

**STUDYING
AIRPOWER**
**EIGHT ESSENTIAL THEMES
FOR PRACTITIONERS**

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Eight integral themes are essential to the study of airpower. These include the history and efficacy of strategic bombardment, a more nuanced model for airpower, balancing direct and indirect airpower, enabling airpower for the future fight, analyzing continuity and change in the history of airpower, civil-military relations, and the role of airpower in the context of other domains of warfare. A strong intellectual grounding in these areas will prepare future Air Force leaders for strategic and operational success.

Most airpower students can relate to the endlessly increasing stack of books in the “to-read” pile on one’s desk or bedside table.¹ What is worth pursuing and what offers less value? An analysis of classics in the field of airpower studies yields eight integral themes ranging from civil-military relations to the challenge of balancing the study of kinetic airpower with the study of nonkinetic airpower. Acquiring a solid foundation in these eight areas will help Airmen stay grounded in firm intellectual territory when preparing for airpower’s future employment. Importantly, these themes span the entirety of airpower history, because history provides enduring lessons from the strategic and operational levels of war, as opposed to the tactical where change occurs more frequently.

**Theme One: The Rise and Fall of
Strategic Bombardment Theory**

What is the most effective use of airpower? Today, the answer to that question is a resounding “it depends,” given a conflict’s particular context. But those who attended British and American staff colleges in the interwar period between World War I and World War II had a different answer: strategic bombardment.

The notion or theory of strategic bombardment—using airpower to target factories and even factory workers, among other targets, in contrast to concentrating airpower on an enemy’s fielded forces—took root even before those aforementioned staff colleges were established for Airmen. The battle for the skies began over cities in the pages of science fiction. H. G. Wells’ *War in the Air*, written four years after the

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1. Thank you to the anonymous peer reviewers for their helpful feedback, which I greatly appreciate.

Wright Brothers first flew, epitomizes this type of fiction, especially viewed from the hindsight of 100 years of airpower history.

Wells depicted a massive fleet of airships flying from Germany to New York City where a panicked and terrified mayor quickly surrendered. But what came next in the plot proved equally prescient: angered citizens armed themselves and took to the streets. Strategic bombardment did not offer the shortcut to victory the fictional German leaders envisioned. One could destroy a city, yet the city could remain “too strong to be occupied.”²

Reality partially echoed fiction in World War I. The kind of air warfare Wells had imagined did occur, although it had a relatively limited material effect on London considering the scale of that war. Still, it elicited an outsized psychological reaction: the British hoped to launch a vast fleet of bombers against German cities in 1919.

Even at the end of the war, bombers made up less than 10 percent of every nation’s air force except those of France and Britain, whose fleets consisted of 15 and 22 percent respectively.³ Moreover, many of those aircraft were day bombers used over the Western Front, with purpose-built, long-range bombers a rarity even in Britain. This reality explains why British bombers dropped 6,402 tons of bombs on the Western Front compared to the Royal Air Force’s short-lived Independent Force dropping a mere 537 tons on Germany.⁴

Dropping bombs is one thing; measuring their effect is another. Germany’s bombing efforts, for example, cost the British about three million pounds in property damage. But, as Robin Higham acerbically noted, to place that number in perspective, hungry rats caused about 70 million dollars in property damage each year.⁵ Similarly, the British admitted their efforts had little material effect on Germany, preferring instead to celebrate the more questionable morale effect British bombing had on German civilians.⁶ Theory outran capability thus keeping the alluring promise of strategic bombardment alive.

The aircraft responsible for far greater strategic effect during the war were those that provided intelligence, spotted for artillery, and fought to achieve air superiority. The powerful theory of strategic bombardment therefore remained untested. Thus arose a conundrum early in airpower’s history regarding the best way to employ it. Some Airmen in leadership positions in the United States and Great Britain were

2. H. G. Wells, *The War in the Air* (London: *Pall Mall Magazine*, 1908; reprint, independently published, 2012), 147.

3. John H. Morrow Jr., *The Great War in the Air: Military Aviation from 1909 to 1921* (Washington, DC: Smithsonian Institution Press, 1993), 346.

4. Richard J. Overy, “Strategic Bombing before 1939: Doctrine, Planning, and Operations,” in *Case Studies in Strategic Bombardment*, ed. R. Cargill Hall (Washington, DC: Air Force Historical Studies Office, 1998), 24.

5. Robin Higham, *Air Power: A Concise History* (New York: St. Martin’s Press, 1972), 57.

6. Tami Davis Biddle, *Rhetoric and Reality in Air Warfare: The Evolution of British and American Ideas about Strategic Bombardment, 1914–1945* (Princeton, NJ: Princeton University Press, 2009), 57.

deeply enamoured with the theory of strategic bombardment, even if most airmen believed airpower had provided its most important contributions on the battlefield.

Practical concerns amplified this tempting theory. Not only did leaders seek to avoid the human costs of the World War I battlefield, but the theory of strategic bombardment helped justify retaining the new independent status of the Royal Air Force, keeping it in existence at a time of extreme budgetary challenges.

This period in history holds key implications for today's theoretical arguments in the space and cyber domains. The same kind of tension between tactical and strategic airpower is echoed between those who advocate for focusing more on developing space capabilities that support warfare occurring on Earth—brown-water spacepower—as opposed to those who argue for more independent spacepower capabilities—blue-water spacepower.⁷

Blue-water advocates contend the key lesson from airpower's early trajectory is that the Air Force today treats the Space Force much like the World War I-era US Army treated the future US Air Force. The more pertinent lesson may be that the Space Force must balance a range of missions far better than the newly independent Air Force did. One of the key challenges is determining what the right pursuit of blue- and brown-water capabilities in the near, mid- and far term looks like.⁸

Theme Two: Strategic Bombing Can Work

Airpower students should appreciate how dogmatically many Airmen have embraced the notion of strategic bombardment. They should also recognize that strategic bombardment can work and that it has helped nations achieve their pursuit of political objectives, albeit rarely as decisively or independently as some airpower zealots have argued.

This assertion challenges Robert Pape's classic *Bombing to Win: Air Power and Coercion in War*. This intriguing, important book deserves to be read. Problematically, however, Pape built his work on a straw man by asserting that the US Air Force of 1996 thought very similarly to the Army Air Corps of 1930 or even the US Air Force of 1965.⁹ In other words, Pape insisted strategic bombardment—which he conflated with punishment bombing or the deliberate targeting of civilians in hopes of affecting leaders' decision-making calculus—dominated Air Force thinking even after the Vietnam War.

Despite the existence of a small and vocal contingent of advocates, including John Warden and his acolytes, strategic bombardment did not dominate Air Force thinking after the Vietnam War.¹⁰ The institution's 1984 version of its *Basic Doctrine*, for

7. Malcolm Davis, "Towards a Blue-Water Space Force?," Australian Strategic Policy Institute, May 19, 2020, <https://www.aspistrategist.org.au/>.

8. Davis, "Blue-Water Space Force?"; and Michael Horowitz, "War by Timeframe: Responding to China's Pacing Challenge," War on the Rocks, November 19, 2021, <https://warontherocks.com/>.

9. Robert Pape, *Bombing to Win: Air Power and Coercion in War* (Ithaca, NY: Cornell University Press, 1996).

10. John A. Warden III, "Strategy and Airpower," *Air & Space Power Journal* 25, no. 1 (Spring 2011).

example, recognized strategic attack could be important. Even then, though, it suggested its use in conjunction with a host of other missions, noting that “[m]odern warfare has demonstrated the potential importance of strategic attacks against targets in an enemy’s heartland.”¹¹ In the 1992 version of the doctrine, in a section on “force application,” an example of close air support immediately followed an example of strategic attack, showing a range of emphasis on kinetic attack.¹²

The doctrine further enjoined commanders to consider other political and military factors in deciding whether to pursue strategic attack. This measured recommendation marked a significant departure from the far more single-minded and independent approaches of previous generations of pilots to employ strategic bombardment.¹³ The Air Force of 1992 better understood the need to be prepared for a wide range of airpower employment across the spectrum as part of an “interdependent team of land, naval, and aerospace forces.”¹⁴

Despite the existence of this doctrine, Pape conflated Air Force support for strategic attack with punishment or the direct targeting of civilians. His three other categories of coercive airpower strategy included (1) risk or slowly increasing amounts of punishment; (2) decapitation or seeking to remove a leader or paralyzing a government from acting; and (3) denial, consisting of attacks on an opponent’s fielded forces, seeking to undermine an opponent’s military strategy.¹⁵

Based on historical evidence, it is difficult to challenge his conclusion that denial offers the best approach to coercive airpower strategy provided the enemy wages a conventional war of movement. But Air Force doctrine already encouraged this approach rather than advocating for punishing civilians. The 1984 Basic Doctrine, for example, explained that the “basic objective” of aerospace forces centered on securing air superiority and targeting an opponent’s “warfighting capacity.”¹⁶

Airpower advocates went too far for much of airpower history in claiming that airpower could win wars on its own. Pape goes too far in the other direction by saying strategic bombing does not work, thus potentially forestalling the employment of important airpower capabilities. One important critique of Pape is Mark Conversino’s “The Changed Nature of Strategic Air Attack.”¹⁷ Moreover, if one reads Pape, one

11. US Department of the Air Force (DAF), Air Force Manual (AFM) 1-1, vol. 1, *United States Air Force Basic Doctrine* (Washington, DC: DAF, 1984), 2-12, <https://aul.primo.exlibrisgroup.com/>.

12. DAF, AFM 1-1, vol. 1, *Basic Aerospace Doctrine of the United States Air Force* (Washington, DC: Headquarters, DAF, March 1, 1992), 6, <https://apps.dtic.mil/>.

13. Phil Haun, *Lectures of the Air Corps Tactical Corps and American Strategic Bombing in World War II* (Lawrence: University Press of Kansas, 2019).

14. DAF, *Basic Aerospace Doctrine*, 1-3.

15. Pape, *Bombing to Win*, 58.

16. DAF, *Basic Aerospace Doctrine*, 1-3.

17. Mark J. Conversino, “The Changed Nature of Strategic Air Attack,” *Parameters* 27, no. 4 (1997), <https://press.armywarcollege.edu/>.

should also read a revisionist work such as Phillip O'Brien's *How the War was Won*.¹⁸ O'Brien argues the Allies' waging of war on a vast air-sea super-battlefield—in which long-range bombing played a crucial role—led to victory against Germany and Japan.

Not only did it work as theoretically intended, but it also had the additional benefit of disrupting the German fielded forces' ability to maneuver. More so than landpower, airpower and seapower both “multiplied exponentially the physical space and conceptual possibilities of the area of battle.”¹⁹ O'Brien does not argue airpower works best independently or that airpower works best in a support role for the Army. Instead, he reflects how an airpower strategy may work with or without other Joint capabilities to support larger political objectives.

In this vein, one of the best cases for successful strategic bombardment occurred in Operation Allied Force in 1999. Yet this operation required more than airpower. First, NATO benefited from a proxy force on the ground in Kosovo even if the two engaged in little coordination. Second, both the US Navy and the US Army participated to varying extents. Finally, NATO has maintained peacekeepers on the ground since 1999.²⁰

Theme 3: A More Nuanced Model for Airpower

Historically, airpower has been dumped into two buckets: tactical and strategic. Tactical airpower generally refers to the way airpower can be used either directly on or near the battlefield. The desired effect is to make the opposing army less likely to succeed. By contrast, a strategic attack rests on the idea that one does not need to defeat an enemy's army but can go directly to the targets that an opponent values most, whether that be a nation's capital city, its key war-supporting factories, or other non-military targets.

This delineation led to some aircraft being identified as strategic, primarily long-range bombers. By contrast, most airmen understood fighters or attack aircraft as tactical. Occasionally the buckets became so full that water spilled out, such as in cases of strategic bombers supporting soldiers on the battlefield.

Although it remains tempting to refer to strategic and tactical airpower for the sake of convenience, airpower education seeks to avoid this dichotomy for good reason. First, strategic is a loaded word that suggests its use has greater value than tactical airpower. As mentioned already, airpower effectiveness depends on context, and there is no single solution for the best way to employ it.

An A-10 attack aircraft destroying an armored personnel carrier that unknowingly held an important leader, for example, might have just as much strategic effect as anything a bomber might do intentionally against an opposing nation's capital. Colin

18. Adam Tooze, *The Wages of Destruction: The Making and Breaking of the Nazi Economy* (New York: Allen Lane, 2006).

19. Phillips Payson O'Brien, *How the War Was Won* (New York: Cambridge University Press, 2015), 5.

20. Anthony M. Schinella, *Bombs without Boots: The Limits of Airpower* (Washington, DC: Brookings Institution Press, 2019), 43–96.

Gray insists, in fact, that everything is tactical in the doing.²¹ Strategic (long-range) bombers should simply be referred to as bombers. Indeed, long-range bombers have provided direct support to soldiers on the ground from World War II to Afghanistan. The label of strategic bomber, however, has confused commentators about the nature of the effect being sought.

Second, only one's opponent can determine an action's strategic effect.²² This is not to say that battle-damage assessment cannot occur; instead, the point is that the enemy decides the extent to which an opponent's action affects its will and, as a result, its decision-making. In short, there is no such thing as a strategic bomber; a bomber may have a strategic effect like any other aircraft, including a cargo plane.

Mark Clodfelter posits one alternative model for organizing airpower. Like Pape, he provides four categories of airpower, although his model ultimately incorporates a broader range of missions beyond the kinetic. Clodfelter divides airpower into two different categories: direct and indirect. By direct, he means using airpower with the intent to have a kinetic effect—dispensing ordnance. By indirect, he refers to how airpower can have a nonkinetic effect ranging from providing intelligence to refueling other aircraft to jamming, along with a host of other missions.

Also, these aircraft may be used in an auxiliary fashion or independently. Auxiliary aircraft can be thought of as supporting landpower or seapower on a battlefield (broadly defined). In contrast, independent airpower often supports objectives that do not aim at an enemy's military forces on a specific battlefield. Operation Nickel Grass provides one exception. This mobility campaign provided key capabilities for the Israeli military to use in the 1973 Yom Kippur War.²³

These four categories can be explained with mostly World War I examples (fig. 1). Direct auxiliary airpower consists of airplanes dropping bombs on tanks or troops on the battlefield. By contrast, indirect auxiliary airpower supports land and sea forces or even other types of aircraft, for example an aircraft relaying an artillery unit's location to another aircraft or fighting unit, enabling that second aircraft or fighting unit to use force against the artillery unit.

Like direct auxiliary airpower, the third category—direct independent airpower—relies on the employment of kinetic weapons, as seen in the case of German zeppelins dropping bombs on London. The last category, indirect independent airpower, does not have a kinetic effect. The Berlin Airlift, in which cargo planes provided crucial supplies to Berlin residents, resulting in the Soviets choosing to reopen roads to Berlin without a single weapon being used, provides one of the most compelling examples of indirect independent airpower. Indeed, it probably qualifies as one of history's most

21. Colin Gray, *Airpower for Strategic Effect* (Maxwell AFB, AL: Air University Press, 2012), 39.

22. Gray, *Strategic Effect*, 288.

23. Mark Clodfelter, *The Limits of Airpower* (Lincoln, NE: Bison Books, 1989), 213–15.

strategically effective uses of airpower because it sent a clear message to the Soviet Union that the United States would support its friends.²⁴



Figure 1. Clodfelter's model applied to World War 1

Even this model has some limitations, of course. Looking at the case of the indirect auxiliary aircraft in the bottom left corner, the observation plane is clearly coming under fire. But it is also armed with a weapon. In this case, the aircraft can potentially have a direct effect on an opponent's aircraft and an indirect effect in its original purpose of artillery spotting. Thus, Clodfelter's model offers more complexity than Pape's, moving airpower students past the strategic versus tactical dichotomy while introducing an additional distinction between kinetic and nonkinetic airpower.

Theme 4: Balancing Direct and Indirect Airpower

If Clodfelter's model did nothing more than add the notion of direct versus indirect airpower, it would still provide an invaluable service because of the extent to which kinetic airpower dominates the historiography. Perhaps the best work for appreciating indirect airpower is James Corum and Wray Johnson's *Airpower in Small Wars: Fighting Insurgents and Terrorists*.

²⁴ John G. Terino Jr., "The Berlin Airlift," (lecture, Air Command and Staff College, Maxwell AFB, AL, November 19, 2018).

This work intriguingly argues that in unconventional or small wars, airpower's greatest effectiveness comes from its indirect effects or what it enables others to do.²⁵ The authors identify intelligence, surveillance, and reconnaissance and mobility as particularly crucial indirect airpower capabilities. The work also provides an introduction to the ways other less well known air forces, such as some in Latin America, employ airpower, as well as a wide chronological sweep of airpower history from its inception to just prior to the US-led global war on terrorism.

Ignoring mobility goes hand-in-hand with ignoring logistics, another critical enabler of airpower. Derek Salmi's *Behind the Light Switch: Toward a Theory of Air Mobility* is a recent important contribution to airpower thinking. Salmi provides a theory based primarily on the operational level of war in that his examples highlight how mobility enables campaigns as a whole. They also enable the employment of mass. The Berlin Airlift, for example, required 308 aircraft to meet the needs of Berlin's population; today, 17 C-5 Galaxies could ferry the equivalent amount of supplies.²⁶

Salmi identifies five factors that facilitate the effective use of a range of air mobility capabilities—freedom of movement, command and control, integrated logistics, technology, and training. Incidentally, one may now arrive at the conclusion that airpower thinking has moved beyond Clausewitz's trinity, given the tendency of these authors to offer more categories..

Salmi also notes Clausewitz clearly demonstrated how logistics affect the strategic level of war as well, observing that “nothing is more common than to find considerations of supply affecting the strategic lines of a campaign and a war.”²⁷ Clear cases of strategic effect have occurred in the history of air mobility. As argued already, the Berlin Airlift convinced European nations that the United States could be counted on. Likewise, Operation Nickel Grass, referenced above, similarly demonstrates how mobility significantly enables the fulfillment of political objectives.

Yet air mobility and superiority often function more as enablers than as leading directly to meeting those political objectives. Perhaps air superiority receives more attention—to use Clodfelter's four categories—because it is more of a direct capability than mobility's more indirect nature. Yet as some have argued, air mobility underwrites the “American way of war” rather than just serving as a “logistical adjunct to trucks, trains, and ships.”²⁸

There is also a symbiotic relationship between air superiority and air mobility. In some ways, air mobility relies on air superiority—or what Salmi labels freedom of movement—before it can be brought to bear.²⁹ It is difficult to imagine, for example, the influx of C-17s into Afghanistan without a significant degree of air superiority. On

25. James S. Corum and Wray R. Johnson, *Airpower in Small Wars: Fighting Terrorists and Insurgents* (Lawrence: University Press of Kansas, 2003), 8.

26. Derek Salmi, *Behind the Light Switch: Toward a Theory of Air Mobility* (Maxwell AFB, AL: Air University Press, 2021), 75.

27. Salmi, *Light Switch*, xv.

28. Salmi, xiii.

29. Salmi, 8.

the other hand, air superiority and air mobility have become interdependent since the Vietnam War. To achieve air superiority, today's short-legged fighters must rely on antiquated KC-135s, KC-10s, and their replacements, KC-46s.

Theme 5: Balancing Airpower for the Future Fight

In addition to comparing nonkinetic and kinetic capabilities, one must constantly prepare for an unknown future. Especially important is how a major air force best balances preparation for conventional wars versus insurgencies. A variation of this question is how do air forces best balance preparation for existential crises—or those wars that must be won but are less likely—versus those less critical to national security but much more likely to occur.

Two approaches to balancing airpower for the future fight show the degree to which framing can shape one's answer, as seen in two airpower publications focusing on contrasting aspects of the Vietnam War. It is well accepted that the Vietnam War can be understood as multiple wars, although historians differ on the exact number. Some focus on the war in the south, while others focus on the war over the skies of North Vietnam. Other approaches examine how the war expanded, looking at the Vietnam War in the context of Laos or Cambodia.

The authors' choice of which war(s) they use to frame their study of airpower critically shapes the arguments and the lessons they learn from it. To use Clodfelter's model, Brian Laslie's *The Air Force Way of War* epitomizes a direct independent approach to one Vietnam war: the air war over North Vietnam. Laslie argues the Air Force transformed itself in paradigm-shifting ways after Vietnam by relearning the importance of achieving air superiority over highly contested areas. Over time, he contends, these reforms led to a more operational approach to airpower employment in which Red Flag and related reforms helped in "systematically building and executing a workable air campaign."³⁰

Regardless of those reforms, Laslie highlights the most conventional of the many Vietnam Wars: the air war against North Vietnam. For those Airmen advocating air superiority as the key lesson to be learned in Vietnam (i.e., learning the lessons of the Vietnam War against North Vietnam rather than South Vietnam), the Yom Kippur War of 1973 only further validated the need to focus on achieving air superiority in a conventional fight as the United States reoriented itself to prepare for war against the Soviet Union. The same debates occur today as military professionals argue about whether the United States is more likely to face large-scale conventional conflict or small wars (or a combination of the two).

By contrast, Laslie's proposition can be set against Corum and Johnson. They ground their work in challenging the Air Force's historically dogmatic approach to employing airpower. The authors cite as evidence the Air Force's determination to end

30. Brian D. Laslie, *The Air Force Way of War: U.S. Tactics and Training after Vietnam* (Lawrence: University Press of Kansas, 2015), 72.

the war in the south by defeating North Vietnam with strategic bombardment. This strategy was a problematic approach given the high will to fight in the North, in addition to the fact that North Vietnam did not rely on industrial warfare, with the notable exception of that nation's conventional invasion of South Vietnam in the spring of 1972.

Air Force leaders sought to turn the Vietnam War into one that suited them rather than acknowledging the war's character was determined by other key actors. Given the Air Force's historical preference for fighting direct, independent wars, one can ask a counterfactual of Laslie: would effective training for achieving air superiority over North Vietnam have changed the conflict's outcome in terms of meeting political objectives? Writing a decade before Laslie, Corum and Johnson likely would argue that such training would be irrelevant to the war's outcome. The war needed to be won in South Vietnam, which could not occur when a corrupt and unpopular government remained in power.

Air forces, like land and sea forces, must balance the question of how to prepare for state-on-state-conflict, counterinsurgencies, and a host of other conflicts. The Vietnam War required balancing the first two, but the question for the student of airpower is how well the Air Force prepared before the Vietnam War and how well it learned its lessons after that war. Understandably, the US Air Force has tended to ensure it prepares for state-on-state conflicts, making do with highly expensive equipment for counterinsurgency when required.

Whether it can more effectively balance in the future remains a key question. After Vietnam, military institutions chose to prepare for a conventional conflict with the Soviet Union. Whether they chose correctly must be considered carefully without the benefit of hindsight, as we only know now that a conventional state-on-state conflict did not break out. Today, the United States finds itself in a similar place after the US-led war on terrorism, the global campaign launched following the terror attacks of 9/11 and ending with the withdrawal of most troops from Iraq and Afghanistan by the end of the Obama administration. The US Army, for example, is torn between advocates insisting on preparation for large-scale ground combat while others argue vehemently for finally learning the lessons of counterinsurgency and proxy wars.³¹

Theme 6: Balancing Continuity and Change in Airpower History

According to one historian, World War I saw the maturation of aircraft through five generations, evolving dramatically from aircraft that simply struggled to fly over the channel from England to France.³² Yet by contrast, today in 2022 the US Air Force

31. Nathan Jennings, Amos Fox, and Adam Taliaferro, "The US Army is Wrong on Future War," Modern War Institute, December 2018, <https://mwi.usma.edu/>.

32. Richard Hallion, *Taking Flight: Inventing the Aerial Age from Antiquity through the First World War* (New York: Oxford University Press, 2003), 353.

awaits its fifth-generation aircraft to enter the fleet in greater numbers and, on the horizon, sixth-generation aircraft are planned to replace the F-22 in particular. The point of this comparison is not to highlight competing narratives of fifth-generation aircraft but to stress the tendency to overemphasize change in airpower history, particularly regarding technology, at the expense of the tremendous continuity in airpower history at the strategic and operational levels.

In this vein, when studying airpower, it is easy to get sucked into the incredible pace of change in technology beginning with World War I. How one views the contributions of technology to airpower's greatest successes and failures greatly shapes one's perspective on specific campaigns. Regarding Operation Iraqi Freedom, for example, a technology-centric advantage may lead one to characterize this campaign as defined by shock and awe due to technological advantages like stealth and precision.³³

By contrast, Williamson Murray begins his case study about that conflict by explaining that it was a "throwback to the earliest days of airpower."³⁴ It may be even more correct, however, to replace the word throwback with that of continuum. The use of airpower since World War I highlights key areas of continuity regarding airpower employment. Importantly, for example, aircraft in World War I attempted the same key missions that airpower continues to perform today.³⁵

This emphasis on continuity serves the further purpose of grounding air forces' tendency to be overly fixated on technology at the expense of strategy.³⁶ German World War II ace Johannes Steinhoff once opined, "the war in the air is a technological war which cannot be won by a technologically inferior fighting force," but his statement deserves unpacking.³⁷

To what extent did the Germans lose in World War II because of a technologically inferior fighting force? Were they even technologically inferior? After all, they operationalized jet aircraft first. Such advantages, though, mattered little in the skies for any number of reasons, such as the failure to get jets operational in large enough numbers fast enough. Additionally, other reasons—such as flawed strategy—offer more causal explanations for German defeat, with strategic limitations emerging as early as the Battle of Britain.³⁸ For today's air forces, adequately preparing for warfare requires serious deliberation that goes far beyond acquiring the latest and greatest technology.

33. Harlan Ullman, "Slogan or Strategy?: Shock and Awe Reassessed," *National Interest*, no. 84 (2006); <http://www.jstor.org/>.

34. Williamson Murray, "Operation Iraqi Freedom, 2003," in *A History of Air Warfare*, ed. John Andreas Olsen (Washington, DC: Potomac Books, 2010), 279.

35. Derek Salmi, *Slim Chance: The Pivotal Role of Air Mobility in the Burma Campaign*, Drew Paper no. 15 (Maxwell AFB, AL: Air University Press, 2014), 5–6.

36. Gray, *Strategic Effect*, 298.

37. Johannes Steinhoff, *Messerschmitts Over Sicily: Diary of a Luftwaffe Fighter Commander* (Mechanicsburg, PA: Stackpole Books, 2004).

38. M. P. Barley, "Contributing to its Own Defeat: The Luftwaffe and the Battle of Britain," *Defence Studies* 4, no. 3 (2004).

To wit, one British officer has recently argued, “the current struggle for the intellectual soul of militaries is . . . between those who are guided by history and those guided by science fiction.”³⁹ But this helpful commentary leaves one unsure as to how to balance these two very different approaches. If Carl H. Builder was correct, the Air Force has fallen too much into the trap of a technologically deterministic and futuristic approach.⁴⁰

General Hap Arnold’s vision for an unmanned Air Force shortly after World War II helps illustrate this problem, given the potential gap between the vision of the future and the reality that followed, in other words, between what can be imagined and what is realistically possible. In his defense, however, we can only see this gap in hindsight. Institutions must dream big while simultaneously tempering those visions with the realization that one cannot predict when technology will become operational.

Resources must also be devoted to training, personnel, and other investments beyond technology. In July 1944, for example, Arnold confidently stated, “We have won this war, and I am no longer interested in it.” Now he sought to turn his interest to the future of airpower, including meeting his vision for an unmanned Air Force, which still has not been fully realized.⁴¹

This story of technological vision outpacing capability is an old one. But Murray’s interpretation of Operation Iraqi Freedom as a “throwback” holds equal importance in reminding militaries to try to contextualize those futuristic visions in history and theory. While some futurists argue we can “see the outline” of change underway, other scholars contend futurists have a poor record for accurately predicating the future.⁴²

Regardless of which approach is more correct, institutions must prepare for an uncertain future, ensuring they are ready for conflict at an unknown time. Such a challenge is not for the weak-hearted. Moreover, the rapid rate of technological change adds an additional layer of complication. There is an intelligence problem relevant to this discussion as well. Precision weapons rely on precise intelligence, making this capability the “21st century turn-key to successful airpower employment,” just as these capabilities crucially enabled artillery spotting on the Western Front in World War I.⁴³

Thus, while acknowledging nuclear weapons as a notable outlier, the ideas that underpin theory and strategy tend to remain more steady and constant than not. As naval theorist Alfred Thayer Mahan argued amid a great period of transition from steamships to battleships, occasionally, the “superstructure of tactics has to be altered or wholly torn down; but the old foundations of strategy so far remain, as though laid

39. Paul Barnes, “Learning the Wrong Lessons,” Modern War Institute, February 4, 2022, <https://mwi.usma.edu/>.

40. Carl H. Builder, *The Masks of War: American Military Styles in Strategy and Analysis* (Baltimore: Johns Hopkins University Press, 1993), 21.

41. “Von-Karman’s Own Story,” *Airman Magazine*, November 1967, 113.

42. P. W. Singer, *Wired for War: The Robotics Revolution and Conflict in the 21st Century* (New York: Penguin Books, 2009), 10; and Lawrence Freedman, *The Future: A History* (Washington, DC: PublicAffairs, 2017).

43. Murray, “Operation Iraqi Freedom,” 281.

upon a rock.”⁴⁴ This point aligns with Gray’s insistence that airpower practitioners must be strongly grounded in airpower history because it allows the “structural perspective of a *longue durée*,” which helps inoculate practitioners against falling prey to unsound ideas.⁴⁵

Theme 7: Civil-Military Relations and the Wars of Frustration

Even almost a half century after the Vietnam War, another unsound idea continues to circulate: the powerful myth of civilian leaders handcuffing airpower and other capabilities, which purportedly caused the United States to lose the war.⁴⁶ Unfortunately, this myth remains alive and well, although it is understandable because many current Airmen have experienced their own frustrations with civilian authorities imposing limitations on airpower employment.

Clodfelter’s *The Limits of Airpower: The American Bombing of North Vietnam*—the same work that provided the quadrivium model of direct or indirect and/or independent or auxiliary airpower—may be the best candidate for puncturing that myth. Clodfelter compellingly challenges Strategic Air Commander General Curtis E. LeMay’s contention that the United States could have won the Vietnam War as early as 1965 by bombing less than 100 targets—supporters of LeMay’s argument point to President Richard Nixon’s seemingly successful unleashing of airpower against Hanoi during Linebacker II.⁴⁷

But Clodfelter’s analysis reveals the flawed nature of the contention that the United States could have won quickly and easily. Most importantly, changing US political objectives and the character of the war, such as reduced support for North Vietnam from the Soviet Union and China, made a kind of victory far more achievable in the early 1970s than it would have been in 1965.

In Clausewitzian fashion, Clodfelter also argues that positive objectives—or those that require the use of force—must be correctly balanced with negative objectives, in which one must eschew or limit the use of force to achieve them.⁴⁸ To achieve victory, Clodfelter insists negative objectives matter as much as positive objectives. In other words, rules of engagement and other limitations imposed on airpower are not just unpleasant inconveniences. Instead, they are essential to achieving political objectives. With its goal of peace with honor (a euphemism for American withdrawal), the Nixon

44. Colin Gray, “The Changing Nature of Warfare?” *Naval War College Review* 49, no. 2 (Spring 1996), <https://digital-commons.usnwc.edu/>; and Gray, *Strategic Effect*, 267.

45. Gray, *Strategic Effect*, 276.

46. Mark Clodfelter, *The Limits of Airpower: The American Bombing of North Vietnam* (New York: Simon & Schuster, 1989).

47. Phillip S. Michael, “The Strategic Significance of Linebacker II: Political, Military, and Beyond” (thesis, Army War College, 2003), <https://apps.dtic.mil/>.

48. Clodfelter, *Limits of Airpower*, 216.

administration had implemented limited and achievable objectives by 1972 in a way that the Johnson administration could not.

Given the rising importance of precision weapons in the West over the last few decades, it is unlikely civilian leaders would remove highly restrictive airpower rules of engagement except in the case of the most existential wars. But as early as World War I, Airmen resisted restrictions imposed from above.⁴⁹ Clodfelter's work provides historical and even theoretical context to why imposing limits on war can work toward achieving one's political objectives—the achievement of which is necessary to victory—rather than just making it more difficult to wage war.

The term *victory* is also a problematic one; alternative concepts like an enduring peace are more accurate. But the restriction of force can enable both visions. There is some evidence that the Soviet Union began sending aircraft into North Korea in the first place in response to the repeated tendency of US Airmen to cross the Yalu River, creating an ongoing battle for air superiority that lasted the rest of the engagement.⁵⁰ Civilian leaders also worried rightfully about the possible risks of escalation, a strategic consideration sometimes difficult for Airmen at the tactical level to appreciate.⁵¹

Theme 8: Studying Airpower in the Context of Other Domains

Another source of frustration for airpower practitioners and scholars can be the wide disconnect between airpower and landpower. Read a history of the Korean War written by a landpower author, for example, and airpower serves as a small adjunct to the war, primarily worth mentioning solely for its provision of close air support.

Naval officer J. C. Wylie offers a helpful explanation for that distinction: air and land strategies can differ fundamentally, as seen in the differences between sequential and cumulative strategies. Generally, a sequential strategy approach helps characterize the land domain, especially in conventional warfare. This approach revolves around a sense of geographical progression as the primary means of assessing progress, or as Wylie describes it, a “series of actions growing naturally out of, and dependent on, the one that preceded it,” such as the two drives across the Pacific during World War II.⁵²

Some may rightly observe that a linear focus can be problematic in unconventional or low-intensity conflict. This critique is fair, although one may point out that such operations are nothing new.

Airpower, by contrast, is more diffuse. In some ways of course, airpower supports a sequential strategy. But it is more complex than that. For this reason, Wylie introduces a cu-

49. Andrew Barros, “Strategic Bombing and Restraint in ‘Total War,’ 1915–1918,” *The Historical Journal* 52, no. 2 (2009): 422.

50. Conrad Crane, *American Airpower Strategy in Korea* (Lawrence: University Press of Kansas, 2000), 49.

51. Heather Venable, “Turning ‘Small’ Wars into ‘Big’ Wars: How Tacticians Endanger Us All,” *Divergent Options*, August 26, 2019, <https://divergentoptions.org/>.

52. J. C. Wylie, *Military Strategy: A General Theory of Power Control* (Annapolis, MD: Naval Institute Press, 2014), 22–23.

mulative strategy that can be understood as more attritional. Submarine warfare in World War I and II, for example, exemplified a cumulative strategy whereby the “entire pattern is made up of a collection of lesser actions” that are “not sequentially interdependent.”⁵³

Notably, Wylie believes cumulative warfare cannot be decisive in its own right; instead, its success determines the “difference between success or failure of the sequential.”⁵⁴ Thus, he seeks to convince strategists to consider how to “balance our sequential and cumulative efforts toward the most effective and least costly attainment of our goals.”⁵⁵

A cumulative strategy can be useful in thinking about air superiority in the air domain. Air superiority can be obtained in many ways, including in a localized and temporary manner. This attainment of air superiority may occur far away from the land domain’s location in a way that allows airpower to achieve independent or joint objectives that fulfill overarching political objectives.

The campaign to achieve air superiority against Germany during World War II is a particularly useful example of this diffuse concept. This campaign both enabled a sequential strategy—the joint operation beginning with the amphibious landing at Normandy in June 1944, to the Army’s progress into Germany until May 1945—and had cumulative objectives of its own outside of achieving air superiority, with the Army Air Forces seeking a decisive effect on the German government by destroying key sectors of its economic and transportation nodes.

Viewing World War II solely through a sequential strategy—the Army’s movement from France into Germany—misses the broader truth. That is, the previous air war over the German homeland, which targeted the German air force, factories, and the transportation network, played a critical role in enabling the subsequent and desired sequential strategy. The Army Air Forces may have desired to achieve victory through its cumulative strategy independently, thereby making the Normandy landing and subsequent operations unnecessary, but that did not occur.⁵⁶

Given the extent to which some Army officers envision air capabilities primarily serving to support their objectives directly over the battlefield, it is useful to consider how Wylie and others help explain why air strategy can be formulated in a way that offers more than just air superiority or close air support.

Conclusion

The most obvious approach to studying airpower would be chronological, beginning with airpower in World War I and continuing through to the present, filling in holes as

53. Wylie, *Military Strategy*, 23.

54. Wylie, *Military Strategy*, 25.

55. Wylie, *Military Strategy*, 25–26.

56. Heather Venable, “Working Backwards from Berlin to the Bocage: Coalescing Airpower Application in the European Theater of Operations in 1944,” *Strategy Bridge*, October 7, 2019, <https://thestrategybridge.org/>.

needed. For those already engaged in the study of airpower, however, this article seeks to offer some key themes to consider studying airpower more holistically and conceptually.

Airpower practitioners and theorists stunted the study of airpower practically from its infancy with their dogmatic investment in strategic bombardment. In many ways, they did not begin to mature in that study until after the Vietnam War. That maturation process continues today, with the aforementioned themes offering strategically important considerations for airpower's best use. The goal is to assure that an individual is well prepared to answer that age-old airpower question: what are the most effective ways to employ airpower in a particular context and why? **Æ**

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