# AIR UNIVERSITY

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# AIRPOWER'S MISSING INGREDIENT

# Critical Reflection and its Impact on Airpower Theory

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Major, USAF

# Contents

# FOREWORD

It's a minor truism in education that the best students are always failing. They are so advanced in their thinking that their instructors unable to keep up with them, and so dismiss them as incorrigible. Of course, the worst students are also failing, and there are a lot more of them, so presuming the fault lies with the student is usually reasonable. At any rate, I wasn't sure what to think of Major XXX XXXX when I first encountered him in my airpower history seminar. He wore the pilot's green bag, but unlike most of the type-A officers in the room he had a peaceful, almost ethereal sense of calmness. When he spoke, it was with a patience that suggested he had a long history of having to carefully explain his intention without appearing condescending. I was skeptical. Did he truly understand the difficult concepts he brought into class or was he merely posing? By the end of the course I realized I had been the student all along, and Adam the master.

In this paper, XXXXX quickly gets to the classic failure in translating theory to practice—theoretical perfection is impossible in reality. The model world or the theorist's vision of what can or should happen is of necessity a closed system. Only the variables under examination have sway, and yet the real world to which it is then applied is a frustratingly open system. Over time, theories that were once perfectly applicable at one place and time become hopelessly counter-productive for general use. XXXXX offers a needed corrective in his discourse by focusing on critical reflection as the key to achieving, then maintaining, a necessary balance between theory and practice. Whereas technology drove the first two offsets in military power in the twentieth century, XXXXX posits that achieving the social and cultural mindset that accepts optimization over perfection should be the true aim of a third, twenty-first century offset, not a new technology that promises complete dominance and control.

If thinking were easy, more people would do it. We are fortunate that XXXXX has done so much quality thinking for us.


Dr XXXX XX XXXXX

# ABSTRACT

This paper was born of frustration, but written with optimism. After a couple of months into the curriculum at Air Command and Staff College, I perceived a reoccurring theme in the lessons: After doing "airpower" for a century, we have still not figured out what it means. Not only did I recognize a lack of general knowledge, but any theory I discovered was either apocryphal, incomplete, or self-serving. Furthermore, I perceived that some of the USAF's most legendary airmen might have disingenuously portrayed results after testing their airpower theories. My frustration stemmed from a belief that an ideal airpower theory did exist, but lay dormant for a hundred years due to human fallibility and bureaucratic inertia. Fortunately, it revealed itself in reflection.

The USAF is still trying to do things the way it always has, but this paper is not about the USAF. It is about Airmen. Airpower belongs to them and the theory within this work remains unbound to anything else. This paper advances that theory by providing the "*what*" and the "*how*" associated with airpower. The "*why*" of airpower will be reserved for a later endeavor. Underlying evidence to support this work relies heavily on historical analysis, application of theoretical construct, and experience as an Airman. It concludes with possible leadership and strategic implications to the USAF following adoption of the theory.

# ACKNOWLEDGMENTS

This paper could not have been written to its fullest without my advisor, Dr. XXX XXX. At the end of all our meetings, he consistently conveyed that he was unsure if he was really helping me, but he most assuredly was. I will be forever indebted to him for having the courage and patience to take on this challenge with me. I would also like to extend my gratitude to my reader, Dr. XXX XXXX. Although I frequently left his office with more questions then I arrived with, his passion for the pursuit of knowledge has left an indelible mark on me. Both of these men shaped my experience at ACSC, and I look forward to picking their massive brains in the future. I highly recommend that future students at the college seek their wisdom and counsel.

To my fellow classmates in ACSC, Flight X…thank you for putting up with me. We made an amazing team and I always left class with a smile, if not a slight grin. I sincerely hope for our paths to cross again in the future.

I would also like to extend my appreciation to my long-time mentor and friend, Col XX XXXXX. His exemplary leadership and guidance has served as a "north star" for me throughout my career.

Finally, I would like to thank my loving wife, XXX and our amazing daughter, XXX. It is difficult to find adequate words to capture my respect and admiration for your kindness and sacrifice. So I will simply and joyfully spend my remaining days on this earth repaying you instead. Thank you.

*In any event, Air Force officers, young and old, must never allow the Air Force to become set in its ways. It should not be wedded to manned aircraft, ballistic missiles, or any other weapon. It must ever be on the alert to meet the demands of the future.* – Gen Charles P. Cabell (USAF)

## Introduction

"Do we know what we mean when we say airpower?" The 520 field grade officers at the Air Command and Staff College (ACSC) were asked this question by the school's Academic Dean on their first day of class. The auditorium fell remarkably and awkwardly silent. These officers, Air Force in large majority, had spent their last ten to twelve years becoming tactical experts in their respective career fields. They had dropped bombs, saved lives, delivered cargo, launched rockets, manned inter-continental ballistic missile sites, protected vast networks, acquired and analyzed critical intelligence, maintained billions of dollars in aircraft and equipment, supported multiple joint and coalition efforts, and bravely led hundreds of thousands of airmen while enduring a constant expeditionary posture for their entire careers. Yet, they, including the author of this work, remained mute.

The United States Air Force (USAF) airmen in the room, purportedly the bastions of airpower, were only the latest in a long line of USAF members who endured a period of extended transition. Even before its creation, the Air Force was objectified by virtually continuous adjustments in size, technology, and capability. Nearly 70 years later, the trend of perpetual change is further evidenced in concepts of airpower as new domains of warfare are penetrated. However, for a service that has achieved astounding victories, extended strategic and technological horizons, and become the model for all other Air Forces to follow amidst constant change, the vacuum of critical thought and reflection towards airpower theory from its future leaders is striking.

Just as historians have spilled gallons of ink tracing the USAF's past, technologists have continually advanced new means, and theorists have envisioned new ways for advancing

airpower. Despite these largely academic endeavors, the USAF has undergone very little evolution over the last 70 years in terms of the development and testing of airpower theories. This indicates that one of two things occurred: the USAF, collectively, believes that it figured out airpower theory decades ago and no longer sees value in refining it; or, the service has allowed other pursuits to take priority and finds it too difficult to reexamine its *raison d'etre*. As with most two-sided narratives, the real answer probably lies somewhere in the middle, but, neither answer explains why the airmen at ACSC were unwilling or unable to answer the question.

Perhaps these officers thought the question was rhetorical? They may have all individually desired to remain anonymous or avoid potential embarrassment for answering incorrectly. While many might have simply not had a convenient answer readily available, some may have never considered the question. Aside from individual excuses and rationalizations, the pregnant silence was a collective response because 520 different answers existed among the crowd and no one felt confident theirs was transcendent.

Regardless of the reasons why thinking about airpower theory has fallen to the wayside, a clear indicator of its absence existed at this critical inflection point for 520 airmen; the future leaders of the service. Furthermore, this indicator revealed that the condition probably existed across the USAF as the student body represents the top 20 percent of officers in their respective career fields. This paper is one airman's attempt to reconcile this plight and the culmination of a yearlong study toward that end.

**Thesis and Methodology.**

Throughout history, airpower has largely been described through combinations of its tools, tactical intentions, and capacities, or the "what" airpower provides. Its advocates and

critics have focused virtually all attention to the merits and challenges of these external elements, i.e. aircraft capabilities, desired effects, etc. While the external and outwardly visible aspects of airpower are important to consider and can never be overanalyzed, there exists another neglected internal half. This vital second facet is the airman's thought process and is the "how" of airpower. True airpower cannot exist without it.

The airman's mode of thinking, which shapes technologies into strategic utility, is critically underappreciated. This neglect is causal to many issues that have plagued the USAF throughout history as the reflective thought process is the connective tissue between ends, ways, and means. Almost 70 years ago, without a complete and clear airpower theory, the USAF struggled to attain its autonomous existence from the other services. Today, without a sound theory, the USAF finds itself in a reactionary posture to wicked international security problems and seemingly intractable internal organizational pressures. Tomorrow, without a well-defined theory, the USAF will carry on sending mixed messages to its airmen, and its joint and international partners about its vision, mission, and goals. Despite good intentions, an incomplete theory subverts trust inside and outside the organization. Not only will reflecting inward identify how ends, ways, and means are effectively selected and executed, but it will also provide a common reference point for airmen to simultaneously achieve alignment and remain agile in an uncertain environment.

In order to cage this problem, previous airpower theories will be examined to demonstrate that purely outward-focused visions are incomplete and to build the context for a new theory: Airpower is the airman's reflective control of speed and access through the air, space, and cyberspace domains, referred to herein as the 3rd Dimension, to produce strategic effect. Additionally, the need to include "Critical Reflection," a paradigmatic duality of critical

thought processes, will be advanced as airpower's missing ingredient and the basis for the transitory idea of airmindedness. Achieving insight into the ontological and epistemological aspects of critical reflection will further assist with framing positive and negative examples of airpower applications in history. Finally, the strategic and organizational significance of including the mental process into airpower theory, and intentionally arming every airman with it, will be explored as a cardinal alternative to conventional "strategic offset" thinking. This work is not merely designed to identify problems and chart their root causes, but to advance a solution to multiple systemic issues that have anchored the USAF for decades.

*Airpower has been undersold in good part because some among its more dedicated promoters have exaggerated what did not require exaggeration, and—most damaging of all—because they chose to advertise their product in a way that ignored or shortchanged much of what it was, did, and could do.*
– Colin S. Gray

## Air Power Theory

Airpower's ubiquitous possibilities fueled the imaginations of open minded military practitioners and led them to expand the strategic horizon. Unfortunately, the advent of aerial warfare and its underpinning strategies are widely attributed to the invention of the airplane and not the thought processes that birthed them. While it is obvious that exerting military power through the air domain could not have been achieved without key technologies, early airpower theorists, including Giulio Douhet, Sir Hugh Trenchard, and Brig Gen William "Billy" Mitchell pinned their visions to their favored technology. While these theories provided the bedrock for establishment of the USAF, they also placed the proverbial cart before the horse and established a systemic trend in collective airpower thought.

**Revealing Early Insights.**

Airpower began as a cognitive and technological solution set for World War I maneuver warfare and Edwardian fears of societal collapse from aerial bombardment.[1] Early theorists capitalized upon the aircraft as a means of avoiding the carnage of trench battle, and in effect, entrenched thinking about warfare. These were only the initial sparks of airpower's promise and fervent support.

Douhet, Trenchard, and Mitchell argued that control of the air with aircraft could provide unencumbered access, speed, strategic consequence, and decisive military action into the future.[2] While Douhet contended that airpower meant "control of the air" and Trenchard viewed it as a means towards a "relentless offensive," Mitchell provided the most succinct and condensed early definition as "the ability to do something in or through the air, and, as air covers the whole

world, aircraft are able to go anywhere on the planet."[3] They all posited that aircraft would experience little difficulty flying across the globe, bypassing adversary defenses, and striking at the heart of the enemy with speed unmatched by terrestrial based weapons. At the time, the evident characteristics of the airplane easily supported their visions, while the guarantee of technological improvements and lack of controverting evidence fanned their passions.[4]

Moreover, Douhet, Trenchard, and Mitchell envisioned aerial conflict in terms of directly or indirectly targeting civilian morale, with the intended byproduct being coercion of the enemy's political elite to sue for peace.[5] This controversial methodology of punishment was unproven at the time of its theoretical development and its efficacy was debunked in later years.[6] Despite this early misinterpretation, the theorists continually averred that aerial combat alone could bring about the cessation of hostilities in future conflicts as airpower was superior to surface warfare, rendering it virtually obsolete, thus providing decisive victory through its strategic effects. Not only was airpower considered the answer to all future military engagements, only a massive fleet of aircraft led by a force of airmen imbued with these beliefs could achieve control of the air.[7] Subsequent decades displaying high and low-intensity conflicts around the world stand in direct defiance of their ideas.

Although these men were guilty of numerous illogical conclusions and soft assumptions, their work is not entirely without merit. They developed a new grammar of war and legitimated the behaviors that enabled airpower. Given the context of their time and that they were operating at the forefront of a new capability, their contentions should be afforded some approbation. Unfortunately, as Clausewitz asserted regarding war, the "grammar, indeed, may be its own, but not its logic" and early airpower proponents introduced critically flawed logic into this fledgling military capability.[8]

Implicit in their airpower theories lay a confusion of strategy with tactics. Strategy is, by definition, never concerned with decisiveness. Professor Everett Dolman contends that strategy is "in its simplest form, a plan for continuing advantage."[9] In this context, strategy is concerned with aggregated events and conditions on a grander scale and is not limited to temporal manifestations like victory or defeat. Therefore, matching strategy to decisiveness is a spurious relationship. Decisiveness belongs to tacticians as they seek to end an event within a given set of boundaries. Strategists are focused on manipulating those boundaries to establish advantage.[10] While the modern-day USAF rightly views airpower's inherent strategic effects within Dolman's framework, the misuse of terms by early theorists led to numerous operational issues, some of which are highlighted later in this paper.

Additionally, early theorists exhibited the seemingly innate desire of airmen to substitute means for ends. Mitchell and his acolytes are especially guilty of this as they linked the aircraft with the end of warfare.[11] They championed that the unique advantages airpower could provide were intrinsically tied to their favored technology. Carl Builder cites a prime reason for this perversion existing in economics, wherein he states a "seller's vested interests are often mostly in the means."[12] The early airpower advocates were largely pilots who loved flying; therefore, if political decision makers were to buy into the theorists' logic, they also had to buy aircraft to achieve the ends they desired. These transactions were not only the impetus for the creation of the USAF, but an entire industrial base. Notwithstanding the great things this illogical conclusion provided, it entrenched a mode of thinking into how the USAF operated externally and internally and how the United States approached future conflicts. These assertions are also explored later in this paper.

The perversion of means and ends also harmed future airpower theory because it elevated favored platforms over the thought processes that led them to those platforms in the first place. Airpower was born of a response to the anchored thinking, dogma, and groupthink of the Army and Navy in the early 20th Century; men of vision sought the means to stop fighting wars as they had always been fought. Unfortunately, their love of aircraft and desire to form an independent service generated sufficient cognitive dissonance to prevent them from reconciling reality over their rhetoric.[13] When their theories failed to be proven, they chalked up the inconsistent findings to either insufficient technological solutions or political limitations placed upon them at the time.[14] Therefore, they fell into the same cognitive trap they so desperately fought to escape in the other services with their own assumptions and paradigms to defend; a persistent condition described by B.H. Liddel Hart as an "uncomfortable habit." He states, "We think and act more from habit than we do from reflection. Those who read history tend to look for what proves them right and confirms their personal opinions."[15] The early theorists are prime example of this phenomenon.

While their theories provided the bedrock for establishment of the USAF, Douhet, Trenchard, and Mitchell set it on a misguided course. They awarded primacy in their theories to their favored technology, and abandoned the thought process that linked the technology to the strategy. Fortunately, later theorists identified early airpower mistakes and addressed them accordingly. Unfortunately, the airman's thought process, critical reflection, remained absent in future airpower theories.

**A Modern Revision.**

Col Jeffrey Smith, a current airpower theorist, avoids the trap of technological reverence, but still produces a vague image of airpower for airmen to grasp. While there are merits to

Smith's updated airpower theory, especially his prime argument that it must be informed by context, further clarification is required.

Smith outlines *access*, *speed*, and *strategic strike* as basic elements of airpower and discounts *decisiveness* as a counterproductive notion.[16] He qualifies these axioms with decades of empirical data, experience, and a fresh insight into the modern security context. Access is defined as inclusive of the space and cyber domains, as well as physical access to potentially contested geographic locations.[17] Achieving access into an adversary's communication networks, decision cycles, and databases should be viewed with the same intent as flying a fleet of bombers over an enemy capital. Speed carries the same physical connotations as the early theorists, but is also applied to the speed at which decisions can be made in war. In this context, Smith states that "this does suggest that aircraft speed is no longer important; rather, [he] suggests that widening the possible understanding of what speed means in the future will expand our perspective of speed as an axiom to airpower theory." [18] Additionally, he argues that strategic strike must include the effects of increased interdependence through globalization.[19]

Furthermore, Smith identifies that "translating theoretical axioms into strategy requires extensive consideration of contextual realities; when the axioms of the theory are challenged by new context, the resulting strategy will likely need to modify."[20] While he blurs the constructs of strategy and tactics, he astutely claims that even though a theory may possess many qualities, neglecting the contextual elements that inform the suppositions that theory is based upon will lead to flawed strategies.

This has been a difficult lesson for airmen to reconcile throughout history. As complexities and nuance accumulate, many individuals face emotional tensions as their cognitive capacity is exceeded. Those tensions are often so distressing that their perception narrows, they

lose the capacity to see larger patterns.[21] Historically, this condition leads to oversimplification and is antithetical to effective airpower.

The external manifestations of airpower can be viewed as continually changing and evolving as new technologies, innovations, and challenges arise. Smith astutely sidesteps pegging airpower theory to current technologies or effects, as its image would be abstracted through motion blur, due to these continual changes. However, merely stating that airpower needs to be informed by context is insufficient. He neglects to include how an airman perceives unique contextual elements in war in relation to established tactics, techniques and procedures (TTPs) and towards doctrinal practices and mandates. Smith produces a strong argument for the "what," but completely excludes the "how," and, in the end, the airpower image Smith generates is blurrier than the early theorists because he never posits a concise definition of his theory.

In order to locate a modern and concise definition, one should look no further than USAF doctrine. Unfortunately, the airpower theory found within is exceptionally misleading. USAF doctrine defines airpower as "the ability to project military power or influence through the control and exploitation of air, space, and cyberspace to achieve strategic, operational, or tactical objectives."[22] While this definition is a great deal more comprehensive than previous theories, it fails to convey what airpower actually controls or how it does it. The verbiage of the doctrinal definition is too imprecise to be effective and resonate with airmen.

USAF theory advances that the domains are the target of control and exploitation, but pure control of an entire domain is not possible. The USAF cannot argue that it wrested military control of the space and cyber domains, because it never has. International law not only forbids the militarization of space, but the USAF assets that operate within it are remarkably vulnerable to attack by actors unbound by international writ.[23] Regarding cyberspace, none of the USAF

core missions are accomplished in this domain.[24] Military control of cyberspace, or cyber superiority, is a joint endeavor and the USAF is better served to focus on how it supports its core missions within it.[25]

Control of the air, Douhet's penultimate goal, only exists as a relative condition of domain superiority within a localized space, for a limited time, and for a specific reason. If a conflict requires that airspace access within a distinct geographic boundary is needed, the USAF is well suited to attaining that access, but has no mandate to access anymore outside of those boundaries. When the USAF needs to exercise that access, it does so, until it no longer requires it. Additionally, the requisite airspace access is critically linked towards the attainment of another goal, and never exists for its own sake. In many instances, complete control is not required. A topical example of this exists in Operation Inherent Resolve, where USAF aircraft are projecting military power in support of US national policy in the same airspace as Russian military aircraft, flying in pursuit of their own national agenda.[26]

Total control over the entirety of a domain is an unachievable goal. Critically, the current doctrinal model of airpower theory can lead one to believe that without control of these domains, airpower does not exist. Regardless of the intent, the language must be precise lest the definition become cliché. If one can argue through literal interpretations of the language that control of these domains has never been achieved, then, inductively, the USAF has never produced airpower. While this contention is untrue, as the USAF generates airpower virtually every day with resounding strategic effect, the doctrinal definition is in dire need of revision. The subsequent section of this work is dedicated to providing that end.

*Yet the closer one adhered to original ideas about air power or to their lineal descendants, the closer one came to developing an absolute model for the use of airpower in warfare – one that might not only run afoul of competing interpretations, developed in the other services or even among civilians, but also force the realities of the war at hand to conform to the expectations of one's theory.* – Donald Mrozek

# A Complete Theory

The following is a new airpower theory. It elevates the strategic options airmen provide to policy makers through the power of their minds across the multiple domains. Succinctly, airpower is the airman's reflective control of speed and access through the 3rd Dimension to produce strategic effect. This theory is informed by the past, unashamedly looks to the future, and serves to unite airmen behind a common identity. Unlike previous theories, this one overtly places the control of airpower in airmen's hands, as it is belongs to them. In order to frame the overarching concept, airpower will be presented as two distinct halves.

**The First Half of Airpower.**

At its core, airpower is concerned with control. It seeks to provide control of risk to friendly forces and political aims. It seeks to control the speed at which we can access and affect persons, places, things, ideas, communications, and data streams and the agility at which we move between or around them. Moreover, it seeks to control an adversary's speed, access, and pursuant options. Therefore, it seeks to control the options we have in the face of an adversary. Control is airpower's calling card and where the strategic effects of the USAF can be found most readily.

Focusing on the achievement of speed and/or access alone can engender a misconstrued perception of airpower's aims. By themselves, they can lead one to think that more speed and more access are always preferred conditions, while this is not always the case. Control of speed is a more worthy goal. The ability to intentionally speed operations up, slow them down, and the agility to oscillate between the two, produces far greater strategic and tactical options than

merely the ability to do something faster than someone else. Speed control should be sought by airpower strategists in the aim of affecting all actions of state and non-state actors, as capabilities designed to upset one might embolden the other. Control of speed of our actions and the speed of the adversary's is critical to unlocking airpower's full potential.[27]

The pursuit of access follows the same logic as speed, but focuses on the intended target of operations as opposed to the velocity of action. The act of increasing or decreasing access for or about war is strategic, while the act of attaining or denying it in war is tactical. Airpower seeks to control access in both strategic and tactical terms through the domains of air, space, and cyber. Maintaining the capability to produce air superiority reliably and efficiently is a strategic effect, while the act of creating it is tactical.

Correlating to Smith's theory, airpower's reach extends from creating conditions of domain superiority anywhere on the earth to beyond geosynchronous orbit, and from analog communications nodes to complex digital databases. Control across these spectra involves generating tactical surprise from our unforeseen presence or creating debilitating fear from being unable to prevent our intentionally telegraphed maneuvers. Additionally, it involves the control of an adversary's relative access. Being able to control an enemy's access to information and options is among the worthiest of pursuits in warfare and airpower strategies must be focused toward this end.

Airpower is also unbound by a prevalent or preferred technology. It is more concerned with its ends and controlling technological means to achieve them. The means chosen to achieve political ends should always be selected through a careful juxtaposition of their perceived effectiveness and efficiency in a given context. Post-application reorientation and reflection on the effectiveness and efficiency of the chosen means is vital to continuing airpower.[28] Without

this measure, airpower is eventually reduced to Mitchell's act of "doing something through the air" and ceases to be productive as its effects are swiftly mitigated.[29]

The USAF has consistently displayed a tendency to seek the most cutting-edge technologies to advance its charge. While it is meritorious to strive for technological improvements, entirely abandoning the proven tools of the past must be avoided.

A master woodworker can create beautiful furniture with hand tools or expensive high-tech machinery. Depending on the application, time restraints towards creating the piece, and the quantity of the work needing to be accomplished, the wood worker might opt to use one toolset or both. They each provide their own strengths and weaknesses. Individually, they require separate training to operate and master, but both are fundamentally tied to the logic and traditions of woodworking. Furthermore, wood will not always act in the manner the woodworker desires it to. Straight grain is corrupted by knots, boards expand, shrink, cup, and warp in varying climactic conditions, and tear outs in joinery occur with frequency.

Creative tools and problem solving techniques to control these issues have been developed and improved throughout the years. The woodworker may have a favored tool, but will continually be challenged by using it in applications where another is more effective or efficient. Furthermore, he will limit the possibilities of what he can create if he maintains strict favoritism.

Airpower functions the same way as there is no one right way to produce its effects, and unforeseen problems often occur in practice. Those problems are often exacerbated when the tools and methods of airpower's application are perceived as the only effectual and relevant tools for the task. Airmen are craftsmen of national security and strategic consequence who happen to be skilled in highly specialized tool sets and trades. Using the right tool for the job ensures

airpower's efficacy and controls the efficiency of action in order to produce desired effects. If a tool from the past can perform the job more effectively or efficiently than a new one, the choice should be obvious.

**The Second Half of Airpower.**

Pursuing the control of speed and access is a not an easy endeavor. It also only comprises one-half of airpower's design. How airpower provides control is fundamentally rooted to a process known as "Critical Reflection" and involves intentionally gauging the cognitive processes that underline perceptions, assumptions, and subsequent actions. The following section of this paper will advance how critical reflection works in practice and how it is inextricably necessary to produce airpower. Additionally, understanding the roots of critical reflection theory will assist with adding weight to the argument that airpower requires this paradigmatic duality to function.

Professor Christopher Paparone illustrates critical reflection as a sense-making process that operates along a spectrum between the poles of logico-scientism and interpretivism, or objective and subjective thought.[30] Logico-scientific military thinkers strive to remove ambiguity and imprecision, and advance an epistemology of TTPs which are manifest as doctrine. The USAF excels in this mode of thinking. Interpretivist thinkers, at the other end of the spectrum, are geared to increase ambiguity and complexity, challenge the efficacy of TTPs, and elevate the unique contextual elements within each operation over doctrine's primacy. Therefore, this process requires oscillating between both thought paradigms.

Critical reflection is not a simple process as it involves operating within an indeterminate zone between both the logico-scientific and interpretivist poles.[31] International security situations may display coherent trends and similarities, but each is unique. Moreover, the complex

overlapping challenges posed in the modern context require that external sense-making involves analysis of the internal thought processes that developed the situation to begin with. In effect, it involves moving forward with what you perceive to be true, and questioning those truths as you progress to generate new ones. As Paparone states, "the proposed paradigmatic duality provides an important complementary, more fluid, and continuous sense of knowledge creation and destruction."[32]

The logico-scientific thinker refutes the complexities and nuance of the subjective situation while the interpretivist challenges the rigidity and simplicity of purely objective constructs.[33] Airpower requires airmen to creatively master both in action. Logico-scientism maintains a widely-recognized doctrinal grammar and a history of TTPs that produce desired effects. Here, airmen must creatively connect prevalent security situations to the appropriate knowledge base before developing courses of action. These phenomena manifest in the Joint Operations Planning Process for Air (JOPP-A), a highly managed and meticulous activity. Conversely, creative endeavors along the interpretivist paradigm involve breaking down the logico-scientific structure. Paparone avers that it "relies on the awareness of both our inadequate linguistic structures and the potential for institutionalized group think among practitioners."[34] In short, airmen must be able to effectively relate logical causalities between broad concepts and simultaneously challenge those relationships through specific narrative interpretations; hence, navigating between both paradigms.

Paparone's effort is highly influenced by Professor Donald Schön, whose canonical work on reflective practice has produced tremendous impact in multiple industries. Central to Schön's writings are the concepts of tacit knowledge and theories-in-use.[35] Conceptually, tacit knowledge means that individuals are capable of knowing more than they can describe. In his words, tacit

knowledge can be witnessed "when we recognize one face from thousands without being able to say how we do so, when we demonstrate a skill for which we cannot state an explicit program, or when we experience the imitation of a discovery we cannot put into words."[36] The USAF was founded on tacit knowledge. Successfully flying an aircraft in the early 20th century largely relied on the pilot exercising this very mental condition. The early skills of piloting were based around feeling the rumble in the seat, understanding the minute tremors on the stick or yoke, and discerning the sound of the engine. Tacit knowledge transposed these otherwise meaningless occurrences into meaningful data points. The term "flying by the seat of your pants" is an aphorism directly derived from this phenomenon.

Tacit knowledge is particularly relevant when comprehending theories-in-use. In Schön's view, "each practitioner develops a theory of practice, whether he or she is aware of it or not. Such a theory is composed of both explicit knowledge, what one is able to say about what one knows, and theories-in-use, which may be unconscious and are revealed in behavior."[37] This is how airmen produce airpower in spite of operating from flawed theories. Many airmen with reflective mindsets are naturally wired to criticize tacit assumptions that have developed around recursive exercises and operations, and reveal the possibility for change. In virtually every engagement that the USAF has undertaken, these airmen have been relied upon to make sense of the unique contextual elements and incorporate the logico-scientific with the interpretivist. Although, they have always been there, exercising an airpower theory-in-use, they have not always been successful at incorporating the two paradigms. Therefore it is imperative that airpower theory includes critical reflection as an essential axiom.

Additionally, knowing *how* airpower works is far more important than knowing *that* airpower works, because nothing *always* works. If it is taken as common sense that airpower

provides answers to all problems, or is decisive in its own right, then airpower is no longer being exercised, as reflection has been abandoned, and the resultant actions will provide undesired effects. While common sense divulges the category of know-how, true know-how is only revealed in the action, not rhetoric.[38] A pilot's know-how resides and is illuminated by his skill in flying the plane, not in how eloquently he or she can describe it. Schön posits, "There is nothing in common sense to make us say that know-how consists in rules or plans which we entertain in the mind prior to action."[39]

Operating within the strategic space between controlling what we can, and knowing that we cannot control everything is a paradigm that goes against the grain of Western thinking. Critically, knowing the differences between what can be controlled and what cannot, and what should be controlled vice what should not, are necessary precursors to action. However, attempts to attain control through airpower are futile without the modes of thought that birthed it. Yet, another question remains. If the initial theorists were so wrong, how has the USAF achieved airpower in the interim years?

The theory of airpower has remained largely tacit. When the 520 airmen were asked to describe it, they appeared to be at a loss. Further reflection will reveal that it has been implicit in their actions, regardless of career field. Every time a pilot has dropped a bomb on an empty building and wondered what the point was, he or she has skirted the boundaries of understanding airpower. Every time an airman powered through a computer-based *Information Awareness* remediation and wondered why the USAF relies on them to protect networks that are not designed to be protected, he or she comes closer to understanding the theory. Every time an airman has launched a satellite into orbit, knowing that the expense and operational necessity of the equipment was entirely eclipsed by its vulnerability, he or she felt airpower fleeting at their

fingertips. Airpower has found a home in this discomfort. The USAF knows it only to exist there, appearing in infrequent bursts of leadership, innovation, and courage, because the underpinning theory is incomplete.

Paparone states, "One has to know the rules…and have the interpretive sensibility of when to break free of them."[40] Without arming airmen with the ability and know-how to reconcile paradox, paradigm blindness and painful dissonance will continue to direct the actions of the world's greatest air force. The airman's critical reflection thought process must be considered as the missing half of airpower theory. Speed and access are vital constituents, but the avenues through which these axioms are pursued must be observed from multiple cognitive paradigms in order to produce the strategic effects airpower is uniquely able to perform.

Fundamentally, the efficacy of the speed and access are contingent on the critical reflective practice of airmen. The combination, or to use the loaded word, synergy, of these are what produce airpower and facilitate its inherent strategic effects. They represent the internal fascia and fibers and the visible external muscle movements of the theory. While speed and access have been adequately discussed in order to provide context for the overarching theory, an examination of critical reflection in airpower history can highlight its tacit presence, or lack thereof, in USAF operations. In order to convey how ineffective airpower without critical reflection can be, and how strategically significant it becomes with it, a study of influential airmen in history can provide an appropriate illustration.

*The truly fascinating question…is how Pete Quesada, with virtually no operational experience prior to the war and a stint in North Africa that focused on air defense and interdiction, could learn the intricacies of tactical air support so quickly and effectively.* – Phillip Meilinger

## Historic Illustrations of Critical Reflection

Throughout history, the USAF has sporadically demonstrated airpower and its strategic effect to its detractors. In nearly every major conflict in which the USAF has participated, a systemic overreliance on a particular weapon system and its advanced capabilities, dogmatic doctrinal manifestation, or a combination of the two have diminished the ability to develop sound strategy and wasted assets and effort. Correspondingly, in all of these conflicts exists at least one airman who could distill multiple opposing ideas in order to develop cogent strategy informed by context and enact innovative tactics utilizing available means; in short, conduct airpower.

This section continues the argument that achievement of advantageous strategic effects in the domains the USAF seeks to control is the result of critical reflective thinking, not merely the result of applying a particular weapon type or method. In order to mitigate maligned air-centric strategies in the future, it is necessary to internalize the lessons of the past. Therefore, positive examples of critical reflective practice in airmen will be shown through the actions of Charles Cabell and Jacob Smart. Negative examples of airmen only utilizing one pole of the critical thought spectrum will be addressed through the actions of William Momyer and Heine Aderholt. In order to envelope a more modern context, the actions of Chuck Horner will elucidate how critical reflection led to one of the most successful USAF operations in history. As all of these airmen were pilots, the scope of this evidence will remain within the confines of manned aircraft and their utilization towards national policy. In summary, the lessons learned from their

examples will highlight the need for further research towards identifying critically reflective airmen in other career fields, and provide a path forward for the USAF.

**Airpower with Critical Reflection.**

Gen Charles P. Cabell was masterful at navigating both paradigmatic poles of critical thought, the logico-scientific and the interpretive. Although few are aware of his tremendous impact to the course of world events, Cabell personifies the effectiveness of airpower when supported by critical reflection. During WWII, his strength of character combined with his intellectual reflective capacity directly affected not only vital war efforts at the theater level, but the overarching military strategy as well. Notwithstanding his acts of strategic vision, including the creation of "The Hump" airlift route while leading Gen "Hap" Arnold's Advisory Council (the first Air Force Commander's Action Group), and the early inclusion of Tempelhof airfield into the US sector of the occupation apportionment zones after the war, his capacity to deconstruct soft assumptions and faults in logic were of incredible value to the war effort.[41] A prime example of these critical reflection abilities can be evidenced in his dealings with Lt Gen Carl Spaatz, commander of the US Strategic Air Forces in Europe.

Lt Gen Spaatz worked exhaustively to develop an air plan to support the invasion of Normandy and achieve its mandate from senior political leaders. Cabell, being widely recognized for his talent and experience in these areas, was asked to take a look at Spaatz' plan and make recommendations. After extensive examination, Cabell found many errors in Spaatz's assumptions and viewed numerous holes in the underlying logic.[42] The focus of preparatory strikes in the run up to D-Day were fixated on targeting railways and hubs throughout France in order to prevent German reinforcement and sustainment efforts post-invasion. Cabell pointed out that only 8 percent of the targeted rail system supported German movements, while the rest

buttressed the economies of France, Belgium, and the Netherlands. In the event of Allied attack, German military rail traffic would invariably take precedence over civilian; therefore, this plan had to ensure that 92 percent of the system was destroyed to be successful.[43] Given the relevant limitations of strategic bombing, especially in terms of accuracy, this would be a virtually impossible endeavor. Furthermore, Cabell stated "the rail marshalling yards were essentially in the centers of the cities within those countries."[44] Bombing raids on these friendly city centers would surely produce a civilian disaster of dire proportions and engender numerous negative second-order effects. Moreover, these hubs were far enough away from critical German nodes that the Luftwaffe would not launch to protect them. Without getting the Luftwaffe airborne and shooting them down, the Allies would have a far greater chance of seeing them over the beaches of Normandy. For these reasons, Cabell argued that oil infrastructure would be a more lucrative target set.[45]

Oil refineries had been targeted before by the Allies, with unfortunate results. The allure of this ripe, consolidated, and vital target was attacked numerous times at great cost to the Allies while producing suboptimal results. Following these engagements, a consensus seemed to exist among strategic leaders that the oil fields were too difficult for the Air Forces to contend with.[46]

Cabell recognized that Allied air operations had effects on the enemy as well the Allies' perceptions of themselves. While much study had been conducted to develop the strategies and capabilities of Allied airpower, much had also recently changed. Given new innovations with targeting and long-range fighter escort, and the increased capacity of the respective bomber forces, the oil fields were a viable target to Cabell. Myopically negating this valuable target set forever was a mistake and its destruction displayed far greater strategic potential than the rail

yards. While Spaatz was unenthusiastic about Cabell's contention, given that he had worked so diligently to secure a mandate for the rail system, he could not find fault in Cabell's reasoning.[47]

Unfortunately, the High Command did not view the issue in the same light. Due to his character and convictions against aggrandizing his position, he refused to guarantee the plan's decisiveness. Cabell knew that nothing should ever be guaranteed to work, as this produces a mental blockage for reflection and new ideas. Therefore, Eisenhower and the Allies commenced with rail attacks, giving the Luftwaffe a sorely needed rest.[48]

Pursuing this line of operation failed to connect the speed and access axioms of airpower to their requisite internal counterpart. Not long after the rail operation began, Cabell's forecast became apparent. The Germans were not producing any significant defenses against the rail yards. Spaatz advanced the oil option to Eisenhower again, this time with positive results. On 12 May, 1944, the Allies struck oil refineries across the continent with tremendous effect.[49] Richard Overy stated that the "impact was immediate. In June, synthetic output fell by 60 percent; by September it had been reduced to a mere 10 percent of the output before the bombing began."[50] Even the uncompromising Commander-in-Chief of RAF Bomber Command, Sir Arthur Harris, eventually came around to seeing things Cabell's way.[51]

Despite the appeal of allowing wishful thinking to cloud his judgment, Cabell states in his memoirs that even though the oil fields proved to be just as critical as he predicted, he valued his objectivity and sound judgement more than glory.[52] This internal fortitude and cognitive discipline allowed him to excel and produce strategic results throughout the war and foster an environment of trust with everyone he worked with.

Cabell also exemplifies how critical reflection reveals how airpower can be misapplied to produce negative strategic consequences. Toward the end of the war, Cabell fought to protect the

immense Škoda Works factory in Czechoslovakia from Allied attack. Although the factory was still producing Nazi war machines, he surmised that "at this final stage of the war, nothing that would come out of that plant could have any effect on the outcome of the war."[53] The effect of destroying it would devastate the liberated Czech economy just as it was trying to get back on its feet. Although, Gen Doolittle's Eighth Air Force attacked the plant before Cabell could confer with Spaatz, the bombers were prevented from destroying it due to weather. Spaatz agreed with Cabell's assessment on the lack of the factory's viability and removed it from the target list quickly thereafter.[54] At the time, critical reflection was a concept far away from being coined as such, but his understanding of its fundamental role in airpower should not be ignored. The USAF often cites the number of targets it bombed, but does little to celebrate the number of targets it did not destroy. In terms of strategy, both are of equal value, and Cabell knew this.

Cabell was succeeded on Arnold's Advisory Council by another airman with the tacit understanding that critical reflection exists at the cellular level of airpower, Gen Jacob Smart.[55] Smart's self-effacing character and reflective abilities enabled him to devise an effective air strategy in support of ending hostilities on the Korean Peninsula.

After many tremendous achievements in WWII, Smart was assigned as the Deputy Commander for Operations in the Far East Air Force (FEAF) during the Korean War.[56] At the time of his assignment, the air strategy was intensely focused on interdiction of Korean railways and supply lines. Numerous limitations were placed upon the planners and executers of the air strategy as United Nations political leaders sought to avoid an escalation of the conflict with China and Russia.[57] Fortunately, Smart's commander, Gen Otto Weyland, had gone to great lengths to build an open-minded organization buttressed by trust and reflective practice; and, Smart capitalized upon this unique, wartime, learning environment.[58]

Upon his arrival, Smart set about orienting himself to the conflict through internalizing and interpreting as much of the complexities and specificities as he could. This not only involved spending time on the front lines with joint partners and flying missions as a staff officer, but taking the time to validate his findings and increase his understanding.[59] This served two functions: it connected the dots between the cause-and-effect relationships that the previous strategy had been built upon and the prevalent feeling that the FEAF was on the wrong path; and, fostered confidence and trust that he had performed due diligence in arriving at his conclusions. After he downloaded enough information, he analyzed the myopic strategy and synthesized a new one to great effect.

Smart's "Air Pressure" strategy sought to eliminate enemy access to the air domain and provide close air support to joint partners on the ground.[60] The focus of this strategy was to deter the North Koreans from pursuing further actions on the ground, for fear that the only planes overhead would be American. This deterrence would serve to enable a more favorable position at the negotiating table for the UN political elites. Additionally, modest levels of railyard bombing would continue to stem North Korean sustainment efforts, and satisfy proponents of the previous plan, despite Smart's belief that interdiction was ineffective.[61]

In Smart's view, airpower was necessary, but could not be viewed as decisive. To this end, he challenged his planning staff to break free of the institutionalized notions of what was tactical and what was strategic.[62] Instead, they should focus on the effects they sought and apply an appropriate tool for the job. This contention was more than semantic. It helped frame the planners' minds to thoughtfully dismantle the logical paradigms of the past and construct effective alternate pathways towards achieving speed and access. In short, Smart armed his planning staff with the ability to produce airpower by removing a cognitive barrier.

While the logic behind this strategy might seem elementary to airmen today, it flew in the face of airpower theory at the time. The early theorists would have dismissed Smart's supposition as an inefficient use of airpower and forecast its inevitable failure.[63] However, being informed by the early theorists, Smart recognized that their rhetoric was antithetical to the true nature of airpower and was unencumbered by them.

Smart's actions further served to foster trust within the FEAF, out to his joint partners, and up to his superiors. His strategy and pursuant narrative sought to eliminate any perception that the air component of the operation was fixated on delusions of grandeur. Instead, the Air Force was to be viewed as an asset to the team.

Jeffrey Haynes, School of Advanced Air and Space Studies (SAASS) graduate, described Gen Smart's reflective capacity as a crucial skill that USAF planners must possess.[64] Smart never became mired down by one mode of critical thought, and continually questioned the assumptions and conclusions that he and his planning staff developed. The resultant impacts the USAF achieved stand as a testament to Smart's critical reflection.

**Airpower without Critical Reflection.**

The Vietnam War provides an alternate insight into the binary structure of critical thinking and the utility of the paradigms acting independently at the operational level of war. As commander of the Seventh Air Force, Gen William "Spike" Momyer personified one pole of the ontological spectrum while Brig Gen "Heine" Aderholt embodied the other. While both can be described as critical thinkers, neither displayed the capacity to alter their thought processes or recognize the other's thought processes as valid. This produced ineffective strategies, subverted trust, and exemplified how airpower must be informed by reflective practice.

Gen Momyer championed the logico-scientific methodology and, according to Donald Mrozek, "tended to see the Vietnam War as an essentially simple conventional conflict masquerading as a subtle and complicated counterinsurgency."[65] To this end, Momyer fought for a traditionally conceived air campaign designed to destroy the adversary's war-making capabilities.

In Momyer's view, the only effective way to prosecute the operation was the Air Force way. Accordingly, he adamantly sought to achieve centralized control over all air assets in the theater in an obstinate effort to reduce complexity and foster sameness. He pushed to not only control the USAF aircraft operating within the country, but over the Naval, Marine, and Army aircraft as well.[66] While many of Momyer's arguments to this end helped him develop trust with his peers and superiors and retain merit given the lack of "unity of effort," his rigid stance came at the expense of trust with his Joint partners.

Additionally, he held firm to doctrinally approved notions including the decisiveness of airpower.[67] In his book, *Airpower in Three Wars*, Momyer maintains that lessons learned regarding the decisiveness of airpower from WWII informed his strategy in Vietnam.[68] Additionally, he contends that the 11-day US air campaign over Hanoi in December of 1972 validates the theory. Unfortunately, Momyer's accounts of the Hanoi bombing operation were described by an Air University professor as a somewhat "self-serving revisionism" designed to protect his narrative behind classified documents.[69] Ostensibly, Momyer's myopic perception constrained the realities of the conflict to conform to his standards of conventional war, which created a condition where he failed to see operational utility in competing viewpoints.

This perceptive practice also forced him to develop numerous contradictory conclusions including measuring the effectiveness of the air effort by the quantity of targets destroyed and

developing an overreliance on superior technology.[70] The process of using target counting as a strategic metric in insurgency warfare fails to acknowledge the political nature of the conflict and confuses the means of war with the ends. Paparone states that individuals "equipped only with logico-scientific epistemology… will hopelessly try to detect logical fallacies when the uniqueness of situations require observer-specific narrative interpretations."[71] Momyer failed to reconcile his incongruous results because of his one-dimensional thinking.

Moreover, while jet aircraft provided the most viable means of mitigating North Vietnamese Army (NVA) air defenses, the extremely low-tech strategy and capabilities of the NVA were frequently able to subvert the US technological edge.[72] Momyer remained unwilling to reflect on his thought process and reconcile the incongruent results. He allowed his attachment to a weapon system projected for an idealized future to overshadow the realities of the conventional present.[73] Although he was a critical thinker, he failed to account for contextual indicators in executing airpower strategy; therefore, Gen Momyer was not a critical reflector, and his air effort suffered as a result.

Operating from the opposite ontological pole, Heinie Aderholt subscribed to the interpretivist paradigm. As commander of the 56th Air Commando Wing, he relied on his intuition and an evaluation of the complex conditions he was experiencing to inform his actions. To this end, he embraced the complexities of the terrain, political factions, ideologies, weather, and enemy capabilities by seeking to work with them vice in spite of them.[74] Although Aderholt rejected entrenched USAF doctrine and developed his perception of reality from context alone, he was well-versed in the operating business rules and norms that governed the USAF.[75] His overt renouncement of rules and norms he felt did not directly support his operational efforts endeared him to his men but alienated him from his superiors, including Momyer.[76] Despite

great effectiveness in utilizing low-tech propeller driven aircraft and innovative methods towards enemy interdiction, Aderholt's overreliance on the subjective form of critical thought prevented him from effectively communicating with the objectively minded USAF leadership.[77] Trust between him and his superiors eroded and his obstinacy became counterproductive to the improvement of airpower strategy. Although Aderholt's interpretivist thinking skills were sound, his refusal to meaningfully collaborate with those who did not share his views showed a lack of critical reflection.

Momyer and Aderholt represent the opposing ends of the critical thought spectrum. Neither airman was able to reflect upon how their thought processes stood in their path. A great level of antagonism existed between them as a result. Since neither believed himself to be wrong, or imagined that he arrived at conclusions regarding the nature of the war with an incomplete picture, neither stood to gain any insight from the other. Fortunately, airmen in future conflicts were not as closedminded.

**Critical Reflection in a Modern Context**

General "Chuck" Horner led a massive effort as commander of all US and Allied air assets during Operations Desert Shield and Desert Storm. As a cerebral airman with extensive Vietnam experience, Horner was uniquely qualified for the job. He had studied the Persian Gulf Theater for years and possessed leadership abilities that enabled him to communicate effectively with the other services, which helped him reduce complexity.[78] Additionally, Horner leveraged his expertise of the complex elements of Arab culture to build relationships, reconcile issues of cultural divergence, and inform targeting strategies that would limit the risk of disastrous second and third-order effects.[79] Furthermore, his optimization of the complex Air Tasking Order process enabled a synergy of the forces while drastically minimizing risk.[80] Despite these efforts

creating significant additional work for him in the short term, Horner's embrace of these contextual complexities and new challenges directly contributed to his success.

Moreover, during the planning stages of the campaign, he took great care to avoid the logical pitfalls that plagued airmen in Vietnam including the advancement of Route Packages.[81] This effort created an atmosphere of trust not only up and down the chain of command, but across to joint and coalition partners. While ensuring joint partners knew what airpower could provide, he did not rigidly advocate for airpower's set doctrinal mandates like his predecessors.[82] Furthermore, he developed an air strategy that married the strengths of decades of airpower theory with observer-specific narrative interpretations that enabled the most decisive air campaign in history. Respectively, he tempered the theoretically sound targeting plan developed by Col John Warden with needed contextual elements and tuned Warden's sterile plan into an executable order meeting the needs of the joint force.[83] Finally, he continually questioned the thought processes that led him and his team to conclusions and remained open to adjustment in light of new data, complexities, and ideas.[84] Horner clearly demonstrated how effective airpower can be when it is informed by critical reflection, and this concept is evident in the great effectiveness of his air campaign.

American airpower has a century of operations to evaluate for evidence of critical reflection in practice. The previous case studies of Gen Cabell, Gen Smart, Gen Momyer, Gen Aderholt, and Gen Horner, provide an adequate cross section and display the phenomena from the perspective of manned aircraft pilots. As the USAF has distinctly sought to advance the manned aircraft as the premier device for advancing airpower throughout its history, they are logical choices to examine. This seemingly focused selection can create the perception that only pilots need to be critical reflectors. Conversely, the modern USAF is only comprised of 4 percent

manned aircraft pilots.[85] Therefore, there is distinctly more room for study into the careers of non-flying airmen and their efficacy utilizing critical reflection in the future.

*The Air Force cannot begin to address its aging aircraft or force composition problem, its overseas basing atrophy and vulnerability challenges, or a variety of other operational and force structure issues, without attending to its institutional identity crisis.* – Thomas P. Ehrhard

## Critical Reflection and the "Force of the Future"

The strategic foothold that USAF seeks can be found inside airmen's minds. Arming every airman with the skills of critical reflection can provide the USAF with an unprecedented expediency towards new strategic horizons. The implications of which will not only resound across the national security landscape, but throughout the organization as well. Internally, it will facilitate greater trust, inspire innovative efforts, and foster a unified identity that is future-oriented while maintaining its rich heritage. Externally, arming the minds of airmen with this skill set will provide for a strategic offset that no adversary can contest.

**Leadership, Organizational, and Identity Implications.**

Airmen who practice critical reflection foster trust among superiors, peers, and subordinates alike. The process of reflecting, not only upon the larger strategic and operational guidance that one is working with, but upon the assumptions and thought processes that develop one's individual perceptions of a situation, projects a high level of integrity and promotes authenticity. The trust that these airmen produce pervades organizations and brings out the best in everyone.

Superiors recognize that critical reflectors can be trusted to complete tasks and projects, as well as lead others to that end, with little oversight. Additionally, superiors tend to rely on critical reflectors within their reach to conduct the "blue sky" thinking for them when they are too task saturated to do it for themselves. They are trusted with this charge because of their capacity to understand their leader's vision in relation to the larger context, and their proximity to the inner workings of the organization. Reflective practitioners recognize trends and can infer

relational values among competing interests. Furthermore, they display a propensity to debunk spurious relationships and focus leaders' attention to needed areas of improvement. Just as critical thinkers are adept at distilling clarity from complexity, reflectors bring the additional capacity of revealing complexity when needed. Through embracing the complexity of the organization, while reconciling the simplified construct of the leader's vision, reflective practitioners illuminate opportunities inside challenges.

Peers see critical reflectors as approachable and honest teammates with a high capacity to influence organizational actions even if they are not in a leadership role. The focus for the reflective practitioner is progress, regardless of who receives the credit for it. If one has the capacity to reflect upon their thought process, motivation, and assumptions, they are naturally guarded against allowing themselves to become impediments to organizational improvement and strategy. Moreover, when one's actions are perceived as originating from a place of sincere reflection, the weight of their actions is magnified. This is leadership by example and should be seen as exceptionally useful in influencing the actions of peers within organizations.

Subordinates revere critical reflector leaders because they view them as having tremendous insight and humility, and therefore, implicitly trust them to combat a perceived "say-do" gap between expressed intentions and actions. This gap is a primary focus for reflective practitioners because it highlights competing perspectives. While USAF leaders might believe that their stated intentions should be taken at face value, they stand at odds with what many within the service perceive as demonstrable action toward those intentions. Critical reflectors possess the capacity to reconcile both vantage points and provide a cogent way forward when provided the opportunity.

Critically reflective leaders are trusted throughout their organizations to develop and implement innovative processes and mechanisms as well. Their capacity to recognize current tensions and relevant stressors upon the larger organizational system or strategic charge is a consequential ability. Trust affords them access to unique ideas, perspectives, and strengths across a multitude of experience levels and types within each organization and the mandate to facilitate change. Therefore, the more airmen who practice critical reflection within the USAF, the better.

Organizations that breed reflective practitioners display the agility for innovative behavior as critical reflection assists in overcoming biases and cognitive shortcuts in organizational design. Like any large organization, the USAF relies on labels, categories, and inferences to smooth operations and facilitate coordination between disparate groups. Operational design is the reification of this maxim. Professor Karl Weick, distinguished author and researcher into organizational behavior and psychology, contends that "reified designs can be dangerous because they encourage perceptual shortcuts such as normalization."[86] Overreliance upon these shortcuts and heuristic devices can breed complacency and remove the perception of need to update them. Large organizations that fail to continually reflect and update their labels exhibit a high potential to become mired by insidious systemic problems. Reflective practice, engaged at the organizational level, can overcome these tendencies and ensure relevance in security system defined by complexity, crisis, and confusion.

Weick further indicates that "whether one is a designer of organizations or of physical structures, the trick is to add density to a skeleton while retaining the vigor, quirks, and visual charm of that skeleton."[87] His metaphor indicates that systems often lose their efficacy when they are over-engineered. While it is important to simplify and structure ambiguous constructs in

order to provide focus, allowing for complexity and nuance to exist in the incomplete provides vitality and needed tension. Critical reflection operates in similar fashion through balancing the opposing poles of critical thought to achieve an end, but relies on these systemic imperfections to fuel progress and innovation.

As a corollary, high reliability organizations display the ability to temporarily increase complexity and obscurity in order to achieve a breakthrough or sustain an ongoing effort.[88] This is critical reflection in action at the organizational level, and airpower was made from the same metal. Early airmen embraced complexity to reveal an alternate way forward. The airpower theory explained within intentionally prefaces *reflective control* with the possessive, *airman's*, as it is through the airman's thought process that strategic options are protected and/or created.

Throughout history, airmen have often used the term *airminded* to define the modality of thought that enables the operationalization of the aircraft in a military context. Coined by Gen Arnold, the term was originally created to draw distinction between those who have it and those who do not, and, in effect, justify the need for an independent air force.[89] People who were not airminded did not have a "distinctive point of view" and could not conceptualize the needs of maintaining and running an effective air force. In essence, Gen Arnold was trying to convey the internal half of airpower—Airmindedness is critical reflection. To that end, the USAF should seek to unify all airmen under a common airminded identity.

Regardless of an airman's career field or path in the USAF, they should consider themselves as airminded. Too often, airmen find themselves clinging to their tools or trade to define who they are and what they can provide. This mindset cages people to remain within the cognitive boundaries of their career field, and limits their potential contribution. Furthermore, it fosters an unhealthy environment of intra-service competition for resource and funding. To

return to the originating issue that sparked this study, this may reveal why the 520 ACSC students struggled with the question.

In the same fashion every US Marine is first and foremost a rifleman, airmen should exhibit equal pride in their primary weapon, their minds. Through this avenue, a matured USAF identity can be realized. Another recent SAASS graduate, Jonathan Riley, explored the roots of the USAF identity problem and identified that the Chief of Staff "who turns the corner will have to find an acceptable and durable equilibrium among the many organizational Air Force subcultures and, in particular, should consider ways to redefine the organization to achieve a more equitable power-sharing arrangement among the tribes."[90] If airpower theory is the "why" behind the service, then it should be reinforced as the bedrock of USAF culture.

Riley further highlights the origins of the USAF identity crisis as stemming from an organizational "Black Death" following WWII.[91] During the drawdown at the end of the war, the most resilient survivors were not just pilots, but those airmen associated with the nuclear weapon. "It is, therefore, through the dominance hierarchy created in the Air Force's formative years that the clear and definitive fracturing of the superordinate Air Force identity occurred, supplanting it with appreciably higher levels of identification with individual career fields instead."[92] In order to uproot the organizational penchant for tribalism, the USAF needs to look to its past and embrace its theoretical roots. Airmindedness birthed the USAF, not a weapon system, and airmindedness can unite its airmen in the future.

Reflection is revelatory. In times of uncertainty, reflection can remind us who we are and illuminate strategies based upon certainty. Through intentionally reframing the airman's reflective mind as a weapon system, the USAF can overcome its perceived identity crisis and enable the strategic offset it fervently seeks.

**Strategic Implications of Airmindedness.**

Currently, the USAF is searching for strategic traction in the concept of the "3rd Offset."[93] This offset can be described as a series of significant technological leaps, across multiple sectors, designed to provide a strategic edge over perceived US adversaries. Ideally, the USAF could simply cancel out the growing gap between current capabilities and missions with undeveloped technologies. The first offset was the advent of nuclear weapons and the second was heralded by precision-guided munitions and stealth technology. Therefore, the USAF merely needs to focus on the next technological leap forward to maintain viability. Thomas Ehrhard likens the USAF's current effort as outsourcing "important investment decisions to mid-level technologists in the hope they produce something useful absent strategic direction."[94] While the motives behind this effort are understandable, the logic is deeply flawed for two fundamental reasons.

First, although this line of reasoning is not new, it unfortunately flips a descriptive mode of understanding towards how events occurred for a prescriptive line of effort. Furthermore, the previous offsets were not recognized as such until they had already been developed. If a group of previously unimagined technologies were within grasp, their existence would not be openly discussed. Lest an adversary be permitted to prepare for their fielding, the offset technologies, and the pursuit of them, would be protected by the highest classification.

Second, a significant detractor with proposed 3rd offset technologies is that they all exist on the grid. The previous offsets required the development of technologies that took years for adversaries to counter, even if they had physical plans. Current offset plans would be proliferated, countered, and/or negated quickly; therefore, they are not potential offsets at all.

Most importantly, through the pursuit of a technology-based offset strategy, the USAF is exacerbating the identity issue and the say-do gap between leadership and the rank-and-file. Whichever technology happens to ascend to primacy at the culmination of this strategy's development, the airmen possessing its charge also stand to possess a generation of key leadership opportunities. This pattern follows decades of USAF proclivities to substitute means for ends. While the message that the strategy's pursuit sends to airmen is not intended, it underwrites the future of a new dominant subculture. Furthermore, the USAF leaders that champion this strategy, fail to recognize the immediate mixed message to airmen: ***The USAF needs young airmen to be innovative and solve the wicked security problems of the future, but is actually focused on finding the next great technology that can do it instead.*** In its current mold, 3rd Offset strategy is not only illogical, but it subverts trust.

In order to reinstall trust and develop a capability that adversaries cannot rapidly counter, the USAF should reflect within the construct of airpower. To that end, the USAF would be wise to refocus its offset strategy on airmindedness. Empowering and advancing the airman's mind as its preeminent weapon system is strategy of certainty, based on an asset that will only appreciate in value over time, which cannot be easily countered.[95] As Schön contends individuals place a normative template on reality during times of uncertainty, utilizing a strategy based on certainty during volatile periods not only reveals strategic options, but creates new ways to manage risk.[96] Revealing unforeseen paths to strategic effect is airpower's norm. Setting airmen to this task exposes virtually zero risk, while simultaneously promising tremendous reward.

An offset strategy to this end would prepare airmen to fight the wars that will come to them in the future, instead of preparing them for wars that the USAF would prefer to fight today.

Additionally, greater investment in this strategy would spread the cognitive power of the force, instead of keeping it elevated in the hierarchy, and foster trust throughout it. Further examination into the mechanics of realizing this transformational strategy is urgently needed.

*A fly on the window attracted to the light*
    *His senses are imperfect so they lead him to his plight*
*His life is now a struggle but his freedom can begin*
    *If he flies into the dark and finds the door that he flew in*
*Things we knew for sure*
    *Sometimes they're not the cure*
*We've got to rearrange our thinking*
    *Or we're just like flies on glass*
*Rearrange our thinking or we're never gonna last*

– Shelter "Revealed in Reflection"

## Conclusion

Strikingly, the answer to why ACSC airmen could not easily answer the Dean's question was revealed while researching the original intent of this paper, synthesizing a new definition of airpower. They were looking outward, not inward. The missing ingredient was the airman's mode of thought, and this work was designed to advance that contention.

Airpower is the airman's reflective control of speed and access to achieve strategic effect through the 3rd dimension. It is truly what we, as airmen, make of it. While airpower in tacit form enabled the USAF to achieve its place in history, it may not secure its future. It is hard to look in the mirror. It is especially hard to change the course of a large organization with entrenched norms that run counter to its desires. While the USAF has achieved astounding victories, extended strategic and technological horizons, and become the model for all other Air Forces to follow, it has also witnessed crushing tactical defeats, entrenched thinking, bureaucratic paralysis, and made grave errors. Much has been written about the USAF's past while theorists and technologists have continually envisioned its future. Despite widely held perceptions of

rooted internal volatilities and cynicism towards the USAF's utility in the context of modern

national security challenges, airmen maintain blazing optimism and hope for the future of

airpower. Airmen know that the future will be what they make of it, and they are ready for the

task.

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**Endnotes.**

(All notes appear in shortened form. For full details, see the appropriate entry in the bibliography.)

[1] Biddle, 15.
[2] Smith, *Beyond the Horizon*, 76.
[3] Mitchell, xiii.
[4] Smith, *Beyond the Horizon*, 76.
[5] Biddle, 140; Builder, 44.
[6] Pape, 21-28; Biddle, 47.
[7] Douhet, 10.
[8] Clausewitz, Book 8, Chap 6B (605).
[9] Dolman, 6.
[10] Ibid, 9.
[11] Builder, 43, 66.
[12] Ibid, 31.
[13] Biddle, 213.
[14] Ibid, 183, 187, 191-192.
[15] Liddell Hart, 16.
[16] Ibid, 76.
[17] Ibid, 86.
[18] Ibid, 87.
[19] Ibid, 88.
[20] Smith, 77.
[21] Weick, *Ambiguity as Grasp*, 177.
[22] AFDD-1, 25.
[23] DeFrieze, 111.
[24] Gen Welch ACSC Speech
[25] Libicki, 333.
[26] Bryen, 21.
[27] Hammond, *The Mind of War*, 196.
[28] Ibid, 4-5.
[29] Mitchell, xiii.
[30] Paparone, *Two Faces of Critical Thinking for the Reflective Military Practitioner*, 105.
[31] Schön, *Educating the Reflective Practitioner*, 6.
[32] Paparone, *Two Faces of Critical Thinking for the Reflective Military Practitioner*, 108.
[33] Ibid, 107.
[34] Ibid, 109.
[35] Kinsella, 397-398.
[36] Argyris & Schön, 9-11.
[37] Ibid, 163.
[38] Kinsella, 407.
[39] Schön, *The Reflective Practitioner*, 50.
[40] Paparone, *Two Faces of Critical Thinking for the Reflective Military Practitioner*, 109.
[41] Cabell, 45 & 143.
[42] Cabell, 118
[43] Ibid.
[44] Ibid.
[45] Ibid, 119.
[46] Ibid, 113.
[47] Ibid, 119.

[48] Ibid, 122.
[49] Ibid, 123.
[50] Overy, 232.
[51] Cabell, 126.
[52] Ibid, 121.
[53] Ibid, 192.
[54] Ibid, 193.
[55] Ibid, 34.
[56] Crane, 115.
[57] Crane, 57-59.
[58] Haynes, 50.
[59] Ibid, 50-53.
[60] Ibid, 54.
[61] Crane, 112-113.
[62] Haynes, 54.
[63] Builder, 79.
[64] Haynes, 60.
[65] Mrozek, 4, 23, 33.
[66] Momyer, 297.
[67] Mrozek, 4 & 33.
[68] Momyer, 39.
[69] Michel, 227.
[70] Clodfelter; Galula, 34; Mrozek, 33.
[71] Paparone, *Two Faces of Critical Thinking for the Reflective Military Practitioner*, 107.
[72] Clodfelter
[73] Mrozek, 45-46.
[74] Trest, 190-191, 196, & 199.
[75] Ibid, 186-188, 206.
[76] Ibid, 126-129, 136-137, 178-181, and 213-215.
[77] Ibid, 176-179.
[78] Clancy, 176-180.
[79] Ibid, 177 & 372-373.
[80] Ibid, 249-251.
[81] Ibid, 262.
[82] Ibid, 247 & 527-547.
[83] Ibid, 264-265 & 274.
[84] Ibid, 15, 264, 269.
[85] Air Force Personnel Center, *Military Demographics*. http://www.afpc.af.mil/library/airforcepersonneldemographics.asp. (Accessed 14 April, 2016).
[86] Weick, *Rethinking Organizational Design*, 39.
[87] Ibid, 41.
[88] Weick, *Ambiguity as Grasp*, 177.
[89] AFDD-2, 4.
[90] Riley, xiii
[91] Riley, 43
[92] Riley, 44.
[93] Secretary James 2016 address at AFA Symposium.
[94] Ehrhard, 49.
[95] Burrus, 37.
[96] Kinsella, 398.