. The bulk of Augustine's work derived from this conclusion about the fundamental purpose of war and dealt primarily with what constitutes a just war in pursuit of peace.

Augustine's just war tenets remained essentially unchanged until later elaborated upon by medieval Catholic theologians, most notably by the thirteenth century scholar Saint Thomas Aquinas. According to J.T. Johnson, Thomas Aquinas' primary contribution to the just war tradition was "to embody, rationalize, and extend the developing consensus on the moral use of armed force."¹⁸³ He did this by making the emerging just war tradition clearer and more structured for laymen.

In his *Summa Theologiae*, Thomas Aquinas wrote that in order that a war be just, "three things are necessary:"

In the first place, the authority of the sovereign, by whose command the war is to be waged; ... Secondly, a just cause is required, namely that those who are attacked, should be attacked because they deserve it; ... Thirdly, it is necessary that the

¹⁷⁹ G.I.A.D. Draper, "Grotius' Place in the Development of Legal Ideas about War," in *Hugo Grotius and International Relations*, ed. Hedley Bull et al. (Oxford: Clarendon Press, 1990), 179.

¹⁸⁰ Telford Taylor, "Just and Unjust Wars," in *War, Morality, and the Military Profession*, ed. Malham M. Wakin (Boulder, Colo.: Westview Press, 1986), 227.

¹⁸¹ Ibid.

¹⁸² Quoted in J.T. Johnson, *Morality and Contemporary Warfare*, 42; See note 2.

¹⁸³ Ibid., 45.

belligerents have a rightful intention; that is to say, that they propose to themselves a good to be effected or an evil to be avoided ... Those who wage wars justly have peace as the object of their intentions.¹⁸⁴

Catholic doctrine played a major role in the evolution of the just war tradition as evidenced by these brief summaries of Augustine and Thomas Aquinas' work. These religious foundations remain in place today. Four of the seven modern *jus ad bellum* criteria defining the right to resort to force are taken directly from this period, namely just cause, right authority, right intention, and the aim of peace. Military scholar Wray Johnson expertly summarizes the development of the just war tradition up through the Middle Ages as follows:

Theoretically, at least, the tradition placed war under the dominion of conscience and in doing so established the precept that "right" was more important than "might." War now required a moral sanction. Moreover, war required the *imprimatur* of state authority and was to be carried out by professionals.¹⁸⁵

A form of practical realism was now tempering Thucydides' classic realism as Western civilization moved beyond the Middle Ages. In 1625, The Dutch scholar and jurist Hugo de Groot, better known by his Latin name as Hugo Grotius, influenced significantly the further development of practical realism.

Grotius, Pufendorf, and Natural Law: Secularizing the Just War Tradition

The writings of Augustine and Thomas Aquinas remained the core of the just war tradition until the emergence of the nation-state in the sixteenth and seventeenth centuries. In 1625, with the publication of his *De Jure Belli ac Pacis* or *On the Law of War and Peace*, Grotius purposely refined the just war tradition in order to remove its religious foundations, replacing them with his theory of natural law. For Grotius and many others that followed, the ethical guidelines for war were better grounded on rational and secular reasoning and were no less valid with or without the presence of God. Natural law did not depend on religion. A series of legal-rational justifications of the just war tradition emerged from this period with far-

¹⁸⁴ Thomas Aquinas, *Summa Theologiae*, no date, n.p., on-line, Internet, 14 May 2003, available from <http://www.newadvent.org/summa/304001.htm>.

¹⁸⁵ Wray Johnson, "Just War and Law of War: A Primer," no date, n.p., on-line, Internet, 11 December 2002, available from <http://fs.huntingdon.edu/jlewis/Outlines/SajustWarWray.htm>.

reaching effects. The secularization of the just war tradition allowed for the introduction of fledgling international law and law of armed conflict in the nineteenth and twentieth centuries when the preeminent position of the nation-state was secured permanently on the world political stage.

Compared to his contemporaries, Grotius was to jurisprudence and the just war tradition as Bacon and Descartes were to philosophy and Galileo and Newton were to applied science. Grotius' interpretation of the just war tradition as it stood in the seventeenth century was guided by his belief that restraint and decency in war could be based justifiably on secular natural law as opposed to religious dogma. His purpose was to divorce natural law from religion by grounding it solely in the social nature and innate reason of man. For his work and contributions to many fields of study, Grotius is credited commonly as "the father of modern secularized natural law" or, more broadly, as "the father of modern international law."¹⁸⁶

Grotius stated, in *On the Law of War and Peace*, that natural law "is a dictate of right reason, which points out that an act, according as it is or is not in conformity with rational nature, has in it a quality of moral baseness or moral necessity."¹⁸⁷ With this seminal conclusion, Grotius humanized and secularized the concept of natural law for future generations of scholars and philosophers. His interpretations of the just war tradition reflected a fundamental shift in the just war tradition from religion to secular law as the basis for going to war and the conduct of the war itself. According to the Grotius scholar, G.I.A.D. Draper, Grotius' purpose in refining the just war tradition was to limit and restrain war in two very important ways: "Firstly, by the just war doctrine, with its severe limitations on the causes of resort to it; and second, in seeking some humane limitations upon the means by which wars were waged, that is, his plea for the *temperamenta belli*."¹⁸⁸

Grotius was disturbed at the prevalence of what he considered to be unjust wars in his time and in times past.¹⁸⁹ This unease and his strong belief in the supremacy of secular natural law influenced greatly his thinking and writing on just war. His significant contributions to the just war tradition are highlighted by Frederick Copleston, S.J., in his classic, multi-volume opus,

¹⁸⁶ Charles S. Edwards, *Hugo Grotius, the Miracle of Holland: A Study in Political and Legal Thought* (Chicago: Nelson-Hall, 1981), 10.

¹⁸⁷ Hugo Grotius, *On the Law of War and Peace*, ed. Wei Wilson Chen, no date, on-line, Internet, 19 March 2003, available from <http://www.geocities.com/Athens/Thebes/8098/>, Book 1, Chapter 1, Section X. Hereafter cited using book, chapter, and section of *On the Law of War and Peace* on-line edition.

¹⁸⁸ Draper, 199. Translated as moderation in war.

¹⁸⁹ Edwards, 116.

The History of Philosophy, and are best summarized as follows.¹⁹⁰ In the *jus ad bellum* tradition, Grotius believed it was permissible for a state to wage a just war against another state that has attacked it, or in order to recover what has been stolen from it, or to “punish” another state if that state is obviously infringing the natural law.¹⁹¹ A preventive war could not be waged unless there was “moral certainty” that the other state intends attack.¹⁹² A just war could not be waged simply for advantage’s sake¹⁹³ or out of a desire to rule others under the pretext that it was for their own good.¹⁹⁴ War, according to Grotius, should not be undertaken rashly.¹⁹⁵ It should only be undertaken in cases of “necessity.”¹⁹⁶ Peace, for Grotius like Augustine and Thomas Aquinas before him, should always be the goal of war.¹⁹⁷

In the *jus in bello* tradition, Grotius believed that in the actual conduct of war what is permissible was best viewed either absolutely in relation to the law of nature or in relation to the law of nations.¹⁹⁸ The law of nature bound all men as men because “those who are enemies do not in fact cease to be men.”¹⁹⁹ The law of nations, as defined by Grotius, was “the law which has received its obligatory force from the will of all nations, or of many nations.”²⁰⁰ In summary, Grotius considered war something that should be avoided at all costs. Nevertheless, just as individuals enjoy the right of self-defense, so do states. Grotius believed there could be a just war but not without restrictions on legitimate means during war. The laws of nature and of nations had to be followed.

This Grotian tradition never died. Although not always attributed directly to Grotius, the international law and law of armed conflict that emerged in the nineteenth and twentieth centuries are taken mostly from his groundbreaking work. It can be said that the final three modern *jus ad bellum* criteria defining the right to resort to force, namely proportionality of ends, last resort, and reasonable hope of success, emerged directly from Grotius’ work.

¹⁹⁰ See Frederick Copleston, S.J., *A History of Philosophy*, vol. III, *Late Medieval and Renaissance Philosophy: Ockham, Francis Bacon, and the Beginning of the Modern World* (1953; reprint, New York: First Image Books, 1993), 328-34.

¹⁹¹ Grotius, Book 2, Chapter 22, Section V.

¹⁹² Ibid.

¹⁹³ Ibid., Book 2, Chapter 22, Section VI.

¹⁹⁴ Ibid., Book 2, Chapter 22, Section XII.

¹⁹⁵ Ibid., Book 2, Chapter 24.

¹⁹⁶ Ibid., Book 2, Chapter 24, Section VIII.

¹⁹⁷ Ibid., Book 3, Chapter 25, Section II.

¹⁹⁸ Ibid., Book 3, Chapter 1, Section I.

¹⁹⁹ Ibid., Book 3, Chapter 19, Section I.

²⁰⁰ Ibid., Book 1, Chapter 1, Section XIV.

Grotius is also credited with first writing about both noncombatant immunity and what Paul Ramsey would later reinvigorate as the “principle of double effect.”²⁰¹ These concepts are the bedrock for the modern *jus in bello* criteria that restrict the employment of force known as discrimination and proportionality of means. Grotius contended, according to Wray Johnson, “what matters most is intent.” If the intent is just, then the end outweighs the means even if innocent lives are lost in the process. While these deaths are regrettable, they can be necessary and, therefore, legal.²⁰²

For the purposes of this work, Grotius’ greatest contribution to the just war tradition is his conclusion that a just war, waged within just limits, served positive human ends. Ultimately, he believed, just wars promote rather than disrupt order among nation-states. Grotius fully recognized, according to Charles Edwards, that humans “are volitional creatures who make moral choices.”²⁰³ In spite of his stated intent to remove the theological foundations from the just war tradition and replace them with secular natural law and the law of nations, Grotius believed in “a higher, more positive moral outlook for human behavior.”²⁰⁴ As a result, in the exceptional cases when war did occur, Grotius held that its character could be regulated rightly and sufficiently to moderate its cruel nature and effects.²⁰⁵

Samuel von Pufendorf, a contemporary and great admirer of Grotius, also made a subtle but very important contribution to the emerging secular just war tradition. In his primary work, *De Jure Naturae et Gentium* or *The Law of Nature and Nations*, published in 1762, sixty-eight years after his death, Pufendorf made a bold connection that allowed for the later emergence of international law in the nineteenth century. He argued that natural law mandated our sociability and, therefore, our need to live in a stable society. This requirement and the overwhelming drive to be social, according to Pufendorf, formed the highest natural law. Our moral duties as good citizens arise from this social mandate and, in turn, inform the just war tradition by creating the need for international law and the law of armed conflict required for a stable, safe society.²⁰⁶

Grotius expressed great faith in law and progress. His principles on when to resort to war and the conduct of warfare form a part of the just war tradition that has come to be a central part

²⁰¹ J.T. Johnson, *Morality and Contemporary Warfare*, 37.

²⁰² Wray Johnson, n.p., Internet.

²⁰³ Edwards, 178.

²⁰⁴ Ibid.

²⁰⁵ Ibid.

²⁰⁶ “Samuel von Pufendorf,” *The Internet Encyclopedia of Philosophy*, 2001, n.p., on-line, Internet, 28 October 2002, available from <http://www.utm.edu/research/iep/p/pufendor.htm>.

of our contemporary system of international law.²⁰⁷ Grotius' work and the key contribution of Pufendorf led directly to the international law of nations and the law of war that emerged in the second half of the nineteenth century.

The Law of War and Airpower: 19th and 20th Century Developments

This work recognizes contemporary American airpower as the most discriminate weapon of war, and further postulates aerial precision as its modern contribution to the just war tradition.²⁰⁸ Therefore, this section is confined to a description of the laws of war in the nineteenth and twentieth centuries that influenced perceptions of the legitimate or moral use of airpower, and its specific relationship to the just war tradition *jus in bello* criteria.

The first modern statement of the law of war and the basis for much of subsequent international law was General Order No. 100. This document, written by Dr. Francis Lieber at the request of President Lincoln during the American Civil War, laid down a code of law for Federal troops to guide their actions in war. Most significantly, General Order No. 100 defined "military necessity" as "those measures indispensable to securing the ends of war."²⁰⁹ Military necessity, according to the document, permitted "direct destruction of life and limb of armed enemies, and of other persons whose destruction is incidentally unavoidable."²¹⁰ General Order No. 100 foreshadowed the debate surrounding the principles of noncombatant immunity or discrimination and proportionality that remain in the forefront today. As Hehir describes it, "The primary moral criterion of just means appears to be the most intrinsically important guide to policy today."²¹¹ Finally, General Order No. 100 echoed just war tradition sentiment by stating, "The ultimate object of all modern war is a renewed state of peace."²¹²

Jurist W. Hays Parks has observed, "What is legal is not necessarily moral and what is moral is not always legal; but, particularly with regard to the law of war, the two are inextricably intertwined."²¹³ By the end of the nineteenth century, the first efforts were made to codify the just war tradition in the form of international law. These attempts to universalize the concept of

²⁰⁷ Draper, 207.

²⁰⁸ For a detailed, well-researched, and valid argument for airpower as "the most discriminate weapon of war," see Phillip S. Meilinger, "Winged Defense: Airwar, the Law, and Morality," *Armed Forces & Society* 20, no. 1 (Fall 1993): 103-23.

²⁰⁹ Quoted in W. Hays Parks, "Air War and the Law of War," *The Air Force Law Review* 32, no. 1 (1990): 7.

²¹⁰ *Ibid.*

²¹¹ Hehir, "Kosovo: A War of Values and the Values of War," 403.

²¹² Quoted in Parks, 8.

²¹³ *Ibid.*, 4.

a valid law of war dealt specifically with the moral and legal aspects of armed conflict.

Beginning with the Hague Peace Conferences of 1899 and 1907 and continuing through the Washington Conference of 1922 and the Hague Commission of Jurists in 1923, the major world powers sought to codify a law of war for the very first time. Even following World War I, however, remarkably little treaty law directly concerned aerial warfare. A commission did adopt the Hague Rules of Air Warfare in 1923, but, as L.C. Green writes, these rules “never embodied into a treaty or officially declared to constitute a statement of law.”²¹⁴ However, despite the fact that the Hague Air Rules were never adopted formally by any nation for fear of restricting the potential of the new aerial weapon, they did constitute rules of customary law relating to air warfare at the beginning of World War II and have maintained the stature of formal international law ever since. These written rules, therefore, should be and are today regarded as the first “authoritative attempt to clarify and formulate rules of law governing the use of aircraft in war.”²¹⁵

Parks summarizes the law of war pertaining to airpower, as it existed at the beginning of World War II, using two principles:

- [First,] that the indiscriminate (that is, intentional) attack of the civilian population as such was prohibited, but that ...
- [Second,] a legitimate military objective could be attacked wherever located so long as ordinary care was exercised in its attack; that is, that collateral civilian casualties were not the concern of the attacker but, by state practice, were regarded as an inevitable consequence of bombardment and a legitimate way to destroy the enemy's will to resist.²¹⁶

Green is correct when he states that while the Hague Air Rules “do not, of themselves, amount to or express the law, they have played a role in the development of law concerning aerial warfare and, as such, cannot be peremptorily dismissed.”²¹⁷ As evidenced by Parks pre-World War II air law principles, the Hague Air Rules tackled head-on the issue of discrimination and strategic bombing to forbid attacks against non-military objectives and attacks for the sole purpose of terrorizing the civilian population.

When the Geneva Conventions came up for review following World War II in 1949,

²¹⁴ L.C. Green, *The Contemporary Law of Armed Conflict* (Manchester, U.K.: Manchester University Press, 1993), 173.

²¹⁵ Green, *Essays on the Modern Law of War* (Dobbs Ferry, N.Y.: Transnational Publishers, Inc., 1985), 137.

²¹⁶ Parks, 31.

²¹⁷ Green, *Essays on the Modern Law of War*, 138.

again, specifics with regard to air warfare were not addressed. The 1949 conventions were solely concerned with “humanitarian law during armed conflicts.”²¹⁸ It was not until the adoption in 1977 of the Protocol I addition to the Geneva Conventions of 1949 that specific written attention was devoted to problems that were peculiar to aerial warfare.²¹⁹

The modern law of war negotiates a judicious balance between military necessity and humanitarian principles. The Protocol I rules are of the utmost importance to decision makers and airpower strategists as they codify moral and legal attempts to maintain this delicate balance in a non-discriminatory fashion.²²⁰ While the U.S. has yet to ratify Protocol I (and most likely never will), its provisions influence greatly American airpower employment decisions today. In short, the U.S. has not ignored “the first international document since 1907 which attempts to regulate the means and methods of warfare.”²²¹ Indeed, the development of aerial precision since the Vietnam War and the provisions of Protocol I appear inextricably linked.

Detailing the many provisions of Protocol I is beyond the scope of this work. Therefore, the following summary is provided to capture the essence of the protocol and its relation to air warfare and aerial precision:

- The intentional bombing of civilians and civilian objects is illegal.
- Objectives aimed at from the air must be military objectives and identifiable as such.
- Any attack on a military objective must be conducted in such a way that civilian population in the vicinity are bombed not through negligence, but incidental collateral damage does not render the attack illegal, provided it is not excessive.²²²
- Attacks may only be directed against military objectives and must not be indiscriminate, and, to the extent feasible, both practicable or practically possible taking into account all existing circumstances to include those of a military character, be in accordance with the principle of proportionality and the rule against unnecessary suffering to avoid excessive damage to civilians and civilian objects.²²³
- The decision as to whether an aerial attack should be launched or not must be made by a commander in light of all knowledge available to him in the particular circumstances, and if, taking all these considerations into account, it

²¹⁸ Ibid., 140.

²¹⁹ Ibid.

²²⁰ For the specific provisions regarding aerial warfare found in the 1977 Protocol I addition to the Geneva Conventions of 1949, see Part IV, “Civilian Population,” Section I, “General Protection against Effects of Hostilities,” Articles 48-60.

²²¹ Green, *Essays on the Modern Law of War*, 142.

²²² Ibid., 144; and Green, *The Contemporary Law of Armed Conflict*, 176-7.

²²³ Green, *The Contemporary Law of Armed Conflict*, 183.

- transpires that civilian damage is likely to be excessive, the attack must be suspended or abandoned.²²⁴
- An attack that treats as a single military objective a number of clearly separated and distinct military objectives located in a city, town, village, or other area containing a similar concentration of civilians or civilian objects is illegal and indiscriminate.²²⁵

At the dawn of the twenty-first century, the just war tradition remains an active part of international discourse. Witness the world debate prior to Operation Iraqi Freedom in 2003. The *jus ad bellum* criteria have remained essentially unchanged from the time of Grotius. Modern just war debate tends to center upon the last resort criteria. However, the *jus in bello* criteria of discrimination and proportionality of means have become more and more refined particularly as the relationship between the principle of double effect and airpower has grown over time. The growing importance of these *jus in bello* principles and the increased sensitivity to collateral damage and casualties across the spectrum of war relate directly to the development of aerial precision and the resulting moral sanctuary.

The Principle of Double Effect: Modern Interpretations

According to J.T. Johnson, the *jus in bello* criteria for right conduct in war, as defined by “the moral principles of discrimination and proportionality,” are quite modern descriptive inventions of just war tradition theorists.²²⁶ Classic just war thinkers had previously defined noncombatants simply by listing the various classes of people who were exempted from harm while engaging in peaceful occupations during wartime.²²⁷ Paul Ramsey, a twentieth century Protestant theologian, sought to change the just war tradition lexicon by reintroducing the terms ‘discrimination’ and ‘proportionality’ back into the discussion of morality in warfare.²²⁸ These terms are now the standard in most just war *jus in bello* literature.

In the most modern sense, discrimination and proportionality are best examined through the lens provided by what is known as the principle of double effect. In the midst of the Combined Bomber Offensive (CBO) during World War II, John C. Ford, S.J., a Catholic priest

²²⁴ Green, *Essays on the Modern Law of War*, 144.

²²⁵ Green, *The Contemporary Law of Armed Conflict*, 177.

²²⁶ J.T. Johnson, *Morality and Contemporary Warfare*, 133.

²²⁷ Ibid. John C. Ford, S.J., provides a representative list numbering more than 100 to include fisherman, glove makers, and prison inmates to name just three. See “The Morality of Obliteration Bombing,” *Theological Studies* 5 (1944): 283-4.

²²⁸ J.T. Johnson, *Morality and Contemporary Warfare*, 133.

and philosophy professor, first opined on the principle derived from the traditional *jus in bello* criteria. Ramsey, whom J.T. Johnson describes as “the central figure in the revival and redefinition of Christian just war theory,” was an important contributor to the debate beginning in the 1960s.²²⁹ Finally, Walzer, with the publication of his book *Just and Unjust Wars* in 1977, dramatically entered into the double effect fray. The principle of double effect and its ramifications on the employment of airpower and aerial precision are best understood using the works of these men.

Ford’s 1944 article on obliteration bombing was a significant event in the modern evolution of the just war tradition and its relation to airpower.²³⁰ Prior to that time, according to Hehir, “just war thinking had been reduced to rote repetition in the textbooks of ethics.”²³¹ In the midst of World War II, Ford addressed the imperfection and unethical nature of the CBO as he saw it. Ford’s argument was purely original in character because, at the time, the idea of collateral damage in *jus in bello* thought was “a pregnant one.”²³² Indeed, the concept may not have been more than “a gleam in its parent’s eyes prior to and during World War II.”²³³ Ford’s analysis of the moral problems associated with obliteration bombing gave rise to the emergence of the principle of double effect after the war’s conclusion.

According to Ford, the principle moral problem raised by the CBO was “the rights of noncombatants to their lives in wartime.”²³⁴ Ford viewed this as an absolute right and most allied air strategists agreed. The problem, according to Ford, was the incredibly strong “appeal to the principle of double effect.”²³⁵ Ford defined the principle as follows:

The foreseen evil effect of a man’s action is not morally imputable to him, provided that (1) the action in itself is directed immediately to some other result, (2) the evil effect is not willed either in itself

²²⁹ J.T. Johnson, “Just War in the Thought of Paul Ramsey,” 184.

²³⁰ Ford defines “obliteration bombing” as “the strategic bombing, by means of incendiaries and explosives, of industrial centers of population in which the target to be wiped out is not a definite factory, bridge, or similar object, but a large area of a whole city, comprising one-third to two-thirds of its whole built-up area, and including by design the residential districts of workingmen and their families.” See Ford, 267.

²³¹ Hehir, “Just War Theory in a Post-Cold War World,” *Journal of Religious Ethics* 20, no. 2 (Fall 1992): 239-40.

²³² Parks, 5.

²³³ Ibid.

²³⁴ Ford, 269.

²³⁵ Ibid., 289.

or as a means to the other result, (3) the permitting of the evil effect is justified by reasons of proportionate weight.²³⁶

The moral questions surrounding the CBO, as previously discussed in Chapter Two of this work, received the focused attention of many following the war. However, in the midst of the CBO, Ford used the principle of double effect to make the case that discrimination was of a higher moral priority than proportionality of means to an end.²³⁷ Ford attempted to identify the line where legitimate military actions cease being permissible and become indiscriminate and immoral. He concluded the CBO air strategists “let go their bombs” and lived with themselves by “withholding their intentions.”²³⁸ During World War II, the principle of double effect was wrongly applied as a straightforward mathematical formula. For Ford, there was the rub. An analysis of double effect requires “sound moral judgment” and “an immense amount of moral experience” by decision makers and air strategists.²³⁹ Notwithstanding the novelty of the aerial weapon and strategic bombardment at the time, Ford judged the CBO as immoral because the proportionality of means to achieve “weighty excusing causes such as shortening the war, military necessity, and saving our own soldiers’ lives” was given a higher moral priority over discrimination.²⁴⁰

Ford deserves much credit for his just war tradition thought in the midst of a total war. While very contentious, his conclusions framed the debate that followed the war for years to come. The ethical dilemma of indiscriminate bombing and the principle of double effect was the most controversial aspect of the *jus in bello* criteria to emerge following World War II. In the 1960s and 1970s, Ramsey and Walzer, respectively, entered into the debate.

Hehir describes Ramsey’s role in the resurgence of the just war tradition in the latter half of the twentieth century as “unique.”²⁴¹ Ramsey’s writings were steadfastly focused on the *jus in bello* criteria and, in particular, on the applications of double effect. Building on the issues first raised by Ford, Ramsey emphasized that the right intention of war was to defend life. Therefore, taking the life of even an unjust person, such as the enemy, should be avoided if at all

²³⁶ Ibid.

²³⁷ Parks, 5.

²³⁸ Ford, 289.

²³⁹ Ibid., 289-90.

²⁴⁰ Ibid., 289 and 308-9.

²⁴¹ Hehir, “Just War Theory in a Post-Cold War World,” 240.

possible.²⁴² Consequently, for Ramsey, discrimination or noncombatant immunity should be considered prior to any discussion of potential effects.²⁴³

Ramsey's interpretation of double effect was founded on the right intentions of political leaders and military commanders. Again, as Ford claimed, the question remained as to where to draw the line between legitimate, moral and indiscriminate, immoral military action. Ramsey concluded, "This distinction is not determined by the amount of devastation or the number of deaths, but by the direction of action itself, i.e. by what is deliberately intended and directly done."²⁴⁴ Like Ford, Ramsey held discrimination as a higher moral priority than proportionality of means.

J.T. Johnson provides an excellent summary of Ramsey's *jus in bello* thought.²⁴⁵ Ramsey initially developed his just war ideas in the context of the nuclear debate of the 1960s. At that time, the important question on most everyone's mind dealt primarily with the morality of counter-value versus counter-force nuclear targeting. Ramsey argued in favor of counter-force targeting based on his interpretations of the *jus in bello* discrimination and proportionality criteria. He defined discrimination as the "avoidance of direct, intentional harm to noncombatants" and proportionality as "making sure that the benefits to be gained from the use of force outweigh the harm."²⁴⁶ Noncombatants were protected by both of these criteria. Discrimination gave them an "exceptionless [sp] moral immunity" from direct, intentional attack while proportionality worked "to minimize the magnitude of that harm" in cases where they are at risk of unintended collateral harm.²⁴⁷ Ramsey's position on discrimination was clear. He wrote, "We do not need to know who and where the noncombatants are in order to know that indiscriminate bombing exceeds the moral limits of warfare."²⁴⁸ In order to define proportionality, Ramsey turned to the principle of double effect.

Ramsey's writings on double effect continue to reverberate today. He recognized that collateral harm to noncombatants would likely occur when morally legitimate targets were attacked. This was regrettable and, therefore, should be minimized so far as possible because of

²⁴² Davidson, n.p. Internet.

²⁴³ Ibid.

²⁴⁴ Quoted in Parks, 5.

²⁴⁵ This summary is based on J.T. Johnson, *Morality and Contemporary Warfare*, 131; and "Paul Ramsey and the Recovery of the Just War Idea," *Journal of Military Ethics* 1, no. 2 (2002): 136-44.

²⁴⁶ J.T. Johnson, "Paul Ramsey and the Recovery of the Just War Idea," 137.

²⁴⁷ J.T. Johnson, *Morality and Contemporary Warfare*, 131.

²⁴⁸ Quoted in J.T. Johnson, "Paul Ramsey and the Recovery of the Just War Idea," 139.

the “moral requirement of proportionality.”²⁴⁹ However, because the noncombatant harm was secondary, an attack with a legitimate purpose was not forbidden by the criterion of discrimination. This was Ramsey’s primary argument in favor of counter-force nuclear targeting.

Ramsey believed proportionality and double effect imposed moral restrictions on the choice of targets and the types of weapons used in an attack.²⁵⁰ These moral restrictions transcend the 1960s nuclear debate and impact directly on modern efforts to achieve perfect aerial precision. In 1961, Ramsey quoted, approving as his own, the words of Thomas E. Murray:

We should attempt to hold the use of force down to the minimum necessary for accomplishing the multiple ideas inherent in the moral idea of war—the military end of terminating the effectiveness of the enemy’s armed forces; the political end of achieving the proper order of power relationships for a stable and just international framework and the moral end of peace itself.²⁵¹

As ironic as it seems for all his writings on the subject, this is Ramsey’s legacy.

Walzer’s *Just and Unjust Wars*, rightly described as “the most influential academic reconsideration of the [just war] tradition in recent times” by one scholar, is a very comprehensive and thought-provoking book.²⁵² Much of it is beyond the scope of this work, however, Walzer’s thoughts on the principle of double effect are pertinent to this analysis. First, he advocates the position that the *jus in bello* discrimination and proportionality criteria can be overridden “in extreme cases.”²⁵³ Paraphrasing Immanuel Kant, Walzer proposes the following maxim: “Do justice unless the heavens are (really) about to fall.”²⁵⁴

This view is commonly described as a case of “supreme emergency,” a phrase Walzer took from a 1939 speech by Winston Churchill.²⁵⁵ Simply put, for Walzer, there are specific situations in war when the *jus in bello* criteria can be openly violated. These situations occur

²⁴⁹ Ibid., 140.

²⁵⁰ Ibid., 140-1.

²⁵¹ Quoted in J.T. Johnson, “Just War in the Thought of Paul Ramsey,” 192.

²⁵² Nicholas Rengger, “On the Just War Tradition in the Twenty-first Century,” *International Affairs* 78, no. 2 (2002): 355.

²⁵³ Walzer, 231.

²⁵⁴ Ibid.

²⁵⁵ Ibid., 251.

“only when we are face-to-face not merely with defeat but with a defeat likely to bring disaster to a political community.”²⁵⁶ The key point here is recognizing just how high Walzer places the supreme emergency judgment bar. Violations of discrimination and proportionality are not permitted to avoid any military defeat. Rather, such violations are only permitted to avoid the death of a legitimate political system writ large.

Second, Walzer argues the principle of double effect should be the product of what he calls a “double intention.”²⁵⁷ Walzer does not question the validity of three of the four aspects of double effect, namely the act must be a legitimate act of war; the direct effect is morally acceptable; and, the good effect is sufficiently good to compensate for allowing the evil effect. Double effect is “in need of correction,” according to Walzer, because it lacks “a positive commitment to save civilian lives.”²⁵⁸ Walzer proposes a “due care” clause as an additional requirement to the principle of double effect. For him, if double effect is to allow the collateral harm of noncombatants, then the harm must be minimized to the greatest extent possible. In the end, if saving noncombatant lives requires risking those of combatants, the “risk must be accepted.”²⁵⁹

The works of Ford, Ramsey, and Walzer, particularly on the principle of double effect, have certainly influenced the moral debate surrounding the use of discriminate airpower. All three theorists give highest priority to the discrimination criterion and the almost sacrosanct protection of noncombatants. A brief review of two recent uses of US airpower reveals the depth of their influence.

Hehir examined the 1991 Gulf War in Iraq and questioned the overall air war on proportionality grounds.²⁶⁰ While recognizing US targeting strategies as sufficiently discriminate during the war, he concluded that proportionality issues had not been framed and pursued adequately by the U.S. He wrote,

The effect of using [high-tech weaponry] on communications facilities, electrical grids, and other strategically appealing targets undoubtedly punishes the civilian population. The criterion of

²⁵⁶ Ibid., 268.

²⁵⁷ Walzer writes, “First, that the ‘good’ be achieved; second, that the foreseeable evil be reduced as far as possible.” Ibid., 155.

²⁵⁸ Ibid., 155-6.

²⁵⁹ Ibid.

²⁶⁰ This analysis is based on Hehir, “Just War Theory in a Post-Cold War World,” 243, 247-8; and, “The Moral Calculus of War,” 125-6.

proportionality is therefore left with new burdens in assessing the *jus in bello*.²⁶¹

Hehir's assessment recalls Walzer's correction to the principle of double effect. This is a dilemma that will be further examined in Chapter Four of this work.

More recently, Max Boot argues that too much concern over *jus in bello* criteria has hampered the air effort during Operation Iraqi Freedom (OIF).²⁶² According to Boot, lawyers, who decide if the expected benefits outweigh the risks of civilian casualties, are vetting all targets in Iraq. In addition, dozens of important targets have been placed off limits because of fears of "high collateral damage."²⁶³ OIF may be a case where moral standards and the corresponding application of *jus in bello* criteria have changed because aerial precision technology has changed. This, too, is a dilemma to be amplified later in this work.

The idea that right conduct in war is defined by the criteria of discrimination and proportionality is fundamental to the modern just war tradition. The principle of double effect is a twentieth century addition to the tradition. For this, Ford, Ramsey, and Walzer deserve much credit. Their modern interpretations of the *jus in bello* criteria greatly influence the employment of airpower today. Aerial precision offers a moral opening for those concerned with discrimination and proportionality issues. It is clear precision-guided munitions make it far, far easier to observe the *jus in bello* criteria than in the past.

Conclusion

Asking just war questions is a moral obligation for decision makers and airmen. The just war tradition represents one way of reflecting on the moral problems associated with the use of military force. It is a tradition deeply rooted in historical and political practice. Decision makers and airpower strategists who must assess, decide, and act in this age of modern warfare and aerial precision cannot escape its influence.

Amoral realists hold that war is hell, within which anything goes. Practical realists believe, to the contrary, that war is "a rule-governed activity."²⁶⁴ The *jus in bello* criteria represent the modern rules of war. That is not to say that the *jus ad bellum* criteria are

²⁶¹ Hehir, "Just War Theory in a Post-Cold War World," 247.

²⁶² See Max Boot, "Sparing Civilians, Buildings, and Even the Enemy," *New York Times*, 30 March 2003, n.p., online, Internet, 30 March 2003, available from <http://ebird.dtic.mil/Mar2003/e20030330169177.html>.

²⁶³ Ibid.

²⁶⁴ Childress, 434.

unimportant. Peace is most always preferable to war and for that reason alone the *jus ad bellum* criteria remain indispensable to decision makers and airpower strategists.

This work argues that the moral, social, and political currents swelling around airpower and the pursuit of perfect aerial precision today are profound. They are no less weighty in their own right than those that swept the seventeenth century in Grotius' time when the modern nation-state first emerged. As historian Tami Davis Biddle predicted in 1994, ethics and efficiency are converging in the drive toward perfect aerial precision.²⁶⁵ The pursuit of perfect aerial precision, however, has created significant dilemmas when one considers both thematic branches of the just war tradition.

²⁶⁵ Tami Davis Biddle, "Air Power," in *The Laws of War: Constraints on Warfare in the Western World*, ed. Michael Howard et al. (New Haven, Conn.: Yale University Press, 1994), 141.

CHAPTER 4

THE DILEMMAS OF PERFECT AERIAL PRECISION

Ethics are not logically, externally related to politics. These two distinguishable elements are together in the first place, internally related.

Paul Ramsey (1973)

To soldiers, optimism comes less easily, for no historical phenomenon has proven more resistant to simplified prescriptions than the subject of their profession.

Andrew J. Bacevich (1988)

In many cases today, war means bringing power, particularly air power, to bear against civil society.

Eliot A. Cohen (1994)

Introduction

In each question of war or the use of force, the consideration of its worth is often a delicate balance of politics, strategy, and ethics. Yet, in the theory and practice of strategy, Colin Gray observes: “Moral discourse often tends to be missing in action.”²⁶⁶ Consequently, Gray asserts: “Ethics is a formally neglected dimension of strategy.”²⁶⁷ The importance of moral reasoning in political and military affairs cannot be overstated. It can be shown to infuse, limit, or enable every decision in these realms. Hence, ethics in war is not oxymoronic. It exists, and exerts a profound influence, whether the individual is aware of it or not. Likewise, pacifism is not the only available moral pathway. On occasion, as the discussion of the just war tradition in the previous chapter shows, the application of violence may be unavoidable. Indeed, moral theories form the basis of what it means to be human, and political decision makers and military strategists neglect them at risk of great peril.²⁶⁸

There are moral, social, and political dilemmas associated with the emergence of a potentially perfect precision capability that may not be readily apparent to politicians and strategists. This study identifies three such dilemmas—the decision to go to war, casualty avoidance and the moral sanctuary, and centralized control with centralized execution—and shows how the just war tradition and moral reasoning influence them significantly. These

²⁶⁶ Colin S. Gray, *Modern Strategy* (Oxford: Oxford University Press, 1999), 30.

²⁶⁷ Ibid.

²⁶⁸ George Weigel, “Moral Clarity in a Time of War,” *First Things: A Monthly Journal of Religion and Public Life* (January 2003): 21.

examples are not exhaustive. However, they are representative of the kinds of dilemmas created by the interaction of an emerging technology, aerial precision, and an established, accepted moral theory, the just war tradition. The intent in describing them is to shed light on the sometimes counter-intuitive outcomes of generally desirable policies and strategies. In the end, this work generates more questions than answers. That is its intent.

Pure moral reasoning is deontological. One obeys a moral principle not because of the consequences of disobedience, but because it is right to do so. The just war tradition is based on deontological moral principles, and not on contingent judgments about the nature of modern warfare or cost-benefit calculations. In the emerging American way of war, the just war tradition is non-negotiable. This is becoming increasingly evident, reaching a peak most recently in Operation Iraqi Freedom. As military technological advances continue almost unabated, that is how it must remain for decision makers and strategists alike.

Public policy analyst George Weigel recently wrote, “No aspect of the human condition falls outside the purview of moral reasoning and judgment.”²⁶⁹ The dilemmas identified in this work demand moral scrutiny. To paraphrase Weigel in the spirit of this work, there is no Archimedean point outside the moral universe from which even the wisest politician or strategist can leverage perfect aerial precision.²⁷⁰

A New American “Go-to-War” Regime?

Regimes, according to Everett Dolman, are an important component of the modern international security environment poorly understood outside the academic world.²⁷¹ This work agrees. Stephen Krasner describes them as “sets of implicit or explicit principles, norms, rules, and decision-making procedures around which actors expectations converge in a given area of international relations.”²⁷² Krasner defines the components of his strict, top-down hierarchy as follows:

Principles are beliefs of fact, causation, and rectitude. Norms are standards of behavior defined in terms of rights and obligations.

²⁶⁹ Ibid.

²⁷⁰ Ibid.

²⁷¹ Everett C. Dolman, *Astropolitik: Classical Geopolitics in the Space Age* (London: Frank Cass Publishers, 2002), 87.

²⁷² Stephen D. Krasner, “Structural Causes and Regime Consequences,” in *International Regimes*, ed. Stephen D. Krasner (Ithaca, N.Y.: Cornell University Press, 1983), 2.

Rules are specific prescriptions or proscriptions for action.

Decision-making procedures are prevailing practices for making and implementing collective choice.²⁷³

It is important to note several key features of a regime for the purpose of this analysis.²⁷⁴ Regimes are not temporary arrangements or ad hoc agreements. They are lasting structures. The issue areas of particular regimes can be specified or limited. Principles and norms provide the basic defining characteristics of a given regime and are not easily changed. Rules and decision-making procedures, however, can change without altering the fundamental purpose of the regime. Successful regimes shape behavior through habituation making expectations of future actions more predictable. Krasner summarizes regime change as follows:

Change within a regime involves alterations of rules and decision-making procedures, but not of norms or principles; change of a regime involves alteration of norms and principles; and weakening of a regime involves incoherence among components of the regime or inconsistency between the regime and related behavior.²⁷⁵

The first dilemma is the distinct possibility that the pursuit of perfect aerial precision is changing the traditional American “go-to-war” or use of military force international regime that is derived directly from our historical experience and the just war tradition. According to Puchala and Hopkins, a regime exists where there is discernibly patterned behavior accounted for by principles, norms, and rules.²⁷⁶ In the traditional American “go-to-war” regime, these principles, norms, and rules are easily characterized as derivations of the just war tradition.

The fundamental principle of the American “go-to-war” regime is that war is bad, undesirable, and should be avoided if at all possible. The *jus ad bellum* criterion of last resort clearly embodies this principle. Although modified by the current US National Strategy that now postulates preventive (or preemptive) wars in defense of vital American interests, the principle that war should be avoided if another option exists that will effectively address the problem is intact. And this is simply because people die during war. No politician or strategist can challenge or change that fact. Both world wars in the twentieth century were total wars

²⁷³ Ibid.

²⁷⁴ The features described are taken from Dolman, 87-9; and Krasner, 1-5.

²⁷⁵ Krasner, 5.

²⁷⁶ Donald J. Puchala and Raymond F. Hopkins, “International Regimes,” in *International Regimes*, 63.

characterized by the dehumanization of war itself and the combatants who fought in them. Mass deaths became statistics. The enemy was portrayed as subhuman, thus easier to kill. The post-war advent of nuclear weapons and the threat of national annihilation contributed further to this dehumanization process. There is no place in all-out nuclear war for the desirable traits of courage or loyalty to emerge and to be lauded. The very decision to go to war is sensor-dependent, machine-calculated, and void of emotion, so that the logic of mutual assured destruction can operate.²⁷⁷ War and the use of force were thought to be less likely in this dehumanized context, and fortunately, nuclear war has been so far avoided. But conventional war has continued, despite the guiding strength of the fundamental principle of the American “go-to-war” regime.

The principle that war *ought* be avoided does not mean that it *must* be avoided. The just war tradition also brings a desirable moral dimension to the pragmatism that accepts as a norm that war is sometimes necessary. The remaining six *jus ad bellum* criteria comprise the regime’s norms and provide moral guidance for the decision to choose the option of using military force. These accepted norms carry with them fundamental policy implications. In that light, J.T. Johnson is correct in his assessment that “there is a place for the use of force under national authority in resistance to armed attack, but also a place for the employment of military means in response to broader kinds of threats to national security, and to the values and structures that define the international order.”²⁷⁸

The American “go-to-war” regime, based on the principles and norms described, remains essentially unchanged in the twenty-first century. With few exceptions, to include the use of atomic weapons against Japan at the conclusion of World War II, the rules of the American regime have mirrored the just war tradition *jus in bello* criteria of discrimination and proportionality.²⁷⁹ Simply put, if war becomes necessary, it must then be conducted

²⁷⁷ See particularly Edward Rhodes, *Power and MADness: The Logic of Nuclear Coercion* (New York: Columbia University Press, 1989), especially Chapter 6, “Doomsday Machines,” for a fascinating description of the dehumanizing illogic of nuclear policy.

²⁷⁸ James Turner Johnson, “The Broken Tradition,” *The National Interest*, Fall 1996, on-line, EBSCOHost, 22 January 2003. This is an insightful essay that argues against what some believe is a “presumption against war” inherent to the just war tradition. Such beliefs, Johnson concludes, are prudential because they are based on conditions in the world that are not only subject to change but fated to change.

²⁷⁹ According to Lawrence Freedman, “The eventual strategic use of the bomb was determined by the conditions prevailing at the time at which the first bomb became available.” President Truman’s stated intent was to limit the casualties (both U.S. and Japanese) and damage of a full-scale assault of the Japanese home islands. See Lawrence Freedman, “The Strategy of Hiroshima,” *The Journal of Strategic Studies* 1, No. 1 (May 1978): 76-97. This

discriminately and proportionally in accordance with the just war tradition. So strong is this sense of right-ness in war that the United States has been a strict adherent of the Geneva protocols governing conduct in war, even (and especially) when the enemy does not so comply. Even when the rules in war appear to break down, as could be argued for some units in the Vietnam conflict, egregious violations of the essential norms are met with disbelief and condemnation, and swiftly punished. In 1926, air theorist William Sherman echoed the spirit of the American regime when he wrote, “There has always been a sentiment among mankind to mitigate the horrors of war, as far as the nature of the thing permits.”²⁸⁰

The decision-making procedures developed to carry out the rules of the American war regime have changed over time, and this is to be expected within a long-standing regime. So long as the individual rules and procedures comply with the overarching principles and norms, the regime remains robust. Typically, changes in rules and procedures are made in response to technological developments. Most recently, the advent of the mass use of precision-guided munitions and the priority given to joint military operations embody these procedures. As will be shown, the pursuit of aerial precision and improved joint training and capabilities have been and remain driven by the desire to follow the rules of the American war regime.

The American “go-to-war” regime reflects Krasner’s top-down methodology. The regime is deliberate by design. The problem to be investigated is that perfect aerial precision threatens to change the fundamental structure of the regime. At best, the development of perfect aerial precision weakens the traditional American “go-to-war” regime because it creates incoherence among the regime’s top-down components and inconsistencies between the regime and related behavior. The top-down methodology of the regime is inverted, becoming bottom-up driven. At worst, it changes the regime completely because different norms and principles could emerge due to a perfect aerial precision capability. Because perfect aerial precision empowers unprecedented levels of discrimination and proportionality, it threatens to lessen the importance of or remove completely the *jus ad bellum* criteria of the just war tradition on which the current regime’s principles and norms are so firmly founded. By making the likelihood of casualties less, the horror of war is thus diminished. Is the unintended consequence of adhering to the just

illustrates that ‘the exception proves the rule.’ It was proportional if the anticipation of not using the atom bomb (when its full ramifications were not clearly understood) was worse than doing so.

²⁸⁰ William C. Sherman, *Air Warfare* (1926, reprint; Maxwell Air Force Base, Ala.: Air University Press, 2002), 213-4.

war tradition by following the rules of the regime that the likelihood of war is increased? Possibly, it is. In the past, questions between ethics and military necessity tilted toward the latter because perfect discrimination was not possible. Given the potential capacity of perfect aerial precision to achieve unprecedented levels of discrimination, important ethical issues reemerge that threaten to change the American “go-to-war” regime. Given perfect aerial precision in the future, war becomes less destructive and force more precisely focused on legitimate military targets and combatants. War is then, in effect, re-humanized. Perfect precision-guided munitions make it far, far easier to observe the just war principles of discrimination and proportionality, thereby making war more likely.

The current regime is based on the principle that all human life has inherent value. Despite that, both the Allies and Axis were guilty of indiscriminate aerial bombing at one time or another. It is equally true, however, that at the time there likely were no alternatives. As Parks concludes, the bomber forces bombed as accurately as possible given their capabilities and opposition.²⁸¹ Discrimination and proportionality were tied directly to military effectiveness. Unfortunately, too many noncombatants on all sides died in strategic bombing attacks. These casualties were accepted as an undesirable but necessary consequence in the pursuit of a greater good—victory. Perfect aerial precision eliminates this effect. The principle that war is undesirable, today, reflects the attitudes of decision makers and strategists conscious of excessive combatant and noncombatant casualties. Remove those casualties and the regime’s fundamental principle changes. The highest principle, that war is undesirable and should be avoided wherever possible, is replaced by the principle that casualties are undesirable, and should be avoided wherever possible. This tiny change allows for and possibly encourages war whenever and wherever casualties can be kept to precise and justifiable limits. This re-humanization of war would make war less bad, perhaps often desirable, and thereby lessen the compulsion to avoid it.

The current debate surrounding the preemptive use of force by the U.S. is a debate about the traditional American “go-to-war” principles and norms. The pursuit of a perfect aerial precision capability fuels the fire of this debate. Given this emerging capability, it is possible to argue that war is now *required* in some cases, and should no longer be seen as a last resort. This would be a clear misunderstanding, however. The Congressional Research Service (CRS) defines the preemptive use of military force as “the taking of military action by the US against

²⁸¹ W. Hays Parks, “Air War and the Law of War,” *The Air Force Law Review* 32, no. 1 (1990): 54.

another nation so as to prevent or mitigate a presumed *military* attack or use of force by that nation against the US.”²⁸² According to the CRS, the US has never, to date, engaged in a preemptive military attack against another nation.²⁸³ While this interpretation is open for some debate in light of Operation Iraqi Freedom, the fact that the debate is even taking place at all is due in large part to the development of advanced aerial precision.

The use of preemptive military force does call into question the utility of the *jus ad bellum* criteria within the just war tradition. War becomes a requirement under certain conditions vice sometimes necessary. The use of force is no longer a last resort but rather a possible first choice. Bernard Trainor observed as much following Operation Allied Force when he wrote, “The ‘air option’ remains an attractive form of coercive diplomacy. That is the danger. It may become too attractive for future generations of decision makers and make force the first option rather than the last.”²⁸⁴ Karl Mueller echoes the point even stronger:

As airpower continues to develop its precision-targeting and – attack capabilities, and as nonlethal weapons enter the military inventory, the traditional association of military force with maximum destruction will become increasingly outdated, and the last-resort principle will eventually have to be abandoned.²⁸⁵

The lure of sterile, distant, clean, and perfect aerial precision seems embedded in the human psyche. Author Dave Grossman calls it the “myth of distant punishment.”²⁸⁶ Decision makers and strategists often seem unable to move beyond their fascination with high-tech hardware toward thinking about the socio-political ramifications of employing it. The traditional American “go-to-war” regime contributes to this, and rightly so. The decision to use military force should not be an easy one. Yet, as precision-guided munitions become more and more precise, the traditional American regime could change. Perfect aerial precision uniquely seems to offer the U.S. both military efficiency and an unparalleled opportunity to seize the moral high ground. The allure of military advantage without political limitations is extremely powerful.

²⁸² Richard F. Grimmett, *U.S. Use of Preemptive Military Force* (Washington, D.C.: Congressional Research Service, 2002), 1-2. Emphasis in the original document.

²⁸³ Ibid.

²⁸⁴ Bernard E. Trainor, “The Perfect War Led America’s Military Astray,” *Wall Street Journal*, 2 August 2000.

²⁸⁵ Karl P. Mueller, “Politics, Death, and Morality in US Foreign Policy,” *Aerospace Power Journal* 14, no. 2 (Summer 2000): 16.

²⁸⁶ Dave Grossman, “The Morality of Bombing: Psychological Responses to ‘Distant Punishment,’” 2000, n.p., online, Internet, 19 September 2002, available from <http://www.killology.com>.

Yet, as Dolman rightly observes, a technology-driven strategy “abandons foresight and follows the apparatus wherever it leads.”²⁸⁷ The dilemma is that perfect aerial precision could make war and the use of force more rather than less likely and this is not necessarily a good thing for the U.S. in the long-term.

Over eighty years ago, Werner Heisenberg, a German physicist, postulated a theory known as the uncertainty principle. He concluded that in subatomic physics the observer becomes part of the observed system. Through the act of measurement, the physicist himself becomes part of the observed reality, so that paradoxically, the more precisely the position is determined, the less precisely the momentum is known. With the development of perfect aerial precision, this work proposes an ethical macroscopic corollary to Heisenberg’s microscopic principle: The more precise precision-guided munitions become, the less authoritative the traditional American “go-to-war” regime becomes for decision makers and strategists. As Fareed Zakaria recently wrote, “Many people believe that the limited, precise targeting we are moving toward isn’t really war.”²⁸⁸ The traditional American “go-to-war” regime is most certainly changing due to the ongoing quest for perfect aerial precision. The dilemma is whether these changes are good or bad.

Casualty Avoidance and the Moral Sanctuary

Following the recent US military campaign in Afghanistan, reporter Thomas Ricks described the new American way of war as “one built around weapons operating at extremely long ranges, hitting targets with unprecedented precision, and relying as never before on gigabytes of targeting information gathered on the ground, in the air, and from space.”²⁸⁹ Ricks is essentially accurate in his description. However, there is an implicit moral imperative that guides this new American way of war, namely that such precision and lethal military capability be used with the greatest of care to avoid noncombatant casualties and minimize collateral damage.²⁹⁰ Unlike what Ricks describes, this moral imperative is not new. It is derived directly from the just war tradition. This imperative carries with it great ethical obligations. Modern

²⁸⁷ Dolman, 148.

²⁸⁸ Fareed Zakaria, “Face the Facts: Bombing Works,” *Newsweek*, 3 December 2001, 53.

²⁸⁹ Quoted in Michael Kelly, “The American Way of War,” *The Atlantic Monthly*, June 2002, n.p., on-line, Internet, 21 May 2002, available from <http://www.theatlantic.com/issues/2002/06/kelly.htm>.

²⁹⁰ It is possible to make a pragmatic argument that the desire to avoid noncombatant casualties and minimize collateral damage merely reflects aspirations to maximize overall efficiency. These arguments are made absent any consideration of the just war tradition.

military “technology,” remarked a Pentagon spokesman recently, “has given us a great capability and a great responsibility” to be more discriminating.²⁹¹ This statement recognizes the importance of these obligations.

Aerial bombing campaigns will always carry the risk of killing innocent noncombatants (or unintended combatants). In war, noncombatants can die in predominantly three ways as a direct result of military action. First, they die if combatants disregard the laws of war and purposely target them. This would be a crime against humanity and US perpetrators would be prosecuted in accordance with the *Uniform Code of Military Justice*. Second, noncombatants can become unintended casualties as a result of weapon system malfunction, human error, or the fog of war. Such losses are regrettable, and while efforts will be made to prevent the incidents from happening again, no legal culpability is normally assessed. Finally, noncombatants can die due to the collateral damage resulting from an attack on a legitimate military target judged appropriate according to the application of the principle of double effect.²⁹² Today, in most all cases, the U.S. seeks to minimize collateral damage and avoid civilian casualties.

Perfect aerial precision would greatly enhance American efforts to maintain this highest of moral standards. The development of aerial precision, as we have seen, has been characterized by an intense desire to overcome ethical injunctions against engaging noncombatants. It is clear that indiscriminate bombing causes broad collateral damage and blatantly disregards American moral virtues that include the dignity and natural rights inherent in every individual. This fact is not in question. The dilemma is just how far a perfect aerial precision capability would raise the moral high bar. Given the new American way of war and historically sound efforts to follow the *jus in bello* criteria in the just war tradition, this work postulates the emergence of a new moral sanctuary associated with a perfect aerial precision capability.²⁹³ Within this moral sanctuary, the more precise our aerial weapons become, the more morally repugnant collateral damage and all casualties become to Americans. Our efforts to achieve casualty avoidance on and off the battlefield would now not only include noncombatants (in accordance with the just war tradition) and American or allied combatants but

²⁹¹ US Army Major General Stanley A. McChrystal, Joint Staff Vice Director for Operations, as quoted in Gerry J. Gilmore, “Precision Munitions Provide ‘Great Capability,’ Carry ‘Great Responsibility,’” Armed Forces Press Service, 3 April 2003, n.p., on-line, Internet, 4 April 2003, available from http://www.defenselink.mil/news/apr2003/n04032003_200304037.html.

²⁹² Of note, starvation, lack of access to medicines, etc. can also lead indirectly to noncombatant casualties.

²⁹³ *Sanctuary* is defined as a sacred and inviolable asylum or a place of refuge or protection.

enemy combatants as well. The emerging moral sanctuary might then call into question whether the principle of double effect remains justifiable in the future.

Clausewitz wrote, “War is not a mere act of policy, but a true political instrument, a continuation of political activity by other means.”²⁹⁴ Because war or the use of military force is a political act, any attempt by the U.S. to forego all concerns of collateral damage in this age of instant media would be an act of political suicide. Thomas Ehrhard describes current US efforts to limit collateral damage as “nothing short of an obsession.”²⁹⁵ For it not to be, argues Ehrhard, would be “anti-Clausewitzian.”²⁹⁶ Perfect aerial precision threatens to strengthen this obsession even further to include limiting enemy combatant casualties as well.

The roots of this new moral sanctuary reach deep into the just war tradition. Within the tradition, there is an understanding, implicit or explicit, of how to consider and treat enemy combatants. Michael Walzer calls this relatively obscure concept the “moral equality of soldiers.”²⁹⁷ The *jus ad bellum* criterion of right intention and the *jus in bello* criterion of proportionality of means provide the moral foundation for the concept. The former is best described as a respect for the dignity of individuals. J.T. Johnson describes the latter as avoiding the gratuitous or unnecessary harm of others.²⁹⁸ The moral equality of soldiers principle historically served to humanize the enemy. The emergence of a moral sanctuary due to perfect aerial precision, however, uses the principle to re-humanize enemy combatants.

Writing in response to the shocking events of 11 September 2001, Martin Cook declared, “Military necessity permits actions that might otherwise be ethically questionable.”²⁹⁹ While acts in defense of the state’s *survival* are often accorded an ambiguous moral threshold, the current War on Terror does not have such an imperative. The emerging moral sanctuary would not permit such actions. The fundamental concept of the moral equality of soldiers is that the enemy combatant has inherent dignity and worth. While soldiers are not often responsible for the *jus ad bellum* declaration of war, they are always accountable for how enemy combatants

²⁹⁴ Carl von Clausewitz, *On War*, ed. and trans. Michael Howard and Peter Paret (Princeton, N.J.: Princeton University Press, 1976), 87.

²⁹⁵ Thomas Ehrhard, Colonel, US Air Force, School of Advanced Air and Space Studies, interviewed by author, 31 March 2003.

²⁹⁶ Ibid.

²⁹⁷ Michael Walzer, *Just and Unjust Wars*, 3d ed. (New York: Basic Books, 1977), 34.

²⁹⁸ J.T. Johnson, *Morality and Contemporary Warfare* (New Haven, Conn.: Yale University Press, 1999), 28.

²⁹⁹ Martin L. Cook, “Ethical Issues in Counterterrorism Warfare,” *Ethics Update*, September 2001, n.p., on-line, Internet, 5 February 2003, available from <http://ethics.acusd.edu>.

(and noncombatants) are considered and treated within war *jus in bello*.

Over time, the theory has grown that the less face-to-face contact combatants have with one another, the easier it is to dehumanize or objectify and then kill them. According to Grossman, increasing the distance between combatants allowed for an increase in the degree of aggression during all recent conflicts.³⁰⁰ Airpower contributed to this trend by separating the airman from the soldier in the trenches, both physically and culturally. However, with the emergence of perfect aerial precision and the ability to better identify and discriminate targets, the moral sanctuary restores the dignity and worth to all enemy combatants that appeared lost during total or indiscriminate war.

From a purely military mindset, there may appear to be a conflict between accomplishing the mission to defeat the enemy and expressing compassion toward that very same enemy. Such compassion during war might yield a military advantage to the adversary and put US combatants at risk. The principle of double effect addresses these valid concerns that any competent commander would have. Perfect aerial precision and the moral sanctuary, however, reintroduce compassion as a military virtue. According to A.J. Coates, “what lies behind the criterion of proportionality is a basic respect for life” that demands commanders not inflict undue or unnecessary suffering on their adversaries.³⁰¹ Perfect aerial precision will likely reinvigorate this respect for life and the moral equality of soldiers in the form of the new moral sanctuary.

The dilemma boils down to an assessment of what constitutes disproportionate casualties during warfare made increasingly discriminate by aerial precision. According to recent Department of Defense statistics, though the total number of participating soldiers, airmen, sailors, and marines has varied tremendously in each engagement from World War I to the present, total US casualties have decreased dramatically since Vietnam.³⁰² In World Wars I and II, Korea, and Vietnam, the casualty ratio remained constant, averaging one in fifteen. During Operation Desert Storm in 1991 (the first true aerial precision war), the ratio decreased to 1 in 784. The latest figures from Operation Iraqi Freedom in 2003 indicate an even greater acceleration of this trend. As of 3 April 2003, the ratio had decreased to only 1 in 1,485. The

³⁰⁰ Grossman, *On Killing* (New York: Little Brown & Company, 1995), 156.

³⁰¹ A.J. Coates, *The Ethics of War* (New York: Manchester University Press, 1997), 227.

³⁰² Quoted in Adrienne Lewis, “Counting Casualties,” *USA Today*, 4 April 2003, 4A. The following analysis is based on Department of Defense (DoD) statistics as presented in the Lewis article. In the DoD study, casualties represent individuals both killed and wounded. The casualty ratio used here compares total number of casualties to the total number of military participants in a given theater of operations.

new moral sanctuary captures this trend and transposes it to enemy combatants as well. While exact figures for enemy casualties are next to impossible to calculate, the expectation of lower enemy casualty rates in this era of advanced aerial precision continues to grow in both military and civilian circles. In the moral sanctuary, disproportionate enemy casualties equate to disproportionate damage in the spirit of the just war tradition. As Michael Ignatieff recently wrote, “War ceases to be just when it becomes a turkey shoot.”³⁰³

Perfect aerial precision allows for the possibility of victory without a huge cost in human lives. Military analyst William Arkin calls this a strategy that favors “focus over scale.”³⁰⁴ Max Boot writes, “In many ways, the U.S. has gone beyond the chivalrous warfare of the 18th and 19th centuries. Nowadays, the military tries to spare not only civilians, but enemy combatants as well.”³⁰⁵ As Boot recounts, on 9 March 1945, more than 300 Boeing B-29 Superfortresses bombed Tokyo, Japan, killing an estimated 84,000 people, mostly civilians.³⁰⁶ In total contrast, during Operation Iraqi Freedom, bombs fell precisely on Baghdad while shopkeepers kept their stores open and cafes served lunch. In addition, prior to the movement of US ground forces to engage the Iraqi Republican Guard assessed as protecting the approaches to Baghdad, the aerial weapons of first choice were leaflets not bombs. The goal was to give the Iraqi military units an opportunity to surrender before precise joint air and ground operations destroyed them. This practice exemplifies the emerging moral sanctuary.

Boot is correct when he writes, “Moral standards have changed because technology has changed.”³⁰⁷ This is an important theme of this work as well. The dilemma of casualty avoidance and the moral sanctuary is already emerging. A perfect aerial precision capability will strengthen the influence of the moral sanctuary on political decision makers and military strategists. The next dilemma may then be what to do when an inhumane adversary uses our humanity against us.

Centralized Control, Centralized Execution

One of the most established tenets of the use of airpower is that offensive air operations should be characterized predominantly by centralized control, command, and planning, and by

³⁰³ Michael Ignatieff, *Virtual War: Kosovo and Beyond* (New York: Metropolitan Books, 2000), 161.

³⁰⁴ William M. Arkin, “A War of Subtle Strategy,” *Los Angeles Times*, 23 March 2003, M1.

³⁰⁵ Max Boot, “Sparing Civilians, Buildings, and Even the Enemy,” *New York Times*, 30 March 2003, n.p., on-line, Internet, 30 March 2003, available from <http://ebird.dtic.mil/Mar2003/e20030330169177.html>.

³⁰⁶ Ibid.

³⁰⁷ Ibid.

decentralized execution. Perfect aerial precision threatens to turn this airpower tenet inside out, however. As technical capacities for battle space management multiply, centralized control *and* centralized execution may become recognized as the more effective means of employing aerial precision within the constraints of the just war tradition. Remote commanders and high-level decision makers could make tactical execution decisions in real time. The moral dilemma inextricably tied to the question of whether centralized control is best complimented by decentralized or centralized execution thus merits serious consideration.

Any discussion of the human element in war must begin with leadership.³⁰⁸ Human factors, according to Jeffrey Cooper, have as much [if not more] to do with military effectiveness than the technical performance of any weapons system.³⁰⁹ According to *US Army Field Manual 3-0*, leadership is the most dynamic element of combat power.³¹⁰ It focuses all the other elements, and is the primary catalyst creating conditions for military success. Audacious and competent leaders, according to doctrine, make the difference in battle. Battle command, the “exercise of command in operations against a hostile, thinking enemy,” is that aspect of leadership most critical for military success.³¹¹ With or without a perfect aerial precision capability, the ability of air commanders to exercise battle command and leadership is essential to the maintenance of American military capacity.

Courage and leadership both empower and cultivate initiative. Initiative is not a uniquely American warrior trait, but US military capacity and doctrine would be moot without it. During World War II, the concept of *Auftragstaktik* was central to the German warfighting philosophy. Drill manuals at the time stipulated that commanders should give their subordinates general directions on what to do while allowing them total freedom to determine how to do it. This approach developed thinking leaders who improvised, adapted, and overcame to exercise sound tactical judgments.³¹² *Auftragstaktik* has traditionally been codified in the “old” American way

³⁰⁸ This discussion of leadership and initiative is based on a previous work by this author. See Scott F. Murray, “Battle Command, Decisionmaking, and the Battlefield Panopticon,” *Military Review* 82, no. 4 (July-August 2002): 46-51.

³⁰⁹ Jeffrey R. Cooper, “Strategy,” in *Air and Space Power in the New Millennium*, eds. Daniel Gouré and Christopher M. Szara (Washington, D.C.: The Center for Strategic & International Studies, 1997), 85.

³¹⁰ *US Army Field Manual 3-0 Operations* (Washington, D.C.: Department of the Army, 2001), 4-7.

³¹¹ *Ibid.*, 5-1.

³¹² John T. Nelson, “*Auftragstaktik*: A Case for Decentralized Combat Leadership,” in *The Challenges of Military Leadership*, eds. Lloyd Matthews and Dale E. Brown (McLean, Va.: Pergamon-Brassey’s International Defense Publishers, Inc., 1989), 27.

of war through the use of commander's intent and the tenet of centralized control with decentralized execution.

The emergence of a network-centric warfare environment threatens to change the doctrinal concept of decentralized execution, and in the process could degrade the ability of military commanders to display initiative.³¹³ Aerial precision is a key component of this “new” environment. Ideally, in network-centric warfare, the senior commander has an unhindered, all-encompassing view of the contemporary operating environment due to the capabilities provided by space-based systems such as the Global Positioning System and complex communications architectures. With the threat of being second-guessed always hanging over them, the initiative of subordinate commanders could therefore be stifled because individuals lead and act differently while being watched.³¹⁴ In this way, initiative could be rendered obsolete if centralized control and centralized execution methods of military operations become the norm. As Cooper notes, no other nation emboldens the critical human element in combat more than the US.³¹⁵ Therefore, the question becomes can the time-tested doctrine of *Auftragstaktik* and the initiative of subordinate commanders endure in an environment characterized by increasing aerial precision and network-centric warfare.

Two recent military operations illustrate clearly this moral dilemma. In November 2002, a US RQ-1 Predator unmanned aerial vehicle launched a single AGM-114C Hellfire precision missile into an automobile traveling through the Yemeni desert, killing all six occupants. Among the dead was Qaed Salim Sinan al-Harethi, the reported al-Qaida mastermind behind the October 2000 terrorist attack against the US Navy destroyer USS Cole.³¹⁶ Thomas E. Ricks reported that in October 2001, during Operation Enduring Freedom in Afghanistan, the US Air Force believed it had top Taliban and al-Qaeda leaders in its sights using Predators armed with Hellfire missiles as many as ten times, but was unable to gain clearance to fire in sufficient time

³¹³ For an in-depth discussion of network-centric warfare, see David S. Alberts, John J. Garska, and Frederick P. Stein *Network Centric Warfare: Developing and Leveraging Information Superiority* 2d ed. rev. (Washington, D.C.: Department of Defense C4ISR Cooperative Research Program, 2000). Note that while the concept of network-centric warfare has been popularized of late, the moral and ethical ramifications of it have been given much less thought than the pure technological limitations, such as bandwidth requirements.

³¹⁴ Jeremy Bentham described this tendency as the “Panopticon effect” when designing his radical eighteenth century penitentiary “as a mill for grinding rogues honest.” See John Stuart Mill and Jeremy Bentham, *Utilitarianism and Other Essays*, Alan Ryan ed. (London: Penguin Books, 1987), 33.

³¹⁵ Cooper, 85.

³¹⁶ For specific details of this operation, see Evan Thomas and Mark Hosenball, “The Opening Shot,” *Newsweek*, 18 November 2002: 48-9; and “Vince Crawley and Amy Svitak, “UAV Strike Raises Moral Questions,” *Air Force Times*, 18 November 2002: 16.

to kill these individuals.³¹⁷

Both the successful use of the Predator/Hellfire combination in Yemen and the failure of senior commanders to authorize its timely execution in Afghanistan raise moral questions. Dubbed “Predator Morality” by the *Wall Street Journal*, the use of an unmanned aerial vehicle armed with precision-guided munitions calls into question the future status of the traditional human element of war.³¹⁸

According to Thomas and Hosenball, the Bush administration apparently spent little time debating the morality of using Predator to “hunt and kill Qaeda men in their lairs.”³¹⁹ In contrast, Westhusing describes a sloth-like US Central Command targeting process where nothing short of an obsession to avoid noncombatant casualties prevented timely use of the Hellfire-armed Predators against key enemy leaders.³²⁰ These two examples describe several facets of command and initiative dilemma brought about in part through the proven success of aerial precision. The network-centric environment, enhanced by aerial precision, could completely erode traditional forms of military leadership and decision-making. According to Sam Sarkesian, commanders may fall into a “ready, aim, aim, aim, aim, aim, ...” trap.³²¹ Here decision makers wait for that final key piece of information before making and implementing a decision, always poised to give the word but ultimately never firing.³²² At the other extreme, aerial precision gives commanders the ability to watch patiently and strike quickly and discriminately, like a sniper lying in wait.

This is why leadership is an art and not a science. There are no systematic rules for the exercise of initiative. Aerial precision and the drift toward centralized control with centralized execution foster a complex decision making environment where the exercise of initiative is made more difficult. Once again, the moral and ethical dilemmas of war are magnified by the pursuit of perfect aerial precision. Such warfare, according to Ignatieff, is a seductive and dangerous illusion, because it muddies the influence of the human element.³²³

³¹⁷ See Thomas E. Ricks, “Target Approval Delays Cost Air Force Key Hits,” *Washington Post*, 18 November 2001; and Ted Westhusing, “Targeting Terror: Killing Al Qaeda the Right Way,” *Journal of Military Ethics* 1, no. 2 (2002): 128-35.

³¹⁸ “Predator Morality,” *Wall Street Journal*, 20 February 2002.

³¹⁹ Thomas and Hosenball, 48.

³²⁰ Westhusing, 130.

³²¹ Sam C. Sarkesian, “The Sorcerer’s Apprentice: Social Science and the American Military,” in *Tooling for War: Military Transformation in the Industrial Age*, ed. Stephen D. Chiabotti (Chicago: Imprint Publications, 1996), 239.

³²² *Ibid.*, 239-40.

³²³ Ignatieff, 212-4.

Conclusion

Full appreciation of the many moral, social, and political dilemmas associated with the emergence of a potentially perfect precision capability remain elusive. This work identified three such dilemmas—the decision to go to war, casualty avoidance and the moral sanctuary, and centralized control with centralized execution—and showed how the just war tradition of moral reasoning influences them significantly. These examples are certainly not exhaustive. They are, however, representative of the kinds of issues inherent in interaction of an emerging technology and an established, accepted moral theory.

Russell F. Weigley noted in his 1977 classic, *The American Way of War*, that “to seek refuge in technology from hard questions of strategy and policy [was a] dangerous American tendency.”³²⁴ The intent in describing these dilemmas is to shed light on the sometimes counter-intuitive, technology-driven outcomes of generally desirable policies and strategies. If the reader has more questions than answers at this point, then this work has fulfilled its intent.

³²⁴ Russell F. Weigley, *The American Way of War* (New York: Macmillan, 1977), 416.

CHAPTER 5

CONCLUSIONS

When it is not a question of acting oneself but of persuading others in discussion, the need is for clear ideas and the ability to show their connection with each other.

Carl von Clausewitz (1827)

There are no easy answers, but there are simple answers. We must have the courage to do what we know is morally right.

Ronald Reagan (1964)

If the purpose of our endeavors is to create a better world, then we require a special sort of creativity that blends thought and imagination without negating obstacles to change. We require, in effect, an understanding of those elements of structure that resist change, as well as a feel for the possibilities of innovation that lie within the shadowland cast backward by emergent potential structures of power.

Richard A. Falk (1981)

The full effects of the revolution in precision guidance are only just becoming apparent.

Michael Ignatieff (2000)

Through the first half of the twentieth-century, the pursuit of a robust aerial precision capability was a major if unrealized goal of airpower theorists and tacticians the world over. Some of the hurdles airpower needed to surmount included limitations of basic aerodynamics, distance, geography, night operations, weather, and guidance. Such technical difficulties, it was widely perceived, could be overcome with dedicated funding and sustained scientific research and development. The payoff was a more lethal, efficient, and effective weapon with a compelling cost-utility argument. Area bombing, while potentially devastating, had severe political, economic, and military disadvantages that the promise of mass precision bombing would sweep aside.

The toughest challenge, however, was to overcome ethical injunctions against engaging and/or killing noncombatants. Indiscriminate area bombing causes broad collateral and unintended damage, and blatantly disregards declared American moral values. While the move to total war began well before the Wright Brothers, the traditional moral sanctuary of

noncombatants was increasingly violated largely with the rise of airpower's capacity for strategic bombing. In partial response, the latter half of twentieth century airpower development has been more attentive to the technical development of precision-guided munitions. The practical transition was evident during the Vietnam War. Today, with the experiences of Operations Desert Storm, Allied Force, and, most recently, Enduring Freedom and Iraqi Freedom under its belt, aerial precision is clearly the centerpiece of US airpower operations. In the process, aerial precision has become airpower's contribution to the just war tradition.

Aerial precision is not only a proven tool of US combat capability. It now represents a moral obligation that will continue to exert increasing influence. Airpower is the most flexible, discriminate, and proportional lethal and nonlethal weapon of choice in the American arsenal. It will likely be the preferred first choice US military instrument of national power for prosecuting military operations. It has the potential to provide the nation's political leaders with the means to achieve national strategic objectives with minimal loss of life for all involved sides. American airpower in the twenty-first century will be characterized by the use of aerial precision to cause less not more death and destruction in accordance with the just war tradition to achieve national strategic objectives.

The Shadowland

War is a rule-governed activity characterized by the conditioned, regulated, and measured application of force, military potential, and patience. When decision makers attempt to exert influence in the international realm to achieve a chosen strategic effect, they may choose military action as the means. When the result is violent death within an adversary's population, military action equates to conventional or protracted revolutionary or internal war, whether declared or otherwise. All such activities fall under the sway of international norms and standards, and so the regulation of force, military potential, and patience is a moral and ethical imperative. Domestic values and popular support also influence the decision making process. An effort to conduct military operations under morally justified conditions and with the intent of minimizing the loss of life and property is an increasingly important part of the emerging twenty-first century American way of war. This has not always been the case.

War has traditionally been characterized by the desire to use of overwhelming force to achieve quick and decisive victory. Moral and ethical concerns, under this model, were often relegated to trivial significance. At best, morality could be linked directly with how quick and

decisive a campaign was; quick wars were better than long ones, and decisive ones limited future disputes, yet even this trite justification could be casually disregarded. As Colin Gray observes, “No sound strategic history of the twentieth century would spend many pages on morality and ethics as independent shapers of strategic behavior.”³²⁵ Nonetheless, this interpretation appears decidedly anti-Clausewitzian. Holistically, war, as an extension of policy by other means, is a profoundly human instrument. It is a fundamental part of the human condition. Ethics in war is not an aside. War, by its very nature, directly engages our moral judgment.

In the twenty-first century, the American purpose of war, while never neglecting vital security interests, will be to advance peace, human rights, and the liberal democratic principle of self-determination. Americans in the main embrace a universalistic ethic that assigns basic rights and respect to individuals by virtue of their humanity. Their government explicitly recognizes the moral worth of all persons. This essential American ethic symbolizes the nation’s moral stance, and will be the essential characteristic of the American way of war in this new century.

Americans possess an outlook best described as practical realism, recognizable in the pure offensive realism found in Thucydides’ *History of the Peloponnesian War*, but informed by the obligations of moral and ethical reasoning. Thus, American decisions to wage and conduct war have tended to be in strict accordance with the just war tradition, a Judeo-Christian theological component, and with international law, a secular rationalist component. These elements combine to make all aspects of war rule-governed activities. Rules can be broken, of course, but doing so has severe repercussions that are receiving increased attention in a world where technology and morality are perennially intertwined.

Perfect aerial precision is a theoretical construct so far unrealized in combat. It does represent an emergent ideal, however, a potential structure of power for America supportive of its aims and place as the world’s lone superpower. But the potential ahead casts a shadowland behind. Within the shadowland, as revealed in Falk’s epigraph at the start of this chapter, it is possible to discern openings that contain significant potential for change, including the prospect of exerting unprecedented influence on the character of the emergent system. The potential impact of perfect aerial precision appears limitless. Yet, as we have seen, there are dilemmas that must be discerned with special attention to the particulars.

³²⁵ Colin S. Gray, *Modern Strategy* (Oxford: Oxford University Press, 1999), 69.

Twenty-First Century Airpower Characteristics

American air operations will progressively be conducted on strategic and operational levels strictly under just war principles, minimizing casualties on all sides in order to bring about a swift and equitable end to conflicts. It is clear, in the most Clausewitzian sense, that there is a relationship between legitimacy, collateral damage, and friendly and noncombatant casualties. As munitions become more and more precise, this relationship is likely to include enemy combatant casualties, as well. As Michael Ignatieff correctly observes, in the twenty-first century, war will cease to be moral when it becomes a “turkey shoot.”³²⁶ Today, the American concern for limiting collateral damage often appears to be nothing short of obsession. In the twenty-first century, this obsession will continue to intensify, and will greatly influence future air operations.

If the American way of war is the conditioned, regulated, and measured application of force, military potential, and patience, then the essence of airpower is found in its inherent discriminate and proportional flexibility. Again, aerial precision is airpower’s modern contribution to the just war tradition. To apply morality to air operations, the United States will likely employ precision-guided munitions to wage effective campaigns while minimizing the impact of weapons on both noncombatants and enemy combatants alike. It will use lethal and nonlethal means that target military capabilities exclusively, and that reduce collateral and unintended damage in ways unimaginable just ten short years ago. Precision-guided munitions may have created a new sense of morality in the American psyche: because precision strike is possible, it *must* therefore be done.

Aerial precision has obviously changed the way war is conducted. Over the last century, airpower has overcome many physical and political sanctuaries to become the dominant arm of American military force. The last sanctuary to emerge may be best described as a moral one, where less killing and destruction is preferred more than overwhelming force with the potential for indiscriminate killing and widespread destruction. Adversaries will surely seek to exploit this sanctuary, making the decision to go to war and American conduct during war extremely difficult. Military targets will be collocated with humanitarian facilities like hospitals and schools. Combatants will continue to pose as noncombatants, or use noncombatants to shield themselves. Ingenious new methods to exploit American ethical limitations in war will be

³²⁶ Michael Ignatieff, *Virtual War: Kosovo and Beyond* (New York: Metropolitan Books, 2000), 161.

devised, but this retreat into barbarism enhances rather than detracts from the moral imperative. How airmen respond to the challenge of maintaining military superiority without violating the moral sanctuary will define the next century's American way of war.

Modern airpower has two incredible strengths to assist in this effort—discrimination and proportionality. It is not without weakness, however, the major detraction being a capacity for “gratification without commitment.”³²⁷ Both these strengths and this weakness converge to form the two most important issues for my twenty-first century American theory of airpower—casualty avoidance and risk aversion. Despite the increased per-weapon lethality of aerial precision, an expectation of fewer casualties on all sides is generally accepted. At the same time, as technology yields more standoff precision-guided munitions, airmen are subject to less risk. Unless aerial precision is made increasingly accurate (aiming toward the theoretical point of perfect precision), these disparate developments could threaten one of the main principles of the just war tradition. As it stands, by virtue of their profession and the American ethic, airmen are *expected* to assume more lethal risk to *themselves* in order to avoid killing noncombatants.

Just war, then, in accordance with the new American way of war, represents the convergence of ethics and efficiency. In the twenty-first century, airpower using aerial precision will afford political leaders the option to apply a minimum level of force necessary for accomplishing moral ends. Military strategists must then recognize and plan for this political and moral imperative.

The Future

The symbol of America's military prowess is now aerial precision and not a mushroom cloud. The preferred ordnance for attacking military targets in the future will likely remain precision-guided munitions. That said, political constraints and aims will continue to shape air operations.

Airpower effectiveness in the future should be far more of the mind than of the machine. The invigorated sense of American morality, empowered by aerial precision, will demand less destruction and certainly less killing of both noncombatants and enemy combatants. Unmanned technologies and currently untapped space power will feed into this moral imperative to create a demand for more precise, perhaps even perfect, aerial precision. These emerging moral

³²⁷ Elliot A. Cohen, “The Mystique of U.S. Air Power,” *Foreign Affairs* 73, no. 1, January/February 1994, n.p., online, Internet, 20 March 2003, available from <http://www.bowdoin.edu/~prael/140/cohen.html>.

inhibitions will also demand better intelligence, surveillance, and reconnaissance capabilities. Airpower is targeting and targeting is intelligence.³²⁸ [Can you cite this?] This will continue to be the case in the future.

This American brand of practical realism is not without significant hurdles. In the future, adversaries will seek advantage by exploiting American morality and its dedication to just war principles, particularly *jus in bello* considerations. In addition, the material influence on airpower effectiveness could continue to demand high tech, politically visible aircraft like the F/A-22 and the Joint Strike Fighter to the detriment of the human dimension of warfare. Network-centric warfare also threatens the foundation of the human dimension. In an age of limited resources, the tendency to train as one has fought in the past also represents a significant hurdle. In the past, airpower wrought untold destruction in support of the attainment of national strategic objectives. In the future, airpower will be asked to accomplish the same objectives with exactly opposite means.

Finally, the effectiveness of American airpower in the twenty-first century will rest upon a continued strong relationship between the American people and their government. Aerial precision presents political leaders with the opportunity to achieve national objectives with minimal loss of life. To use airpower in ways that do not support this moral imperative could threaten this sacrosanct relationship.

Final Thoughts

Airpower in the twenty-first century must adeptly handle a double-edged sword. Advancing technologies have wrought dramatic developments in airpower capabilities. Aerial precision is the most promising of these emerging technologies. On the other side, the very speed and extent of these technological developments have made it difficult to formulate enduring concepts for airpower employment. If one begins at the most fundamental level of war—the human dimension—answers await, and a sound, discerned airpower theory will likely emerge.

American airpower has a distinct moral component in accordance with the American universalistic ethic. The most rational objective of any state is to pursue its vital security interests without resort to war or violence. In the twenty-first century, in accordance with the

³²⁸ Phillip S. Meilinger, *10 Propositions Regarding Air Power* (Washington, D.C.: Air Force History and Museums Program, 1995), 20.

just war tradition, less not more killing and destruction will be the norm if war becomes the option of choice. Airmen, as thinkers and not just doers, have a moral obligation to pursue this option using aerial precision. The moral inhibitions of American air commanders, politicians, and the American people will continue to enhance the influence of the just war tradition in the pursuit of US national interests. Aerial precision, as airpower's modern contribution to the just war tradition, is therefore the foundation of American airpower theory in the twenty-first century.

Everett Dolman recently noted, "No one can reliably predict the unforeseen (by definition), but we can identify trends and broad changes that seem likely to impact US defense policy and military operations for the next several decades."³²⁹ The quest for perfect aerial precision represents one of the most significant future trends for political decision makers and military strategists alike. Better, more just, and well-discerned political and military decisions cannot escape the dilemmas identified in this work. As Walter J. Boynes rightly notes, "No military service in history has ever had placed upon it the requirement for victory at a minimum cost to both sides."³³⁰ The future remains unknown but aerial precision will no doubt play a significant part in any twenty-first century outcome.

³²⁹ Everett C. Dolman, "Military Intelligence and the Problem of Legitimacy: Opening the Model," *Small Wars and Insurgencies* 11, No. 1 (Spring 2000): 27.

³³⁰ Walter J. Boyne, *Beyond Wild Blue: A History of the United States Air Force, 1947-1997* (New York: St. Martin's Griffin, 1997), 7.

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