

Aftermath: A Historical Analysis of Resiliency Following Failure in Battle

A Monograph

by

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Abstract

Aftermath: An Analysis of Resiliency Following Failure in Battle, by Lt Col Lee G. Gentile, Jr., USAF, 49 pages.

This monograph set out to determine if the USAF exhibited enduring organizational resiliency traits by analyzing four aerial battles where US airmen recovered from initial failure and achieved subsequent victory. The author used literary works from the field of military defeat to determine the framework to evaluate the selected World War I, World War II, Korea, and Vietnam battles. This paper concluded that there were four enduring characteristics that made airmen and their organizations resilient.

First, strategic reserves and industrial capacity were vital to an organization's ability to replace its losses and return to full strength. World War I highlighted the dangers of failing to prepare the country for mass-mobilized, industrial warfare. These lessons led to the industrial base that allowed Eighth Air Force to recover from staggering losses in the opening months of the Combined Bomber Offensive. The advent of the Cold War resulted in a large active duty air force plus a sizeable reserve and National Guard component, a surplus of aircraft in long-term storage, a strategic industrial reserve capacity, and stockpiles of strategic and critical materials, allowing the USAF to overcome losses sustained in the Korean War. However, the Vietnam War highlighted that if the Air National Guard and Air Force Reserve are not used as intended, they cannot strengthen the resiliency of the USAF and its combat units.

Second, combat experience and flexibility were critical factors in reducing casualties and helping an organization recover from its losses. Veteran airmen possessed knowledge that could only be learned by years of study, training, exercising, and fighting. Using a 'combat orientation' program, they passed valuable experience to new aircrews while mitigating the extremely high risks associated with the first days of combat. Additionally, veterans helped units adjust tactics and upgrade aircraft and aircraft systems in order to counter the enemy advantages and prevent subsequent defeat.

Third, esprit de corps was vital to a unit's ability to recover from failure. Psychological and cultural beliefs such as confidence, honor, and loyalty caused airmen to engage the enemy continually despite the understanding that they and their brethren were likely to become casualties. Additionally, the ability to grieve and then compartmentalize allowed pilots to accomplish their mission.

Fourth, leadership at all levels, from the strategic to the tactical, influenced the resilience of an organization. Strategic and operational leaders made decisions and implemented policies that had long-term impact on a unit's resiliency. At the tactical level, formal and informal leaders influenced the organization's short-term recovery process by addressing esprit de corps problems, correcting tactical deficiencies, exhibiting courage in the face of the enemy, mentoring new pilots, and helping the squadron grieve lost comrades.

Lastly, this paper proposes several situations that highlight potential resiliency shortfalls in the current force and require further evaluation.

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Acronyms

| | |
|------|---------------------------------|
| AAA | Anti-Aircraft Artillery |
| AEF | American Expeditionary Force |
| AS | Aero Squadron |
| BG | Bomb Group |
| CSAF | Chief of Staff of the Air Force |
| QDR | Quadrennial Defense Review |
| RAF | Royal Air Force |
| SAC | Strategic Air Command |
| SAM | Surface to Air Missile |
| USAF | United States Air Force |

Introduction

It was 0500 on March 11, 1967. Pilots from the 357th Tactical Fighter Squadron sat in silence as the mission commander briefed the wing's second strike on the Thai Nguyen Iron and Steel Complex in North Vietnam. They listened intently to the weather, target area description, and friendly and enemy orders of battle, paying particular attention to the enemy's air defenses. They mentally rehearsed the mission while silently praying for the three comrades that did not return from yesterday's mission.¹ They were surprised, dismayed, in disbelief, and even blameful, but still they prepared to go.²

Heroic stories like this permeate the history of the United States military. Each service has its heroes, those individuals and units that are admired for their courage and patriotism; role models that service members strive to emulate. However, do we understand why they continued to fight? Why were these units able to recover from their losses? Were there certain resiliency traits or characteristics that contributed to these airmen's ability to accept failure in battle and then go on to win future engagements? The thesis of this paper argues that strategic reserves and industrial capacity, combat experience and flexibility, esprit de corps, and leadership allowed US airmen to recover from tactical failures and achieve success in subsequent battles during World War I, World War II, Korea, and Vietnam.

Context

Understanding resilience is crucial to preparing the US Air Force (USAF) for future warfare. Currently, the USAF is the most powerful air force in the world. Since Desert Storm, the USAF and its allies have won six air wars with minimal losses. The USAF's ability to dominate

¹Robert Deas, *Two Days of Rolling Thunder* (Cambridge, MA: Y2B Publishing, 2011), 97.

²Wolfgang Schivelbusch, *The Culture of Defeat* (New York: Metropolitan Books, 2001), 69.

in air, space, and cyberspace is the result of lessons learned from previous wars, and the associated technology and training advancements.³ However, events such as the evolution of the Islamic State of Iraq and Syria, the rise of China, the resurgence of Russia, and the unpredictability of North Korea and Iran threaten United States interests and military forces around the globe.

The 2014 Quadrennial Defense Review (QDR) cautions that the US military's advantage will erode over time. Recognizing this threat, the 2014 QDR directs the military to improve resilience in order to recover from a large-scale, coordinated attack.⁴ However, the 2014 QDR does not define resilience or those characteristics that make a military organization resilient. Therefore, we must ask what traits or characteristics the USAF needs in order to recover from failure in battle. In order to answer this question, this paper will conduct an analysis of aerial battles in World War I, World War II, Korea, and Vietnam in order to determine enduring resiliency characteristics that could be used to evaluate today's force.

Methodology

This paper starts by defining common terminology, clarifying the difference between defeat and failure, and establishing an understanding of resiliency. Next, it references various literary works on military defeat in order to establish historic military resiliency characteristics. Using the established criteria, this paper then analyzes four aerial battles to determine what resiliency characteristics existed and whether they are enduring. It will then draw conclusions and offer recommendations for maintaining and enhancing USAF resilience into the future.

³US Air Force, *White Paper: Air Force Performance in Desert Storm* (Washington DC: Government Printing Office, 1991), 1, accessed January 14, 2015, <http://www.dtic.mil/dtic/tr/fulltext/u2/a235941.pdf>.

⁴Office of the Secretary of Defense, *2014 Quadrennial Defense Review* (Washington DC: Government Printing Office, 2014), 19-20, 38, accessed October 1, 2014, http://www.defense.gov/pubs/2014_Quadrennial_Defense_Review.pdf.

Defeat or Failure

In order to understand what makes an organization resilient, one needs to recognize the difference between defeat and failure. Webster's dictionary defines defeat as "to win a victory over (someone or something) in a war, contest, game, etc.; to cause (someone or something) to fail; or to control or overcome (someone or something)."⁵ This definition implies that there is a winning side and a losing side, that the outcome of the event is final, and that the losing side is unable to recover from the loss because of the absence of the will to continue.⁶ Conversely, Webster's dictionary defines failure as "the omission of occurrence or performance; a state of inability to perform a normal function; or a lack of success."⁷ This implies that there is a loser, but that the loss is not final. Therefore, failure and defeat are two different outcomes of losing. In military terms, failure is the inability to achieve the objective or complete the mission whereas defeat is an organization's inability to recover from the loss and conduct future missions.⁸ In order to establish resiliency traits, this study will focus on failures, not defeats.

What is Resiliency?

In recent years, resiliency has become common in the USAF's vernacular and has served as the foundation for helping airmen manage stress. However, can the Air Force, as an institution, be resilient? Webster's defines resilience as "the ability to become strong, healthy, or successful again after something bad happens; and/or the ability of something to return to its original shape after it has been pulled, stretched, pressed, bent, etc."⁹ Based upon this definition, everything,

⁵Merriam Webster's Dictionary Online, "defeat," accessed December 19, 2014, <http://www.merriam-webster.com/dictionary/defeat>.

⁶Schivelbusch, *The Culture of Defeat*, 2.

⁷Merriam Webster's Dictionary Online, "failure," accessed December 19, 2014, <http://www.merriam-webster.com/dictionary/failure>.

⁸T.N. Dupuy, *Understanding Defeat: How to Recover from Loss in Battle to Gain Victory in War* (New York: Paragon House, 1990), 46.

⁹Merriam Webster's Dictionary, "resilience," accessed December 19, 2014,

including an organization, is potentially resilient. The question remains then, what characteristics make an organization resilient after failure and are they enduring?

Potential Organizational Resiliency Characteristics

To answer this question, this paper draws on the conclusions of several studies. The US military has a long tradition of studying history, particularly failures and defeats, in order to garner lessons for future generations.¹⁰ In *America's First Battles*, Charles Heller and William Stofft examine the causes of the US Army's difficulties during the initial engagements of ten armed conflicts. Although their analysis focuses on how to prevent similar disasters in the future, it also identifies resiliency characteristics that led to future success.¹¹ These traits fall into four larger categories that this study defines as: strategic reserves and industrial capacity, combat experience and flexibility, esprit de corps, and leadership.

Strategic reserves and industrial capacity determine a military unit's ability to replace people and equipment lost in battle. Strategic reserves include existing forces (active, reserve, and National Guard), equipment, and the ability to transport them to the battle.¹² Industrial capacity is the ability to train new members of the armed forces and produce new or additional equipment.¹³ In order to determine the impact of strategic reserves and industrial capacity on a unit's resiliency, it is necessary to assess the link between a unit's ability to replace its losses and its ability to succeed following failure.

<http://www.merriam-webster.com/dictionary/resilience>.

¹⁰Dupuy, *Understanding Defeat*, 40.

¹¹Charles E. Heller and William A. Stofft, *America's First Battles: 1776-1965* (Kansas: University Press of Kansas, 1986), 327-352.

¹²George Friedman, "Frittering Away the Strategic Reserve," *The Officer* 84, no. 7 (September 2008), 43-6, accessed December 20, 2014, <http://search.proquest.com/docview/214096896?accountid=28992>.

¹³The Collins' English Dictionary Online, "industrial capacity," accessed December 19, 2014, <http://www.collinsdictionary.com/dictionary/english/industrial-capacity>.

Combat experience and flexibility are traits that allow units to mitigate casualties and overcome changes in the enemy's strategy and tactics. Combat experience is defined as the number of combat veterans and/or experienced airmen in a unit.¹⁴ These individuals are experts in their aircraft, know how to manage stressful situations, and have learned to balance aggression against survivability.¹⁵ Flexibility is the unit's willingness and ability to innovate and improvise in order to defeat the enemy.¹⁶ In *Military Misfortunes*, Elliot Cohen and John Gooch conclude that military units are defeated because they fail to learn obvious lessons, fail to anticipate predictable situations, and/or fail to adapt to new and unexpected circumstances.¹⁷ By thoroughly assessing how units learned, adapted, and anticipated future battles, it will be possible to determine the impact of combat experience and flexibility on resilient units.

Esprit de corps is "the common spirit existing in the members of a group and inspiring enthusiasm, devotion, and strong regard for the honor of the group."¹⁸ A unit's esprit de corps influences the individual member's ability to recover from failure and be effective in subsequent combat operations. In the *Culture of Defeat*, Wolfgang Schivelbusch highlights that esprit de corps is influenced by psychological, cultural, and political beliefs.¹⁹ Psychological beliefs include morale, confidence, and the will to fight. Cultural beliefs include honor and loyalty. Political beliefs have ties to the legitimacy of the conflict and belief in the cause. By evaluating

¹⁴Air Force Instruction (AFI) 11-202 Vol. 1, *Aircrew Training* (Washington DC: Government Printing Office, 2010), 3, accessed January 14, 2015, http://static.e-publishing.af.mil/production/1/af_a3_5/publication/afi11-202v1/afi11-202v1.pdf.

¹⁵Heller and Stofft, *America's First Battles*, 341.

¹⁶Air Force Doctrine (AFD) Vol. 1, *Basic Doctrine* (Washington DC: Government Printing Office, 2011), 61, accessed January 14, 2015, <https://doctrine.af.mil/dnv1vol1.htm>.

¹⁷Elliot A. Cohen and John Gooch, *Military Misfortunes: The Anatomy of Failure in War* (New York: Free Press, 1990), 26.

¹⁸Merriam Webster's Dictionary Online, "esprit de corps," accessed December 19, 2014, <http://www.merriam-webster.com/dictionary/espritdecorps>.

¹⁹Schivelbusch, *The Culture of Defeat*, 10.

events following a unit's failure, it will be possible to determine what factors consistently influenced esprit de corps.

Air Force Doctrine Publication Volume 2: Leadership defines leadership as “the art and science of motivating, influencing, and directing airmen to understand and accomplish the Air Force mission in joint warfare.”²⁰ Robert Pois and Philip Langer conclude in *Command Failure in War* that military leaders are responsible for setting the unit on a path to victory or defeat.²¹ Leadership ties everything together. However, leadership is not limited to a unit's commanders and supervisors, it also included those individuals whose informal leadership inspired greatness. By reviewing the influence of leaders at all levels, from the generals to the newest pilot, one will be able to deduce the influence of leadership on a unit's ability to recover from its losses and continue to fight.

Using the aforementioned categories, this paper will analyze the Aisne-Marne Campaign in World War I, the Combined Bomber Offensive in World War II, 'MiG Alley' during the Korean War, and Operation Rolling Thunder in the Vietnam War in order to determine the enduring nature of these resiliency traits. Although these air battles were not the first battles of the war, they were battles where US airmen were subjected to heavy casualties and persevered. Due to the scope of this paper, it was not possible to evaluate every squadron in every air battle for the conflicts studied. Therefore, the conclusions are unique to the specific battles and units.

²⁰Air Force Doctrine (AFD) Vol 2, *Leadership* (Washington DC: Government Printing Office, 2011), 31, accessed February 3, 2015, <https://doctrine.af.mil/download.jsp?filename=Volume-2-Leadership.pdf>.

²¹Robert Pois and Philip Langer, *Command Failure in War: Psychology and Leadership* (Bloomington, IN: Indiana University Press, 2004), 226-227.

Historical Analysis

Strategic Reserves and Industrial Capacity

Modern conventional warfare requires manpower, equipment, and the logistical network to deploy and sustain the force. Since the dawn of aviation, aircraft and the people who fly and maintain them have been at the forefront of technology. Research, design, development, and production of aircraft require time and money. Months of training are necessary for aircrew members to learn and master their trades. The experience of senior airmen, which develops over many years, is not easily replaced. However, in war, aircraft are destroyed and aircrew members are killed. Historically, when a unit has lost more than ten percent of its men and equipment, it has been defeated.²² Therefore, there must be a replacement mechanism if the unit is going to recover from failure in combat.

In World War I, the United States lacked the strategic reserve and industrial capacity to meet the war's demands. When the United States declared war on April 6, 1917, the Air Service had twenty-six pilots (none with actual combat flying experience) and fifty-one trainer aircraft. None of the air units had trained for battle and no one in the United States had developed doctrine for aerial combat.²³ Additionally, US civilian aviation was limited. Only twelve US companies produced aircraft, none of which had the mass-production capacity to meet the demands of the war effort.²⁴ There was no significant civilian aviation reservoir and the civilian flight schools lacked the capacity needed to increase training production 150-fold in nineteen months.²⁵ To

²²In the 1960s, a study based on the interviews of dozens of officers from major to lieutenant general concluded that most officers believed that casualty rates as high as fifty percent were acceptable. However, based upon the analysis of one hundred battles, most commanders accepted defeat when less than ten percent of the force was lost in a single battle. Dupuy, *Understanding Defeat*, 214-218.

²³ James J. Hudson, *Hostile Skies: A Combat History of the American Air Service in World War I* (Syracuse, NY: Syracuse University Press, 1968), 3.

²⁴Ibid, 12.

²⁵Ibid, 26.

overcome these shortfalls, the United States initially relied on Great Britain, France, Italy, and Canada to train and equip its airmen.

When the American Expeditionary Force (AEF) engaged in combat operations during the Aisne-Marne Campaign over a year later, the situation had scarcely improved. During a twelve-day period in late July through early August 1918, the 27th Aero Squadron (AS) lost nearly three quarters of its pilots and aircraft.²⁶ Because the United States lacked a strategic reserve, the 27 AS had to rely on industrial capacity to replace its lost aircraft. Unfortunately, delays in the development of the US aircraft industry forced the Army Air Service to rely on the European military industrial complex in order to resupply the 27 AS.²⁷ Despite high attrition rates on the western front, the nine French contractors were able to meet the demand for replacement parts and aircraft, allowing the 27 AS to return to full strength within a few days.

By the summer of 1918, the US Army Air Service had a fully developed pilot training program.²⁸ The United States was just entering the fighting and still had a significant strategic manpower reserve.²⁹ Although few civilians were pilots, the Air Service had the capacity to train a steady stream of replacement pilots.³⁰ This was evident on July 23, 1918, when nine new pilots

²⁶Ibid, 112-113.

²⁷Ibid, 12. The first American built combat aircraft did not emerge from the factory until February 1918. Production rates increased from fifteen per month in April to one thousand one hundred per month by October 1918. However, only one thousand two hundred American built aircraft deployed to France before the Armistice. Nalty, Bernard C. *Winged Shield, Winged Sword: A History of the United States Air Force* (Washington DC: Air Force History and Museums Program, 1997), 1:47.

²⁸“The Air Service rapidly expanded from three flying fields in the spring of 1917 to twenty-seven by November 1918.” This allowed the Air Service to expand from one thousand two hundred airmen to over two hundred thousand before the end of the war. Nalty, *Winged Shield, Winged Sword*, 1:51-1:53.

²⁹By the summer of 1918, the European powers had lost more than two million men with millions more wounded or missing in action, draining their strategic reserve and nearly erasing an entire generation of young men. Public Broadcasting System, “World War 1 Casualty and Death Tables,” accessed October 11, 2014, http://www.pbs.org/greatwar/resources/casdeath_pop.html.

³⁰In late 1917 and early 1918, the US relied on the Europeans to train its initial pilots. By the end of 1918, the Air Service pilot training facilities had produced fifteen thousand pilots.

arrived at the 27 AS to replace the pilots that had been lost only a few days prior.³¹ Although, these inexperienced and overconfident pilots lacked the combat skills of the veterans they replaced, the ability to restore the 27 AS to full strength highlighted the importance of strategic reserves and industrial capacity on a unit's resilience.

The United States' non-existent strategic reserves and inadequate industrial capacity during the First World War had a profound impact on future Second World War military leaders such as Henry "Hap" Arnold and George C. Marshall. Both Arnold and Marshall were staff officers in 1917-1918, and saw the problems of inadequate manning, training, and equipment firsthand. When the Munich crisis occurred in September 1938, then Major General Hap Arnold was the commanding general of the US Army Air Corps. He attended a Presidential meeting in November 1938 where President Roosevelt expressed his concern about the strength of the German Air Force compared to the air forces of the United States, France, and Britain.³² At that time, the US Army Air Corps owned one thousand six hundred aircraft, and industry only produced eighty-eight aircraft per month.³³ At President Roosevelt's direction, Arnold began

Nalty, *Winged Shield, Winged Sword*, 1:51-1:53.

³¹Hudson, *Hostile Skies*, 113-114. The Chateau-Thierry campaign was the most difficult air operation the 1st Pursuit Group fought during the war. On July 21st and 22nd, the 27th Aero Squadron lost seven of its eighteen pilots and aircraft. Tragedy would again befall the 27th on August 1st when six of its pilots were shot down in a battle near Fere-en-Tardenois. In a period of twelve days, the 27th lost seventy-four percent of its authorized flying personnel, the largest number of casualties of any of the 1st Pursuit Group's squadrons during the entire war. The losses at Chateau-Thierry were so dramatic that when Frederick Ordway, one of the first pilots in the 27th Aero Squadron, visited the squadron at the end of the campaign there were only three original members remaining. Bert Frandsen, *Hat in the Ring: The Birth of American Air Power in the Great War* (Washington DC: Smithsonian Books, 2010), chap 8, Kindle.

³²In November 1938, the German Air Force was nearly double the combined French-British total. Richard G. Davis, *Bombing the European Axis Powers* (Montgomery, AL: Air University Press, 2006), 37.

³³*Ibid*, 37.

expanding the Air Corps to twenty thousand aircraft and US industrial capacity to two thousand planes a month.³⁴

After Germany invaded Poland in 1939, General George C. Marshall, then Chief of Staff of the Army, began to prepare the country for war. During World War I, General Marshall had been responsible for manning, training, and equipping the AEF prior to its deployment to France. In his memoirs, General Marshall noted his frustration with the country's preparations in 1917 despite Europe having been at war for three years.³⁵ This experience drove General Marshall to increase the size of the active duty force while engaging with industry to prepare manufacturers to support the rapid buildup of US military equipment and the lend-lease program.³⁶

By August 1940, US war plans called for more than twenty-one thousand aircraft and one hundred seventeen thousand Air Corps personnel. To meet this demand, Major General Arnold increased the pilot training quota to thirty thousand pilots a year.³⁷ This led to a strategic reserve of more than one hundred fifty-two thousand personnel and twelve thousand aircraft in the Army Air Force, formerly the Army Air Corps, by December 1941.³⁸ When the Eighth Bomber Command (re-designated as Eighth Air Force in February 1944) joined the Combined Bomber Offensive on June 10, 1943, it had 33,436 personnel and 1,215 bombers.³⁹

³⁴Ibid, 37.

³⁵George C. Marshall, *Memoirs of My Service in the World War, 1917-1918* (Boston: Houghton Mifflin, 1976), 52.

³⁶Mark A. Stoler, *George C. Marshall: Soldier-Statesman of the American Century* (Boston: Twayne Publishers, 1989), 69-71.

³⁷Wesley F. Craven and James L. Cate, *The Army Air Forces in World War II* (Chicago: University of Chicago Press, 1948), 1:136-1:137.

³⁸Statistical data prior to 1944 lacks the fidelity necessary to determine how many aircrew members were serving in the US Army Air Force in 1941. US Air Force, Office of Statistical Control, *Army Air Forces Statistical Digest, World War II* (Washington, DC: HQ US Army Air Forces, 1945), 15, accessed December 20, 2014, <http://www.afhso.af.mil/shared/media/document/AFD-110331-045.pdf>.

³⁹Including fighter and transport aircraft, Eighth Bomber Command had 1,841 aircraft total at the start of the Combined Bomber Offensive. Craven and Cate, *The Army Air Forces in*

Based on doctrine developed at the Air Tactical School, Eighth Bomber Command focused on precision daylight bombing in order to destroy Germany's military, industrial, and economic systems.⁴⁰ The Royal Air Force (RAF) had attempted daylight bombing in 1940, where it suffered terrible losses. Therefore, the RAF subscribed to nighttime area bombing to reduce casualties. However, Eighth Bomber Command remained loyal to its daytime precision bombing strategy. In the first three months of the offensive, Eighth Bomber Command lost 367 aircraft and 3,413 personnel (roughly one fifth of its aircraft and over ten percent of its force).⁴¹

Because worldwide demand for aircrews and aircraft was high, there were little to no strategic reserves by the summer of 1943. However, by May 1943, the United States was producing over two thousand aircrew per month, and it was producing over three thousand aircrew per month by October 1943.⁴² Additionally, aircraft production steadily increased from 2,971 aircraft per month in January 1942 to 8,781 aircraft per month by the end of 1943.⁴³ By 1944, the industrial power of the United States was fully mobilized for war. US manufacturers converted factories that mass-produced domestic products, such as cars, tractors, and refrigerators, into the largest military-industrial base in history. The facilities and manufacturing expertise allowed the United States to produce nearly nine thousand aircraft per month, with a bomber coming off the production line every fifty-five minutes.⁴⁴

World War II, 1:34, 1:157.

⁴⁰Nalty, *Winged Shield, Winged Sword*, 1:279.

⁴¹Office of Statistical Control, *Army Air Forces Statistical Digest, World War II*, 51, 255.

⁴²Aircrew production levels remained around three thousand aircrew per month through the beginning of 1945. Once Germany was defeated, aircrew production was reduced to approximately one thousand five hundred aircrew per month. *Ibid*, 66-67.

⁴³*Ibid*, 51, 112.

⁴⁴Ford Motor Company, "The Story of Willow Run," accessed on December 15, 2014, www.restoreyourford.com.

By the time victory was declared in the European Theater in 1945, Eighth Bomber Command had suffered 63,410 casualties and 11,687 aircraft destroyed.⁴⁵ It had lost nearly twice the number of personnel and over six times the number of aircraft with which it started the Combined Bomber Offensive. Because US industry contained the world's best mass production capability, the United States was able to produce more aircraft than were lost in battle, allowing the Eighth Bomber Command to recover from its losses.⁴⁶ To complement the increased aircraft production, the Army Air Force had developed a massive pilot training program that produced more new pilots and aircrew than were lost on the front. However, as in World War I, experience became the limiting factor because an inexperienced pilot was not an equal replacement for a combat veteran. Because the value of combat experience increased during subsequent wars and technological advancements, this topic will be evaluated in detail later in this paper.

Following World War II, the US military began the process of returning to a peacetime footing.⁴⁷ However, several US leaders were concerned about the long-term intentions of the Soviet Union. Therefore, as the USAF reduced the size of the active duty force, it placed most of the excess aircraft into long-term storage facilities. This additional strategic reserve provided military capacity that augmented what was available in the Air National Guard and Air Force Reserve. Furthermore, studies in the aftermath of World War II highlighted the need to maintain the industrial capacity and raw materials to win a war of attrition. Therefore, Congress passed Public Laws 79-520 and 80-883 directing the services to establish "stockpiles of strategic and critical materials" and to assume responsibility for the "maintenance, disposition, and

⁴⁵By VE Day, casualties in the European Theater included 19,876 dead, 8,413 wounded and evacuated, and 35,121 missing, interned, and captured. Office of Statistical Control, *Army Air Forces Statistical Digest, World War II*, 51, 255.

⁴⁶Nalty, *Winged Shield, Winged Sword*, 1:235.

⁴⁷President Truman was concerned about the budget deficits and the potential inflation and economic dislocation it would create. *Ibid*, 5.

administration” of several civilian factories and their production equipment.⁴⁸ These actions preserved the strategic reserves and industrial capacity that had assured Allied victory in World War II.

Growing concern regarding communist expansion in Asia and Europe, undeterred by the US nuclear threat, caused the US military to advocate for a larger peacetime force and the capacity to mobilize the country rapidly. When North Korea invaded South Korea on June 25, 1950, the US Air Force had 17,063 aircraft, including 3,343 bombers and 3,673 fighters, in the active inventory and 34,524 active duty aircrew members.⁴⁹ The reserve and Guard provided an additional 3,905 aircraft and 159,258 aircrew members.⁵⁰

A robust industrial base complemented this strategic reserve. At the start of the Korean War, the USAF was accepting 138 aircraft and graduating 55 replacement pilots per month.⁵¹ Because of the United States’ industrial capacity, it was able to increase production to an average of 394 aircraft, including more than 200 fighters and bombers, per month throughout 1952 and 1953.⁵² With the help of civilian aviation, the USAF was able to double its pilot training capacity by 1953, producing over one hundred fully trained pilots per month.⁵³

⁴⁸US Congress, *First Session of the Seventy-Ninth Congress, Public Law Chapter 590*, (Washington DC: US Congress, 1946), accessed December 21, 2014, www.legisworks.org/congress/79/publaw-590.pdf. US Congress, *First Session of the Eightieth Congress, Public Law Chapter 883* (Washington DC: US Congress, 1947), accessed December 21, 2014, www.legisworks.org/congress/80/publaw-883.pdf.

⁴⁹US Air Force, Comptroller of the Air Force, *United States Air Force Statistical Digest: Fiscal Year 1950* (Washington, DC: HQ US Air Force, 1950), 13, 179, accessed December 18, 2014, <http://www.afhso.af.mil/shared/media/document/AFD-110405-027.pdf>.

⁵⁰In June 1950, the Air National Guard reported that it had 4,150 rated officers while the Air Force Reserve reported that it had 103,134 pilots and 45,427 other rated officers. *Ibid*, 334, 346, 380.

⁵¹*Ibid*, 97, 164.

⁵²Comptroller of the Air Force, *Fiscal Year 1953*, 180.

⁵³Comptroller of the Air Force, *Fiscal Year 1950*, 444.

Combat losses in Korea averaged around fifty-seven aircraft per month in 1950 and 1951, with enemy ground fire and accidents accounting for most of the losses. Attrition rates dropped to forty aircraft per month from January 1952 until July 1953, with enemy ground fire and accidents remaining the leading causes. By the end of the Korean War in 1953, the Air Force had lost 2,015 aircraft (757 to enemy action) with 1,841 casualties.⁵⁴ Based on the strategic foresight following World War II, the United States' strategic reserves and industrial capacity allowed the Air Force to replace the losses sustained in Korea. However, there was a critical weakness in the system. A lack of a specific wartime mission, training deficiencies, and obsolete equipment left many reservists and Guardsmen unprepared for combat.⁵⁵ Additionally, Guardsmen and reservists tended to deploy as individuals vice entire units. They were often assigned to missions and aircraft that they were unfamiliar with, which further degraded their effectiveness during the initial stages of the war. In response, Congress made sweeping changes to the laws throughout the remainder of the 1950s in order to ensure that the Guard and reserve maintained their combat readiness.

Because the United States had been surprised by the North Korean invasion, many feared that the west would not have the strategic warning required to generate a force large enough to combat a nuclear-armed Soviet Union. The ensuing Cold War strategy resulted in the expansion of the military industrial complex and the largest standing military in US history. However, President Eisenhower saw the impact of the Korean War and vowed not to get involved in limited conflicts that would degrade the military and the economy. Therefore, his strategy to contain

⁵⁴Korean War casualties included 1,180 dead, 368 wounded, and 293 prisoners of war. US Air Force, Comptroller of the Air Force, *United States Air Force Statistical Digest: Fiscal Year 1953* (Washington, DC: HQ US Air Force, 1953), 20, 101, accessed December 18, 2014, <http://www.afhso.af.mil/shared/media/document/AFD-110405-030.pdf>.

⁵⁵“US Air Force Fact Sheet: Forging the Air National Guard,” Headquarters Air National Guard, last modified unknown, accessed February 3, 2015, http://www.ang.af.mil/resources/factsheets/factsheet_print.asp?fsID=10507&page=1.

communist expansion, deter nuclear war with the Soviet Union, and preserve the American economy relied heavily on the use of strategic airpower, driving the Cold War buildup of the Air Force.⁵⁶

When the Vietnam War commenced in 1962, the Air Force had a significant strategic reserve with 15,897 aircraft and 884,025 personnel on active duty.⁵⁷ Additionally, the USAF was accepting an average of nine new bombers and eleven new fighters per month while training over one hundred new mission-qualified pilots every month.⁵⁸ Aircraft production varied over the duration of the conflict with bomber production dropping to zero in 1963 through 1966 (FB-111 production did not begin until 1967). Fighter production remained at forty-five per month from 1963 through 1965, and steadily increased to a high of seventy-four per month in 1966. From 1967 through 1975, average fighter production varied from forty-five to fifty-five aircraft per month.⁵⁹ Therefore, the USAF was able to replace the 2,251 aircraft and helicopters lost in battle over Vietnam.⁶⁰

Although the USAF was able to replace the aircraft, there were significant manpower problems that statistics can mask. When the Kennedy Administration took over, it started reducing the number of aircraft in favor of limited war policies and ballistic missiles.⁶¹ This

⁵⁶Donald Alan Carter, "Eisenhower Versus the Generals," *The Journal of Military History* 61, no.4 (October 2007), 1170.

⁵⁷US Air Force, Comptroller of the Air Force, *United States Air Force Statistical Digest: Fiscal Year 1962* (Washington, DC: HQ US Air Force, 1962), 83, 227, accessed December 19, 2014, <http://www.afhso.af.mil/shared/media/document/AFD-110412-017.pdf>.

⁵⁸Ibid, 72, 287. Mission-qualified pilots have completed a training program that qualifies them to "perform the command or unit mission." AFI 11-202 Vol. 1, 12.

⁵⁹Production numbers were derived from various Comptroller of the Air Force Statistical Digests. US Air Force, Comptroller of the Air Force, *United States Air Force Statistical Digest: Fiscal Years 1962-1976* (Washington, DC: HQ US Air Force, 1962-1976), accessed December 18, 2014, <http://www.afhso.af.mil/usafstatistics/index.asp>.

⁶⁰The USAF lost 1,737 aircraft to hostile fire and 514 for other reasons (mechanical, weather, pilot error, etc.). Nalty, *Winged Shield, Winged Sword*, 2:331

⁶¹US Air Force, Historical Division Liaison Office, *USAF Manpower in Limited War:*

resulted in the Air Force's overall rated manning strength decreasing from more than sixty-eight thousand in 1964 to just over forty-seven thousand in 1975.⁶² However, the Air Force's policy of placing rated officers in non-flying staff, research, and leadership positions led statistics-driven Secretary of Defense McNamara to believe that the USAF had an adequate number of pilots to fight the war. However, of the nearly forty-nine thousand pilots in 1964, roughly half were veterans from World War II and Korea and were no longer assigned to flying duties. This policy resulted in a shortfall of nine thousand five hundred pilots under the age of thirty and a surplus of twelve thousand over the age of forty.⁶³

Three other policy decisions affected the deployed unit's ability to recover. First was the one hundred-mission policy.⁶⁴ Once a pilot had flown one hundred missions over Vietnam, they had to return to the States regardless of the status of their replacement. As the air war intensified, pilots started reaching this mark around the seven-month point.⁶⁵ This forced the USAF to augment the deployed units with temporary duty pilots until the replacement arrived, severely constraining manning levels in the other commands. The second policy concerned subsequent

1964-1967, by George F. Lemmer (Washington, DC: Government Printing Office, 1968), 26, accessed January 13, 2015, <http://www.afhso.af.mil/shared/media/document/AFD-110322-016.pdf>.

⁶²US Air Force, Comptroller of the Air Force, *USAF Summary: January 1976* (Washington DC: HQ USAF, 1976), pers 18, accessed December 18, 2014, <http://www.afhso.af.mil/shared/media/document/AFD-110404.039.pdf>.

⁶³Lemmer, *USAF Manpower in Limited War*, 25.

⁶⁴Rotational policies, using a combination of months in theater and/or combat sorties, were used in World War II and Korea to help commanders manage combat fatigue. However, unlike Vietnam, these policies had a caveat that allowed unit commanders to extend personnel in order to prevent manning shortages that would negatively affect mission accomplishment. US Air Force, Historical Division, Historical Studies Branch, *Combat Crew Rotation: World War II and Korea* (Montgomery, AL: Air University, 1968), 4, accessed February 4, 2015, <http://www.afhra.af.mil/shared/media/document/AFD-080424-048.pdf>.

⁶⁵Donald D. Little and Barry L. Spink, *USAF Personnel Rotation in Southeast Asia: 1961 through 1971* (Montgomery, AL: Air Force Historic Research Agency, 2013), 13, accessed January 5, 2015, <http://www.afhra.af.mil/shared/media/document/AFD-090804-098.pdf>.

involuntary tours in Southeast Asia. The policy stated “...no individual, except those who volunteer, will be reassigned a second tour in Vietnam until all others available in the same specialty and grade have served an initial tour.”⁶⁶ This created an experience problem that will be covered in a subsequent section. The third policy was the most damaging. The absence of a declaration of war and a lack of political will prevented the USAF from using the strategic manpower inside the Air National Guard and Air Force Reserve. Therefore, the USAF had to rely on existing manpower and newly trained pilots to meet the needs of the combat units.⁶⁷

If a unit is going to be resilient following failure in battle, it must be able to replace its men and equipment. This was most prominent in World Wars I and II where industrialized nations fought total wars. These were wars of attrition where the victor was able to ‘out produce’ the loser. Using the lessons of World War I, US military leaders prepared the country’s industrial base for mass mobilization in 1939-1941. Following World War II, the country’s leaders realized that there would be little to no warning in a war with the Soviet Union. This resulted in the creation of a large active duty air force plus a sizeable reserve and National Guard component, a surplus of aircraft in long-term storage, a strategic industrial reserve capacity, and stockpiles of strategic and critical materials. Additionally, the dawn of aviation led to the rapid development of new aviation technology and the expansion of the civilian aviation sector. This further expanded the aviation industrial complex while training segments of the civilian population to fly. Because of the US Air Force’s strategic reserve and industrial capacity, the casualties sustained in Korea were easily absorbed; albeit with some initial difficulty because of the less than desirable preparation and employment of the Guard and reserve. On the other hand, Vietnam highlighted the consequences associated with the inappropriate employment of the strategic reserves. Because of the lack of political will regarding the use of the National Guard and reserve personnel, the

⁶⁶Ibid, 21.

⁶⁷Lemer, *USAF Manpower in Limited War*, 19.

USAF was able to replace the aircraft quickly, but not personnel. The unwillingness to use the strategic reserve created experience problems in the deployed units, and manning shortages throughout the remainder of the force. Based on the analysis, it is evident that the strategic reserves and industrial capacity were vital to a unit's ability to be resilient when personnel and equipment were lost in battle. However, all four conflicts highlighted that new pilots could not replace the experience of the veterans who did not return.

Combat Experience and Flexibility

Veteran airmen acquire expert knowledge through study, training, simulations, and more importantly, combat. It is knowledge that is learned over time and cannot be taught in a classroom.⁶⁸ It is experience that comes from exposure to aerial combat and an effective understanding of the events that transpired. Combat experienced personnel help units learn, anticipate, and adapt following failure in battle. However, a unit must be flexible if it is going to innovate and improvise in order to defeat the enemy.⁶⁹ The leadership and the airmen must be able to critically analyze the causes of the failure, develop solutions, and be willing to make the necessary changes in order prevent future failures.

Since World War I, the USAF has been concerned about the experience of its pilots compared to that of its enemy. When the US Army Air Service started combat operations in the spring of 1918, the German Air Force had been fighting for more than three years and was considerably more experienced than the new American Air Service. The German pilots had survived hundreds of battles and downed scores of British and French aircraft. Although they

⁶⁸“It was found in the spring and summer of 1918, that no amount of training at the rear, even though the instructors were French pilots who had served at the front, would give the pupils the atmosphere and point of view of a fighting pilot.” US Air Force, The Office of Air Force History, *The US Air Service in World War I* (Washington DC: Government Printing Office, 1979), 3:285, accessed January 22, 2015, <http://www.afhso.af.mil/shared/media/document/AFD-101124-028.pdf>.

⁶⁹AFD Vol. 1, 61.

were experienced killers, they were also experienced survivors because they knew when to engage and when to leave the fight. To overcome the experience gap, the AEF leadership took two major steps. First, they integrated America's most experienced aviators into the 1st Pursuit Group. Second, US airmen commenced their first combat operations in the Toul Sector where they had faced units that were either battle fatigued or very inexperienced before fighting Germany's best pilots.⁷⁰

Starting in 1914, American volunteers had been flying in the British and French Air Forces.⁷¹ When the United States declared war in 1917, ninety-three of the American volunteers including Raoul Lufbery, the leading ace in the Lafayette Escadrille, transferred to the Army Air Service.⁷² Lufbery and the other experienced aviators became the backbone of the 1st Pursuit Group during the first few months of operations on the Western Front.⁷³ These veterans served as instructors and patrol leaders during the initial combat sorties. They helped the inexperienced pilots learn the lessons of past aerial engagements, taught them to control their aggression, and demonstrated the employment of the correct tactics at the proper time.⁷⁴ Under their guidance, the 1st Pursuit Group achieved twenty-seven victories while only losing fourteen pilots.⁷⁵

⁷⁰Frandsen, *Hat in the Ring*, chap 5, Kindle.

⁷¹The US recognized the value of experienced pilots but recovery of downed aircraft in German occupied territory exceeded the service's technological capabilities. Ibid, chap 1, Kindle.

⁷²The Lafayette Escadrille was the French Air Force squadron for the American volunteers. Ibid, chap 2, Kindle. In aerial combat, an 'Ace' is one of the most revered pilots in the squadron. Achieving the status of 'Ace' is equivalent to winning the Heisman Trophy or being named the MVP of the Super Bowl. In order to become an 'Ace', a pilot must shoot down five enemy aircraft. To attain this honor, a pilot must master the employment of his aircraft, fully understand the strengths and weaknesses of his enemy's aircraft, and have the instincts to know when to fight and when to disengage. By default, an ace is one of the most experienced pilots in the squadron. Nalty, *Winged Shield, Winged Sword*, 1:64.

⁷³Maurer, *The US Air Service in World War I*, 285.

⁷⁴New pilots flew 'cook's tours' with squadron commanders or experienced flight leads in order to become familiar with local terrain, visual lookout, and dogfighting. Hudson, *Hostile Skies*, 113.

⁷⁵The 1st Pursuit Squadron post-mission reports indicated that a total of fifty-eight

Although the 1st Pursuit Group had gained vital combat experience in Toul Sector, it was not enough to counter the German pilots during the opening phase of the Aisne-Marne Campaign. Unlike in the Toul Sector, US airmen would do battle with three of the German Air Force's best squadrons, including Baron Von Richthofen's 'Flying Circus'.⁷⁶ Furthermore, the 1st Pursuit Group relied on the small formation tactics that had been effective in the Toul Sector. These three to five aircraft formations were woefully inadequate against the German's large hunt formations, which were often twenty to thirty aircraft strong.⁷⁷ This resulted in German pilots downing American airmen at a rate of nearly two-to-one.⁷⁸

However, with every battle US airmen gained more experience allowing them to adapt to new German tactics. With the arrival of the new Spad 13 aircraft in mid-July 1918, the 1st Pursuit Group shifted to squadron-sized formations of twelve to fifteen aircraft, which placed the Americans on a more equal footing with the Germans.⁷⁹ By August 1918, the 1st Pursuit Group was launching group-sized formations to match the newest German tactics. The continual increase in experience and the ability to adapt to the new threat resulted in the 1st Pursuit Group destroying thirty-eight enemy aircraft while only losing thirty-six aircraft by the end of the Aisne-Marne Campaign.⁸⁰ Although numerically a draw, it was a significant achievement for the Air Service. The 1st Pursuit Group highlighted the importance of transferring the experience of combat veterans to new pilots, and adapting to changes in enemy tactics in order to recover from its early losses and defeat the adversary.

German aircraft had been shot down. However, they were only credited with twenty-seven victories because victories had to be confirmed from sources outside of the air service. Ibid, 77.

⁷⁶Ibid, 92 and 96.

⁷⁷Ibid, 96.

⁷⁸Ibid, 90-117.

⁷⁹Ibid, 105.

⁸⁰Ibid, 117.

During World War II, US airmen would again fight very experienced German pilots. To overcome this disadvantage, ‘combat orientation’ became a crucial part of training inexperienced bomber crews in Europe. Newly arrived pilots, regardless of rank or position, would fly in the cockpit of an experienced bomber crew before leading their own crew into combat.⁸¹ By flying with experienced crews, new airmen learned how to control their fear in the face of the enemy while gaining confidence in the survivability of their aircraft and tactics. When the Korean War started, many of the senior pilots had fought in World War II and had aerial victories from the European and Pacific fronts.⁸² Although they had not flown in the skies over Korea, these combat veterans provided the experience needed to help the new pilots acclimate to the stresses of air-to-air combat in the ‘Jet Age’. As the war progressed, the program of flying new pilots with veteran aviators well versed in combat over Korea was crucial to mitigating losses.⁸³

Similarly, in Vietnam, new fighter pilots had to complete several flights to the target areas of southern North Vietnam before they were allowed to fly into the MiG and surface-to-air missile (SAM) infested areas near Hanoi.⁸⁴ Additionally, new or upgrading flight leads had to lead a mission to Hanoi with a highly experienced flight lead in the number three position before they were certified to lead missions into the northern target areas.⁸⁵ The value of passing combat

⁸¹On his first mission over Germany, Brigadier General Newton Longfellow, commander of the 2nd Bomb Wing, was standing in the cockpit monitoring an experienced crew when the aircraft was hit by AAA. Longfellow panicked and started grabbing the throttles and turbo controls, which could cause significant engine malfunctions at altitude. In order to get Longfellow to stop, the pilot had to elbow him in the face. If there had not been an experienced crew on board, Longfellow’s fear would have resulted in the unnecessary loss of an aircraft and crew. Geoffrey Perret, *Winged Victory: The Army Air Forces in World War I* (New York: Random House, 1993), 246.

⁸²Nalty, *Winged Shield, Winged Sword*, 2:21, 2:30.

⁸³Harold Fischer and Penny Wilson, *Dreams of Aces: The Hal Fischer Story, Korea and Vietnam* (Dallas: Great Impressions, 2001), 29.

⁸⁴Jack Broughton, *Thud Ridge* (Friendswood, TX: Baxter Press, 1996), 45-46.

⁸⁵Ibid, 150.

experience to the newest pilots was so important, that to this day nearly every command in the USAF has a local area orientation program that requires new aircrew members to fly a specified number of sorties with an experienced aircrew member before being certified to conduct missions in that area of responsibility. Ultimately, the 'combat orientation' program promoted learning from the mistakes and knowledge of others while reducing the risk to new pilots as they gained experience.

Some may contest that experience is not important, that you can replace the lost pilots with new pilots without affecting the combat effectiveness of the unit. However, this has not been true historically. In fact, long wars and sustained losses compounded the problem by accelerating attrition rates and decreasing unit effectiveness. For instance, in World War II, the German and Japanese Air Forces were handicapped by the decrease in the experience levels of their aircrew as the war progressed.⁸⁶ To meet the demand for pilots, they attempted shortening training courses. However, this further decreased the experience level of the new pilots, which caused the attrition rates to increase dramatically.

The USAF faced a similar problem in Vietnam. Because of the policies of the Kennedy and Johnson Administrations and the demand for fighter pilots over the duration of the Vietnam War, the USAF implemented a program that considered pilots 'universally assignable' to any airframe in the USAF inventory.⁸⁷ By allowing bomber, tanker, and air defense pilots to retrain as fighter pilots, the USAF hoped to prevent combat fatigue in the fighter pilot force.⁸⁸ Although the transferring pilots had several hundred hours of flying experience, they had minimal experience as fighter pilots; the result was a dismal survival rate. Because of the complexity associated with

⁸⁶Nalty, *Winged Shield, Winged Sword*, 1:215 and 1:301

⁸⁷Lemmer, *USAF Manpower in Limited War*, 25.

⁸⁸"You can't have the same younger people fighting the battle interminably or they run out of longevity. Even if they don't, you can only put a guy in the way of getting killed so many times before he loses his enthusiasm for the role." Broughton, *Thud Ridge*, 162.

employing an aircraft as a weapon, the loss rate increased from 0.25 aircraft per month in 1965 to 4.5 aircraft per month by 1968.⁸⁹ This highlighted that professional fighter pilots had skills and instincts that took years to develop through rigorous study, training, exercises, and evaluation; skills that could not be developed during a four-month requalification program. This lesson is even more critical today because of the advancements in weapons, sensors, communication and data-link suites, and defensive systems.

In addition to helping new pilots adjust to combat quickly, veterans helped units recognize weaknesses and develop potential solutions. However, the leadership and the airmen had to be willing to adjust to the changes in enemy weapons and tactics. During the initial stages of the Combined Bomber Offensive, German fighters plagued Eighth Bomber Command bombers in route to the target areas. Allied fighters were limited in range by their fuel capacity and could not stay with the bombers during their attacks deep into Germany. Unescorted bomber losses were seven percent compared to two percent for escorted bomber missions. This meant that the average bomber crew would survive twelve to fourteen unescorted missions.⁹⁰ Three changes reduced the casualty rates: tighter formations, external fuel tanks, and the development of the P-51.

Unable to wait for a technological solution, then Colonel Curtis LeMay, commander of the 305th Bomb Group (BG), developed and implemented the wedge-shaped combat box formation. Furthermore, he instilled formation discipline in all of his crews through repetitive

⁸⁹When the USAF commenced operations against North Vietnam in 1965, the average fighter pilot had five hundred hours of flying experience in their assigned aircraft. By 1968, the average experience level had decreased to 250 fifty hours in that particular airframe. In comparison, the US Navy did not consider its pilots universally assignable, continually rotated experienced pilots into Vietnam, and did not experience an increase in aircraft losses. C.R. Anderegg, *Sierra Hotel: Flying Air Force Fighters in the Decade after Vietnam*, (Washington DC: Government Printing Office, 2001), 14, accessed January 16, 2015, <http://dtic.mil/dtic/tr/fulltext/u2/a476975.pdf>.

⁹⁰Perret, *Winged Victory*, 249.

practice over England. These adjustments maximized the firepower of the bombers while reducing their vulnerabilities. This formation was so effective that it was quickly adopted as the Eighth Bomber Command standard.⁹¹ Moreover, the advent of external fuel tanks extended the range of the P-38s, allowing them to escort the bombers deep inside German controlled territory.⁹² However, the arrival of the P-51 in 1944 gave the Allies the upper hand in the skies over Germany. Equipped with large internal and drop-away external fuel tanks and six .50 caliber machine guns, the Rolls Royce Merlin powered P-51 was able to attain the speed, altitude, and range to escort the bombers deep inside Germany, virtually eliminating the German fighter threat.⁹³ The willingness of Army Air Force leaders to accept inputs from veterans provided the flexibility required to overcome severe initial losses.

In Vietnam, USAF pilots flew against SAMs for the first time in history. After losing several aircraft, the experienced pilots in the 355th Fighter Wing at Takhli and the 388th at Korat developed new tactics to increase their survivability. They experimented with different altitudes, formations, and onboard electronic countermeasures. Although the new tactics were effective, the advent of the 'Wild Weasel' platform truly degraded the North Vietnamese SA-2s.⁹⁴ According to USAF official history, "[in] 1965 the North Vietnamese fired about fifteen SA-2s for every aircraft shot down. By the end of Rolling Thunder, they had to fire an average of forty-eight

⁹¹Kozak, *Lemay*, 99.

⁹²Nalty, *Winged Shield, Winged Sword*, 1:159.

⁹³*Ibid*, 242.

⁹⁴In 1965, the USAF secretly outfitted two-seat F-100Fs with radar homing and warning (RHAW) equipment, which allowed the crew to find the SAM site and attack it with rockets. The F-105 assumed the 'Wild Weasel' mission in May 1966. The F-105 carried AGM-45 'Shrike' anti-radar missiles and conventional bombs, which along with new 'hunter/killer' tactics, improved the success of the anti-SAM campaign. "US Air Force Fact Sheet: First In, Last Out: Wild Weasels vs. SAMS," National Museum of the USAF, last modified unknown, accessed February 3, 2015, <http://www.nationalmuseum.af.mil/factsheets/factsheet.asp?id=3666>.

missiles to down one aircraft.”⁹⁵ This illustrates the importance of an organization’s willingness to change in order to overcome an enemy advantage and recover from failure in battle.

However, one could argue that combat experience has caused some aviators to be overly cautious and inflexible. During the initial months of the operations in Europe, Eighth Bomber Command was losing one out of every four bombers. Concerned by the anti-aircraft artillery (AAA) fire during bombing runs, pilots were maneuvering every ten to fifteen seconds to avoid the heavy fire. However, the aggressive maneuvering made the Norden bombsight ineffective. This reduced the accuracy of the bombs, limited their damage, and forced Eighth Bomber Command to re-attack the same target areas over the course of several days. Aware of the Allied targets, the German’s were able to improve the defenses while waiting for the next attack, further increasing Eighth Bomber Command’s losses.

When LeMay arrived in the European theater, he met with one of his fellow commanders, Frank Anderson, the commander of the 306 BG. LeMay respected Anderson for his flying ability and experience as the pilot of the lead bomber in six of the first ten missions into occupied territory. Because the 306 BG had been flying combat sorties since August 1942, LeMay asked Anderson to brief him on the standard tactics used by the Eighth Bomber Command. When Anderson told LeMay “if you fly straight and level for as much as ten seconds, the enemy is bound to shoot you down,” LeMay was shocked.⁹⁶ Although LeMay did not want to question Anderson’s combat experience, he knew that “no bombardier could drop bombs on a target in a ten-second run.”⁹⁷

⁹⁵“US Air Force Fact Sheet: F-105F Thud Wild Weasels and Rolling Thunder,” National Museum of the USAF, last modified unknown, accessed January 16, 2015, http://www.nationalmuseum.af.mil/factsheets/factsheet_print.asp?fsID=14505&page=1.

⁹⁶Kozak, *LeMay*, 94.

⁹⁷*Ibid*, 94.

After reviewing the Eighth Bomber Command's battle damage reports, LeMay concluded that Eighth Bomber Command was sustaining massive casualties without damaging the targets, forcing them to re-attack the same target continually. Using an old field artillery manual, LeMay calculated the possibility of an anti-aircraft shell hitting a B-17. Based upon the size of the aircraft and the distance from the guns, LeMay determined that it would take 372 rounds to hit an aircraft.⁹⁸ Armed with statistical data, LeMay issued an order that all 305 BG aircraft will fly straight and level during the last leg of the bombing run. Although faced with initial condemnation from the ranks, Lemay's changes were validated when AAA downed none of his group's bombers and twice the number of bombs hit their targets compared to the other groups.⁹⁹ Though the combat veterans in the Eighth Bomber Command had propagated a technique that traded bombing accuracy for a perceived increase in survivability, they were relatively inexperienced and still in the process of developing the tactics required to successfully implement daylight bombing. Once they had a leader who was willing and able to make changes, the combat veterans were vital in inculcating the new tactics throughout the command.

As shown, combat experience has been the catalyst for learning, anticipation, and adaptability. USAF leaders have historically been concerned with combat experience because it cannot be taught; it must be learned in a dangerous classroom where mistakes often result in death. Veterans have learned lessons through years of study, training, exercising, and evaluation. Pairing inexperienced and experienced airmen reduced the time required for the new airmen to learn these same lessons while increasing their survivability. The United States was not the only country to realize this. During World War II, experienced pilots were so important that in 1940

⁹⁸When LeMay calculated the number of anti-aircraft round required to down a bomber, he underestimated the difficulty of hitting an aircraft traveling at 250-300 MPH. The number was closer to eight thousand five hundred rounds. However, anti-aircraft artillery was slightly more lethal than fighter aircraft with the former downing five thousand four hundred aircraft compared to the latter's four thousand three hundred. Ibid, 101,113.

⁹⁹Ibid, 109.

Britain and Germany created units that specialized in recovering downed pilots over the English Channel.¹⁰⁰ Drawing on the lessons of both World Wars and the first year of combat in Korea, the USAF started tracking the number of and average combat experience level of aircrew committed to the conflict in 1952, a practice that continues today. Another factor that allowed a unit to prevent failure from turning into defeat was flexibility. As *Air Force Doctrine Volume 1: Basic Doctrine* states, flexibility is one of the tenets of air power.¹⁰¹ This tenet stems from the flexibility of airmen throughout history to learn, adapt, and anticipate. Veterans often see problems and suggest changes in order to adapt to new enemy technology or tactics. However, as discussed, the leadership and the airmen must be willing to understand why they failed and willing to make changes in order for the organization to be resilient.

Esprit de Corps

Another characteristic that makes an organization resilient is esprit de corps. In *Culture of Defeat*, Schivelbusch defines esprit de corps as a complex system of psychological, cultural, and political beliefs that influence how units and individuals react to battle, and more importantly, failure in battle.¹⁰² He outlines critical elements such as morale and the will to fight, confidence and feelings of superiority over the enemy, honor, and the legitimacy of the conflict. As David Fisher states in *Morality and War*, these beliefs enabled a person or persons to “persevere in the face of difficulty and danger, not allowing fear to obscure [one’s] judgment of what needs to be done.”¹⁰³ By analyzing the actions following a failure, this study aims to determine what factors impacted esprit de corps.

¹⁰⁰Nalty, *Winged Shield, Winged Sword*, 1:171.

¹⁰¹AFD Vol. 1, 27.

¹⁰²Schivelbusch, *The Culture of Defeat*, 10.

¹⁰³David Fisher, *Morality and War: Can War be Just in the Twenty-first Century* (Oxford: Oxford University Press, 2001), 121.

As Schivelbusch notes, an organization's morale and will to fight are easily suppressed after losing a battle. During the opening stages of the US bomber operations in 1942, unescorted attacks on targets deep in German-controlled territory resulted in casualty rates as high as twenty-five percent. As such, Eighth Bomber Command crews knew they were unlikely to reach twenty-five missions, the number of combat sorties marking the end of a crew's tour of duty. The British newspapers and the BBC, which the aircrews read and heard, covered the extremely high casualty rates and British criticism of daylight precision bombing in depth.¹⁰⁴ British public criticism of US tactics compounded the Eighth Bomber Command's morale problem.¹⁰⁵ Low morale led to flight discipline problems as pilots became more concerned with surviving than fighting. Therefore, as previously described, they adopted tactics that they believed improved their survivability at the expense of accuracy.

However, General Ira Eaker, commander of Eighth Bomber Command, never lost faith in the importance of precision daylight bombing and therefore needed to solve the morale issue in order to prove his theory. The answer came in October of 1942 with the arrival of the 305 BG and its commander, Curtis LeMay. As discussed in the previous section, LeMay analyzed the problem and developed new tactics that improved the survivability and lethality of the bombers. Eighth Bomber Command adopted these adjustments, which improved the morale of the bomber crews and the effectiveness of daylight bombing.¹⁰⁶ However, the crew of the *Memphis Belle* was the turning point. In May 1943, they became the first bomber crew to complete a combat tour.¹⁰⁷ The *Memphis Belle* had beaten seemingly impossible odds and proved to everyone in the command

¹⁰⁴The Royal Air Force used daylight bombing in 1939. After sustaining horrific casualties, the RAF transitioned to nighttime bombing for the remainder of the war. Nalty, *Winged Shield, Winged Sword*, 1:186.

¹⁰⁵Perret, *Winged Victory*, 253.

¹⁰⁶Kozak, *LeMay*, 109.

¹⁰⁷Perret, *Winged Victory*, 253.

that it was possible to survive the war. Once the other crews realized that they could survive, morale and the will to fight improved dramatically. This resulted in an increase in flight discipline, which further improved bomber survival rates and weapons accuracy.

Managing the grief associated with losing friends was another factor that was critical to the morale of the units. Given the relatively young age of new aviators, most had had little exposure to death and the feelings associated with it. As Colonel (retired) Hal Fischer notes in his autobiography:

“One of our tent mates was Lieutenant Briggs...something went wrong with the airplane on takeoff, causing a power failure and in the dark he had tried to turn back to the field. A huge pyre of flame at the end of the runway marked his unsuccessful recovery effort...it was my first experience with death during combat operations. Up to now, it had been merely an academic thing, we were at war and people got killed. But this was someone I knew and shared a tent with. It all became very real...”¹⁰⁸

Therefore, airmen had to learn to grieve for their friends and then compartmentalize those feelings in order to accomplish the mission. The unit leaders and combat veterans played a key role in helping the new pilots deal with the loss of their friends and squadron mates. The older airmen had been there. They had lost friends and dealt with the sadness, the fear, and the anger. They had learned to overcome it and did what they could to mentor the new pilots.

This mentoring started with the World War I veterans. The 1st Pursuit Group lost droves of aviators, forcing the survivors to manage their feelings while continuing to fly missions.¹⁰⁹ During the interwar years, the volume of accidents and deaths associated with the golden age of aviation resulted in the loss of many friends and squadron mates. The mass casualties sustained in the air during World War II exacerbated the need for pilots to mourn the loss of their comrades

¹⁰⁸Colonel (retired) Hal Fischer was a double ace with ten confirmed MiG kills in the F-86 during the Korean War. He flew 105 combat missions in the F-80 and 70 in F-86. He was shot down on April 7, 1953 where he was a prisoner-of-war in China until 1955. Fischer and Wilson, *The Hal Fischer Story*, 30.

¹⁰⁹Frandsen, *Hat in the Ring*, chap 8, Kindle.

and then compartmentalize their emotions in order to be combat effective.¹¹⁰ Following World War II, peacetime aircraft accidents killed hundreds of pilots a year fueling the belief that it is not a matter of ‘if’ you will lose a squadron mate, but ‘when’. Although the USAF lost many pilots in training accidents during the 1940s, as Fischer notes it was still a shock to new pilots when it happened. However, this disassociation with death did not last long. After three years of fighting in the skies over North Korea, most, if not all, pilots had lost friends and squadron mates.

In *The Right Stuff*, Tom Wolfe notes that aviation accidents and death were a part of everyday life during the 1950s, 60s, and 70s.¹¹¹ During these early years of the ‘Jet Age’, technology was improving at an exponential rate. As new aircraft were developed, test pilots were the first to fly them; most of whom were combat veterans from the Korean War. Since there was no war, the combat veterans continued their dance with death in these new machines. Unfortunately, many did not survive.¹¹² Although being a test pilot was risky, duty in fighter and bomber units was also hazardous. As Wolfe highlights, in 1952, fighter-pilot trainees at Edwards Air Force Base were being killed at a rate of 1.7 per week.¹¹³ This was not limited to the USAF. A US Navy report concluded that a pilot who flew for twenty years had a twenty-three percent chance of being killed in an aircraft accident.¹¹⁴ Combat deaths in Vietnam further increased the percentage of pilots who had lost friends and squadron mates. As such, USAF pilots became

¹¹⁰Kozak, *LeMay*, 114.

¹¹¹Of note, this did not account for the possibility of being killed in combat. Tom Wolfe, *The Right Stuff* (New York: Bantam Books, 1980), 7.

¹¹²Because of the extremely high casualty rates amongst the test pilot community, Chuck Yeager notes that the test community culture used anger toward the pilots who died in test flights in order to avoid being consumed by sorrow for lost comrades. Chuck Yeager and Janos, Leo, *Yeager: An Autobiography*. (New York: Bantam Books, 1986), 227-228.

¹¹³Wolfe, *The Right Stuff*, 16.

¹¹⁴*Ibid*, 17.

accustomed to dealing with the loss of their brethren and managing the associated morale problems.

In fact, losses were viewed as the ‘cost of doing business’ until General Curtis LeMay became the commander of Strategic Air Command (SAC) and then Chief of Staff of the Air Force (CSAF). While at SAC, LeMay was so concerned about aircraft accidents, particularly when fatalities were concerned, that he instituted a program where the commander of the affected wing had to brief him on the cause of the accident.¹¹⁵ This program resulted in a dramatic decrease in accidents and fatalities in SAC. When LeMay became the CSAF, he implemented this program throughout the service. This resulted in an Air Force-wide effort to mitigate unnecessary risk and reduce fatal aircraft accidents. As a result, USAF casualties have remained around four per year from 2004 to 2013 even though the USAF was engaged in combat operations in Iraq, Afghanistan, and Libya.¹¹⁶

In addition to the morale issues, other psychological problems can develop from failure. Anyone who has lost in sports or failed in competition knows that a loss of confidence in one’s skills and/or feelings of inferiority compared to one’s opponent are common. As Schivelbusch notes in *Culture of Defeat*, a loss of confidence or feelings of inferiority normally occur following failure in combat and that “military forces that lack confidence will simply flee the field.”¹¹⁷ However, that has not occurred in resilient units.

In July 1918, the 27 AS lost seventy-four percent of its pilots and aircraft in twelve days of combat in the Château-Thierry sector. The Germans had achieved a two-to-one advantage and

¹¹⁵LeMay’s efforts in Strategic Air Command resulted in an 85% decrease in accidents from sixty-five major accidents per one hundred thousand flying hours to nine per one hundred thousand flying hours. Kozak, *Lemay*, 291.

¹¹⁶US Air Force, “Aircraft Statistics,” Air Force Safety Center, accessed January 13, 2015, <http://www.afsec.af.mil/organizations/aviation/aircraftstatistics/index.asp>.

¹¹⁷Schivelbusch, *The Culture of Defeat*, 6.

news that their friends and peers did not return was difficult to take.¹¹⁸ Losses were severe and should have devastated the remaining members of the squadron. However, this did not occur because the squadron's morale, confidence, and will to win remained high. They believed they had been 'victorious' in their first battle with the Germans in the Toul Sector, achieving a three-to-one kill ratio, and they were confident that they could defeat the German pilots.¹¹⁹ This confidence, and the boost that came with each American aerial victory, allowed the 27th Aero Squadron and the 1st Pursuit Group to recover from horrific casualties and achieve a one-to-one kill ratio by the end of the campaign.¹²⁰

Similarly, USAF units experienced heavy losses over the skies of North Vietnam but did not lose their confidence because they believed that they were better than the MiG pilots they faced. Colonel (retired) Jack Broughton was the vice wing commander at Takhli Air Base in Thailand where he flew F-105s from the summer of 1965 until the summer of 1966. In his book *Thud Ridge*, Broughton states:

I have fought with MiGs in two wars now...they don't go first class and our guys are both good and dedicated...they still have not learned their lessons well and I suspect they do not do their homework properly. With the advantages they have going for them, I am sure glad that the majority of those we have tangled with to date are not as clever in this game as our guys are. Anyone who reads the air-to-air results and feels that American technology has scored another victory over the competition of the world is sadly misled.¹²¹

¹¹⁸Quentin Roosevelt, the son of President Theodore Roosevelt, was one of the more popular pilots in the 1st Pursuit Group. His death significantly affected his friends and comrades. Edward V. Rickenbacker, *Fighting the Flying Circus* (New York: Frederick A. Stokes Company, 1919), 193.

¹¹⁹Hudson, *Hostile Skies*, 77. Billy Mitchell noted that although the 1st Pursuit Group's success in the Toul Sector had no operational impact, it was a moral victory for the Americans. If the 1st had failed, it "would have had a dampening effect on our morale and would have greatly improved that of the German aviators." Frandsen, *Hat in the Ring*, chap 5, Kindle.

¹²⁰Rickenbacker, *Fighting the Flying Circus*, chap 19, Kindle.

¹²¹Broughton, *Thud Ridge*, 168-169.

Broughton's comments stressed the importance of being confident in the face of the enemy. Although he does not specifically highlight it, it was the rigorous training, ability to adapt, and the desire of each fighter pilot to get better every day, not just technology, that allowed US airmen to remain confident as they fought the North Vietnamese.¹²²

Other unique traits were honor and loyalty, both of which are a significant part of the military ethos. Unsurprisingly, they have played a significant role in an airman's willingness to continue fighting following failure. Since World War I, pilots have viewed themselves as the 'Knights of the Blue'.¹²³ Starting in the twelfth century, knights lived by a code of chivalry that emphasized the virtues of courage, honor, and service. This unwritten code was evident on July 2, 1918 when Lieutenant Colonel Harold Hartney, the commander of the 27 AS, attempted to disqualify Lieutenant Ralph Schmidt from flying for vision deficiencies. Schmidt's vision issues allowed multiple German fighters to maneuver unnoticed to his six o'clock (placing them in the optimal weapons employment zone), and prevented him from executing the appropriate defense. Schmidt could have accepted his commander's dismissal in order to prevent meeting the same fate as many of his squadron mates, instead he pleaded to remain because "no one will understand." Hartney sympathized with Schmidt stating, "what could I do with a spirit like that," allowing Schmidt to stay against his better judgment. Although Schmidt fought valiantly, his vision issues resulted in him being wounded by a German fighter two weeks later.¹²⁴ This story

¹²²Broughton's notes that his experience with Chinese and North Vietnamese MiG pilots was different from his experience with the Soviet MiG pilots, particularly the MiG-21 pilots. He warns that the USAF should not become overly confident because the US had not faced the best MiG squadrons in the world. Broughton highlights that later in the Vietnam War, Soviet MiG-21 pilots achieved a ten-to-one kill ratio against the US pilots. Ibid, 96.

¹²³Sixty-two stories about the 94 AS had become a regular feature in the press. Their stories were heroic, inspiring thirty thousand men to fight in the US Army Air Service through the end of the war. Frandsen, *Hat in the Ring*, chap 2 and 5, Kindle.

¹²⁴John Guttman, *USAS 1st Pursuit Group*, (New York: Osprey Publishing, 2008), 60.

highlights how honor and loyalty convince young men and women to face the enemy even when the odds were against them.

Another instance of the importance of honor and loyalty can be found over the skies of North Vietnam. In *Thud Ridge*, Broughton highlighted many of the issues that the fighter squadrons faced, including unclear strategic guidance; ‘off limits’ areas, commonly called sanctuaries; and the trials of penetrating the most heavily defended targets in the world. He illuminated the stress associated with flying into the overlapping surface-to-air, enemy fighter, and anti-aircraft artillery zones, and the psychological impact of losing friends and squadron mates in such a politically constrained war.¹²⁵ Despite the growing threat of the North Vietnamese air defenses, US airmen fought through their fear and pressed north against targets where the odds were stacked against their survival. In his year at Takhli, Broughton only ran across four pilots who, in his words:

Couldn’t hack it, only four whose fear overcame them and dealt them the gravest defeat man can suffer—to surrender to the cowardice that made them quit in the face of the enemy while those they had lived with went forth to take their chances on dying or rotting away in prison...no matter what demands the leadership imposes, the combat soldier who falters and fails in the face of the enemy’s fire is an unspeakable wretch whose own insides must someday devour him.¹²⁶

Broughton’s account highlights how an airman’s honor and loyalty to their comrades, squadron, and country helped hundreds overcome their grief for lost brethren and fear of becoming the next casualty in order to continue flying north on missions that many believed were suicidal.

In addition to psychological and cultural beliefs, Schivelbusch notes that political beliefs have historically influenced a unit’s esprit de corps. His theory surmises that if an airman does not believe in the war he or she is fighting, or feels that the American people do not support them or the war, that their will to fight will be diminished. Because of the total nature of World War I

¹²⁵Broughton, *Thud Ridge*, 125, 135.

¹²⁶*Ibid*, 169-170.

and World War II, airmen and the American public recognized that the survival of the United States was at risk. Since airmen believed they were fighting for a noble cause, they were able to continue to fight despite the catastrophic losses they faced. However, the World Wars are an extreme. When a country is fighting for its survival, everyone is supporting the war and every soldier, sailor, airman, and marine must continue to fight regardless of the casualties.

Conversely, the Korean and Vietnam Wars were not fought for the survival of the United States and lacked overwhelming popular support. Politics were at the forefront of these wars, which affected the airmen. However, conflict legitimacy had minimal impact on esprit de corps. Instead, the problems were caused by the constraints that politicians placed on operations. In Korea, USAF fighter pilots knew that the MiGs were based in China. Yet, they were not permitted to attack the bases. Instead, US airmen had to wait for the MiGs to challenge them in aerial combat, which increased the chances of being shot down.¹²⁷ This was even more evident in Vietnam where US airmen could not attack North Vietnamese air bases, or SAM sites that were under construction because the politicians feared killing the Russian military advisors. Like in Korea, USAF pilots had to wait for the MiGs and SAMs to engage them before they could take action. As Broughton notes, “I shudder to think of the worthless loss of people and machines this ironclad party line of stupid and inflexible tactical ignorance has caused.”¹²⁸

Hence, it was not the politics of the conflict that affected the esprit de corps of the combat aviators, it was the political constraints. The most likely reason is that aviators were volunteers, not draftees. Therefore, it is not a combat aviator’s job to determine the legitimacy of the conflict. That is the politicians’ job. The aviator’s job is to engage the enemy and destroy the assigned target while maximizing their and their squadron mates’ survivability. Therefore, a unit’s esprit

¹²⁷Cecil G. Foster and David K Vaughan, *MiG Alley to Mu Ghia Pass: Memoirs of a Korean War Ace* (North Carolina: McFarland and Company, Inc. Publishers, 2001), viii.

¹²⁸Broughton, *Thud Ridge*, 38.

de corps is impacted more by political limitations placed on mission accomplishment than the legitimacy of the conflict.

As Rupert Smith notes in *The Utility of Force*, esprit de corps is critical because military units have historically “defeated a numerically and technologically superior force because they had the will to endure and win.”¹²⁹ Using Schivelbusch’s categories of psychological, cultural, and political beliefs to evaluate the various battles, several important points became clear. First, morale and the will to keep fighting despite the loss of friends and squadron mates were critical to recovery of unit effectiveness. Second, the ability to manage grief, both a peacetime and wartime trait, allowed units to continue to execute the mission despite the loss of their brethren. Third, confidence in one’s ability and feelings of superiority over the enemy allowed airmen to overcome the fear associated with the dangers of aerial combat. Fourth, honor and loyalty to one’s comrades, squadron, and country helped airmen, the ‘Knights of the Blue’, return to the skies and fight another day. Lastly, political constraints on operations affected the airmen’s esprit de corps more than the legitimacy of the conflict. As David Fisher notes in *Morality and War*, “a force where virtues, such as courage, fortitude, and loyalty, were more highly developed will usually defeat a stronger force in which they are less so.”¹³⁰ These esprit de corps traits, and more, were clearly visible in the resiliency of the various units that this study evaluated.

Leadership

Thus far, this study has evaluated the importance of strategic reserves and industrial capacity, combat experience and flexibility, and esprit de corps to an organization’s resilience. However, one factor was integral throughout, leadership. Leadership was foundational to the units’ ability to replace men and equipment, capitalize on combat experience, ensure flexibility,

¹²⁹Rupert Smith, *The Utility of Force: The Art of War in the Modern World* (New York: Alfred A Knopf, 2007), 244.

¹³⁰Fisher, *Morality and War*, 109.

and maintain esprit de corps. Without leadership, resilience would not have been possible. Leadership within an organization is broken into two categories, formal and informal. The formal leadership is comprised of the commanders and supervisors in the chain of command. These individuals were responsible for honoring fallen comrades, glorifying American aerial victories, fighting for better aircraft and equipment, improving tactics, and preparing replacements for the rigors of combat. Formal leadership was positional where respect was derived from rank and location within the hierarchy, but it was a respect that had to be maintained by taking care of the unit. Informal leadership stemmed from the members of the organization that earned the trust and respect of the unit through superior knowledge, performance, and character. These airmen directly influenced esprit de corps and often filled roles that formal leaders could not, such as confidante, coach, and teacher. By examining an organization dealing with failure, it is possible to understand how both leadership groups influenced resiliency.

Formal leadership consists of three different categories: strategic, operational, and tactical, similar to the levels of warfare.¹³¹ At the strategic level, civilian and military leaders made decisions and implemented policies that had long-term impact on a unit's resiliency with second, third, and fourth order consequences. For instance, if Marshall and Arnold had not taken steps to increase the size of the Army Air Force or the capacity of industry and training facilities, Eighth Bomber Command would not have been able to replace its losses. Conversely, McNamara's policies regarding tour lengths and subsequent involuntary tours in Southeast Asia created a fighter pilot shortage that exacerbated combat losses and hampered the replacement of casualties. Furthermore, political decisions such as sanctuaries (where pilots could not fly or targets could not be attacked) or not activating the Guard or reserve negatively affected the esprit

¹³¹AFD Vol. 2, 238.

de corps of the unit. Therefore, strategic leaders had a lasting and widespread impact on an organization's ability to recover from failure in combat.

Operational leaders were normally responsible for the overall conduct of the war, and they too made decisions and implemented policies that affected an organization over long durations. As seen in Vietnam, Seventh Air Force's decision to attack the same target via the same route day after day allowed the North Vietnamese to adjust combat air patrol locations and reposition SAMs and AAA.¹³² This example highlights how operational leaders hampered the F-105 squadrons' resiliency during Rolling Thunder. However, Eighth Bomber Command in World War II illustrated how operational leadership can help. The command's willingness to adopt LeMay's revised tactics was critical to the bomb groups' ability to recover, and the success of the Combined Bomber Offensive.

Tactical-level leaders normally resided at the wing level and below, with formal and informal leaders converging inside the squadrons. Tactical leaders had immediate impact on the organization's resiliency. They addressed esprit de corps problems, assessed and corrected tactical deficiencies, exhibited courage in the face of the enemy, mentored new pilots, and helped the squadron grieve lost comrades. Of all the leadership tiers, the tactical leaders had the most impact on the organization's short-term recovery process.

During the initial phase of Rolling Thunder, the 355th Fighter Wing at Takhli suffered heavy losses to the North Vietnamese air defense network. When Broughton started flying with the 354th Tactical Fighter Squadron, he immediately noted the low morale:

The squadron was down in the dumps, there was no doubt about that, and one of my first challenges as a commander was to get to know them and try to strike the chord that would get them up again, but without the loss rate they had suffered before. Strangely, the boss never told me that I had that for my first job. Nobody even mentioned it. It was just something you knew if you had the touch.¹³³

¹³²Broughton, *Thud Ridge*, 77.

¹³³*Ibid*, 63.

As a vice wing commander, Broughton and the commanders below him addressed the causes of the morale problem and took action to remedy them. Because of resource and authority constraints, these actions were limited to changes in tactics and addressing airmen's fears and concerns.

Leading from the front has historically been the best tactic for front-line commanders and supervisors, especially when a unit has failed. Curtis LeMay's leadership had a profound impact on the 305th Bomb Group over the skies of Europe. Although his combat-box formation and straight-and-level bombing runs proved instrumental in the success of the daylight precision bombing campaign, they were not particularly popular amongst the aircrew members. However, LeMay's willingness to put his life on the line by flying in the lead aircraft on every mission highlighted his belief in the new tactics to the aircrew under his command.¹³⁴ His courage was instrumental in relieving the fears of his subordinates, and pivotal to the crews adopting the changes.

Managing combat losses was a critical task for tactical leaders, particularly commanders of units that suffered continual casualties. Once veterans started to see newer faces replacing new faces, they became apprehensive. This forced commanders to implement the 'combat orientation' sorties and make some straightforward statements to new pilots in order to establish expectations. On July 23 1918, Harold Hartney, the commander of the 27th Aero Squadron, briefed the nine replacement pilots prior to his first combat flight with them:

You men stand in front of me today [but] within two weeks each and every one of you will be dead—cold dead—unless you weigh what I say.

You are going to be surprised in the first, second or third trip over the line and, despite all I can say right now, you will never know there is an enemy ship near you until you notice your windshield disintegrating or until a sharp sting interrupts your breathing.

School is over. You have a man's job...so when you get up there over the lines you find you want to come back that means you're yellow. I do not ask you to be brave

¹³⁴Kozak, *LeMay*, 106.

enough to go over, I only ask you to have enough guts to come back and tell me so and get the hell out of this outfit...you are in the 27th in name only. When you have shown your buddies out there that you have guts and can play the game honestly and courageously, they'll probably let you stay. You'll know without my telling you when you are actually a member of this gang. It's up to you.¹³⁵

Although Hartney's words and leadership style are harsh, they highlight the gravity of combat aviation, the dire situation of the 27 AS, and the importance of addressing the veteran's concerns about the new pilots.¹³⁶

Additionally, formal leaders memorialized lost comrades in order to help the unit's grieving process. When the 27 AS lost one of its favorite members, the former All-American collegiate football star Fred Norton, the squadron commander made Norton's message to his squadron mates, "Twenty-seventh – more power to you," the squadron moto.¹³⁷ These actions helped the survivors accept the losses and transform their grief into determination. Although it did not eliminate it, this process helped reduce depression and anger, which clouded judgment and decision making ability.

Without question, formal leaders had a significant impact on their organization's resiliency. However, there were gaps and limitations to their influence and access that the informal leaders filled. Informal leaders usually attained their position based upon their knowledge, performance in combat, and character. They normally had access to smaller groups of airmen for longer periods of time, which allowed them to become confidants, mentors, teachers, and coaches. Although the informal leaders had little to no ability to influence or change policy, they were vital to maintaining esprit de corps.

¹³⁵Harold E. Hartney, *Up and At 'Em* (Harrisburg, PA: Frederick A Praeger, 1940), 188-189.

¹³⁶Of the nine pilots that reported that day, only three survived the war. The six who died accounted for twenty-six victories. Hudson, *Hostile Skies*, 113.

¹³⁷Frandsen, *Hat in the Ring*, chap 8, Kindle.

For example, during the Korean War, Hal Fischer and Cecil Foster became the best pilots in the squadron, earning the respect of peers and superior alike. Because of their performance in the sky and willingness to make themselves and others better, these two informal leaders quickly upgraded to flight lead, and were promoted to flight commander (a formal leadership position) ahead of their peers. Since they had daily contact with smaller groups of airmen, Fischer and Foster were able to earn the trust and respect of their squadron mates. They helped new pilots address their fears, correct their mistakes, and take care of their needs.¹³⁸ These informal leaders complemented the formal leaders by filling the gaps that the chain of command was either unaware of or could not address.

As noted, informal leaders often became formal leaders because superiors and peers alike respected them. In World War I, Jimmy Meissner was one of the most respected pilots in the 1st Pursuit Group.¹³⁹ He had earned several kills, been the first pilot to experience the failure of Nieuport 28's upper wing, and was smart in battle. During a dispute with the group commander, the 147 AS commander was relieved for insubordination. The ensuing morale problems associated with the firing of a well-respected commander and the transition to a new aircraft in the middle of a campaign devastated the 147 AS. Therefore, Meissner was selected as the replacement commander in order to reverse the tide. Meissner was mindful of the respect he had earned and used it wisely to lead his men during the transition to the new Spad 13 aircraft.¹⁴⁰ Within a few weeks, Meissner reported that the 147 AS had transitioned to the Spad without further incident and that morale had improved.

Similarly, Eddie Rickenbacker became the AEF's leading 'Ace' and one of the most respected pilots in the 1st Pursuit Group during World War I because of his ability to down

¹³⁸Foster, *MiG Alley to Mu Ghia Pass*, viii.

¹³⁹Frandsen, *Hat in the Ring*, chap 8, Kindle.

¹⁴⁰*Ibid*, chap 5, Kindle.

German fighters without taking unnecessary risks. Like many of the group's revered pilots, he was promoted to squadron commander, ensuring the 1st Pursuit Group continued to succeed following the losses sustained during the Aisne-Marne Campaign.¹⁴¹ However, Rickenbacker's respect and influence did not end after the war. During the initial months of World War II, the Army Air Force sent him to Europe to assess the combat capability of the deployed forces and make recommendations for future acquisition programs.¹⁴² Rickenbacker had no formal leadership role at that time, but his knowledge and expertise allowed him to influence future changes to the aircraft, aircrew equipment, and tactics that allowed the Army Air Force to persevere after sustaining massive casualties in 1942 and 1943.

As noted, leadership at all levels, formal and informal, had roles and responsibilities associated with strengthening the resilience of a unit. Political and strategic leaders provided the men and equipment to replace those lost in combat. Operational leaders adjusted plans and policies to allow organizations to change and adapt to new environments and challenges. Tactical leaders addressed personnel and morale issues while encouraging airmen to innovate, overcome, and persevere. Formal leaders wielded significant power based upon their position, but there were limitations. Many airmen would not approach the chain of command with certain issues, which created an opportunity for informal leaders to excel. Informal leaders interacted with smaller groups of airmen more frequently, helped address their concerns, and funneled critical issues to the chain of command. However, the chain of command had to be willing to listen and not compromise the trust and respect of the informal leaders. As history has shown, an organization requires leadership from airmen at all levels, from the Chief of Staff to the squadron commander to the newest aircrew member, if it is going to recover from its losses and continue to fight.

¹⁴¹Ibid, chap 8, Kindle.

¹⁴²Perret, *Winged Victory*, 248.

Conclusions

Historically, US airmen that have failed in battle have not been defeated. Determining how these units recovered from their failures requires an understanding of organizational resiliency traits. In *America's First Battles*, Heller and Stofft provided four large categories that this study defined as strategic reserves and industrial capacity, esprit de corps, combat experience and flexibility, and leadership. By analyzing several aerial battles where US airmen recovered from their losses, it was possible to identify the traits that made them resilient.

In all cases, the ability to replace lost personnel and equipment was vital to a unit recovering. As noted, the United States was so concerned with its strategic reserves and industrial capability after World War II that the US Congress passed laws to ensure they were preserved. The Cold War Years led to the creation of a large active duty Air Force plus a sizeable Air Force Reserve and National Guard component, and a surplus of aircraft in long-term storage. Additionally, the increase in civilian aviation during the 1930s, 40s, and 50s provided access to civilian pilots who could train new military pilots, such as Eastern Airways during the Korean War, or become military pilots themselves.¹⁴³ However, Vietnam highlighted that if not used as intended, the manpower in the Air National Guard and Air Force Reserve cannot help the resiliency of the USAF and its combat units. Undoubtedly, the ability to replace aircraft and aircrew was vital to a unit recovering from its losses. However, the inexperience of the replacement crews was a problem highlighted in all four wars.

Combat experience has been a force multiplier since World War I. 'Combat orientation' was a technique that commanders used in order to provide valuable experience to new aircrews while limiting the extremely high risks associated with the first days of combat. During the

¹⁴³Columbus Air Force Base Historian, *A Brief History of Columbus AFB and the 14th Flying Training Wing* (US Air Force, Columbus Air Force Base, 2010), 6, accessed January 16, 2015, <http://www.columbus.af.mil/shared/media/document/AFD-110131-051.pdf>.

Vietnam War, a Department of Defense report called *Project Red Baron* recognized combat experience as one of the most important factors in pilot survival. The report concluded that if a pilot could make it past the tenth sortie, their chances of surviving the war increased dramatically.¹⁴⁴ This led General Robert Dixon, the commander of Tactical Air Command, to create exercises, such as Operation Red Flag, in order to simulate the first two weeks of aerial combat.¹⁴⁵ Despite a generation of combat veterans in the Air Force, few have fought a war against a credible integrated air defense. Therefore, realistic training and exercises are vital for providing the next generation of combat aviators with experience.

Flexibility was the most important resiliency trait for short-term recovery and improved survivability. The 1st Pursuit Group's squadron-sized formations, the 305th Bomb Group's wedge-shaped combat box formation, and the 355th and 388th Fighter Wing's anti-SAM tactics provided effective counters to evolving enemy tactics and technology. Furthermore, the institutional flexibility associated with the development of drop tanks and the P-51 in World War II, the F-86 in Korea, and the 'Wild Weasel' platforms in Vietnam provided the technological advantage to accompany the improvements in tactics. If these units had not been flexible, they would not have been able to counter the enemy, which would have led to subsequent defeat. This highlights the tenet that flexibility is the key to airpower.

¹⁴⁴Department of Defense, Weapons Systems Evaluation Group, *Red Baron Report* (Washington DC: Government Publishing Office, 1968), accessed January 12, 201, http://www.dod.mil/pubs/foi/Science_and_Technology/WSEG/356.pdf.

¹⁴⁵Operation Red Flag is a "realistic combat training exercise involving the air forces of the United States and its allies." Participants conduct mock combat against fighter, space, information operations and air defense aggressor units that "replicate the tactics and techniques of potential adversaries." "USAF Fact Sheet: 414th Combat Training Squadron 'RED FLAG'," Nellis Air Force Base, last modified unknown, accessed February 3, 2015, <http://www.nellis.af.mil/library/factsheets/factsheet.asp?id=19160>.

Esprit de corps proved to be another vital trait in a unit's ability to recover from failure. However, it is a complex characteristic that is difficult to measure. As the examples highlighted, psychological and cultural beliefs such as confidence, honor, and loyalty caused airmen to engage the enemy continually despite the understanding that they and their brethren were likely to become casualties. One of the most significant traits was the ability to grieve and then compartmentalize. This trait was forged by years of constant casualties and the belief that it was 'business as usual'. However, the USAF culture has changed due to the dramatic reduction in fatalities from several a day in the 1950s and 1960s to four per year from 2004 to 2013, despite continual combat operations.¹⁴⁶ Lastly, political beliefs affected the aviators, but not as Schivelbusch outlined. Aviators were more concerned with the politics *in bello* than the politics *ad bellum*. In conclusion, esprit de corps proved to be a 'decisive factor' in an organization's ability to be resilient following failure in battle.¹⁴⁷ However, fully understanding these complicated psychological, cultural, and political beliefs exceeds the scope of this paper, but warrants further analysis.

Although this study evaluated leadership as a separate resiliency trait, it cannot be separated from the other traits. Leadership was the connective tissue that ensured a unit had the resources, experience, flexibility, and esprit de corps to recover from failure in battle. At the strategic level, Generals George Marshall and Hap Arnold prepared the United States and the Army Air Corps for the trials of attrition warfare. Furthermore, Congress and senior defense leaders understood the need to establish and maintain the strategic reserves and industrial capacity that allowed the USAF to absorb the losses sustained in Korea and Vietnam. At the operational level, the Eighth Bomber Command's willingness to adopt LeMay's changes to

¹⁴⁶US Air Force, "Aircraft Statistics," Air Force Safety Center, accessed January 13, 2015, <http://www.afsec.af.mil/organizations/aviation/aircraftstatistics/index.asp>.

¹⁴⁷Schivelbusch, *The Culture of Defeat*, 298.

bomber formations and tactics improved bombing accuracy and aircrew survivability, which led the *Memphis Belle* completing the first combat tour. At the tactical level, the veteran pilots explored the use of different altitudes and formations in order to counter the SA-2s while the commanders supported the changes and advocated for technological improvements. Therefore, it required leadership at all levels for an organization recover from failure.

By analyzing failures in World War I, World War II, Korea, and Vietnam, this paper highlighted four characteristics that made airmen and their organizations resilient. First, strategic reserves and industrial capacity allowed a unit to return to full strength. Second, combat experience and flexibility helped units learn, anticipate, and adapt in order to overcome the enemy's advantages. Third, esprit de corps, and the associated the psychological, cultural, and political beliefs, helped airmen recover from failure in combat. Lastly, leadership ensured the success of the other traits while driving the unit's recovery. Although the scope of this paper was limited to certain segments of the four wars, these traits were consistent throughout the study. Further analysis may identify other traits or sub-traits; however, history has shown that these four traits are the foundation of the USAF's enduring resiliency characteristics. Using these characteristics, this paper proposes potential resiliency shortfalls in the current force that require further evaluation.

Future Considerations

Much like the post-Korean War era, the post-Iraq/Afghanistan War political leaders are realizing the immense burden that extended land wars place on the US economy, citizenry, and military. This has resulted in a return to reliance on airpower to engage threats overseas, as seen in the campaigns in Libya and against ISIS. Similarly, the United States is using air and naval power to contain Chinese expansion in the Pacific and counter the possibility of North Korean aggression on the Korean Peninsula. As such, airpower remains a critical component to protecting

vital US interests around the world. Because the USAF is forward deployed to bases on the conflict fault lines, there is increased potential for an enemy attack.

As of March 2015, the USAF had 3,563 aircraft and 17,953 aircrew members on active duty.¹⁴⁸ The Air Force Reserve and Air National Guard provided another 1,393 aircraft and 7,512 aircrew members.¹⁴⁹ Given the attrition numbers in the last two conflicts, this is a sizeable strategic reserve. However, what if North Korea attacked Osan Air Base or if ISIS or Iran attacked a US base in the Middle East? Would the USAF have a large enough reserve to counter the loss of two fighter squadrons or a bomber squadron and still be able to fight a large-scale conventional war? Furthermore, the Fiscal Year 2015 USAF Comptroller report states that the USAF is accepting twenty-six F-35 fighters in 2015 and no bomber aircraft.¹⁵⁰ Given the production quotas, does the United States have the industrial capacity to build the replacement aircraft? As history has shown, a unit must have the ability return to full combat strength in order to overcome attrition. This resiliency trait it is absolutely vital for a modern-day air force.

Currently, the USAF produces over one thousand new pilots per year. Although they are initially qualified in their major weapons system, they are far from experienced combat aviators. Given the complexity of today's aircraft and weapons, it takes the average fighter or bomber pilot four to five years of intense study, training, and exercises (such as Red Flag, wing-level readiness exercises, and higher-headquarters inspections) before they are considered experienced. Therefore, the USAF would have to rely heavily upon the Guard and reserve for combat

¹⁴⁸US Air Force, "Air Force active-duty and civilian demographics," Air Force Personnel Center, last modified September 30, 2014, accessed January 9, 2015, <http://www.afpc.af.mil/library/airforcepersonnel demographics.asp>.

¹⁴⁹Headquarters US Air Force A3O, e-mail message to author, March 11, 2015.

¹⁵⁰US Air Force, Air Force Financial Management and Comptroller, *United States Air Force: Fiscal Year 2015 Budget Overview* (Washington DC: Government Printing Office, 2014), 4, accessed January 6, 2015, <http://www.saffm.hq.af.mil/shared/media/document/AFD-140304-039.pdf>.

experience. However, this creates another problem. How would the USAF rotate experienced pilots from stateside units to wartime units over the course of a longer war with high attrition? Would the AEF construct still be viable? What effect would the mass mobilization of National Guard and reserve pilots have on the airline industry and the US economy?

Furthermore, commanders at all levels should consider a potential cultural issue associated with mass casualties. One of the unintended consequences of our safety and risk management programs is the dramatic reduction in the number of pilots who have lost friends and squadron mates. Although the USAF never can nor should return to a mindset that aircraft and aircrew losses are 'part of doing business,' it is critical that the USAF and airmen consider how to recover following the loss of ten, twenty, or thirty percent of the squadron during major combat operations. The USAF has not faced this operational issue since Vietnam. Although most of the USAF pilots are combat veterans, few have lost friends and fewer have lost friends in combat. More importantly, when a squadron loses an aircraft and/or a pilot, it normally stands down for a day. However, this may not be possible during major combat operations. One option that commanders at all levels might consider is a 'last letter' to loved ones. This technique has been used extensively, but normally on the eve of a war. However, why wait? Military aviation is an inherently dangerous job regardless of the airframe and the conflict condition. If aviators are required to write a letter to their parents, siblings, spouse, and children, they will have to face the reality that they and their brethren could die doing this job. Although this will not fully solve the potential morale issues, it would ensure that combat would not be the first time they have faced death. Furthermore, commanders would learn to help their airmen through this acceptance period while they themselves learn to address and control their own emotions.

Lastly, there may be some underdeveloped leadership skills that warrant further study. Following heavy casualties, commanders will need to help restore confidence and morale in the unit. There is a story about a speech delivered on the eve of Desert Storm. A wing commander

stood before his airmen and told them that the war would commence in a few hours. Additionally, he told them that he expected to lose twenty-five percent of the aircrew and aircraft. Without another word, he then turned around and walked off the stage. Although this may be folklore, it highlights some important issues that future commanders must address before combat and the associated casualties are inevitable. It is understandable that the commander was overtaken by emotion as he looked across the crowd and thought about the fact that a quarter of the aircrew members would not make it back from their first mission. However, this did not instill confidence in the aviators that were about to embark on the largest air war since Vietnam. Fortunately, the predictions did not come true. However, what if they had? Would that commander have been able to stand in front of the survivors and motivate them? More than likely the answer is no.

Therefore, senior leaders must mentally prepare themselves for the possibility of mass casualties in the next major aerial battle and develop the leadership skills required to suppress their own grief while motivating their subordinates to return to their aircraft and face the enemy.

The world is an uncertain place. Time and again, men have resorted to war and violence to achieve their objectives, and although international organizations, such as the United Nations, have made significant progress in establishing international order, they have not and will not be able to prevent war. Therefore, the USAF needs to be prepared for every situation possible, including recovery from failure in battle. Based upon historical analysis, this paper identified four resiliency characteristics that allowed USAF organizations to recover from failure. Using these criteria, the USAF should evaluate the existing force and take measures to fix deficiencies in order to strengthen its resilience and ensure its dominance into the future.

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