Aiming for Strategic Effect: The Evolution of the Army Air Force’s Strategic Bombardment Campaigns of World War II

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AIMING FOR STRATEGIC EFFECT: THE EVOLUTION OF THE ARMY AIR FORCE’S STRATEGIC BOMBARDMENT CAMPAIGNS OF WORLD WAR II

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ABSTRACT

During the final months of World War II, the Army Air Force launched hundreds of incendiary bombing raids against several Japanese cities. This decision countered long-established strategic strike doctrine. Beginning in World War I, American airmen advanced strategies, developed new technologies, and waged several policy battles based upon the perceived value of precision strategic attack. Bomber crews employed this strike method against targets throughout Europe in World War II. Initial air raids flown against Japan during the conflict also employed precision strategic bombing tactics. This changed in March 1945, when air commanders ordered their crews to attack broad urban regions using incendiary munitions. These bombing raids ultimately precipitated the end of the conflict.

This thesis explores the development of strategic bombing from its conception in World War I to its implementation in World War II, with particular emphasis upon why air commanders altered their bombing strategy from precision strike to mass attack in the air war against Japan. Chapter one affords a broad overview of strategic bombing. Chapter two details the genesis of the mission in World War I. Chapter three
focuses on strategic bombardment doctrine development during the 1920s and 1930s. Chapter four describes the precision strike campaign waged against targets in occupied Europe between 1942 and 1945. Chapter five analyzes the switch from precision methods to mass area bombing in the latter stages of the war. Chapter six assesses the effectiveness of the bombing campaigns in both Europe and Japan.

The thesis concludes that air commanders in World War II sought to degrade Germany and Japan’s capacity to sustain their respective war efforts. Airmen believed precision bombing was the most effective and efficient means of attaining this goal. A unique set of circumstances in the air campaign against Japan compromised the utility of these established tactics. Still seeking to undermine the Japanese war-enterprise, airmen initiated mass incendiary raids against urban centers as an alternate method of target destruction. Overarching combat results, not a rigid adherence to a specific doctrine governed the decision to switch from precision strategic strike tactics to mass area methods in March 1945.
ACKNOWLEDGMENTS

This thesis is dedicated to those who fought and flew to secure a more effective, efficient path to victory. With particular thanks to Major General John Alison, Lieutenant Colonel Donald Lopez, Captain Richard Dinning, Staff Sergeant Leonard Merz, Staff Sergeant Richard Murphy, Staff Sergeant Alfred Restuccia, and Corporal Harvey Sanford.
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CHAPTER ONE

INTRODUCTION

On February 2, 1945, Army Air Force Lieutenant General Ira Eaker declared victory. The war against Germany would last another four months, but as far as he was concerned, airmen had delivered on a promise they first made to President Franklin Roosevelt during the summer of 1941—that precision strategic bombing would precipitate “…the breakdown of the industrial and economic structure of Germany.”

Now, with the end of the war in sight, Eaker proudly explained:

I am certain that there is no informed quarter among Allied leadership where it is not generally recognized that the decision to launch full-scale strategic bombing, and particularly the decision to provide a large precision daylight American bomber force, was sound.

General Eaker faced a starkly different situation when he began this quest in 1942. As the head of VIII Bomber Command, he strove to build a strategic air force capable of destroying key facets of the German war-making enterprise. With a chronic shortage of airmen and aircraft, he struggled to sustain missions amidst the incessant onslaught of the Axis opposition. Simply surviving to fly and fight another day was a tenuous

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1 U.S. Army Air Corps, Air War Plans Division, “Air War Plans Division-1,” memorandum for the Chief of Staff, subject: Munitions Requirements of the Army Air Forces for the defeat of our potential enemies, 12 August 1941, Air Force Historical Office, Bolling Air Force Base, DC, tab A, 1.

proposition. What sustained Eaker and his crews was a stalwart belief that crippling specific German war industries would curtail the Axis power’s ability to continue the conflict. Three years later, this dedication to the cause of precision strategic bombardment was vindicated.

Half-a-world away from Ira Eaker, Major General Curtis LeMay faced a mounting crisis. As the commander of all very long range strategic bombers in the Pacific, he was charged with destroying a critical set of Japanese targets. Standard precision strike tactics were not working. The very same methods that brought victory in Europe were failing against Japan. Facing overwhelming pressure to end the war as soon as possible, LeMay had to get results. On March 9, 1945, he ordered his crews to launch a mass incendiary raid. Instead of attacking specific war production plants, airmen would scorch miles of urban territory.

In making this one decision, General LeMay cast aside the foundational tenets of American airpower doctrine. The entire notion of what it meant to be an airman was interwoven into the concept of precision bombing—striking specific targets to yield exacting objectives. Individuals had built their careers and personal reputations upon this concept. Thousands of bomber crews had spent the past three years flying, fighting and dying based on the precepts of precision strike. Amidst the unrelenting pressure to secure rapid results, General LeMay chose to chart a new course. In doing so, he made

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one of the most pivotal command decisions of World War II. The fate of the conflict hinged upon this choice.

The roots of strategic bombing extend back to the bloody trenches of World War I. The conflict was defined by brutal attrition warfare, with ground forces launching successive attacks over a narrow band of territory for nearly half-a-decade. The cost in lives and resources was simply overwhelming.⁴

Pioneering aviators flying over the battlefields realized that the air domain afforded an alternate path to secure victory. Instead of fighting mile-by-mile to capture enemy territory in a linear fashion, airmen could fly over the opposing forces and strike critical war industries. Deprived of the tools to fight, an adversary would face rapid defeat. As one British airman explained:

The soldier recognizes in order to achieve the national objective of overcoming the opponent’s will, it is normally necessary for him to ultimately undertake—or at least to threaten—the occupation of the enemy’s country or the interruption of his vital lines of communication and supply. The airman strikes directly at those objectives.⁵

Aviators on both sides of the conflict experimented with this new concept, launching various bombing missions far past the trench lines.

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While these missions did not substantively impact the outcome of the war, airmen were quick to note the potential that lay within this new avenue of attack. According to a 1917 British report:

The day may not be far off when aerial operations with their destruction of enemy lands and destruction of industrial and population centers on a vast scale may become the principle operations of war, to which older forms of military operations may become secondary and subordinate…  

American airmen concurred with this sentiment. Given the extreme loss of life, overwhelming destruction and dubious battlefield results yielded by conventional tactics in World War I, military aviators highlighted the need for more effective and efficient combat methods. Strategic bombing comprised a key facet of their vision; a concept later branded “Victory through Airpower.”

Senior Army leaders did not share airmen’s enthusiasm for strategic strike. As far as they were concerned, wars were fought and won by soldiers on the ground. Any positive potential afforded by aviation should be focused on the battlefield. As a 1919 Army review board headed by Major General Joseph Dickman declared: “Nothing so far brought out in this war shows that aerial activities can be carried on independently of ground troops to such an extent as to materially affect the conduct of the war as a

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whole.”

Airmen fervently disagreed and spent the next two decades advocating for the strategic strike mission set. As leading air advocate Brigadier General William Mitchell explained: “The advent of airpower which can go straight to the vital centers and entirely neutralize or destroy them has put a completely new complexion on the old system of making war.”

By the middle of the 1930s, airmen developing strategic bombing doctrine advanced the concept of selective targeting. Realizing that it would be impossible to hit all facets of an enemy’s war economy, they advocated striking specific targets that would yield a compounded effect upon the war enterprise. As a 1938 Air Corps lecture explained: “It is plain that a nation must possess a highly organized and smoothly functioning economic system to carry on war in the modern way.”

Strike missions should seek: “… to cause a breakdown—a collapse—of this industrial machine by the destruction of some vital link or links in the chain that ties it together….”

If multiple factories relied upon a key rail line for raw materials, then the most efficient use of bombing assets would be to strike the railway instead of the individual plants. Production would grind to a halt without the raw materials. Bombers could then

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11 Ibid., 9.
strike other targets elsewhere in the war production system.\textsuperscript{12} Airmen recognized that raw destruction was not the goal. They instead sought to focus precise striking power against specific targets to debilitate the enemy as rapidly as possible. This strategy increasingly defined the air arm. As Air Force Commanding General Hap “Henry” Arnold later explained: “Our whole fight for an Air Force had come to center more and more around bombardment, precision bombardment….”\textsuperscript{13}

Army leaders continued to resist the concept of strategic strike. Competing philosophical visions regarding the nature of war divided the airmen and their ground counterparts. According to a 1934 Army review board headed by Major General Hugh Drum: “The idea that aviation can replace any of the other elements of our armed forces is found, on analysis, to be erroneous.”\textsuperscript{14} War Department leaders restricted Air Corps aircraft acquisition to “that class of aviation designed for the close support of ground troops….”\textsuperscript{15} Air Corps officers fought against such restrictions, but found little success. As one airman summarized: “Air Corps officers were still part of the United States Army and could be expected to behave as such.”\textsuperscript{16}

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\textsuperscript{12} Haywood S. Hansell, Jr., \textit{The Air Plan that Defeated Hitler} (Atlanta, GA: Higgins-McArthur/Longino & Porter, Inc, 1972), 84.
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\textsuperscript{16} Hansell, \textit{The Air Plan that Defeated Hitler}, 72.
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Airmen finally gained traction with their strategic strike vision during the summer of 1941. Anticipating America’s entry into World War II, President Franklin Roosevelt asked for “overall production requirements required to defeat our potential enemies.”  

17 Airpower strategists used the President’s inquiry as an opportunity to lay forth a precision bombing strategy. Top War Department officials approved the plan in August, 1941. If the United States was going to have to fight again, airmen were determined to avoid another conflict akin to World War I.  

18 When America declared war against Germany and Japan in December 1941, strategic bombers were some of the first combat assets sent to fight the Axis powers. With operations against Germany designated as the priority, airmen struck targets in occupied Europe beginning in the summer of 1942. Enemy opposition was so fierce that bomber units suffered loss rates in excess of 5 percent per-mission. That meant airmen were statistically dead after twenty sorties.  

19 Ira Eaker wrote to Chief of Staff

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17 U.S. Army Air Corps, Air War Plans Division, “Air War Plans Division-1,” 5.


of the Army General George Marshall during the summer of 1943 about one such mission:

A B-17 from the 96th Bomb Group had its pilot killed and co-pilot seriously wounded. The navigator took charge and brought the plane back to England. Though badly damaged, the crew elected to attempt to land rather than bail out, deserting dead and wounded….With all but slight and intermittent help from the co-pilot, who was suffering from severe shell fragment wounds in his arm and head, the navigator and engineer brought the plane in for a safe landing….One great fact stands clear: the Germans could not stop our attack.  

The losses were exceedingly difficult to bear, for as General Arnold remarked: “Our reservoir of skilled and experienced officers was so shallow that every time we lost one he was almost irreplaceable.” Airmen’s commitment to the precision strike strategy propelled them forward amidst such challenges.

In addition to the struggles to survive in combat, air commanders strove to keep missions focused upon relevant targets. Ground leaders ordered the bombers to support soldiers on the front lines, political officials wanted sorties directed against various high-profile targets, and competing commands sought to divert the aircraft to alternate operational theaters. If precision strategic bombing was going to work, airmen needed to focus upon the priority aim points. As bombing strategist Elihu Root, Jr explained: “The enemy economy was too large—thousands of times too large—to blast it all. We

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21 Arnold, Global Mission, 259.

had to choose vital points where small physical damage could cause great industrial disruption.”

At one point in the war, American air commanders even had to fend off a British attempt to wholly curtail their daylight precision bombing campaign. The Royal Air Force wanted to secure the American bomber crews and their aircraft for indiscriminate night raids against urban targets.

No matter how difficult the challenges, how daunting the odds, airmen persevered with their quest for precision strike. As air strategist and bomber commander Major General Haywood Hansell explained: “Bombs on target were the sine-quo-non of all our effort and sacrifice.”

As bomber crews continued to fly and fight over Europe, raids against the Japanese Home Islands commenced during the summer of 1944. Mirroring the approach taken in Europe, air commanders emphasized that it was not enough to “…merely bomb Japan. The targets selected, the timing, the weight must be chosen with surgical skill….“ Their objective was clear, to strike “…those economic and industrial establishments upon which her military strength depends.”

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25 Hansell, The Air Plan that Defeated Hitler, 139.

26 Herman S. Wolk, Cataclysm: General Hap Arnold and the Defeat of Japan (Denton, TX: University of North Texas Press, 2010), 97.

27 Ibid.
By February 1945, air commanders faced a major problem. Precision tactics were failing to net target destruction. If bombing could not prompt the Japanese to surrender, ground forces would storm ashore on the Home Islands by year’s end. As Major General Haywood Hansell explained: “Time had become an obsessive compulsion—the time for invasion of Japan. Washington placed great stress on a quick end to the war, emphasizing that this carnage must not go on a single week longer than necessary to achieve victory.” War planners calculated that 193,500 Allied personnel would be killed or wounded in this final assault. Top air leaders were determined to avoid this fate.

On the night of March 9, 1945, 385 B-29s embarked for Tokyo on their first mass incendiary mission of the war. Subsequent raids flown over the next six months incinerated sixty-seven Japanese cities. While these attacks were indiscriminate and brutal, they were also effective. According to Prince Fumimaro Konoe:

“Fundamentally, the thing that brought about the determination to make peace was the

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29 Hansell, The Strategic Air War Against Germany and Japan, 213.

30 Wolk, Cataclysm: General Hap Arnold and the Defeat of Japan, 145.


prolonged firebombing by B-29s.” Victory through airpower worked because airmen adjusted their bombing methodology to attain the overarching wartime goals.

In the summer of 1944, the commander of the Fourth Bomb Wing Brigadier General Frederick Castle reflected upon strategic bombing’s contribution to the war effort. Highlighting airmen’s quest for a prudent path to victory, he remarked: “One basic fact in any discussion of what we are learning in World War II is that a method of war has been discovered, which no longer depends mainly on attrition for the final decisive results….” While General Castle did not live to see airpower’s final role in bringing World War II to a successful conclusion, his vision proved prescient.

The airmen of World War I favored precision strategic bombing because they thought it would enable victory in a more effective, efficient manner. Twenty years later, precision tactics in the European theater ultimately netted this objective. Air commanders pushed themselves and their crews to the brink to manifest their vision. By severely reducing Germany’s capability and capacity to wage war, airmen enabled the Allies to successfully beat back enemy forces in a rapid and decisive fashion. Territory that previously saw a half-decade long bloody stalemate during World War I was rapidly captured by the Allies in World War II—with eleven months transpiring between the D-Day landings in France and ultimate victory in the heart of Germany.


When it came to the Pacific, these tactics were tossed aside as air commanders responded to a different set of operational considerations and strove to end the war as rapidly as possible. This change in methodology did not involve relinquishing the fundamental goal of an effective, efficient path to victory. Pre-war doctrine explained that “the will to wage war is supported by the means to wage war. When a nation is deprived of the means, the will collapses.”\textsuperscript{35} Airmen attained this goal against Japan because they were willing to adjust their respective tactics in response to the unique operational factors within each theater. Securing victory prudently, not blind dedication to a rigid set of tactics was what mattered. In doing so, airmen ended the war without putting hundreds of thousands of lives at risk with an invasion of Japan. This stands as one of the most pivotal command decisions of World War II.

The ultimate legacy of strategic bombing against Germany and Japan was aptly summarized by Walt Rostow, a World War II target analyst and subsequent national security advisor to President Lyndon Johnson. He explained: “A generation of leaders, a firm operational doctrine, a set of mature staff concepts, and a fighting style crystallized over these decisive months. The character of the modern United States Air Force cannot be understood outside the context of that experience.”\textsuperscript{36} Rostow was correct. The drive to secure national security goals in a decisive, prudent fashion stands


as a defining element of the modern United States Air Force. Achieving this goal in practice requires air commanders to adjust their strategy and tactics to meet the demands of a given mission. That was the very same challenge air commanders faced during the final months of the war against Japan.

This thesis will analyze the evolution of World War II strategic bombing doctrine, with particular focus placed upon the switch from precision-focused strikes to mass aerial attacks. This will involve analysis regarding pre-war doctrine, followed by an evaluation of operations in both the European and Pacific Theaters of Operation through an ends, ways, means approach. This paper will address three main questions: What were the goals of bombing in the respective theaters? What were the primary strategies employed? How were the results actually manifested?
CHAPTER TWO
WORLD WAR I: THE ORIGIN OF STRATEGIC AIRPOWER

During a December 14, 1914 House Military Affairs Committee hearing, Chief of the Army Signal Corps Brigadier General George Scriven testified: “…as a fighting machine, the airplane has not justified its existence.”¹ The United States purchased its first military aircraft in 1911 and three years later, the commander of the Army’s aviation arm was less than impressed.² Given the frail nature of early aircraft, General Scriven’s skepticism was understandable. Simply flying a few dozen miles and arriving safely at the desired destination was a challenging proposition for early military aviators. It was unclear whether these nascent flying machines would withstand the rigors of combat.³ All of this changed in the skies above Europe during World War I. Aviation capabilities advanced rapidly as aviators from both sides of the conflict expanded the notion of what it meant to fly and fight.⁴


² Edgar S. Gorrell, The Measure of America’s World War Aeronautical Effort (Burlington, VT: The Lane Press, 1940), 2.


⁴ Gorrell, The Measure of America’s World War Aeronautical Effort, 2.
Upon entering the conflict in 1917, U.S. military commanders rapidly gained appreciation for combat aviation.\(^5\) Flying tactical missions in direct support of the soldiers on the ground, airmen bombed hostile forces, helped guide artillery fire, shot down enemy aircraft, and provided battlefield intelligence data.

Aviators also realized that they could expand their activities past the immediate zone of conflict by attacking strategic centers connected to the enemy’s war effort. These targets included production plants, logistics lines, and military command centers.\(^6\) As Charles Gray, editor of the British magazine *The Aeroplane* explained in June 1917: “Behind Germany’s army lie the sources from which it is fed. The iron mines, the steelworks, the armament factories…. [They] lie within reach of the air weapons of war….\(^7\) This form of strategic attack promised a more effective, efficient means to secure combat objectives. Opposing armies would be hard pressed to continue the conflict without the tools required to fight.\(^8\)

While American airmen departing Europe at the end of World War I were brimming with confidence regarding airpower’s burgeoning potential, circumstances


were quite different when the United States entered the conflict in April 1917. The Air Force, known then as the Air Service, was wholly unprepared for war.⁹ According to General John Pershing, commander of the American Expeditionary Forces in France:

> Out of the sixty-five officers and one thousand men in the Air Service Section of the Signal Corps, there were about thirty-five officers who could fly. With the exception of five or six officers, none of them could have met the requirements of modern battle conditions and none had any technical experience with aircraft guns, bombs or bombing devices. We could boast some fifty-five training planes in various conditions of usefulness, all entirely without war equipment and valueless for service at the front. Of these fifty-five planes, it is amusing now to recall that the National Advisory Committee for Aeronautics…advised that fifty-one were obsolete and four were obsolescent.¹⁰

Future Air Force Commanding General Henry “Hap” Arnold concurred with this pessimistic assessment: “At this time we were ranked 11th among the nations of the world in terms of aviation. Actually, it was worse than that, statistics aside, we had no airpower at all.”¹¹ Military officials had to come to grips with this new domain amidst the strain of combat.

Congress took rapid action to bolster the Air Service upon America’s entry in the war. Between 1917 and 1919 lawmakers appropriated $1,691,854,758 for military aviation activities.¹² While this sizable funding allotment could certainly buy airplanes,

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devising competent strategies to guide their use proved far more challenging.

According to Colonel Thomas Milling, Chief of the Air Service for the First Army:

At the time we declared war on Germany, few people in the United States knew anything about the Air Service or had any real knowledge about airplanes, types that should be employed, or the use that could be made of them—either from a command standpoint or from a standpoint of war.\(^\text{13}\)

Soldiers traditionally fought in a linear fashion on the battlefield. Engagements took place in a restricted space with armies seeking to annihilate the opposing force and gain control of its respective territory. With the air domain offering a range of new combat capabilities, commanders had to reconsider how to best harness this new realm.\(^\text{14}\)

Assuming that the traditional battlefield was still the decisive medium of war, Army commanders favored using aircraft in a tactical fashion to support the ground forces. According to General Pershing, airmen should “…drive off hostile airplanes and procure for the infantry and artillery information concerning the enemy’s movements.”\(^\text{15}\) Aircraft could also bomb tactical battlefield targets, such as enemy troop concentrations and artillery emplacements.\(^\text{16}\) The unifying factor with these


\(^{15}\) Craven and Cate, Plans and Early Operations, January 1939 to August 1942, 37.

missions was that airplanes operated as an extension of the Army to maximize battlefield objectives.

World War I also saw another airpower vision emerge past the tactical domain. Innovative leaders willing to look past the traditional battle front understood that aircraft could strike strategic targets deep behind enemy lines. Through bombing armament factories, command centers, and logistics lines, airmen could attack core sources of enemy combat power. Colonel Edgar Gorrell of the Air Service’s planning staff emphasized this in a November, 1917 memorandum, explaining that it was “…of paramount importance that we adopt at once a bombing project …at the quickest possible moment, in order that we may not only wreck Germany’s manufacturing centers but wreck them more completely than she will wreck ours next year.”

Colonel Gorrell’s appreciation for strategic attack dated back to May 25, 1917, when long range German bombers struck targets in southeast England. Subsequent raids throughout 1917 and 1918 killed 1,400 British citizens and destroyed a number of buildings throughout London and surrounding towns. The attacking crews were supposed to restrict their strikes to military installations, but nascent targeting

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technology and the fact that most of the missions occurred at night precluded accurate aiming.\textsuperscript{21}

Even though the raids netted haphazard results, the British Royal Flying Corps had to withdraw fighter units from the front in France and redeploy them in England for homeland defense purposes.\textsuperscript{22} As WWI pilot and future commander of the Royal Air Force, John Slessor, observed:

\begin{quote}
So urgent was the political demand for air protection at home, that in the summer of 1917 at the most critical period, just before the opening of the 3rd Battle of Ypres, Sir Douglas Haig actually had to send home from the front in France two of his best fighter squadrons for the defense of London. So the activities of the German bombers, miles from the scene of the battle on the ground, had an effect upon the air situation over the decisive front.\textsuperscript{23}
\end{quote}

While the German raids against England did not paralyze the British war effort, they successfully impacted the balance of power on the traditional battlefield. As far as airmen were concerned, this was a powerful lesson that emphasized the value of strategic bombardment.\textsuperscript{24}

Political leaders in England also recognized the potential afforded by long range bombing. Seeking to bolster their own strategic strike capabilities, the British government formed an autonomous air arm—the Royal Air Force (RAF). Airmen

\begin{footnotes}
\item[23] Slessor, \textit{Air Power and Armies}, 24.
\end{footnotes}
flying independently of the tactically-focused Army commanders could now extend their activities into the broader strategic domain. Lieutenant General Christian Jan Smuts, a key figure behind the British drive for air autonomy, explained the reasoning behind this decision:

Air forces can be used as an independent means of war operations. Nobody that witnessed the attack on London on the 11th of July could have any doubt of that point. Unlike artillery, an air fleet can conduct extensive operations far from, and independently of, both army and navy. As far as can at present be foreseen, there is absolutely no limit to the scale of its future independent war use. And the day may not be far off when operations with the devastation of enemy lands and destruction of industrial population centers on a vast scale may become the principle operations of war, to which the older forms of military and naval operations may become secondary and subordinate.25

General Smuts’ comments highlight one of the principle developments that occurred during World War I: redefining the scale and scope of a conflict. Airpower enabled warring nations to strike targets past the reach of traditional surface forces. Long range bombers could now fly over vast swaths of hostile territory and strike the very sources of power that enabled the enemy to fight.26

RAF commanders outlined a multi-faceted strategic strike strategy. Bombers would hit production plants, transportation lines and command centers. British airmen


also threatened industrials workers in a quest to subvert their productivity amidst the strain of anticipated air raids.\textsuperscript{27}

General Hugh Trenchard, a top RAF leader in charge of the new strategic bombing effort, highlighted this strategy in a November 1917 memorandum to the British War Cabinet:

Long distance bombing is an integral part of offensive aerial warfare on the Western Front. It is designed to...weaken the power of the enemy both directly and indirectly—directly by interrupting his production, transportation, and organization through infliction of damage to his industrial, railway, and military centers and by compelling him to drawback his fighting machines to deal within the menace—indirectly by producing discontented alarm amongst the industrial population. In other words, it aims at achieving both a material and morale effect.\textsuperscript{28}

Early RAF bombing missions yielded disappointing results. According to General Trenchard: “...it was not possible with the forces at my disposal to do sufficient material damage so as to completely destroy the industrial centers in question.”\textsuperscript{29}

Crews had a difficult time locating and accurately striking specific targets like factories and transportation lines. RAF pilot John Slessor explained the problem: “Our material and technique, even at the end of the war, were really primitive; in the early days...there was not even such thing as a bomb sight, and bombing was done by the

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\textsuperscript{27} Ibid., 136.
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\begin{flushright}
\textsuperscript{28} Williams, \textit{Biplanes and Bombsights: British Bombing in World War I}, 53.
\end{flushright}

\begin{flushright}
\textsuperscript{29} Jones, \textit{The War in the Air: Being the Story of The part played in the Great War by the Royal Air Force}, 36.
\end{flushright}
‘chuck and chance it’ method….”30 Trenchard concurred: “The accuracy is not great at present and the pilots drop their eggs well in the middle of town generally.”31

Determined to get results, the Royal Air Force focused upon the enemy industrial workforce.32 Targeting broad population centers did not require pinpoint accuracy. Pleased with the results of these generalized area strike missions, Trenchard explained: “…no town felt safe and it necessitated continuous and thorough defensive measures on the part of the enemy to protect the many different forces over which my force was operating.”33 The RAF prioritized mass bombing against civilian targets for the duration of the war. This tactic later resurfaced in World War II.

The United States entered World War I amidst this strategic bombing surge. Inspired by the example of the Royal Air Force, American airmen sought to develop their own long range strike force. On November 18, 1917, Chief of the American Expeditionary Force Air Service Brigadier General Benjamin Foulois submitted a plan to his Army superiors advocating bombing missions against “…the commercial centers and lines of communication in such quantities as will wreck the points aimed at and cut

30 Slessor, Air Power and Armies, 130.


32 Williams, Biplanes and Bombsights: British Bombing in World War I, 167.

off supplies without which the armies in the field cannot exist.”

General Pershing, the top American leader in France, disagreed with this strategy.

The Commander of the American Expeditionary Forces believed that the battlefield was the primary wartime zone of influence. Airpower’s effect would be the greatest when used on the front lines. Strategic missions against distant enemy targets would deprive the ground forces of support necessary to secure tactical victories. Pershing vocalized frustration with his strategically-minded airmen in his memoirs: “The tendency of our air force at first was to attach too much significance to flights beyond the enemy’s lines in an endeavor to interrupt his lines of communications.”

Seeking to cure airmen of their strategic aspirations, the General explained: “we sent aviators to serve awhile with the infantry and study the problem from its point of view.” As far as Pershing was concerned, airmen should support the ground units at the front rather than striking strategic targets behind enemy lines.

Nor was the top American commander alone in his assessment. British Expeditionary Force Commanding Field Marshall Douglas Haig was less than enamored with the concept of a strategic bombing force. In a memorandum to his superiors at the War Office, he declared: “Long-range bombing as a means of defeating

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36 Ibid., 337.
the enemy is entirely secondary…its results are comparatively unimportant.” As far as World War I ground commanders were concerned, wars were won on the battlefield, not miles behind an opponent’s lines.

Ordered to fly and fight above the trenches of the main battlefront, American airmen never participated in a strategic bombing campaign during World War I. Of the 138 tons of bombs dropped by U.S. aircraft during the war, nearly all were released in the support of battlefield objectives. Despite this tactical focus, American airmen were still enamored with strategic bombing’s potential.

When the war ended in the fall of 1918, U.S. Air Service representatives established a formal bombing survey to assess the impact of the RAF’s strategic campaign. American airmen wanted to gather information to help them develop their own post-war strategic strike doctrine.

While American airmen and their RAF counterparts both embraced the concept of strategic strike, their views diverged when it came to operational methods. U.S. bombing survey analysts openly denounced the British decision to abandon strikes against specific war industries: “The decision to ‘bomb something up there’ might have appealed to one’s sporting blood, [but] it did not work with greatest efficiency


39 Kennett, A History of Strategic Bombing, 86.

40 Johnson, Wingless Eagle: U.S. Army Aviation through World War I, 212.
against the German fighting machine…”

Instead of haphazard aiming, the survey emphasized the need for precise targeting: “The criticism is also directed against the bombing of a town rather than some definite objective of military value in the town….” Bombs would only net an impact if they were directed against relevant targets.

The survey analysts also disagreed with the Royal Air Force’s enthusiasm for striking morale-related targets:

Bombing for morale effect alone…was probably the excuse for the widespread of bombs over a town rather than their concentration on a factory, is not a productive means of bombing. The effect is legitimate and just as considerable when attained indirectly through the bombing of a factory.

There was a difference between raw destruction and prudent targeting. U.S. airmen believed a successful strategic strike campaign demanded precise aiming against specific facets of the enemy’s war enterprise.

The bombing analysts also concluded that certain targets were more lucrative

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42 Ibid.
43 Ibid., 502.
than others. Airmen needed robust intelligence to ensure they were striking the most lucrative aim points:

In considering [war production]… a careful study [should be undertaken] of the different kind of industries and the different factors of each. This study should ascertain how one industry is dependent on another and what the most important factories of each are. A decision should be reached as to what factories if destroyed would do the greatest damage to the enemy’s military organization as a whole. On these factories the entire available bombing force should be concentrated until it is satisfied that the factory is sufficiently crippled.44

This analytical approach eventually developed into a core element of airpower doctrine that guided strategic bombing operations in World War II.

British airmen reflecting upon their World War I strategic strike campaign arrived at far different conclusions than their American counterparts. They stood by their area strikes, with the Air Ministry concluding: “At present the morale effect of bombing stands undoubtedly to the material in proportion twenty-to-one, and therefore it was necessary to create the greatest morale effect possible.”45 The Royal Air Force embraced this approach twenty years later when they engaged in a mass bombing campaign against German morale in World War II.

The U.S. Air Service had come a long way since General Scriven dismissed the force’s utility in his 1914 testimony before the House Military Affairs Committee. From a handful of obsolete, fragile aircraft to a battle-tested air arm imbued with the core tenets of airpower strategy. World War I served as a formative experience for

44 Ibid.

45 Williams, Biplanes and Bombsights: British Bombing in World War I, 243.
American airmen. They departed France with a redefined notion of the battle space, which now included strategic targets deep behind enemy lines. Airpower advocates embraced this new medium, even though their senior Army commanders preferred to focus on traditional battlefield operations.

Airmen and soldiers spent the next twenty years debating the value of strategic bombing. As far as airpower proponents were concerned, they were advocating for a more effective, efficient way to secure wartime goals. As leading airpower champion Brigadier General William Mitchell explained:

> Armies proved conclusively in the last war that they could not gain victory. For four years they faced each other across a lot of ditches in northern France and went backward and forward only a few miles. Millions of men were killed and wounded; billions of dollars were spent; natural resources became exhausted; lines of communication were destroyed or greatly impaired. All that happened only went to prove that the armies, following an entirely worn-out theory that they could advance and capture the vital centers of the enemy against an opposing army, had not taken a proper count of modern means of defense, such as the machine gun, the rapid fire cannon and toxic gasses. By their ignorance of modern methods and devices, they brought the world to the verge of ruin.46

Resolute in their beliefs, airmen pressed ahead with their strategic airpower vision.

They were determined build a viable, robust operational force to empower the nation in a prudent, decisive fashion. “Victory through Airpower” defined this cause.

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CHAPTER THREE
THE INTERWAR YEARS: FOSTERING A CONCEPT

Testifying before the House Military Affairs Committee in 1926, World War I air commander and former Assistant Chief of the Air Service Brigadier General William “Billy” Mitchell espoused the contribution he believed strategic bombing would make in a future conflict:

There has never been anything that has changed war the way the advent of airpower has….In the future we will strike, in cases of armed conflict, when all other means of settling disputes have failed, to go straight to the vital centers, the industrial centers, through the use of an air force and hit them. ¹

His prediction proved prescient. During World War II, American airmen would drop over 1,626,864 tons of bombs upon strategic targets throughout Europe and Japan. ²

The effects of these strikes were pronounced, with the United States Strategic Bombing Survey concluding: “It brought the economy which sustained the enemy’s armed forces to virtual collapse.”³


³ The United States Strategic Bombing Survey, The United States Strategic Bombing Survey: Over-all Report (European War), 107.
These campaigns succeeded thanks to the airpower advocates who advanced the concept of strategic bombardment throughout the interwar period of the 1920s and 1930s. Returning home from World War I, airmen were determined to develop a more effective, efficient means to secure victory than the gruesome land battles they observed in France.⁴ Instead of fighting to seize territory and annihilate an opposing force, aviators realized that they could fly past enemy armies and strike vital war-enterprise targets. An adversary would face rapid defeat without functioning factories, logistics hubs, and command centers.⁵ While rudimentary World War I strategic bombing missions yielded limited results, airpower advocates were confident they could develop the mission into a robust, war-winning endeavor.⁶ Leaders in the War Department did not share airmen’s affinity for strategic strike.⁷ As far as they were concerned, armed conflicts were fought and won on the battlefield. According to a 1938 Army report: “None of this [aviation] progress…has changed the conception that the infantry division continues to be the basic combat element by which battles are won, the enemy fielded forces are destroyed and captured

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territory held.” Ground commanders contended that aircraft afforded their maximum contribution when flying in support of battlefield objectives, not against distant strategic targets.

Past these ideological debates, airpower advocates faced a major obstacle constructing a modern Air Force. No matter the potential promised by their strategic strike theories, airmen’s plans were of little tangible value without the long range bombers required to fly the proposed missions. Airmen spent most of the 1920s making due with World War I-era bi-planes and things improved little during the Great Depression.

Despite these challenges, airmen persevered. They expanded the basic concept of strategic strike into a robust set of strategies and tactics, which eventually guided the air campaigns of World War II. With war clouds burgeoning in Europe and the Pacific during the late 1930s, air leaders finally secured the necessary funds to modernize their aircraft inventory. The strategic bombers that flew and fought against Germany and Japan in World War II trace their origins back the latter years of the interwar period.

In February 1935, then-Major Carl Spaatz wrote to his friend then-Brigadier General Henry “Hap” Arnold regarding recent strides they made advancing the concept

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of strategic strike. With great satisfaction, Spaatz predicted: “Airpower is going to be an entirely different thing than what we have visualized in the distant past and the future is going to justify our most rosy dreams.” These two future air commanders would have been hard-pressed to imagine the extent to which this prediction would manifest itself over the following decade. The roots of that success lay with airmen who dedicated themselves to the cause of strategic airpower during the 1920s and 1930s.

The dynamics surrounding the interwar strategic bombing debate hinged upon a simple question: Where were modern wars fought and won? Soldiers and airmen returning home from World War I stood divided upon this issue. As far Army ground commanders were concerned, the battlefield represented an armed conflict’s decisive center of gravity. As the 1923 U.S. Army Field Regulations explained: “The ultimate objective of all military operations is the destruction of the enemy’s armed forces by battle. Decisive defeat in battle breaks the enemy’s will to wage war and forces him to sue for peace.” Recent combat experience from World War I supported this conclusion. Opposing armies engaged in a series of battles to gain control of their respective opponent’s territory.

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12 Wesley Frank Craven and James Lea Cate, eds., Plans and Early Operations, January 1939 to August 1942, vol 1of The Army Air Forces In World War II (New York: Van Rees Press, 1948), 44.

13 Ibid., 37.
While new technologies, such as combat aviation, expanded the scale and scope of the conflict, Army leaders believed that the battlefield retained its preeminence as central focus of the war. As a 1919 War Department review board headed by Major General Joseph Dickman explained: “Nothing so far brought out in the war shows that aerial activities can be carried on, independently of ground forces, to such an extent as to affect materially the conduct of war as a whole.”\(^{14}\) As such “…aviation must continue to be one of the auxiliaries of the principle arm, the infantry.”\(^{15}\) Aircraft would make their greatest contribution flying in support of soldiers on the ground. This meant bombing enemy battlefield positions, gathering intelligence information through aerial reconnaissance, helping direct artillery fire, and shooting down hostile aircraft.\(^{16}\)

Airmen returned home from World War I with a far different perspective. The cost of the conflict, whether measured in terms of lives lost of resources expended, was truly staggering. Armies locked in a bloody stalemate struggled in vain to secure any appreciable gains for nearly half-a-decade.\(^{17}\) Airmen believed airpower offered a new alternative to help secure victory in a far more effective and efficient fashion.\(^{18}\)


\(^{15}\) Ibid.

\(^{16}\) Craven and Crate, *Plans and Early Operations, January 1939 to August 1942*, 19.


\(^{18}\) Major General Frank M. Andrews, “Modern Air Power” (lecture, National Aeronautic Association, St. Louis, MO, January 16, 1939), Air University Library Historical Division, 248.211-20, 2.
leading airpower advocate Brigadier General William Mitchell explained in his book *Skyways*:

The advent of airpower, which can go straight to the vital centers [of an enemy] and entirely neutralize them, has put a new complexion on the old system of war. It is now realized that the hostile main army in the field is a false objective and the real objectives are the vital centers.19

Airmen contended that the advent of combat aviation expanded the scope of war far past the traditional battlefield. Strategic bombers could fly over hostile territory and destroy core elements of the enemy’s war enterprise—things like factories, transportation lines, and command centers. Deprived of the tools necessary to sustain the conflict, an opposing force would have to surrender.20

Airpower advocates argued that airpower’s reach extended the conflict’s center of gravity past the battlefield to the enemy’s core war sustaining enterprises that enabled it to project combat power.21 As far as airmen were concerned, strategic attack allowed military leaders to secure combat objectives in a far more decisive, prudent fashion. As senior air commander Major General Frank Andrews explained in a 1939 speech: “Air forces, unlike ground forces, are not forced to wage an exhausting war at a nation’s frontier.”22


Despite airpower advocates’ confidence in strategic strike’s potential, their superiors in the War Department refused to cede their established position that wars were fought and won by soldiers on the battlefield. Airmen grew exceedingly frustrated in the face of this intransigence. As future Chief of the Air Corps then-Colonel Benjamin Folouis testified during a 1919 House Military Affairs Committee hearing:

The General Staff of the Army is the policy-making body of the Army and, either through a lack of vision, lack of practical knowledge, or deliberate intention to subordinate the Air Service’s needs to the needs of the other combatant arms, has utterly failed to appreciate the full military value of this military weapon and, in my opinion, has utterly failed to accord it its just place in our military family.23

Determined that their strategic strike concepts held great merit, airmen spent much of the interwar period engaged in an aggressive advocacy campaign.

Brigadier General Billy Mitchell stood forth as the nation’s top airpower champion. He spoke to countless audiences around the nation, authored three books, wrote several articles for mass-market publications, and was a regular fixture on Capitol Hill.24 Most importantly, he inspired airmen to fight for their strategic airpower principles. As the General explained in his 1921 book Our Air Force: “Aeronautics is a new and developing art. We must not prepare for what is going to happen yesterday, but what is going to happen tomorrow, and the day after.”25 The top air commanders of

23 Craven and Crate, Plans and Early Operations, January 1939 to August 1942, 21.

24 Ibid., 24-25.

World War II—General Henry “Hap” Arnold, General Carl Spaatz, and General Ira Eaker—were all Mitchell protégés.\textsuperscript{26} According to Arnold: “The officer most responsible for the progress of the Air Service, for maintaining interest and morale of its personnel in those lean years, was General Billy Mitchell.”\textsuperscript{27}

Aggressive airpower advocacy was fraught with great professional risk, as General Mitchell learned in 1925, when the War Department tried him before a court martial on the charge of insubordination. The Air Service’s top advocate had crossed the line in challenging the Army’s official doctrinal precepts regarding the nature of war.\textsuperscript{28} Even without Billy Mitchell in their official ranks, airmen remained committed to their strategic airpower convictions.

Ironically, General Mitchell’s downfall precipitated the first influx of tangible support the Air Service received since World War I. With the court martial rapidly escalating into a national event, President Calvin Coolidge tasked leading businessman Dwight Morrow to convene a board to determine “the best means of developing and applying aircraft in national defense.”\textsuperscript{29} While the resulting report did not embrace airpower, instead concluding “the next war may well start in the air but in all


\textsuperscript{27} Arnold, \textit{Global Mission}, 91.

\textsuperscript{28} Craven and Crate, \textit{Plans and Early Operations, January 1939 to August 1942}, 27.

probability will wind up, as the last war did, in the mud,” it did precipitate the 1926 Air Corps Act. This legislation elevated the air arm’s standing within the War Department’s bureaucracy as the Army Air Corps; created a new civilian leadership position, the Assistant Secretary of War for Air; and afforded a five-year aircraft modernization program. This was all welcome news for airmen who were still taking to the sky in World War I relics.

Past advocacy efforts and achievements in the political domain, airmen expanded the breadth and depth of strategic airpower’s intellectual underpinnings. The heart of this effort was located at Maxwell Field in Montgomery, AL, where Air Corps officers attended the Air Corps Tactical School (ACTS). Instructors at this professional military education institution lectured that it was not in the country’s interest to engage in another land war guided by the precepts of attrition and occupation. Strategic bombing afforded a more effective, efficient means to secure national objectives. Chief of the Air Corps Major General James Fechet emphasized

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30 Ibid., 7.

31 Ibid., 15-21.

32 Edgar S. Gorrell, The Measure of America’s World War Aeronautical Effort (Burlington, VT: The Lane Press, 1940), 8.


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this message in a 1928 address to ACTS students:

The objective of war is to overcome the enemy’s will to resist and the defeat of his army, his fleet or the occupation of his territory is merely a means to this end and none of them is the true objective. If the true objective can be reached without the necessarily defeating or brushing aside the enemy force on the ground or water and the proper means furnished to subdue the enemy’s will and bring the war to a close, the object of war can be obtained with less destruction and lasting after effects that has here-to-fore been the case. As present, the Air Force provides the only means for such an accomplishment.35

Such a pronouncement stood in stark contrast to the Army’s official doctrine of the period: “The coordinating principle which underlines the employment of the combined arms is that the mission of the infantry is the grand mission of the entire force.”36

In addition to their coursework, ACTS instructors worked to enhance strategic strike doctrine.37 While the bombing campaigns of World War I provided a general vision, these missions lacked a defined, consistent strategy. According to the Air Service’s Strategic Bombing Survey of World War I:

The greatest criticism to be brought against aerial bombardment as carried out in the war of 1914-1918 is the lack of a predetermined program carefully calculated to destroy by successive raids those industries most vital in maintaining Germany’s fighting forces.38

36 Ibid., 42.
ACTS instructors sought to provide future air commanders with a robust set of guiding doctrinal principles to maximize the effectiveness of future strategic bombing campaigns.  

First and foremost, airmen needed to know where to aim their bombs. As ACTS instructor Major Muir Fairchild emphasized in a 1938 lecture: “Let us hope that war does not find him bent over a map in his tent, trying to pick out vulnerable points to be hit by his attacking force….” Instead, Fairchild emphasized: “Only by a careful analysis will it be possible to select the line of action that will most effectively accomplish our purpose and provide the greatest employment of the Air Force during war.” Securing the maximum strategic effect with a finite supply of strike resources required airmen to think about the concept of best value. What potential targets within the enemy’s war-making enterprise were the most important?  

Airmen at ACTS studied industrial complexes within the United States and discovered that a network of mutually dependent systems facilitated production. Target a critical element of the enterprise and enemy’s war effort would grind to a halt. ACTS

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41 Ibid.
instructor Major William Sherman explained this in his 1926 book *Air Warfare*:

> Industry consists…of a complex system of interlocking factories, each of which makes only an allotted part of the whole. This is an era of specialization. Accordingly, in the majority of industries, it is necessary to destroy certain elements of the industry only, in order to cripple the whole, these elements may be called the key plants…on the declaration of war, these key plants should be made the objective of a systematic bombardment…until their destruction has been assured.…

Instead of bombing vast swaths of territory, ACTS curriculum emphasized the importance of targeting key nodes of the enemy’s war enterprise. Without the tools to make war, an opposing state would have to surrender. As the 1936 ACTS lecture “Air Warfare” explained: “The will to wage war is supported by the means to wage war. When a nation is deprived of the means, the will collapses.” Calculated, focused paralysis, not raw destruction, was the defining hallmark of American strategic airpower doctrine during the 1920s and 1930s.

Despite airmen’s progress in the intellectual domain, they still lacked the modern aircraft necessary to achieve their strategic strike vision. As Air Corps Commanding General Benjamin Folouis explained: “We suffered from a chronic lack of funds in all the peacetime years and never had been able to build up our authorized strength in men or planes.” Problems stemming from this underinvestment came to a head in 1934, when President Franklin Roosevelt ordered the Air Corps to fly the

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nation’s airmail in lieu of commercial firms between February and June 1934. Fifty-seven aircraft crashed and twelve pilots died as airmen struggled to deliver the mail in obsolete aircraft, which lacked basic navigational equipment and communications devices. Adverse weather, the darkness of night, and challenging cross-country terrain proved to be too much for the aviators and their primitive planes. If airmen could not deliver the mail at home, they surely would not be able to sustain bombing missions in combat.

In the wake of the air mail fiasco, President Roosevelt and Congress issued additional funds to the Air Corps to begin much needed aircraft fleet modernization. The Air Corps’ first acquisition priority was a new bomber capable of transforming their strategic strike theories into reality. They issued a requirement for an aircraft capable of carrying two thousand pounds of bombs for two thousand miles at two hundred miles per-hour. The Boeing Corporation responded to this request and constructed a new design, the B-17 Flying Fortress. This was not just another airplane; it afforded true strategic power projection. Far bigger than existing designs, the B-17’s four engines allowed it to carry more bombs over a greater distance than any other plane in the Air Corps inventory. Explaining the significance of the new plane, Hap

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45 Mets, Master of Airpower: Carl A. Spaatz, 94.

46 Futrell, Basic Thinking in the United States Air Force, 1907-1960, 70.


48 Foulois, From the Wright Brothers to the Astronauts: The Memoirs of Major General Benjamin D. Foulois, 231.
Arnold commented: “Our whole fight for an Air Force had come to center more and more around bombardment, precision bombardment by daylight, all things summed up by the great word ‘B-17.’”

Top Army leaders were far less enamored with the new bomber, especially after the prototype crashed during its official evaluation trials at Wright Field in Dayton, Ohio. Army Chief of Staff General Malin Craig rejected the Air Corps’ request for sixty-five B-17s, instead limiting the purchase to thirteen aircraft. The bulk of the bomber order was directed to the Douglas Aircraft Corporation’s B-18 Bolo. A much smaller design powered by just two engines, the B-18 lacked the range and payload capacity of the B-17. Unable to fulfill the strategic bombing requirements outlined in Air Corps doctrine, the B-18’s utility was limited to the battlefield in support of ground forces.

Once again, airmen’s quest for strategic airpower was stymied by the War Department. In frustration, Hap Arnold remarked, “One of our toughest fights was to see that the War Department did not use all our meager appropriations for procurement of light planes for the support of ground troops.”

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49 Arnold, Global Mission, 259.

50 Craven and Crate, Plans and Early Operations, January 1939 to August 1942, 66.

51 Ibid.

52 Maurer, Aviation in the U.S. Army, 1919-1939, 348.

53 Arnold, Global Mission, 153.
Army’s battlefield priorities versus the Air Corps’ strategic focus was still pronounced nearly two decades after World War I.

Airmen’s strategic vision finally began to gain traction as leaders watched air battles rage throughout Europe at the beginning of World War II. With German bombers pummeling England during the Battle of Britain, President Roosevelt sharply declared:

A new regiment of field artillery, or a new barracks at an Army Post in Wyoming, or new machine tools in an ordnance arsenal would not scare Hitler one blanket-blank-blank bit! Airplanes were the implements that would have an influence on Hitler’s activities.\textsuperscript{54}

He asked Congress to authorize the production of 50,000 combat aircraft for the Air Corps, Navy, and various Allied air forces. Congress supported this goal and appropriated $2,380,408,570 to the Air Corps, which was enough to buy more than 19,000 aircraft.\textsuperscript{55} The question loomed: was this support too little, too late? The aviation industry spent the past decade teetering upon the precipice of insolvency. Expanding production capacity would take time. Secretary of War Harry Woodring highlighted these challenges to President Roosevelt shortly before his 1938 resignation: “…we are not prepared for conflict. Billions appropriated today cannot be converted into preparedness tomorrow.”\textsuperscript{56}

\textsuperscript{54} Ibid., 177.

\textsuperscript{55} Ibid., 202.

In addition to bolstering America’s military forces, the Roosevelt Administration began to define a potential strategy in the event the United States was “compelled to resort to war” against the Axis powers of Germany, Italy and Japan.  

Between January and March 1941, at a series of meetings known as the American-British Conversations Number One (ABC-1), officials from the two countries agreed upon a general strategy in which they would first defeat Germany and Italy, followed by a subsequent offensive against Japan. Neither Britain nor the United States possessed sufficient military capacity to fight two concurrent full-scale wars. With Germany projecting the greatest perceived threat, operations in Europe stood as the priority. American military officials codified this plan on May 14, 1941 in a strategy document termed “Rainbow 5.”

On July 9, 1941 President Roosevelt wrote to Secretary of War Henry Stimson requesting “…the overall production requirements required to defeat our potential enemies” as defined in ABC-1 and Rainbow 5. When this assignment reached the airmen at the Air War Plans Division (AWPD), they faced a critical question. In the words of AWPD director Colonel Harold George: “How far can we go in a plan for air

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59 U.S. Army Air Corps, Air War Plans Division, “Air War Plans Division-1,” memorandum for the Chief of Staff, subject: Munitions Requirements of the Army Air Forces for the defeat of our potential enemies, 12 August 1941, Air Force Historical Office, Bolling Air Force Base, DC, tab A, 1.
warfare and still have some chance that it will be seriously considered by the Chief of Staff of the Army and the Secretary of War?“  

Airmen had to tie aircraft production figures to a defined strategy. They recognized that this planning exercise presented a tremendous opportunity to offer top leaders policy options past standard ground combat methods.

The four airmen leading the project—Colonel Harold George, Lieutenant Colonel Kenneth Walker, Major Laurence Kuter, and Major Haywood Hansell—were all veteran instructors from the Air Corps Tactical School. As Hansell explained:

We had one definite asset going for us: We had spent years together as instructors in Bombardment and Air Force at the Air Corps Tactical School. We embraced a common concept of air warfare and we spoke a common language.

Imbued with the tenets of airpower advocacy, the airmen decided to press ahead in drafting a strategic air campaign as a central focus of their proposed air plan.

The resulting document, designated AWPD-1, called for “… the breakdown of the industrial and economic structure of Germany. This conception involves the selection of a system of objects vital to the continued German war effort.”

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62 Hansell, *The Strategic Air War Against Germany and Japan*, 31.

63 U.S. Army Air Corps, Air War Plans Division, “Air War Plans Division-1,” tab 1, 1.

64 Ibid., tab 1, 2.
striking method, the airmen emphasized: “The most effective manner of conducting such a decisive offensive is by destruction of precise objectives….“65 They prioritized attacks against three main sectors: electrical power generation; transportation infrastructure; and the petroleum, oil and lubricants industry.66 According to AWPD team member Haywood Hansell: “In selecting principal targets, we attempted to identify ‘service systems,’ i.e., systems which motivated or connected industries, rather than the industries themselves.”67 Bombers would strike specific aim points to yield a compounded destructive effect upon the enemy’s war enterprise.

The AWPD team briefed Army Chief of Staff General George Marshall regarding the details of their proposal on August 30, 1941. He responded: “I think the plan has merit. I should like the Secretary and Assistant Secretaries to hear it.”68 With those words of approval, twenty years’ worth of air-minded determination, dedication, and perseverance paid off.

In his book Winged Defense, General Mitchell explained: “Aircraft do not need to pierce the line of either navies or armies. They can fly straight over them to the heart of the country and gain success in war. To gain a lasting victory in war, the hostile

65 Ibid.

66 Ibid.

67 Hansell, The Air Plan that Defeated Hitler, 84.

68 Hansell, The Strategic Air War Against Germany and Japan, 40.
nation’s power to make war must be destroyed…”⁶⁹ At the time he wrote these words, strategic bombing was just a theory. Two decades later, Mitchell’s strategic airpower vision was going to be tested on a scale and scope of immense proportion.

CHAPTER FOUR
WORLD WAR II EUROPEAN THEATER OPERATIONS: TURNING THEORY INTO REALITY

On the morning of December 7, 1941, Japanese naval air units launched a surprise raid against United States’ military assets at Pearl Harbor, Hawaii. Chief of the Army Air Corps, Major General Hap Arnold, first heard of the attack through a radio broadcast while on a hunting trip in California. Reflecting upon the moment, he declared, “I couldn’t believe it…the war was on.”¹ He immediately rushed back to Washington, D.C. to take charge of aerial defense measures. Colonel Carl Spaatz learned of the attack while unpacking boxes at his newly-acquired home in Alexandria, Virginia. The phone rang bearing news of the strike. Upon answering, he exclaimed “Christ, no!” and ran out the door to the War Department.² News of the military disaster reached Colonel Ira Eaker as he was laying down for a nap. His wife bounded up the stairs and exclaimed, “The Japs have attacked Pearl Harbor!”³ She quickly confirmed this announcement by turning on the radio. Eaker leapt up and called the War Department for further instruction.⁴


⁴ Ibid.
While the attack at Pearl Harbor stood as a surprise for the subsequent leaders of America’s strategic bombing effort against Germany, these airmen had effectively spent their careers preparing for this moment. Their identities were indelibly shaped by the battles of the past two decades in which they repeatedly pressed War Department leaders to accept a new strategically-focused approach to war premised upon long range precision strike. Such advocacy required determination amidst countervailing War Department views. Ira Eaker recollected, “We were just sort of voices in the wilderness. A great many military people considered us crackpots.”

As war clouds burgeoned over Europe and the Pacific, things began to change for the airmen. Hap Arnold explained that when President Franklin Roosevelt first began to posture for the possibility of war in 1938, he did so through an air-centric approach. He argued to his senior advisors that “A new regiment of field artillery, or a new barracks at an Army post in Wyoming, or new machine tools at an ordnance arsenal…would not scare Hitler one blankety-blank-blank bit!” The President emphasized that “Airplanes were the war implements that would have an influence on Hitler’s activities!”

Airmen firmly agreed with the President’s assessment, but continued to face intransigence within the ranks of the institutional Army. As General Arnold later reflected, “The War Department, as a whole, did not support the buildup of the Air

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Force as a strategic weapon…” And the gains he secured occurred “…in spite of the average War Department officer, rather than because of him.” Army heritage and identity were defined by the ideals of a traditional linear ground campaign. Long range precision strike was not part of that vision. In fact, just months before the attack at Pearl Harbor, official Army doctrine proclaimed:

> Air operations, like any other operations, are governed by the same fundamental principles that have governed warfare in the past. Air Forces constitute a highly mobile and powerful element which conducts the air operations required for carrying out the Army mission.\(^8\)

Changing this mindset was far from simple—especially when “Victory through Airpower was pure theory”\(^9\)—the astute observation of Air Corps Tactical School instructor and future strategic planner Haywood Hansel.

> Despite this skepticism, airmen pressed forward with steadfast determination and defined purpose as they sought to actualize their strategic bombardment theories through operational execution. The first two years of this effort were defined by austerity—a dearth of the necessary personnel and equipment required to sustain bombing raids of sufficient mass and rapidity to net desired results. When Ira Eaker took the command of initial bombing operation in England, the entire force consisted of six officers and no planes. He built it into a unit of historic proportions—185,000 officers and enlisted personnel equipped with over four thousand aircraft spread across

\(^7\) Ibid., 538.


\(^9\) Ibid., 75.
40,000 acres that hosted forty-three airfields.\textsuperscript{10} The magnitude of this accomplishment can never be overstated.

Amidst these resource challenges, air leaders were repeatedly called upon to defend their aerial strategy. British commanders wanted to fold the American bombing resources in with their mass night strikes. Political leaders diverted the airmen from their strategic targets in various schemes to address alternate goals. Commanders in competing theaters sought to secure the bombers to execute their localized missions.

American airmen persevered. They continued to hone their concepts and methodology in response to combat lessons learned. Application of overwhelming mass in a concurrent, unified effort defined their quest.

By 1944, their efforts were finally yielding the desired results. Aircraft production, personnel inflows, and requisite logistical support finally matched mission requirements. This force paved the way for Allied landings at Normandy on June 6, 1944. Territory that previously saw a half-decade long bloody stalemate during World War One was rapidly captured by the invading forces—with 11 months transpiring between the landings in France and ultimate victory in the heart of Germany.

When the war came to an end in May 1945, American airmen stood proud. They succeeded in transforming a theoretical operational concept into an indispensable strategic asset. This did not happen by default. As Prime Minister Winston Churchill

\textsuperscript{10} Parton, “Air Force Spoken Here”: General Ira Eaker and the Command of the Air, 155.
explained, it was a process involving “blood, sweat, and tears.”\(^\text{11}\) Whether struggling for adequate resources, defending against political interference, or continually working to keep the aircraft focused on their assigned strategic targets—airmen remain fixed upon their goal: daylight precision strategic bombardment. Perseverance and dedication to a set of principles eventually prevailed—netting “Victory through Airpower.”\(^\text{12}\)

This story of strategic bombardment in the European Theater of Operations of World War Two traces its origins back to a set of meetings held during the winter of 1941—termed the “American-British Conversations Number One” (ABC-1). Representatives from the United States and the United Kingdom met to collaborate on devising an overarching strategy to defeat the Axis powers should America get drawn into the war.\(^\text{13}\) The meetings centered upon a “Germany first” approach, whereby the European Theater would be prioritized over events in the Pacific. American airmen were provided a significant opportunity when British representatives advocated a strategy that emphasized strategic air and sea power versus one dominated by ground


\(^{12}\) Alexander De Seversky, Victory through Airpower (New York: Simon and Schuster, 1942), 352.

\(^{13}\) Wesley Frank Craven and James Lea Cate, eds., Plans and Early Operations, January 1939 to August 1942, vol 1 of The Army Air Forces In World War II (New York: Van Rees Press, 1948), 137.
forces. The final agreement acquiesced to this approach and called for a combined strategic air offensive against Germany to pave the way for an eventual invasion of the continent. US war planners formalized this strategy in an official directive known as “Rainbow 5.”

Air Corps leaders were now armed with the requisite top-level backing necessary to counter War Department resistance to a strategic bombing campaign. This support proved most opportune in July 1941 when President Roosevelt called for wartime production estimates “required to defeat our potential enemies” as stipulated in ABC-1 and Rainbow 5. Air Corps officials gained permission for their new strategy office—the Air War Plans Division (AWPD)—to draft the aviation portion of the report. This was a fortuitous step, for as AWPD staff member Haywood Hansell explained, “What airpower would be like in the coming conflict was a foregone conclusion if the War Plans Division of the Army were to write the air portion of the report to the President. This was something to be feared.”

Recent staffing developments saw the inclusion of prior ACTS instructors into the Air War Plans Division—providing champions the opportunity to shape national strategies.

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17 Hansell, The Air Plan that Defeated Hitler, 63.
policy in an air-minded fashion. The resulting document, coined AWPD-1, championed an ambitious long range precision strike campaign. The air strategists estimated they would need over 135,000 airmen to operate a fleet of over seventy thousand aircraft to meet the goals outlined in ABC-1 and Rainbow 5. Chief of Staff of the Army General George Marshall approved the proposal on August 30, 1941— remarking “Gentlemen, I think the plan has merit.”\textsuperscript{18} Marshall’s open-minded approach towards aviation was no accident. Air Corps leaders had deliberately cultivated the General through much engagement and education. Their efforts paid off—with Marshall willing to consider airpower concepts that previous senior leaders would have deemed heretical.\textsuperscript{19}

After the December 7, 1941 attack at Pearl Harbor, American and British leaders spent the latter half of December and the beginning of January in a series of planning sessions known as the ARCADIA Conference. They endorsed the “Germany-first” approach as specified in ABC-1 and agreed that US bombers would fly in coordination with the Royal Air Force (RAF) to degrade key Axis targets in Europe.\textsuperscript{20} ARCADIA participants also decided that Allied forces would invade North Africa in an operation codenamed “TORCH.” Launching a ground offensive directly into the heart of German resistance on the Continent of Europe was deemed too risky at this

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\textsuperscript{18} Copp, \textit{Forged in Fire: Strategy and Decisions in the Air War over Europe, 1940-45}, 156.


nascent stage of the conflict. The British and Americans also devised an integrated leadership system in which commanders of the respective military branches would meet collectively to decide major issues as the Combined Chiefs of Staff.

This decision was particularly advantageous for General Arnold because it elevated his stature in relative parity to the Army Chief of Staff General George Marshall and Chief of Naval Operations Admiral Ernest King. This was not an altruistic gesture on the part of the top American Army and Navy commanders—it was a matter of not getting out-voted by the British in policy debates. The Royal Air Force was an independent Service, so in order to match the presence of three British military leaders, Marshall and King needed to include General Arnold as a counterpart to RAF head Air Chief Marshal Charles Portal. Arnold was similarly afforded a seat on the Joint Chiefs of Staff for the sake of equity. President Roosevelt’s Chief of Staff, Admiral William Leahy, participated with the Joint Chiefs representing the Commander in Chief. Affording Arnold a seat with the group enabled Service representation parity.

While such political victories marked tremendous progress for airmen, bureaucratic standing seemed incidental in contrast to the global set of challenges now

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21 Wesley Frank Craven and James Lea Cate, eds., *Europe: Torch to Pointblank, August 1942 to December 1943*, vol 2 of *The Army Air Forces In World War II* (Chicago: The University of Chicago Press, 1949), 281.

facing AAF leaders. Haywood Hansel reflected on the situation:

Back at the Air Corps Tactical School, the theory of flying over an enemy’s armed force and striking the vital element of his homeland seemed as simple as it was attractive. But how to accomplish this feat against a great power, riding on the crest of victory and equipped with the latest creations of munitions technology was a practical problem of immense dimensions.\(^{23}\)

Despite half a decade’s worth of preparation, airmen still lacked the basic tools required for the job: modern bombers, protective fighter escorts, trained crews, effective munitions, adequate intelligence information to guide targeting efforts, base infrastructure, and a logistics line to sustain an immense air campaign. When isolationist Secretary of War Henry Woodring departed the War Department in 1938, he warned President Roosevelt that “…we are not prepared for a major conflict. Billions appropriated today cannot be converted into preparedness for tomorrow.”\(^{24}\)

The men of the AAF were struggling to gain traction amidst that stark reality. They simply had too little of everything.

Truly effective and sustainable force projection was a future goal, not a present reality. As far as strategic bombing was concerned, it all came down to amassing concentrated volume. Scattered, disparate strikes were not capable of consequentially degrading an enemy’s war-making capacity. According to Hap Arnold: “Airpower means employment of airplanes in numbers large enough to secure complete [target]

\(^{23}\) Hansell, The Air Plan that Defeated Hitler, 193.

\(^{24}\) Copp, Forged in Fire: Strategy and Decisions in the Air War over Europe, 1940-45, 69.
destruction.” Air leaders were preparing to wage a long term air campaign—not fly a discrete set of missions. They had to strike a wide swath of targets and keep them out of action through subsequent raids. That meant constant missions of sufficient mass to net the necessary level of destructive might. Airmen also had to incorporate enough elasticity into their inventory structure to replace combat losses so that the bombing force would not attrite into oblivion. Planners of AWPD-1 understood this reality and predicted that it would take until the fall of 1943 to assemble the core force of 1,360 heavy bombers, augmented by a monthly influx of 456 replacement aircraft to sustain an all-out offensive.

In addition to raw numbers, air leaders also counted upon precision strikes to net requisite target destruction with the available force structure. Air Force historian Richard Davis aptly captured the essence of this point: “Ten tons of bombs on target would do as much damage as one hundred tons of bombs dropped with ten percent accuracy.” If airmen were going to have to fly and fight with a dearth of forces throughout 1942 and most of 1943, then they needed to ensure the aircraft on hand were as effective as possible. Mass area strikes executed in a random fashion akin to the early strategic bombardment strikes of the First World War would not work. The airmen needed every bomb dropped to count—they simply lacked the force structure to


26 Hansell, *The Air Plan that Defeated Hitler*, 79.

27 Ibid., 72.

pursue less efficient types of targeting. This magnified the importance of the Air Corps Tactical School’s precision bombardment doctrine. As Hansell affirmed, “Bombs on target were the sine qua non of all our effort and sacrifice.”

As the ARCADIA Conference drew to a close, the Joint Chiefs of Staff approved the dispatch of American heavy bombers to England on January 13, 1942. Executing this order was far from simple because there simply were not any bombers or crews to deploy. The AAF was husbanding an extremely limited supply of aircraft between world-wide operational requirements and training efforts in the United States. As Hap Arnold remarked, “We were dispersing our military power even before we really had it.” The situation was so bleak that future strategic bombardment icon Curtis LeMay only had three B-17s to train thirty-five crews. He had to establish round-the-clock flight operations for his airmen.

While new recruits struggled to learn the basic principles of flight, senior air commanders were confronted with their own respective set of challenges. Ira Eaker discovered this when he arrived in England on February 23, 1942 to establish America’s preeminent bombing force in Europe—the Eighth Bomber Command of the Eighth Air Force. The newly-promoted Brigadier General did not possess a fleet of

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29 Hansell, *The Air Plan that Defeated Hitler*, 139.


32 Davis, *Carl A. Spaatz and the Air War in Europe*, 71.
bombers to strike Germany. Instead, he and six aides traveled circuitously by commercial air service—almost getting shot down by a German fighter plane in the process.33 Upon arriving in England, they found a completely blank slate. Eaker took immediate action securing existing airfields from the RAF, while also gathering land for new bases that he would need for future units. He established an American command structure and formed relationships with top RAF Bomber Command leaders—studying their night strike operations.34 Eaker’s close friend, Brigadier General Carl Spaatz, became his immediate superior as commander of the Eighth Air Force on May 10, 1942.35

As spring turned into summer, Hap Arnold grew increasingly frustrated with his top airmen in England. American units operating in the Pacific fought in a series of high profile engagements—most notably the Battle of Midway in early June—yet nothing seemed to be occurring in Europe.36 Faced with pressure from the Joint Chiefs and the President, Arnold ordered the Eighth Air Force to launch its first combat mission on July 4, 1942. American airmen would fly six A-20 light bombers borrowed from the British.37 Spaatz and Eaker protested that their crews were not ready, but to

33 Copp, Forged in Fire: Strategy and Decisions in the Air War over Europe, 1940-45, 230.
34 Hansell, The Strategic Air War Against Germany and Japan, 61.
35 Davis, Carl A. Spaatz and the Air War in Europe, 71.
36 Mets, Master of Airpower: Carl A. Spaatz, 122.
no avail—the Commanding General of the Army Air Force wanted tangible action.\textsuperscript{38} The results were disastrous. One third of the force was lost—seven Americans were dead and one was a captured. Of the half-dozen aircraft on the raid, four failed to drop their bombs anywhere near their assigned targets.\textsuperscript{39}

When American heavy bombers finally began to arrive in England in mid-July, Spaatz and Eaker were frustrated to discover that the crews required more training before they were ready for combat. As their recent July raid proved, dispatching an unprepared force in a haphazard fashion risked disaster. A vast proportion of the planes would likely get shot down—attrition that could not be readily replaced. Missions would grind to a halt if they could not be executed in a sustainable and survivable fashion.\textsuperscript{40} Arnold did not want to hear about these challenges—he wanted results. On August 9 he expressed his concern in a terse note to Spaatz:

I am personally gravely concerned over the apparent extension of the time period which you had anticipated necessary to complete the training of our units prior to their actual entry into combat….The strategic necessity for the immediate or early initiation of effective, aggressive American Air Force offensive operations becomes more and more apparent here daily.\textsuperscript{41}

Looking to whip his crews into shape, Eaker turned to trusted friend Frank Armstrong:

“I have asked you to do many things for me. This time I am putting a real load on

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\textsuperscript{38} Copp, \textit{Forged in Fire: Strategy and Decisions in the Air War over Europe, 1940-45}, 267.

\textsuperscript{39} James Parton, “\textit{Air Force Spoken Here}”: \textit{General Ira Eaker and the Command of the Air} (Bethesda, MD: Adler & Adler, Publishers, Inc., 1986), 166.

\textsuperscript{40} Davis, \textit{Carl A. Spaatz and the Air War in Europe}, 85.

\textsuperscript{41} Ibid., 96.
\end{flushleft}
you….You are going to complete the training of our new heavy bomb group and fight
with them in sixteen days.” Armstrong delivered.

The Eighth Air Force launched its first official mission of the war on August 17, 1942—twenty-three B-17s dropping 36,900 pounds of bombs against rail yards in Rouen, France. The bombers were escorted by British fighters to ward off German fighters. No Americans were lost. General Arnold was deeply encouraged by the raid, writing to fellow members of the Joint Chiefs of Staff that the attack on Rouen:

…verifies the soundness of our policy of the precision bombing of strategic objectives rather than mass bombing of large, city size areas. The Army Air Forces early recognized that the effective use of airpower on a worldwide basis required the ability to hit small targets from high altitudes.

Ira Eaker was less ebullient, observing that “The raid went according to plan, and we are well satisfied with the day’s work. However, one swallow does not make a summer.”

Such good fortune would not last long for the men of the Eighth Air Force. The next few months would push commanders, airmen, and faith in daylight precision

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43 Copp, Forged in Fire: Strategy and Decisions in the Air War over Europe, 1940-45, 288-290.

44 Craven and Crate, Europe: Torch to Pointblank, August 1942 to December 1943, 299.

45 Morrison, Fortress Without a Roof: The Allied Bombing of the Third Reich, 48.
bombe to the brink. As General Eaker later reflected: “For the next year, daylight bombing was on trial.”

Following the mission to Rouen, leaders of the Eighth Air Force were informed that they were going to lose key facets of their operation. Four bomb groups, with about thirty-five bombers each, were redirected to support the Allied invasion of Axis-occupied North Africa—Operation TORCH. This amounted to losing 140 aircraft, 1,098 officers, and 7,101 enlisted men. Eighth Bomber Command had to make ends meet with only two fully operational groups. General Spaatz also departed England with a new assignment to support TORCH’s commander, General Dwight Eisenhower. Ira Eaker was subsequently promoted to head the Eighth Air Force.

This erosion of force structure fundamentally handicapped efforts to create an effective, sustainable bombing operation. Spaatz expressed his grave concern to Arnold regarding this issue in an August 24, 1942 letter:

In so far as my advice is requested, and often when it is not requested, I have reiterated the folly of attempting to fight the war all over the world. In my opinion, unless the powers that be come to a full realization of the necessity for the concentration of the Air Forces in this theater, we stand an excellent chance of losing the war.

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48 Craven and Crate, Europe: Torch to Pointblank, August 1942 to December 1943, 235.

49 Ibid., 283.

50 Davis, Carl A. Spaatz and the Air War in Europe, 110.
Concurrent, overwhelming destructive striking power was what the airmen flying out of England needed to succeed. Haywood Hansell emphasized this key point in one of his pre-war Air Corps Tactical School lessons:

> The maximum resources available and needed should be employed “in mass” to attain the purpose chosen as the objective. In strategic air warfare the mass of the attack must be devoted to this purpose. The number of targets must be constrained within the capacity of the mass to destroy; the mass must be conserved and concentrated on those targets. The temptation to divert portions of the mass to the destruction of other targets which are appealing at the moment must be resisted.  

Events unfolding in support of the global Allied war plan were undermining this core principle. Airmen remaining in England were pushed to the brink as they struggled to sustain missions with too little of everything.

In August 1942 the Eighth launched four missions, the biggest of which included thirty aircraft. September saw another four missions flown, with the largest featuring seventy-six aircraft. By October, the count was down to three missions, with the most sizable affording 108 aircraft. This anemic collection of bombers was hard pressed to make a real difference because too few bombs were being dropped in a regular, concerted fashion. Their missions were pinpricks, not the overwhelming blows airmen’s strategy required.

Crews faced tremendous challenges surviving amidst such constraints. As

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51 Hansell, *The Air Plan that Defeated Hitler*, 42.

52 Davis, *Carl A. Spaatz and the Air War in Europe*, 103.
Hansell, now a combat commander, explained:

The cut-off in the promised flow of additional units in the buildup of the bomber force, and the lack of replacements for groups already at war, placed an almost intolerable strain on the morale of the crews. The morning after each mission saw the breakfast table growing smaller….The crews developed a new and morbid game. Graphs were plotted and re-plotted and discussed and examined…when the straight line crossed the abscissa, in about three months, everyone would be gone.53

By the fall of 1942, the diversion of resources to Operation TORCH saw Eighth Air Force bomb groups that should have had thirty-five airplanes down to eighteen per unit.54 This trajectory was not sustainable.

On top of these force management issues, the airmen also faced major weather-related operating challenges. According to Curtis LeMay, the bomb group commander who struggled to train his entire force with three B-17s:

Two kinds of weather plagued us in the ETO, both over England and the Continent—lousy and worse—from fogged-in air bases to cloud cover over the targets to winds aloft sometimes reaching over 100 miles an hour, harassing navigators and bombardiers on the bomb run, and sometimes jeopardizing the return of the entire force.55

British weather records confirmed this observation—indicating that on average missions could only be flown five days per month—a major challenge for a group whose entire purpose was mission execution. As LeMay remarked, “The only point in

53 Hansell, The Air Plan that Defeated Hitler, 137.


flying a bomber in this war…was to drop bombs where they would do the most harm to the enemy.” Actuarial tables gathered during the war showed that weather-related accidents posed a greater threat to the airmen of the Eighth Air Force than enemy fighters or anti-aircraft fire. 

Political interference also began to disrupt targeting priorities for the Eighth. German submarines were ravaging Allied supply convoys in the Atlantic Ocean—sinking over five hundred American and British ships by the summer of 1942. Allied war efforts in Europe could not continue amidst such losses. Top leaders in America and England demanded that the heavy bombers of the Eighth concentrate the bulk of their attacks upon submarine port and production infrastructure. The first such raid occurred on October 21, 1942. Not only did these attacks relieve pressure from the primary target network designated by the air planners, but the submarine facilities proved impenetrable. The roofs of the docking facilities were constructed with reinforced concrete several feet thick. Bombs leveled the surrounding towns, but did little to harm the intended targets.

57 Morrison, Fortress Without a Roof: The Allied Bombing of the Third Reich, 180.
58 Ibid., 9.
61 Copp, Forged in Fire: Strategy and Decisions in the Air War over Europe, 1940-45, 311.
While these events were unfolding, President Roosevelt called for a revised set of production estimates and associated strategies.\textsuperscript{62} AWPD-1 contributor Haywood Hansell temporarily left his combat duties in England to spearhead this effort at the War Department. Drafting occurred over a frantic period of eleven days.\textsuperscript{63} The resulting document, AWPD-42, closely mirrored AWPD-1, especially in calling for “the systematic destruction of selected vital elements of the German military and industrial machine through precision bombing in daylight.”\textsuperscript{64} Key objectives in Europe included airplane assembly facilities, aircraft engine production plants, transportation and power facilities, petroleum facilities, aluminum production and rubber manufacturing. Submarine-related installations also joined the list.\textsuperscript{65} Hansell explained the choice of such targets:

In selecting principle targets, we attempted to identify “service systems,” i.e., systems which motivated or connected industries, rather than industries themselves. Electric power for example, was vital to all industries…transportation of raw materials and components of finished products effected almost all production, and petroleum products were vital to the mechanical elements of the armed force and to many industries as well.\textsuperscript{66}

\begin{itemize}
  \item \textsuperscript{62} Hansell, \textit{The Strategic Air War Against Germany and Japan}, 8.
  \item \textsuperscript{63} Morrison, \textit{Fortress Without a Roof: The Allied Bombing of the Third Reich}, 10.
  \item \textsuperscript{64} Craven and Crate, \textit{Europe: Torch to Pointblank, August 1942 to December 1943}, 278.
  \item \textsuperscript{65} Futrell, \textit{Basic Thinking in the United States Air Force, 1907-1960}, 130.
  \item \textsuperscript{66} Hansell, \textit{The Air Plan that Defeated Hitler}, 84.
\end{itemize}
AWPD-42 called for 2,016 heavy bombers in England by January of 1944—a lofty target for an organization struggling to keep one hundred bombers in the fight. This document was formally released on September 9, 1942.67

Another major problem facing airmen in this period was a distinct lack of information to guide targeting efforts. Up until 1940, the Army controlled all intelligence gathering functions. Not only did this yield the collection of ground-centric data, but it also precluded airmen from gaining access to information of interest—even Hap Arnold was excluded from regular intelligence briefings.68 General Marshall recognized that such a system was inadequate and approved a new intelligence section specifically for the airmen. This was critical, for as Arnold later quipped, “[Army intelligence] could not see over the hill to the necessity of establishing an agency for securing the new kinds of information needed for an air war.”69 The entire theory of strategic bombardment centered upon striking the proper aim points to net the maximum desired effect in the most efficient manner possible—something exceedingly important for a bombing force with finite resources. Hap Arnold emphasized this point by explaining: “We couldn’t just bomb anything that happened to catch a bombardier’s eye, or the eagerness of a well-meaning lay-man at home. A scientific selection of the right targets…was as important as the ability to hit

68 Morrison, Fortress Without a Roof: The Allied Bombing of the Third Reich, 6.
69 Arnold, Global Mission, 535.
them.” The airmen who wrote AWPD-1 and AWPD-42 drafted the best plans possible with the information then available, but an operational war plan demanded more precise data—aligning the general targeting strategy outlined in the war plan with specific aim points.

Eaker confronted this shortfall when he first arrived in England and quickly went about recruiting economists, industrialists, and intelligence experts for a team he branded the Enemy Objectives Unit (EOU). As EOU veteran Walt Rostow, explained, “We sought target systems where the destruction of the minimum number of targets would have the greatest, most prompt, and most long-lasting direct military effect.”

Rostow further elaborated:

One had to ask, in assessing the results of an attack, how large its effect would be within its own sector of the economy or military systems; how quickly would the effect be felt; how long would it last; and what its direct military consequences would be.

AWPD-42 provided general guidance, Eaker's EOU provided the detailed granularity required for actual employment.

Hap Arnold also created a similar group to help guide efforts from Washington, D.C.—termed the Committee of Operations Analysts (COA). As COA member Elihu Root Jr. explained, “The enemy economy was too large—thousands of times too

70 Ibid., 333.


72 Ibid.

73 Morrison, Fortress Without a Roof: The Allied Bombing of the Third Reich, 92.
large—to blast it all. We had to choose vital points where small physical damage would cause great industrial disruption.”  

74 The COA released its first set of recommendations in March 1943—seventy-six specific targets related to the priority areas highlighted in AWPD-42.  

75 As the report indicated:

> It is clear that it is better to use a high degree of destruction in a few really essential industries or services than to cause a small degree of destruction in many industries. It is clear that results are cumulative and that a master plan, once adopted, should be adhered to with relentless determination.  

76 The list drafted by the COA included fighter aircraft, ball bearings, petroleum, abrasives, non-ferrous metals, rubber and tires, submarine yards and bases, military transport vehicles, transportation infrastructure, coking plants, iron and steel production, machine tools, electrical equipment, optical precision instruments, chemicals, food, nitrogen, and antiaircraft and anti-tank artillery.

77 While the airmen of the Eighth Air Force steadfastly focused their attention upon key target networks, the Royal Air Force opted to pursue a different bombing strategy. In the decade following World War I Air Chief Marshall Hugh Trenchard sought to preserve his nascent Royal Air Force as an independent military branch.


77 Ibid., 11.
Seeking a defining focus that would help justify his Service’s continued existence, Trenchard focused upon the strategic bombing mission that he helped pioneer during the closing year of the War. RAF doctrine, policies, and identity became increasingly intertwined with the notion of the potential afforded through long range strike. The problem with this approach was that it was not adequately resourced. In 1919 Parliament had passed the “Ten Year Rule”—legislation that stipulated no war would occur for the following decade. All military budgets and plans were based upon this assumption. The legislation was extended through 1932, and even when it was finally struck down, the Defense Requirements Committee warned that “very serious financial and economic situation…would not justify an expanding expenditure by the Defense Services.” This approach inhibited bombardment aviation from developing far past World War I standards. RAF leaders discovered in a 1939 exercise that bomber crews were unable to competently navigate their way to assigned practice targets—missing the aim points by upwards of fifty miles. These types of shortfalls became excessively clear when the Royal Air Force launched its first offensive bombing raids of World War II.


81 Allen, The Legacy of Lord Trenchard, 81.
British air leaders initially directed daylight strikes against specific targets connected to the German war industry—harnessing the approach favored by the U.S. Army Air Corps. Such raids did not last long when German defenses decimated undertrained airmen flying obsolete bombers. The RAF began to dispatch its crews against focused targets under the cover of darkness, but as Air Vice Marshall John Slessor, who commanded a bombing unit during this period, explained, “…we were failing to hit any but the most obvious targets on the clearest moonlit nights.” The disappointing results of these early raids were further confirmed in August 1941 when Prime Minister Winston Churchill’s scientific advisor, Frederick Lindemann, tasked economist David Miles Bensusan-Butt to study RAF bombing results during June and July 1941. The data painted an alarming picture. It turned out that just two-fifths of the crews were coming within five miles of their assigned targets—hardly the accuracy required to eliminate key elements of the enemy’s infrastructure.

Responding to this alarming news, Deputy Chief of the Air Staff Air Vice Marshall Sir Norman Bottomley recommended the cessation of precision night strikes and instead focus upon the “destruction of morale of the population of certain vital

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84 Copp, *Forged in Fire: Strategy and Decisions in the Air War over Europe, 1940-45*, 213.

industrial centers." With the Luftwaffe striking London in an indiscriminate fashion during the Battle of Britain, RAF leaders felt fully justified in launching like-minded strikes against German cities.

Secretary of State for Air Sir Archibald Sinclair and the British Defense Committee issued officially policy guidance ordering the switch to mass strikes on February 14, 1942, declaring that “it has been decided that the primary objectives of your operations should now be focused upon the morale of the enemy civil population and in particular, of the industrial workers.” Air Marshall Harris later explained this strategy to General Eaker: “You destroy a factory, they rebuild it. In six weeks they are in operation again. I kill all their workmen and it takes twenty-one years to provide the new ones.” Trenchard concurred with this approach, writing to Churchill:

All the evidence of the last war and of this show that the German nation is particular susceptible to air bombing….Taking all in all the percentage of bombs which hit the military target at which they are aimed is not more than one percent….If, however, our bombs are dropped in Germany, than 99 percent which miss the military target all help to kill, damage, frighten, or interfere with Germans in Germany.

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87 Craven and Crate, *Plans and Early Operations, January 1939 to August 1942*, 118.


89 Morrison, *Fortress Without a Roof: The Allied Bombing of the Third Reich*, 37.

90 Allen, *The Legacy of Lord Trenchard*, 159.
The Royal Air Force was following a familiar pattern first established in World War I—unable to focus precise striking power upon key targets, the blunt force of morale bombing was harnessed once again.

Despite this change in tactics, Bomber Command was still facing immense difficulties sustaining operations. RAF losses were pronounced—with just 17 percent of crews expected to complete their thirty-four mission tour of duty.\textsuperscript{91} The Service could not train personnel and build modern bombers fast enough to keep its ranks full. Underinvestment in the inter-war years and early attrition would take time to reset. The RAF only had forty-two heavy bombers in January 1942. By December, this number was up to two hundred and sixty-one—still too small to sustain regular missions against German cities.\textsuperscript{92} In addition to these operational challenges, RAF leaders were confronted by an increasingly skeptical Prime Minister. The RAF’s inter-war vision regarding the indomitable bombing force lay in tatters. Churchill voiced his frustration with his air commanders: “Even if all the towns of Germany were largely uninhabitable it does not follow that the military control would be weakened or that the war industry could be carried on.”\textsuperscript{93} RAF leaders faced immense pressure to increase their performance. The future fortunes of their air arm were contingent on results—


\textsuperscript{92} Sir Arthur Harris, \textit{Bomber Offensive} (London: Collins, 1947), 101.

\textsuperscript{93} Allen, \textit{The Legacy of Lord Trenchard}, 93.
bombing was the primary reason why the branch was allowed to maintain its autonomy.\textsuperscript{94}

At the very same time RAF leaders faced this myriad of challenges, the first vestiges of the Eighth Air Force began to arrive in England. British leaders were highly skeptical regarding American intentions to conduct daylight raids. As Ira Eaker recounted, “Harris said he frankly didn’t believe that we could bomb by day because our losses would be too high. That had been his experience in the past.”\textsuperscript{95} Chief of the Air Staff Air Marshall Charles Portal concurred, writing to Sir Archibald Sinclair on September 27, 1942:

The Americans will eventually be able to get as far as the Ruhr, suffering much heavier casualties than we now suffer at night, and by going much more rarely…If it can be kept up in the face of losses (and I don’t think it will be) this will of course be a valuable contribution to the war, but it will certainly not result in the elimination of the enemy fighter force and so open the way to the free bombing of Germany.\textsuperscript{96}

The British also questioned the value of precision targeting—the core element of the U.S. strike doctrine. As Harris explained, “The difficulty was that we had no means of finding which were the general panacea targets at any given moment, whereas anyone could see for himself that such targets as Essen and Berlin contained vast numbers of war industries.”\textsuperscript{97} In other words, the RAF had already tried what the Eighth was

\textsuperscript{94} Morrison, \textit{Fortress Without a Roof: The Allied Bombing of the Third Reich}, 30.


\textsuperscript{96} Parton, “\textit{Air Force Spoken Here”}: General Ira Eaker and the Command of the Air, 198.

\textsuperscript{97} Harris, \textit{Bomber Offensive}, 234.
setting out to accomplishment. It had not worked for them and so there was little reason to believe things would be different for the Americans.

Faced with tremendous resource shortfalls and the need to net results, British leaders sought to fold the Americans into Bomber Command. Churchill wrote to Harris on September 18, 1942 declaring:

> It is a great pity that General Arnold does not first try to send two or three hundred of his American bombers to expand our Bomber Command, after they have been adapted to night fighting. Failing this, he should send us as many American squadrons as he can to operate from this country, and teach them to fly by night. So far, his day bombing operations have been on a very petty scale.\(^98\)

Harris concurred with the Prime Minister, noting:

> Six months ago preparations were in hand to receive 100 or more US bomber squadrons, the best aerodromes and the best flying counties were given up for their reception. Today there are only some 100 US bomber aircraft in all and plans [Operation TORCH] are apparently on hand to reduce even these next to nothing.\(^99\)

Nor were Churchill and Harris alone in their frustration. Sir Archibald Sinclair skeptically inquired in a September 25, 1942 memo: “What are the Americans doing? They have not dropped a single bomb on Germany.”\(^100\) Given all the pressures at play, the British grew increasingly disenchanted regarding the American obsession with


\(^{99}\) Ibid., 170.

\(^{100}\) Morrison, *Fortress Without a Roof: The Allied Bombing of the Third Reich*, 53.
daylight precision bombing, the slow progress in building a striking force, and the opportunity cost of dedicating resources to this avocation.

The men of the Eighth Air Force were well aware of this frustration—especially since they shared many of the same problems. As Ira Eaker explained:

It was quite natural that the RAF hoped that we would join with them in their effort. They were short of crews and of planes, and it would have been very useful to them to have us join them and their effort. And, naturally, that was what they wanted us to do.\textsuperscript{101}

Haywood Hansell concurred, remarking that “There was tremendous pressure put on the Eighth Air Force during this period to give up daylight bombing and to convert to night bombing.”\textsuperscript{102} However, airmen of the Eighth resisted, for as Hansell further explained, “That would have necessarily have meant giving up the entire concept of precision bombing, as it was then known, and abandoning the effort to cripple German industry through the destruction of key industrial targets.”\textsuperscript{103} Americans firmly believed in their precision doctrine. Writing to Army Chief of Staff General Marshall in July 1942, Arnold reiterated that “Successful air operations depend on the continual application of massed airpower against critical objectives.”\textsuperscript{104}

Arnold understood the precarious state of his strategic air effort. He believed bolstering this mission required advocacy far past the top War Department ranks. He


\textsuperscript{102} Hansell, \textit{The Strategic Air War Against Germany and Japan}, 136.

\textsuperscript{103} Ibid.

\textsuperscript{104} Arnold, \textit{Global Mission}, 334.
needed a full-fledged public relations campaign to defend the Eighth Air Force, explaining to General Eaker:

   We must fully inform this country of the success that we had had with them [heavy bombers] to date and point out forcibly that through their use from Europe in ever increasing numbers we can crush Germany’s capacity to wage war at its source.\textsuperscript{105}

American air leaders had seen night bombardment in person during the Battle of Britain and they were less than impressed with its strategic effect and did not want to pursue this path. Carl Spaatz was an observer in London during that period and wrote to Arnold regarding the German switch to night bombing operations with utmost skepticism:

   The Germans can’t bomb at night—hell, I don’t think that are very good in daylight—but they haven’t been trained for night bombing. Nope, the British have got them now. They’ve forced them to bomb at night. The Krauts must be losing more than we know.\textsuperscript{106}

Arnold, Spaatz, and Eaker did not intend on making this same mistake. They would soon be called upon to defend this position.

   The contest between daylight precision bombing and mass night strikes came to a head in January 1943 at a conference of Allied leaders held in Casablanca, Morocco. With operations in North Africa winding down, President Roosevelt, Prime Minister Churchill and their respective top military commanders were scheduled to meet to discuss subsequent goals and associated strategies. Hap Arnold was among the military

\textsuperscript{105} Craven and Crate, \textit{Europe: Torch to Pointblank, August 1942 to December 1943}, 297.

\textsuperscript{106} Davis, \textit{Carl A. Spaatz and the Air War in Europe}, 52.
leaders present at the conference. As he later recalled:

I knew the question on which I would have the hardest, toughest fight: would the US Army Air Force be permitted to carry out its plans for daylight bombing? I knew that the British had taken this matter up with the Prime Minister and were determined that the Americans should not do daylight bombing, but should join their own night bombardment effort. I also knew that he Prime Minister had already taken the matter up with the President; that the President, in turn, would take the issue up with Secretary Stimson and General Marshall, and all would start bearing down on me.\textsuperscript{107}

Everything was on the line—he needed to win this fight. Seeking his top advocate, Arnold wired Eaker. His note abruptly read: “Meet me tomorrow morning at Casablanca.”\textsuperscript{108}

When Eaker arrived in Casablanca he was greeted by Arnold, who declared, “Ira, I have bad news for you. President Roosevelt has agreed, at Mr. Churchill’s request, that your Eighth Air Force will cease daylight bombing and join the RAF in night bombing. What do you think of that?”\textsuperscript{109} Eaker delved upon the merits of daylight bombing and then summed up his frustration in a most pointed fashion, “If our leadership is that stupid, count me out, I don’t want any part of it.”\textsuperscript{110}

For the next twenty-four hours, the Commander of the Eighth Air Force worked to hone his presentation to the Prime Minister. He understood that his goal was not to denigrate Royal Air Force bombing operations, but instead articulate an argument for

\textsuperscript{107} Arnold, \textit{Global Mission}, 393.

\textsuperscript{108} Eaker, interview 1966, 11.

\textsuperscript{109} Eaker, interview 1974, 7.

\textsuperscript{110} Ibid.
why a collaborative approach encompassing British operations by night and American missions by day was in the overarching interest of the Allies. So while discussing merits of daytime operations, his goal was to advocate for collaboration with Bomber Command, not subservience.\textsuperscript{111} Eaker’s presentation to the Prime Minister consisted of eight individual points, which were based upon four main themes: 1) Daylight afforded more precise targeting that would permit greater force efficiency and effectiveness. 2) Bombing around the clock increased the strain placed upon Germany. 3) Transitioning to night operations would further delay American bombing efforts. 4) The Allies had to net air superiority over Europe prior to an invasion. Bomber gunners and Allied fighter escort aircraft were successfully shooting down German fighters during the daylight raids. Darkness prevented such engagement during the RAF’s nocturnal raids.\textsuperscript{112}

While the conversation between Eaker and Churchill was not recorded, the General’s notes afford insight into the dialogue. First, regarding the need for accuracy:

It is easier to locate the target by day, easier to hit it because the image can clearly be seen in the bombsight, and the accuracy is at least five times than that can be done at night. This means that it takes but one-fifth the force to destroy a factory as it does by night…..There are many products which flow from these facts. If we send a smaller force, we expose a smaller number to enemy action; our losses for a given task are less. We have more force for other targets and can attack more targets, within a given time.\textsuperscript{113}

\textsuperscript{111} Craven and Crate, \textit{Europe: Torch to Pointblank, August 1942 to December 1943}, 304.


\textsuperscript{113} Ibid..
Regarding increased strain on the German system, Eaker remarked:

Day bombing keeps the enemy defenses from resting by day. It keeps them alerted twenty-four hours per day. As a consequence, it takes twice or three times the number to man the defenses. This means fewer people in factories and productive war industry.\(^{114}\)

Highlighting the delays associated with a transition to night operations, Eaker tied back to efficiency and effects:

I have had a year flying in England and twenty-five years flying at home. I say this out of experience, quite frankly, our people are not equal to English weather at night. Either they must go through a long training period or the losses would be frightful. I want no part of it. I do not want the night training because of the long delay; I do not want our people to fly habitually at night until thorough training because of the heavy casualty in crashed aircraft and crew losses which would invariably result.\(^{115}\)

Finally, the daylight bombing missions were taking the fight to the German Air Force-whose defeat was top allied goal:

One of the most important things we would lose if we went to the night bombing would be the destruction of the German day fighters….he [Germany] has to fight our bombers when we hit his vital targets. It represents the most economical method left us of reducing German air strength, a necessary prelude to victory.\(^{116}\)

While the points were not entirely drawn from the Air Corps Tactical School line of thought, Eaker’s task was to appeal to Churchill, not lecture him on intricacies of doctrine. His overarching point was crystal clear: American airmen were dedicated to daylight precision bombing because it maximized efficiency and effect.

\(^{114}\) Ibid., 5.

\(^{115}\) Ibid., 7.

\(^{116}\) Ibid., 9.
When Eaker concluded his presentation, Churchill pushed back. He cited the Eighth Bomber Command’s low mission rate, anemic force structure, and the lack of missions into Germany itself. General Eaker concurred with the Prime Minister’s frustration and highlighted that such limitations were not permanent and would be addressed as the force available to him grew in size and capability.\textsuperscript{117} As a show of good faith, Eaker promised that his bombers would strike their first German target by February 1, 1943 with at least one hundred heavy bombers.\textsuperscript{118} After pondering the matter for a bit, Churchill responded to the affirmative:

\begin{quote}
Young man, you have not convinced me that you are right, but you have persuaded me that you should have further opportunity to prove your contention. How fortuitous it would be if we could, as you say, bomb the devils around the clock. When I see your president at lunch today, I shall tell him that I withdraw my suggestion that US bombers join the RAF in night bombing and that I now recommend that our joint effort, day and night bombing, be continued for a time. That round-the-clock bombing effort you so eloquently describe is powerfully persuasive. I wish you good luck and continued success.\textsuperscript{119}
\end{quote}

As far as the American airmen were concerned, Ira Eaker had truly saved the day. Twenty years worth of struggle in the name of precision strategic attack came down to one meeting.

Hap Arnold later reflected upon this victory with pride, remarking: “That was a great relief for me and my command. We had won a major victory, for we would bomb in accordance with American principles, using methods for which our planes were

\begin{footnotes}
\item \textsuperscript{117} Craven and Crate, \textit{Europe: Torch to Pointblank, August 1942 to December 1943}, 303.
\item \textsuperscript{118} Ibid.
\item \textsuperscript{119} Eaker, interview 1974, 10.
\end{footnotes}
Arnold then cements the policy triumph with his superiors: “I had a talk with the President and with General Marshall on the same subject, as far as they were concerned, the matter was settled. Everyone said, “Go ahead with your daylight precision bombing.” As far as Haywood Hansell was concerned, “If Eaker had bowed to the RAF and British requirements to go in for night bombardment, the whole course of the war would have been changed.” Eaker viewed the situation a bit differently, remarking that “I’ve always felt that it was the PM [Prime Minister] who saved our daylight bombing campaign at that critical juncture.” Spaatz cuts to the essence of the victory: “Our stand was that we would bomb only strategic targets—not areas. I believed that we could win the war more quickly that way.”

On January 21, 1943, the Combined Chiefs of Staff issued CCS 166/1/D, an official directive calling for, “the progressive destruction and dislocation of the German military, industrial and economic system and the undermining of the morale of the German people to a point where there armed resistance is fatally weakened.” This pronouncement, colloquially known as the Casablanca Directive, satisfied both

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121 Ibid.
122 Parton, “*Air Force Spoken Here*”: General Ira Eaker and the Command of the Air, 222.
bombing philosophies. American airmen could focus on their key nodes through daylight attacks. The RAF could continue their mass strikes against morale. The directive also provided for targeting prioritization in accordance with EOU and COA analysis: 1) German submarine yards 2) German aircraft industry 3) Transportation 4) Oil Plants 5) Other targets of war industry.126

Eaker did not waste any time upon returning to England—he owed the Prime Minister a strike against Germany. On January 27, ninety-one bombers struck port facilities at Wilhelmshaven.127 This mission fell short of the one hundred bombers he promised Churchill, but it was the best he could manage. By February, Eaker only had seventy-four bombers and crews. Deeply concerned over his dwindling force, Eaker wrote to Spaatz, “We are bombing Germany now with less than a hundred heavies—something you and I both agree should not be done.”128 It was not until the end of March that reinforcements enabled him to launch missions in excess of one hundred aircraft.129

As Eaker’s combat striking power finally began to increase, both he and his RAF counterparts agreed that they needed to further define their respective bombing strategies. The Casablanca Directive, while strategically important, lacked operational

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126 Hansell, The Strategic Air War Against Germany and Japan, 72.


129 Craven and Crate, Europe: Torch to Pointblank, August 1942 to December 1943, 309.
details. Additionally, AWPD-42 was increasingly out of date. It was drafted while the Eighth Air Force was flying its very first missions. As Eaker remarked, “the plan was too theoretical in stating the force required.” Using data from COA, EOU, and the British Economic Ministry of Warfare, a group of Eighth Air Force and Bomber Command officers devised a new set of priorities and corresponding force requirements. Haywood Hansell was a leading figure in this planning effort. From Air Corps Tactical School to AWPD-1 and AWPD-42, to this new endeavor—Hansell was the recognized master in defining heavy bombardment strategy.

The resulting document—termed the “Combined Bomber Offensive” (CBO)—centered around seventy-six specific targets that were connected to an overarching set of six war-making enterprises: submarine yards and bases; the German aircraft industry; ball bearings; oil; synthetics and rubber tires; and military transport vehicles. This rank ordering of targets was a slight modification of that stipulated by the Casablanca Directive. Bombs were targeted for maximum destructive effect within the enemy’s war-making system. A prime example of this thinking was exemplified by

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130 Copp, Forged in Fire: Strategy and Decisions in the Air War over Europe, 384.

131 Hansell, The Strategic Air War Against Germany and Japan, 80.

the Allied attempt to target ball bearing production. CBO analysis concluded:

The critical condition of the ball bearing industry in Germany is startling. The concentration of that industry renders it outstandingly vulnerable to air attack. Seventy-six percent of the ball bearing production can be eliminated by destruction of the targets selected. This will have an immediate and critical repercussions on the production of tanks, airplanes, artillery, diesel engines—in fact, upon nearly all the special weapons of modern war.\textsuperscript{133}

As a key element of nearly any mechanized item, the strategists identified ball bearing production as a choke point whose severe degradation would have a disproportionately large impact upon the entire war enterprise.

Guarding the six systems and the seventy-six individual targets was the German Air Force. Termed an “Intermediate Objective,” air superiority had to be gained as a precondition to ensure both bombing raid sustainability and the survivability of a land invasion in Europe. According to the strategists:

If the growth of the German fighter strength is not arrested quickly, it may become literally impossible to carry out the destruction planned and thus to create the conditions necessary for ultimate decisive action by our combined forces on the Continent.\textsuperscript{134}

The plan stipulated that “the successful prosecution of the air offensive against the principle objectives is dependent upon a prior (or simultaneous) offensive against the German fighter strength.”\textsuperscript{135} A battle for control of the sky stood above everything else. From Ira Eaker’s perspective, “A sufficient depletion of the German Fighter

\textsuperscript{133} Ibid., 7.

\textsuperscript{134} Ibid., 8.

\textsuperscript{135} Ibid.
Force is the one essential preliminary to our imposing our will by the use of airpower on any portion of the war effort which may subsequently be selected.”136 This stood in contrast to pre-war doctrine, which advocated that the “bomber will always get through.” Wartime experience dictated a far different reality. As the Casablanca Directive explained, large bomber formations affording mutually supporting defensive fire and their supporting fighter escorts would seize control of the sky from the Germans. Enemy fighter plane production plants would be hit on the ground and the airmen of the Eighth Air Force would challenge the opposing fighters in the air.

After prolonged austerity, the Eighth Air Force was finally set to expand. The Combined Bomber Offensive called for a four phase ramp-up to increase the scale and scope of daylight operations. By June 30, 1943, the Eighth was scheduled to have 944 heavy bombers in its inventory. This would expand to 1,192 heavy bombers by September 30, 1943. At year’s end the total was slated to hit 1,746 aircraft. The fourth phase would afford 2,702 heavy bombers by March 31, 1944.137 Reaching these goals was a top priority for Allied commanders as they sought to launch a cross-channel invasion of Europe in the spring of 1944. The successful execution of the Combined Bomber Offensive was a critical element required to facilitate that operation.138


137 Combined Chiefs of Staff, Plan for Combined Bomber Offensive from the United Kingdom, 20.

138 Craven and Crate, Europe: Torch to Pointblank, August 1942 to December 1943, 373.
On April 29, 1943, Eaker briefed the CBO plan to the Combined Chiefs of Staff in Washington, D.C. The presentation was a rousing success, gaining approval from both the British and American commanders. US Ambassador to Britain Averill Harriman commented upon this achievement to Assistant Secretary of War for Air Robert Lovett: “This has been a tough job, but Ira has finally done it.” The Combined Chiefs of Staff formally approved the plan on May 18, 1943 during the TRIDENT Conference of top American and British leaders. Later that summer at the QUADRANT conference, leaders set May 1, 1944 as the invasion date for Europe.

Setting a firm invasion date was a critical step in bolstering the efforts of the Eighth Air Force. Airmen in England constantly struggled for resources in 1942 and throughout much of 1943 due to competing centers of gravity—North Africa, the Pacific, etc. Now that ground forces were scheduled to land in France within a year, the Combined Chiefs of Staff recognized the need to prioritize the strategic air

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139 Morrison, *Fortress Without a Roof: The Allied Bombing of the Third Reich*, 94.


142 Craven and Crate, *Europe: Torch to Pointblank, August 1942 to December 1943*, 373.
campaign. As RAF commander John Slessor explained:

The Chiefs of Staff did not think it would be tactically possible to establish a large Allied Army in France as long as the base of German Military Power was undestroyed; and therefore that we should undermine that power by the destruction of the German industrial and economic war machine before we attempted invasion; to this end the heavy bomber would be the main weapon.¹⁴３

The CBO plan emphasized that such objectives demanded adequate resourcing:

In view of the ability of adequately and properly utilized airpower to impair the industrial source of the enemy’s military strength, only the most vital considerations should be permitted to delay or divert the application of an adequate air striking force to this task.¹⁴⁴

While AWPD-1 and AWPD-42 were closely aligned with the CBO, skeletal provisioning inhibited their operational effectiveness. The foreboding pressure of an invasion in France would finally change these dynamics. The Eighth Air Force’s operational requirements finally aligned with the Allies’ strategic priorities. As Eaker explained to Arnold: “There is only one thing we require here to do the job—the job that will hurt the enemy the most—and that is an adequate force.”¹⁴⁵

A flow of new airplanes and crews were gradually resetting the losses precipitated by Operation TORCH and ongoing combat casualties. The aircraft industrial base was finally attaining the wartime production rates required to sustain global combat operations. In 1941, the United States as a whole produced one hundred


¹⁴⁴ Combined Chiefs of Staff, Plan for Combined Bomber Offensive from the United Kingdom, 21.

heavy bombardment aircraft. This rose to 2,500 in 1942 and further accelerated to 8,600 tails in 1943.¹⁴⁶ Mission tallies reflected this growth. May 1943 saw the Eighth put up 279 planes on a single raid—up from seventy-nine in February.¹⁴⁷ Overall, the number of bomb groups doubled between June and December 1943.¹⁴⁸ In addition to the raw number of aircraft, the crews were also improving their proficiency in the ever-important quest for accuracy. During the first half of 1943, 5.5 percent of bombs fell within five hundred feet of the aim point and 16 percent fell within 1000 feet. By the latter half of the year accuracy had improved such that 14.5 percent of bombs fell within five hundred feet and 21 percent fell within one thousand feet of the aim-point.¹⁴⁹

1943 also marked a critical point through staying the course. As Hansell observed:

There is a thin line between stubborn and stupid adherence to a preconceived idea on one hand, and courageous persistence in the face of initial reverses on the other. The commander who correctly gauges the proper line of action, who remembers that his enemy is also being hurt, and who is driven by a relentless will to win—generally does win. General Eaker never wavered.¹⁵⁰

Such determination and drive was difficult to maintain in the heat of battle. Eaker threw his men into the fold day after day against steep odds. As EOU member Walt Rostow observed, “A generation of leaders, a firm operational doctrine, a set of mature staff concepts, and a fighting style crystallized over these decisive months. The character of the modern US Air Force cannot be understood outside the context of that experience.”

Things were forecast to improve, but airmen in England were still waging a difficult campaign.

Despite the Eighth’s improved performance, German war production actually appeared to be increasing. Hitler did not order full wartime mobilization until 1942. That meant that the production economy was afforded a generous level of elasticity at the very time American airmen were trying to strike strategic nodes of the system. A prime example of this was illustrated by the fact that the German fighter aircraft production nearly tripled between January and July 1943. Diversionary strikes, like those waged against German submarine targets, further exasperated the issue, with 63 percent of the Eighth Air Force’s bombs directed against U-boat-related targets during the first quarter of 1943.

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Such challenges precipitated friction between leaders in Washington and commanders in theater. Hap Arnold was constantly berating his subordinates to fly more missions and drop more bombs. He complained that “I was not satisfied with the number of bombers being used in England out of the available total, or with the number of bombs being dropped on targets, since the objectives themselves apparently were not being destroyed.”

Eaker saw the situation quite differently:

It became my duty to make certain that we did not, through unwise or careless of hasty action, sacrifice our whole force. We could have taken, say, our first 100 bombers at such a rate and against such distance targets that we would have lost them all in ten days, because on some of those targets we lost 10% on a mission. But I always said and reported to General Arnold that I would never operate that force at a rate of loss which we could not replace. If he would send us a bomber group each week of eighteen planes, I would make certain that we lost only eighteen planes that week or as nearly to that as I could. I always made it clear that I would never completely destroy the force because we would be out of business and our effort would have been considered as a failure.

This precarious precipice between results and survival was evidenced on August 17, 1943, when 320 American bombers struck a major ball bearing production center in Schweinfurt, Germany. A total of sixty bombers were lost—15 percent of the striking force. Seven returning aircraft were so battle-damaged that they never flew again and a further 138 required major repair work.

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157 Davis, *Carl A. Spaatz and the Air War in Europe*, 287.
The mission itself was actually rather successful, reducing ball bearing production by 38 percent for a period of time.\textsuperscript{158} However, battle losses were so severe that the Eighth Air Force had to curtail operations for two months until the losses were reset. This reduction in operations allowed the Germans to rebuild the plant and diversify elements of production to increase the complexity of the targeting problem.\textsuperscript{159}

As bomb group commander Curtis LeMay explained:

> You might say that we gave them a thorough course in repairing battle damage, primarily because Eaker had no choice but to violate a pertinent principle in war—mass. For too long playing catch up, he lacked the resources to follow-up initial attacks soon enough, and with sufficient mass.\textsuperscript{160}

Hansell curtly summarized the situation: “While the bombing was good and the destruction extensive, the Air Force could not continue attacks with such loss ratios.”\textsuperscript{161}

Eaker held the course. Precision daylight strikes would continue, with tangible effects gradually emerging by the end of the year. German fighter production peaked in July with 1,050 aircraft and was down below six hundred by December.\textsuperscript{162} The air-to-air engagements between the American airmen and the defending Germans were wars


\textsuperscript{159} Davis, \textit{Carl A. Spaatz and the Air War in Europe}, 287.

\textsuperscript{160} LeMay, “The Command Realities,” xv.

\textsuperscript{161} Hansell, \textit{The Strategic Air War Against Germany and Japan}, 86.

of attrition. But as Hap Arnold explained, “from the strategic, though not the human, point of view, we could regularly replace our losses; the Germans who suffered heavily in these major battles, could only do so sporadically.”\textsuperscript{163} Arnold was not alone in making such observations. Joseph Goebbels, the German Reich Minister for Propaganda, remarked in his diary on May 16, 1943 that “The war in the air is becoming more bitter from day-to-day. The day raids by the American bombers are causing extraordinary difficulties.”\textsuperscript{164} Such destruction could not be endured indefinitely, for as Goebbels concluded, “If this condition continues and we find no proper antidote for these day raids, we shall have to face exceptionally severe consequences which in the long run will prove unbearable.”\textsuperscript{165}

As the air war progressed, the crews of the Eighth Air Force were buoyed by a new technology—radar-assisted bombing. American bombers could only see their targets an average of seven days per-month due to adverse weather conditions in Europe.\textsuperscript{166} Concentrated, sustained strikes were not possible amidst this limiting factor. Harnessing British night bombing radar technology, American scientists devised a system known as H2X to facilitate daylight target identification in overcast weather. The radar was not very precise, but it allowed the bombers to get reasonably close to a

\begin{footnotesize}
\textsuperscript{163} Arnold, \textit{Global Mission}, 487.


\textsuperscript{165} Ibid.

\textsuperscript{166} Arnold, \textit{Global Mission}, 375.
\end{footnotesize}
target—with at least 5 percent of the bombs falling within a mile of the aim point.\footnote{McArthur, \textit{Operations Analysis in the U.S. Army Eighth Air Force in World War II}, 109.} Given the pressure for results, this level of accuracy was deemed acceptable. Some bomb damage was better than none at all and these raids forced German fighters into the sky—thereby exacerbating their losses.\footnote{Hansen, \textit{Fire and Fury: The Allied Bombing of Germany, 1942-1945}, 138.} Airmen flew the first raid using H2X technology on September 27, 1943 against the German port city of Emden. The technology became increasingly important as winter weather degraded. Fifteen of the twenty-one missions flown in November and December used radar guidance.\footnote{Roger A. Freeman, \textit{The Mighty Eighth War Manual} (Avon, G.B.:Cassell & Co., 1984), 48-49.}

In addition to H2X technology, General Arnold sought alternate basing options in Italy to circumvent adverse English weather. The Joint Chiefs of Staff approved these measures on October 22, 1943—thereby creating the Fifteenth Air Force.\footnote{Craven and Crate, \textit{Europe: Torch to Pointblank, August 1942 to December 1943}, 566.} When weather prevented operations from England, Italian-based bombers could strike Germany from the south.\footnote{Morrison, \textit{Fortress Without a Roof: The Allied Bombing of the Third Reich}, 156.} This basing alternative also brought additional targets into range for the American airmen and prompted the Germans to disperse their defenses across a broader front.\footnote{David R. Mets, \textit{Master of Airpower: Carl A. Spaatz} (Novato, CA: Presidio Press, 1988), 168.}
As 1943 drew to a close, Ira Eaker received orders transferring him from command of the Eighth Air Force to a new position in charge of all Allied air units in the Mediterranean, including the newly-formed Fifteenth Air Force. He described it as “the darkest hour for me.”\textsuperscript{173} When General Dwight Eisenhower arrived in England as Supreme Commander of the Allied Forces in Europe, he wanted his trusted airman, General Carl Spaatz in charge of air operations out of England.\textsuperscript{174} The two had formed a close working relationship in North Africa, with Eisenhower remarking:

> Air-ground cooperation takes men of some vision and broad understanding to do the job right. Otherwise, a commander is forever fighting with those air officers who, regardless of the ground situation, want to send big bombers on missions that have nothing to do with the crucial effort.\textsuperscript{175}

The comment struck directly at the age-old debate between air and ground factions—whether the center of an effort should be placed upon the front lines or at vital strategic target centers past the front lines. While Spaatz had certainly been loyal to his commander in the deserts of North Africa in support of the land campaigns, the theater lacked much in the way of strategic infrastructure that could be targeted by bombers. With Eaker’s Eighth Air Force striking core targets in Europe, Spaatz was able to focus on the tactical fight. The new command arrangement presented far different set of

\textsuperscript{173} Eaker, interview 1966, 13.

\textsuperscript{174} My Three Years with Eisenhower: The Personal Diary of Captain Harry C. Butcher, USNR, Naval Aide to General Eisenhower, 1942-1945 (New York: Simon and Schuster, 1946), 463.

\textsuperscript{175} Hansell, The Air Plan that Defeated Hitler, 239.
circumstances. Europe was full of strategic targets that airmen, including Spaatz, had an overriding desire to strike.\textsuperscript{176}

Upon arriving in England, General Spaatz did not assume his old position as commander of the Eighth Air Force. That job went to Major General James Doolittle—a pioneering airmen who served with Spaatz in North Africa.\textsuperscript{177} Arnold created a new position, United States Strategic Air Forces in Europe (USSTAF), to help shield the strategic bombing force from tactical diversionary efforts precipitated by a major Allied land presence in Europe. The Army Air Force Commander explained his motivations to Spaatz:

\begin{quote}
Air Operations in Europe must be controlled and planned by one man…unless we are careful, we will find our air effort in Europe dispersed….This must be prevented. We should take advantage of the ring of airbases with which we are now surrounding Germany so as to secure maximum striking power.\textsuperscript{178}
\end{quote}

As USSTAF Commander, Spaatz would be the overarching air coordinator for all air assets in Europe—including over Eaker’s forces in the Mediterranean. His seniority, command parity with respective Royal Air Force officials, and relationship with Eisenhower would help sustain and maintain the pressure upon key elements of the German war machine in a coordinated, unified fashion.\textsuperscript{179}

\textsuperscript{176} Copp, \textit{Forged in Fire: Strategy and Decisions in the Air War over Europe}, 453.

\textsuperscript{177} Hansen, \textit{Fire and Fury: The Allied Bombing of Germany, 1942-1945}, 170.

\textsuperscript{178} Parton, \textit{“Air Force Spoken Here”: General Ira Eaker and the Command of the Air}, 332.

\textsuperscript{179} Craven and Crate, \textit{Europe: Torch to Pointblank, August 1942 to December 1943}, 754.
There was also another largely unsaid reason for the new command position: the future of the Army Air Force. Arnold hinted at these aims in a February letter to Spaatz:

Anther and perhaps equally important motive behind the formation of the United States Strategic Air Forces in Europe was my desire to build an American Air Commander to a high position prior to the defeat of Germany. It is that aspect particularly which has impelled me in my so far successful fight to keep your command parallel to Harris’ Command and, therefore, parallel to Ike’s. If you do not want to remain in a position parallel with Harris, the air war will certainly be won by the RAF, if anybody. Already spectacular effectiveness of their devastation of cities has placed their contribution in the popular mind at so high a plane that I am having the greatest difficulty in keeping your achievements in its proper role not only in publications, but unfortunately in military and naval circles and, in fact, with the President himself. Therefore, considering only the aspect of a proper American share for credit in the air war, I feel we must have a high air commander somewhere in Europe.¹⁸⁰

Arnold and the other top airmen wanted their Service to gain independence from the Army after the war.¹⁸¹ Securing this goal demanded a strong air leader in the combat theater.

Spaatz’s biggest problem was a dearth of time. Given the May 1 invasion target date, he had approximately 120 days to gain air supremacy and degrade the German war-making enterprise.¹⁸² As he explained to Eaker, “I have reviewed the problem of strategic bombing of our enemies, and the thing that has struck me the most is the

¹⁸⁰ Davis, Carl A. Spaatz and the Air War in Europe, 279.


¹⁸² Copp, Forged in Fire: Strategy and Decisions in the Air War over Europe, 453.
critical time factor. We have very little time in which to finish our job.”¹⁸³ Arnold too
felt this pressure, writing to Spaatz that: “I believe that we must use every effort to
secure the maximum use of our tremendous airpower.” He continued to explain that
“Without destroying the German Air Force, we can never secure the maximum benefits
of our Air Force against the objectives assigned. As a matter of fact, we may reach a
stalemate in the air.”¹⁸⁴ Concerted, continual strikes would define Spaatz’s command
tenure. Eaker had dreamed of such power projection during his time in England, Spaatz
had the tools to make it happen. He did not hesitate.

A prime example of this striking power occurred at the end of February, when
Spaatz launched a week-long offensive with a combined force of 3,800 bombers from
both the Eighth and Fifteenth Air Forces against Combined Bomber Offensive priority
targets.¹⁸⁵ Airmen managed to drop nearly ten thousand tons of bombs—a total equal
to the Eighth’s entire efforts during its first year of operations.¹⁸⁶ This defined what it
meant to project overwhelming, concurrent striking power against key nodes of the
German war-making apparatus. These raids saw airmen strike 75 percent of the
factories that were responsible for 90 percent of German aircraft production.¹⁸⁷ With so

¹⁸³ Davis, Carl A. Spaatz and the Air War in Europe, 306.
¹⁸⁴ Mets, Master of Airpower: Carl A. Spaatz, 190.
¹⁸⁵ Copp, Forged in Fire: Strategy and Decisions in the Air War over Europe, 460.
¹⁸⁶ Wesley Frank Craven and James Lea Cate, eds., Europe: Argument to V-E Day, January
1944 to May 1945, vol 3 of The Army Air Forces In World War II (Chicago: The University of Chicago
Press, 1951), 43.
¹⁸⁷ Morrison, Fortress Without a Roof: The Allied Bombing of the Third Reich, 179.
many installations under nearly-simultaneous attack, the Germans were hard pressed to offset the losses. Eaker emphasized this point in a letter to Arnold: “We must show the enemy we can replace our losses. He knows he can’t replace his.”

Sustaining maximum pressure upon the enemy demanded increased reliance upon radar-assisted bombing even if it meant a lack of precision. Spaatz explained this in a January 23, 1944 letter to his subordinates:

Our effort requiring the enemy to oppose us on our terms must be pushed relentlessly everyday it is humanly possible to operate over Germany. Standard operational limitations which have been widely used in the past will not be applicable to the present emergency situation. Greater risks are justified and infinitely greater demands on personnel are mandatory.

The men understood that such procedures were a far cry from their precision strike doctrine, with Doolittle writing to Spaatz that “Ordinarily bombs are scattered over at least ten times as much area as with visual bombing. It is analogous to shooting into a flock of ducks rather than selecting your duck.” However, time was of the essence. These men had to deliver results. With the size of their bomber formations on the rise, they could afford such inaccuracy.

An immense price was paid to sustain the torrent of operations. In February 1944, the Eighth Air Force lost 299 bombers—one-fifth of its force. Given that the

188 Ibid., 164.
189 Davis, Carl A. Spaatz and the Air War in Europe, 394.
191 Davis, Carl A. Spaatz and the Air War in Europe, 323.
loss rate for this period averaged 3.5 percent, this meant that if one thousand crews
started their respective twenty-five mission tours of duty, only 411 would survive till
completion.\textsuperscript{192} The attrition was not one-sided. During January 1944, the Luftwaffe
lost 12.1 percent of its fighter pilots. In February this number climbed to 17.1
percent.\textsuperscript{193} Such losses could not be backfilled. In total, between June 1941 and June
1944, the German Air Force lost 31,000 flying personnel.\textsuperscript{194} The German Air Force
could not train, equip, and sustain a competent force under this pressure. The
Americans could.

Between September 1943 and May 1944, the ranks of the Eighth Air Force
swelled from 461 to 1,655 bombers. Fighters flying escort increased from 274 to 882
aircraft during the same period.\textsuperscript{195} Combined, the Eighth and the Fifteenth Air Forces
fielded an inventory of 2,800 bombers by March 1944.\textsuperscript{196} This massive air arm
imposed tremendous cost upon the entire German war-making enterprise. Over two
million individuals were occupied in ground-based air defense duties as anti-aircraft
gunners. One million people were dedicated to infrastructure repair and over 250,000
were solely occupied with repairing the petroleum, oil, and lubricants infrastructure

\begin{footnotes}
\item[192] Mets, \textit{Master of Airpower: Carl A. Spaatz}, 196.
\item[193] Davis, \textit{Carl A. Spaatz and the Air War in Europe}, 338.
\item[194] Kennett, \textit{A History of Strategic Bombing}, 158.
\item[195] Biddle, \textit{Rhetoric and Reality in Air Warfare: The Evolution of British and American Ideas
\item[196] Hansell, \textit{The Air Plan that Defeated Hitler}, 184.
\end{footnotes}
This translated into a vast resource commitment for defense and operations sustainment—not offensive combat power.

Amidst this success, bomber crews still juggled diversionary assignments that diluted the force available to project against CBO priority targets. Germany began launching V-1 unmanned flying bombs against England during the fall of 1943. Six thousand London civilians were killed by these attacks during the first half of 1944, with a further forty thousand wounded. Such losses did not pose a military threat to England, but did yield political challenges. Winston Churchill wanted the V-1s stopped and so American bombers were forced to drop over one hundred thousand tons of bombs on the missile launching sites between the fall of 1943 and the winter of 1944 as part of “Operation CROSSBOW.” The effect of such missions was dubious at best, for the launching sites proved largely impervious to bombing raids. However, much like the U-boat campaign, politics overrode military judgment and Spaatz was forced to dilute his primary effort at its most critical phase. The difference between the U-boat campaign and CROSSBOW was that the bomber force had grown to a point where such a diversion could be absorbed more readily without completely undermining the primary offensive against the strategic target set.

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197 Davis, Carl A. Spaatz and the Air War in Europe, 590.

198 Morrison, Fortress Without a Roof: The Allied Bombing of the Third Reich, 242.

199 Mets, Master of Airpower: Carl A. Spaatz, 239.


201 Hansen, Fire and Fury: The Allied Bombing of Germany, 1942-1945, 184.
Earlier in his career, while facing pre-war struggles with the tactically-minded land forces, Spaatz confided in his diary that “It takes close coordination with the Army to obtain maximum misuse of airpower.” He would soon revisit such frustration while his bombing efforts were achieving epic results against the Combined Bomber Offensive targets. As the date for invasion grew near, Allied commanders had to decide what target destruction strategy would precipitate the greatest positive effect in support of the Allied invasion and overarching war effort. Looking into this issue, Eighth Air Force EOU experts determined in a March 5, 1944 report that petroleum, oil, and lubricant (POL) refining plants should top the target priority list. Their report explained:

No other target system holds such great promise for hastening German defeat. Stores of finished petroleum products are sufficient only for several months’ of military operations. The loss of more than 50 percent of Axis output would directly and materially reduce German military capabilities reducing tactical and strategic mobility and frontline delay of supplies.

POL refineries presented a very unique target—they affected most of the German war enterprise—from aviation and ground force mobility to logistics and war production. The refineries were highly concentrated in a few distinct locations. The POL production machinery took up vast swaths of acreage and was incredibly complex. Allied bombing strikes against such targets promised to net significant results—

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202 Davis, Carl A. Spaatz and the Air War in Europe, 37.

203 Rostow, Pre-Invasion Bombing Strategy: General Eisenhower's Decision of March 25, 1944, 34.
especially since the force now had the capacity to re-strike, thus hindering reconstruction efforts.\textsuperscript{204}

Spaatz and his team drafted a proposed air campaign strategy against the POL targets for General Eisenhower’s approval.\textsuperscript{205} They were not pleased with the results. British air leaders had devised a competing plan for bombers to strike seventy-six specific the rail transportation facilities in France to limit the mobility of German forces and resupply efforts once the invasion commenced. This plan was devised by Air Marshall Arthur Tedder and his scientific advisor Dr. Solly Zuckerman.\textsuperscript{206} Walt Rostow explained the thinking behind this plan—namely that these men had:

\ldots come into the target selection business in a tactical theater (North Africa) \ldots [their] careers had never required them to formalize criterion for target selection in a strategic context and apply them systematically by comparison to alternative target systems.\textsuperscript{207}

In other words, the British plan favored the near-term tactical fight. Spaatz was able to adjust his thinking from the tactical-centric operations of North Africa to the strategic environment of Europe. His British counterparts failed to make such a transition. As far as Spaatz was concerned, POL was the optimal centralized, vulnerable target. Rail systems, on the other hand, were incredibly diffuse and difficult to target. The

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\textsuperscript{204} Hansen, \textit{Fire and Fury: The Allied Bombing of Germany, 1942-1945}, 183.

\textsuperscript{205} Rostow, \textit{Pre-Invasion Bombing Strategy: General Eisenhower’s Decision of March 25, 1944}, 14.


\textsuperscript{207} Rostow, \textit{Pre-Invasion Bombing Strategy: General Eisenhower’s Decision of March 25, 1944}, 15.
\end{flushright}
transportation network also afforded vast redundancy. Rails lines could be readily repaired, alternate lines could be used, and logistics could be switched to roads.\textsuperscript{208}

Explaning those points to Eisenhower, Spaatz highlighted:

\begin{quote}
The effort from the oil attack…is certain to be more far reaching. It will lead to sure disaster for Germany. The rail attack can lead to harassment only. It weighting these two, it appears that too great a price may be paid for certainty of very little.\textsuperscript{209}
\end{quote}

The crux of Spaatz’s case rested on the point that fourteen synthetic oil plants produced 60 percent of the usable refining capacity available to the Germans. This afforded a discrete target set capable of yielding a greater strategic effect versus the rail lines, which involved tremendous redundancy and elasticity.\textsuperscript{210} Writing to Arnold, Spaatz explained:

\begin{quote}
A concentrated attack against oil, which would represent the most far-reaching use of strategic airpower that has ever been attempted in this war, promises more than any other system, a fighting chance of ending German resistance in a shorter period than we ever thought possible.\textsuperscript{211}
\end{quote}

This debate cut to the core of strategic targeting doctrine—netting the greatest effect in the most prudent possible fashion.

On April 17, 1944, Eisenhower issued his order: the transportation strike plan was the priority: “Our armies will also require the maximum possible assistance on the

\textsuperscript{208}Copp, Forged in Fire: Strategy and Decisions in the Air War over Europe, 459.

\textsuperscript{209}Davis, Carl A. Spaatz and the Air War in Europe, 353.

\textsuperscript{210}Butcher, My Three Years with Eisenhower: The Personal Diary of Captain Harry C. Butcher, USNR, Naval Aide to General Eisenhower, 1942-1945, 507.

\textsuperscript{211}Davis, Carl A. Spaatz and the Air War in Europe, 348.
ground preparatory to the actual assault. This can best be given by interfering with rail communications in the OVERLORD area.”

Walt Rostow expressed the frustration of strategically-minded airmen:

> The Army Air Forces had to do everything in their power to contribute to the success of the invasion. But they were in a position to do more: to weaken gravely the enemy’s capacity to resist on land and in the air, on every front.”

Post-war analysis concurred with Rostow’s assessment, concluding that “The pre-D-Day attacks against French rail centers were not necessary, and the seventy thousand tons [of bombs] could have been devoted to alternate targets.”

The Eighth Air Force dedicated 41 percent of its bomb tonnage to rail targets and only 11 percent to Combined Bomber Offensive targets during the spring of 1944. Such force diffusion allowed the Germans to recuperate and rebuild targets that had been ravaged over the previous few months. Spaatz was able to negotiate with Eisenhower for a few opportunities to strike POL targets, but he would have to wait till later in the year to pursue his favored option with a full-fledged force.

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212 Butcher, My Three Years with Eisenhower: The Personal Diary of Captain Harry C. Butcher, USNR, Naval Aide to General Eisenhower, 1942-1945, 507.

213 Rostow, Pre-Invasion Bombing Strategy: General Eisenhower’s Decision of March 25, 1944, 37.

214 Craven and Crate, Europe: Argument to V-E Day, January 1944 to May 1945, 161-162.

215 Davis, Carl A. Spaatz and the Air War in Europe, 333.

216 Mets, Master of Airpower: Carl A. Spaatz, 255.
General Eaker was under no such restrictions and he launched a series of major
strikes against a key POL refining center in Ploesti, Romania. Five-hundred Fifteenth
Air Force bombers attacked the complex on May 5, followed by seven-hundred more
on May 18, 460 on May 31, and three-hundred on June 6. In total, twenty-four
strikes were launched against the Ploesti complex during the spring and summer of
1944. German POL stocks dropped to 38 percent of their January through March 1944
average. Considering that it was fundamentally impossible to relocate this
production capacity, these reductions permanently degraded core German POL
supplies—with the Fifteenth Air Force continuing re-strike missions until the territory
was eventually overtaken by advancing Russian forces in August 1944. Concerted
striking power exerted upon a defined target set worked when commanders were
willing to authorize the strikes and continue necessary follow-up attacks. Between
January 1944 and summer 1944, overall German POL production was down by two-
thirds—at the very same time German requirements surged with simultaneous land
campaigns raging in the Eastern, Western, and Southern fronts.

Despite all the resourcing issues and diversions—North Africa, submarine
facilities, V-1 target sites, and now the transportation plan—the American airmen in

220 Biddle, *Rhetoric and Reality in Air Warfare: The Evolution of British and American Ideas
About Strategic Bombing, 1914-1945*, 246.
Europe created the conditions for OVERLORD succeed. As Haywood Hansell explained:

The strategic air offensive, in spite of delays and diversions, completed the “fatal weakening” of Germany before a single allied soldier had set foot on German soil. The combined strategy would have better served the Allied cause if the original plan had been followed. The effect of bombing upon the selected industrial and economic systems was catastrophic.\textsuperscript{221}

American airmen had seized command of the sky and severely degraded German offensive capacity. General Arnold summarized this accomplishment with pride:

When our invasion forces finally landed on June 6, not only was there no Luftwaffe to meet them, but all the way across France, and in battered Germany itself, the Luftwaffe, except for token resistance, had been taken out of their way. However bitter those beached may have been for the men in the boats, the German Air Force was not there.\textsuperscript{222}

While tremendously significant, the landings at Normandy did not portend the end of the war. USSTAF had many missions ahead of it to help bring the war in Europe to a close.

The Eighth Air Force flew exclusively in support of OVERLORD operations through June 18.\textsuperscript{223} Prior to the landings in Normandy, General Spaatz transferred control of all air assets to General Eisenhower.\textsuperscript{224} This drove a major focus on tactical operations—especially bombing in close support of allied ground forces. Spaatz wrote

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\textsuperscript{221} Hansell, \textit{The Strategic Air War Against Germany and Japan}, 119.

\textsuperscript{222} Arnold, \textit{Global Mission}, 489.

\textsuperscript{223} Craven and Crate, \textit{Europe: Argument to V-E Day, January 1944 to May 1945}, 284.

\textsuperscript{224} Mets, \textit{Master of Airpower: Carl A. Spaatz}, 203.
\end{flushleft}
to Eisenhower in protest, remarking that “In absence of a major ground force emergency, I do not believe that the results from the tactical use of heavy bombers will constitute and much support to OVERLORD and use of the same force against critical enemy targets.”

Focusing on the battle front at the expense of strategic targets allowed the Germans time to reset, rebuild, and redouble their production efforts.

Throughout the summer of 1944, strategic targets in Germany lay sixth on the target prioritization list—behind close air support for ground forces, disruption of transportation, neutralization of V-1 launch sites, supporting forward airborne forces, and supplying troops via air drops of supplies. Hansell expressed frustration with situation:

It was the supreme irony that those strategic air forces, having won the crucial battle at such cost in blood and guts—having attained the “overriding intermediate objective” that stood in the way of the primary strategic objectives—then faced an even more formidable obstacle to the prosecution of the strategic air war: the determination of high authorities and commanders to direct the power of the strategic air forces away from those primary objectives and in a support role for the furtherance of the ground objective.

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225 Davis, *Carl A. Spaatz and the Air War in Europe*, 424.


227 Davis, *Carl A. Spaatz and the Air War in Europe*, 430.

228 Hansell, *The Air Plan that Defeated Hitler*, 184.
Spaatz cut to the core of the issue in a June 17, 1944 diary entry:

My own opinion of the present situation is that so far the Germans have been very successful in that all the power of the Americans and British is being contained in a narrow beachhead by 14 [German] divisions, thereby relieving Germany of the pressure of bombardment to which they have been subjected during the past six months. 229

Hansell and Spaatz were right, the effect of such diversions was pronounced. German fighter plane manufacturers used this period to rebuild, enabling production to hit its peak in the fall of 1944. It was finally destroyed in 1945 by concerted, unyielding attacks. 230

Spaatz finally regained command authority over his bombers on September 1, 1944. 231 While still required to support the ground campaign, he was able to rebalance his target priority list: POL, German aircraft industry, ground motor transport and ordnance production; and radar strikes on rail yards in the event that weather necessitated radar bombing. 232 Most importantly, he was finally able to regain the momentum that he had achieved during the past winter. 233 POL targets stood as his top priority. Spaatz believed his force had finally found a strategic chokepoint that would

229 Davis, Carl A. Spaatz and the Air War in Europe, 423.
230 Mets, Master of Airpower: Carl A. Spaatz, 248.
231 Copp, Forged in Fire: Strategy and Decisions in the Air War over Europe, 475.
232 Davis, Carl A. Spaatz and the Air War in Europe, 490.
233 Craven and Crate, Europe: Argument to V-E Day, January 1944 to May 1945, 322.
cripple the German war effort. He explained, “The German Air Force ground forces, and economy are all imminently faced with collapse for the lack of fuel.”

Even when weather degraded with the onset of winter, American bombers sustained missions with radar bombing. By the last quarter of 1944, 80 percent of Eighth Air Force missions involved “blind” bombing. Keeping the pressure on the German war system was the paramount objective, even if accuracy suffered. The one allowance American air commanders made with radar-guided strikes was to ensure they occurred in Germany proper, not occupied territories where innocent civilians would be subjected to the less accurate strikes. As General Fred Anderson, head of Eighth Bomber Command explained:

> It is the policy of the US Strategic Air Forces in Europe to limit attacks to military objectives and to use precision techniques. When weather conditions preclude visual bombing military objectives in Germany proving suitable for “bombing through overcast” technique are selected for attack…under normal conditions it is not our policy to attack targets in enemy occupied territory unless the target can be identified by visual means.

With an average error of two miles, radar bombing was truly a blunt force instrument. From September 1944 through December 1944, the Eighth Air Force flew an average of eighteen days per-month with an average of forty groups each

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234 Hansell, *The Strategic Air War Against Germany and Japan*, 121.


236 Davis, *Carl A. Spaatz and the Air War in Europe*, 564.

day—a far cry from the anemic efforts of 1942 and 1943. This robust display of airpower was having a marked effect. With their POL reserves at record-low levels, the German Air Force found it nearly impossible to train its airmen. This yielded a force of woefully underprepared pilots. By the end of 1944, odds dictated that German airmen would survive an average of seven missions before getting shot down. In March 1945 the Eighth sent out raids on twenty-six days—twenty of them affording more than one thousand bombers on each raid. Finding targets suitable for attack became an increasing challenge.

The final decision point testing America’s adherence to precision bombardment doctrine in the European Theater came in the winter of 1945. With the German forces falling back toward Berlin, Allied leaders sought to impede the German’s ability to reinforce their frontline units. At the February, 1945 Yalta Conference, Soviet officials requested a series of bombing raids against “communications [logistics lines] to hinder the enemy from carrying on the shifting of his troops on the East from the Western front, from Norway, and from Italy…. ” American and British leaders suggested a series of bombing strikes against key rail yards in cities such as Berlin, Leipzig, and

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241 Davis, *Carl A. Spaatz and the Air War in Europe*, 563.
Dresden. The targets in question were located in the center of the respective cities, which would invariably yield much collateral damage.

The idea of mass urban bombing was not a new concept. The British airmen of Bomber Command spent the entire war flying such missions. American airmen steadfastly refused to adopt such tactics, most notably at the 1943 Casablanca Conference. Their opposition was confirmed yet again in September 1944, when General Eisenhower’s headquarters issued orders calling for American—British raids against urban centers in Germany, termed Operation THUNDECLAP. Arnold, Spaatz, Eaker, and Doolittle protested in unified solidarity, with Eaker explaining that, “We should never allow the history of this war to convict us of throwing the strategic bomber at the man on the street.” With the Allied ground forces firmly ashore in France and control of the Combined Bomber Offensive back with General Spaatz, the last thing American airmen wanted to do was dilute their striking power against a random set of mass targets unrelated to their established priority list.

Official US bombing policy directives reflected the air commanders’ desire to avoid indiscriminate mass strikes. An October 29, 1944 memo to men of the Eighth

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242 Mets, Master of Airpower: Carl A. Spaatz, 274.

243 Craven and Crate, Europe: Argument to V-E Day, January 1944 to May 1945, 639.

244 McFarland, America’s Pursuit of Precision Bombing, 1910-1945, 168.
and Fifteenth Air Forces stipulated:

1. No towns or cities in Germany will be attacked as secondary or last resort targets, targets of opportunity, or otherwise unless such towns contain or have immediately adjacent to them, one or more military objectives. Military objectives include railway lines; junctions; marshaling yards; railway or road bridges; or other communications network; any industrial plant; and such obvious military objective as oil storage tanks, military camps and barracks, troop concentrations, motor transport or AFV [armed forces vehicle] parks, ordnance or supply depots, ammunition depots; airfields; etc.

2. Combat crews will be briefed before each mission to insure no targets other than military objectives in Germany are attacked.

3. It has been determined that towns and cities large enough to produce an identifiable return on the H2X scope generally contain a large proportion of the military objectives listed above. These centers, therefore, may be attacked as secondary or last resort targets by through-the-overcast technique\(^\text{245}\)

Considering the inaccuracy of radar bombing, using a town as an aim point amounted to mass area bombing. However, the nuanced command intent was clear—military objectives were the goal, not the mass civilian attack. If civilians were hit in a legitimate role, that was an unfortunate reality of war, but it should never be the driving intent.

General Spaatz explained his nuanced thinking on the subject of targeting in a post-War interview:

\[…\text{we always attacked only legitimate military targets with only one exception-the capitol of the hostile nation. Berlin was the administrative and communications center of Germany and therefore became a military target.}\]\(^\text{246}\)

\(^{245}\) Davis, *Carl A. Spaatz and the Air War in Europe*, 508.

\(^{246}\) Spaatz, interview 1962, 1.
The coalescence of military targets in an urban area made it impossible to differentiate between military aim points and the surrounding urban area. While such strikes against an urban area may have netted similar results to that of British area bombing, Spaatz’s statement highlights the overarching command intent—he was still focused upon specific targets, not brute bombing for the sake of raw destruction akin to the RAF’s area raids.

The Yalta directive to strike the urban rail yards fell into a similar category of targeting philosophy. Rail yards would serve as the aim points, but mass collateral damage was going to be extraordinarily high in the surrounding areas. Even though such raids would invariably net military effects, this approach was unpopular with many American air commanders. General Doolittle marked his opposition in a January 30, 1945 memo:

...we will, in what may be one of our last and best remembered operations, regardless of its effectiveness, violate the basic American principle of precision bombing of targets of strictly military significance for which our tactics were designed and our crews trained and indoctrinated.247

Such opposition was not enough to halt the urban strikes. The American bombers started bombing city-center rail yards in February, 1945.248

While all the cities attacked in this campaign were heavily damaged, three raids on Dresden yielded particularly notorious results. British bombers first struck the

247 Davis, Carl A. Spaatz and the Air War in Europe, 549.

248 Morrison, Fortress Without a Roof: The Allied Bombing of the Third Reich, 291.
historic German city on the night of February 13 with a high percentage of incendiary munitions. American raids during the following two days further compounded the carnage.\textsuperscript{249} After the last day of bombing, thousands of civilians were dead amidst the rubble of the ravaged city. The scale and scope of the destruction in such a compressed timeframe was terrifying in its efficiency and effect.\textsuperscript{250}

Response to the strikes was pronounced and adverse. A February 18, 1945 \textit{Washington Star} article by Howard Cowan proclaimed: “Allied air commanders have made the long awaited decision to adopt terror bombing of the great German population centers as a ruthless experiment to hasten Hitler’s doom.”\textsuperscript{251} Responding to the public outcry, Arnold wired Spaatz requesting “Does this represent a change from American policy of bombing selected industrial structures to one of bombing cities?”\textsuperscript{252} The official clarification was issued on April 10, 1945. It declared:

\begin{quote}
The US Strategic Air Forces in Europe have not as anytime had a policy of making areas bombing attacks upon German cities. Even our attacks against the Berlin area were always directed against military objectives…our pathfinder [H2X] attacks against communications centers have often resulted in an area type of bombing because of the inaccuracy of this type of bombing.\textsuperscript{253}
\end{quote}

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\textsuperscript{250} Hansen, \textit{Fire and Fury: The Allied Bombing of Germany}, 1942-1945, 256.

\textsuperscript{251} Davis, \textit{Carl A. Spaatz and the Air War in Europe}, 559.

\textsuperscript{252} Morrison, \textit{Fortress Without a Roof: The Allied Bombing of the Third Reich}, 292.

\textsuperscript{253} Davis, \textit{Carl A. Spaatz and the Air War in Europe}, 582.
\end{footnotes}
Officially, American airmen were holding to their line: the aim point was a legitimate military target. That was the intent and collateral damage while unfortunate, was not the primary goal. Efforts like the proposed combined night attacks with the British or Operation THUNDERCLAP projected raw, unchecked aggression without a focused purpose. Missions flown against targets in city centers like Berlin and Dresden or with H2X radar yielded collateral damage as an undesirable consequence, not the overarching aim. Spaatz curtailed further mass urban bombing on March 1, 1945 and redirected American bombers against standard Combined Bomber Offensive targets.\textsuperscript{254}

By April 1945, Germany’s surrender was simply a matter of time. Nearly every target of value had either been captured by Allied ground forces or destroyed through previous raids. On April 13, 1945 General Spaatz issued orders effectively ending the Combined Bombing Offensive. Three days later he reported to his commanders:

The advances of our ground forces have brought to a close the strategic air war waged by the United States Strategic Air Forces and the Royal Air Force’s Bomber Command. It has been won with a decisiveness becoming increasingly evident as our armies overrun Germany.\textsuperscript{255}

From 1942 till the issuance of cessation orders, the men of the Eighth and Fifteenth Air Forces had flown 756,124 sorties. They dropped a total of 1.4 million tons of munitions on missions that claimed 9,949 bombers.\textsuperscript{256} Of the total tonnage dropped, three-fifths was leveraged upon Combined Bomber Offensive targets—the rest being

\textsuperscript{254} Hansen, \textit{Fire and Fury: The Allied Bombing of Germany, 1942-1945}, 256.

\textsuperscript{255} Morrison, \textit{Fortress Without a Roof: The Allied Bombing of the Third Reich}, 299.

\textsuperscript{256} Ibid., 302.
dropped upon ground force support targets, Operation CROSSBOW targets, and the pre-OVERLORD transportation plan. In fact, Spaatz’s surge of activity during the winter of 1944, followed by the boost in missions flown in the fall of 1944 through the spring of 1945 represented the only times when strategic airpower was engaged in a coherent, adequately resourced, and focused fashion. Despite these challenges, American airmen had remained true to their cause—they waged an air campaign based upon the precepts of daylight precision bombing. The net effect of this quest was best summarized by a German fighter pilot, Hans Fay, who defected to the Americans in the final weeks of the war: “The American Air Force has shortened the war by years as well as decided its outcome.” Elaborating upon his point, Fay explained: “Only bomber attacks during daytime have crippled and destroyed our industry.” With regard to the British mass strikes, Fay was dismissive: “Bombing attacks on cities did not exert a profound influence on German morale. This was true even of the devastating bomb carpets.” Such a report cut to the precise point American airmen had been trying to make ever since the World War I.

The American airmen who waged a relentless campaign for the precise, strategic employment of airpower during the interwar years could look upon the past three and a half years with vindicated pride. All the political battles, personal sacrifice, and determination were vindicated by the results netted in Europe. The process was far

257 Copp, Forged in Fire: Strategy and Decisions in the Air War over Europe, 480.

258 Ibid.
from flawless, but the end result stood forth as a testament to the value of their quest.

Now that the war in Europe was coming to a close, it was time to focus on the Pacific.
CHAPTER FIVE

WORLD WAR II PACIFIC THEATER OPERATIONS: COMMAND DECISION

On the morning of April 18, 1942, a United States Navy taskforce was sailing approximately six hundred miles off the coast of Japan. At the heart of this group was the aircraft carrier USS Hornet, with sixteen Army Air Force B-25 Mitchell medium bombers atop its deck.¹ Four months had passed since Japanese airmen struck a wide variety of American military targets at Pearl Harbor, Hawaii—thereby propelling the United States into World War II. Further defeats at Wake Island, Guam, the Philippines, and beyond left the United States in an exceedingly precarious and demoralized state. The time had arrived for a counterstrike.²

When the B-25s launched from the deck and headed to strike the Japanese industrial cities of Tokyo, Yokohama, Nagoya, Osaka, and Kobe, their orders were simple: “You are to look for and aim at military targets only, such as war industries, ship-building facilities, power plants, and the like.”³ Four hours later, mission commander Lieutenant Colonel James Doolittle and his crew released a handful of bombs on an industrial facility in Tokyo. Recalling the event years later, he explained


I dropped down to rooftop level again and slid over the western outskirts of the city into low haze and smoke, then turned south and out to sea. As fast as he and his airmen had appeared over Japan, they were gone. No American bomber would revisit these skies for another two years.

The raid was a complete surprise. While the B-25s dropped less than one hundred bombs—just two thousand pounds per airplane—the notion that Japan was vulnerable to air attack shocked many in the country. An April 29, 1942 article in the Japanese weekly magazine Shashin Shuho attempted to downplay the event: “There is no country which has been defeated only by air raids, regardless of how many it has sustained.” Subsequent events would prove otherwise.

Three years later, with the Second World War at an end, Vice Admiral Shigeru Fukudome—Chief of Staff of the Combined Japanese Fleet—explained: “If I were to give you the decisive factors in the war in the order of their importance, I would place first the Air Force.” Japan chose to surrender in the absence of an invasion upon their Home Islands. They still had over two-and-a-half million troops in place, nine

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4 Ibid., 9.


6 Glines, The Doolittle Raid: America’s Daring First Strike Against Japan, 147.

7 Naval Analysis Division, OPNAV-P-03-100, United States Strategic Bombing Survey [Pacific]: Interrogations of Japanese Officials (Washington, D.C, 1946), 2: 529.
thousand combat aircraft, and a civilian population willing to resist.\textsuperscript{8} As Hap Arnold explained:

\begin{quote}
The surrender of Japan comes after the severest and most concentrated bombing campaign in history and without an invasion of the homeland. This is the first time a nation has capitulated with its major armies designed for defense of the homeland still intact.\textsuperscript{9}
\end{quote}

Army Air Force airmen dropped 159,662 tons of ordnance on Japan over the course of 31,387 individual bomber sorties. Ninety percent of this bomb tonnage was dropped during the last five months of the war—a crescendo of overwhelming destruction.\textsuperscript{10} Sixty-six cities lay ruined, with the vast percentage of Japanese war-making capacity wrecked.\textsuperscript{11} The net effect of these air strikes was clear-cut. According to Japanese Premier Prince Fumimaro Konoe: “The determination to make peace was due to the prolonged bombing by the B-29s.”\textsuperscript{12}

While “Victory through Airpower” was certainly a notion welcomed by the Army Air Force, the strategy and tactics that ultimately defeated Japan were starkly different than those championed by airmen during the interwar years and the European

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\item\textsuperscript{9} Herman S. Wolk, \textit{Cataclysm: General Hap Arnold and the Defeat of Japan} (Denton, TX: University of North Texas Press, 2010), 2.
\item\textsuperscript{10} Office of Statistical Control, Headquarters Army Air Forces, \textit{Army Air Forces Statistical Digest (World War II)} (Washington D.C., 1945), 291.
\item\textsuperscript{11} Hansell, \textit{Strategic Air War Against Japan}, 71.
\item\textsuperscript{12} Haywood S. Hansell, \textit{The Strategic Air War Against Germany and Japan} (Washington D.C.: Office of Air Force History, 1986), 257.
\end{itemize}
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strategic air campaign. As pre-war Air Corps Tactical School (ACTS) doctrine explained:

The air offensive should be directed against that particular vital element of the national economic structure, the destruction of which would have the most conclusive and far-reaching effect and which, at the same time, presents the fewest and most concentrated objectives.\(^\text{13}\)

Airmen spent much of the 1920s and 1930s defending this strategy. They were emboldened by a sincere belief that destroying specific strategic targets afforded America an effective, efficient wartime path for securing national interests. This stood in stark contrast to the brutal trench warfare that defined World War I.\(^\text{14}\)

When the United States entered World War II, airmen advocated for precision strategic bombing in key policy debates and worked with utmost dedication to actualize the mission through the English-based Eighth Air Force.\(^\text{15}\) They faced repeated challenges from individuals seeking to dilute and divert their efforts, but the American airmen persevered.\(^\text{16}\) The most notable of these instances occurred in February 1943, when Eighth Air Force Commanding General Ira Eaker blocked British efforts to absorb the American precision bombing campaign into the Royal Air Force’s


indiscriminate night operations. Meeting with Prime Minister Winston Churchill in Casablanca, Morocco, Eaker articulated long-standing Army Air Force strategic bombardment principles:

Daylight is more economical than night bombing. It is easier to locate the target by day, easier to hit it because the image can be clearly seen in the bombsight, and the accuracy is at least five times than that can be done at night.

He capped off his arguments by highlighting “It takes one-fifth the force necessary to destroy a factory by day as by night.” Eaker prevailed, with top American and British commanders ultimately codifying the Army Air Force’s daylight precision strategic strike policy in June 1943 through a plan known as the Combined Bomber Offensive. Commanders agreed to focus upon six war-making systems by attacking seventy-six individual targets. This policy held in effect until Germany’s surrender on May, 8 1945.

The air campaign over Japan embodied a far different approach. Instead of using precision strike to eliminate select nodes within an enemy’s war-making

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19 Ibid.

20 Combined Chiefs of Staff, Plan for Combined Bomber Offensive from the United Kingdom, 14 May 1943), Air Force Historical Office, Bolling Air Force Base, DC, 5.

apparatus, airmen flying against Japan harnessed mass blunt force to net desired effects. Incendiary munitions comprised over half the bomb tonnage released upon Japan during the last six months of the war. Airmen flew most missions at night, which precluded precision aiming.\textsuperscript{22} By May 1945, approximately 75 percent of the bombs dropped by B-29s were incendiaries—98,000 tons out of the 153,000 tons released.\textsuperscript{23}

Why did the airmen abandon their precision strike strategy? They had dedicated tremendous energy to advancing this concept during the interwar years. This fight even cost some airmen their careers, with Brigadier General William Mitchell standing as the most notable example. By the time World War II arrived, precision strategic strike stood as an element of identity for many of the Army Air Force’s top commanders. They held firm with this strategy throughout the European air war. However, when the strategic air war against Japan accelerated in 1945, these same leaders rapidly jettisoned their quest for precision strategic attack and adopted mass bombing tactics. This represented a dramatic departure from an intellectual line of engagement that extended back to World War I.

To understand why air commanders abandoned their stalwart commitment to precision, it is important to discuss the operational challenges, political dynamics, and time pressures that defined operations in the Pacific Theater. A unique confluence of

\textsuperscript{22} Wolk, \textit{Cataclysm: General Hap Arnold and the Defeat of Japan}, 218.

\textsuperscript{23} Office of Statistical Control, \textit{Army Air Forces Statistical Digest (World War II)}, 291-293.
events in these areas prompted air leaders to prioritize mission success over doctrinal allegiance.

Above all, the Pacific’s second-tier status shaped nearly every operational facet of the theater. Whether discussing policy debates, strategy, resource apportionment, or timetables—combat actions against Japan were never afforded prime focus until Germany’s defeat lay within reach. This sort of approach was not an accident, but instead resulted from deliberate decisions Allied leaders made prior to America’s entry into the war. As air strategist Major General Haywood Hansell emphasized, “In no case did the pre-Pearl Harbor grand strategy contemplate the strategic offensive against Japan until victory in Europe was assured.”\textsuperscript{24} British and American officials decided upon this two-track approach during the winter of 1941 at a series of meetings termed “American British Conversations Number One” (ABC-1).\textsuperscript{25} Discussing potential strategies should America enter the war against the Axis powers, representatives acknowledged that the Allied nations lacked sufficient resources to wage concurrent full-scale military operations against both Germany and Japan. Given that Germany presented a greater immediate threat to shared interests, they agreed upon a policy in which American and British forces would first engage European Axis nations and then

\textsuperscript{24} Haywood S. Hansell, Jr., \textit{The Air Plan that Defeated Hitler} (Atlanta, GA: Higgins-McArthur/Longino & Porter, Inc, 1972), 74.

swing to the Pacific to address the Japanese challenge.\textsuperscript{26} America officially adopted this two-tiered approach in a strategy document termed “Rainbow 5.”\textsuperscript{27}

The United States entered the Second World War a few short months later in response to the December 7, 1941 Japanese attack upon Pearl Harbor, Hawaii. Even though the first blows against the U.S. occurred in the Pacific, American and British leaders reaffirmed the notion of a “Germany first” approach three weeks later at the ARCADIA Conference. A new policy directive, known as ABC-4, explained:

\begin{quote}
At the American-Britain staff conversations in February 1941, it was agreed that Germany was the predominant member of the Axis powers, and consequently the Atlantic and European area was considered to be the decisive Theater. Much has happened since February last, but notwithstanding, the entry of Japan into the war, our view remains that Germany is still the prime enemy and her defeat is the key to victory….It should be a cardinal principle that only the minimum of force necessary for the safeguarding of vital interests in other theaters should be diverted from operations against Germany.\textsuperscript{28}
\end{quote}

When victory in Europe appeared certain, America and Britain pledged to “the take the offensive at the earliest possible opportunity and ultimately to conduct an all-out offensive against Japan.”\textsuperscript{29} This Germany-first strategy put strategic bombing on hold in the Pacific Theater for 1942 and 1943.

\textsuperscript{26} Hansell, \textit{The Air Plan that Defeated Hitler}, 58.


\textsuperscript{28} Grace Pearson Hayes, \textit{The History of the Joint Chiefs of Staff in World War II: The War Against Japan} (Annapolis, MD: Naval Institute Press, 1982), 41.

\textsuperscript{29} Ibid., 52.
America’s first two years of fighting in the Pacific involved a holding action in China and a series of island invasions in which a limited pool of American forces sought to first check, and then rollback the expanse of the Japanese Empire.\(^3\) Airmen flew most of their missions in support of tactical objectives because there were simply no strategic targets within range of American air units—things like war material factories, central command and control networks, and key logistics hubs. This left commanders in the European Theater as the driving personalities shaping strategic bombardment strategy for much of the war.\(^3\)

Despite this delayed focus on the Pacific Theater, the airmen still had to devise a general long-range strategy and associated set of requirements for defeating Japan. This occurred in the summer of 1942 when General Henry “Hap” Arnold, commander of the Army Air Force, temporarily recalled leading air planner then-Brigadier General Haywood Hansell from his combat duties with the Eighth Air Force to guide the Air War Plans Division (AWPD) in drafting an updated strategy and resource document to supersede pre-war efforts.\(^3\) This new guidance, termed AWPD-42, recognized the obvious geographical challenges facing airmen in the Pacific: “Our Armed Forces in


\(^3\) Wesley Frank Craven and James Lea Cate, eds., *Europe: Torch to Pointblank, August 1942 to December 1943*, vol 2 of *The Army Air Forces In World War II* (Chicago: The University of Chicago Press, 1949), 277.
the Far Eastern Theater are not within effective striking distance of the vital sources of Japanese military policy.”

Accordingly, Hansell and the AWPD staff divided the war into two phases: 1) “Air operations in support of our land and sea forces to regain bases within striking distance of Japan.” 2) Airmen would subsequently launch “Air operations against Japan proper to destroy her war-making capacity.” Bombers would strike eight targets systems within Japan: aircraft engine factories, submarine construction yards, naval bases, aluminum plants, iron and steel production, oil, chemical plants, and rubber factories. As with operations against Germany, airmen were seeking to net the greatest strategic effect in the most efficient possible manner.

In addition to developing a long-range plan, airmen also realized they needed a new airplane with the necessary range required to strike Japan. While B-17 and B-24 heavy bombers were adequate for strategic operations in Europe, the distances involved in the Pacific were far greater. The origin of this new long range strike platform extended back to 1939, when Hap Arnold submitted a request for a four-engine bomber with a two thousand mile radius that would supersede the capabilities

33 Futrell, Basic Thinking in the United States Air Force, 1907-1960, 158.

34 Ibid.

35 Ibid.

36 Hansell, The Strategic Air War Against Germany and Japan, 59.

37 Hansell, The Air Plan that Defeated Hitler, 50.

38 Cline, Washington Command Post: The Operations Division, 299.
of existing designs.\textsuperscript{39} On June 14, 1940, the War Department provided Boeing with $85,652 to begin work on a prototype—termed the XB-29.\textsuperscript{40} Four months later, observing the burgeoning threat Japanese forces posed in Asia, Hap Arnold explained to Assistant Secretary of War Louis Johnson that the B-29 would stand as the only tool in the American aerial arsenal “that could hope to exert pressure against Japan.”\textsuperscript{41} By the time the new bomber flew in 1942, the Army Air Force had 1,644 B-29s on order.\textsuperscript{42} Its 3,200 mile combat range and ten-ton bomb capacity represented a monumental leap over the older B-17s and B-24s.\textsuperscript{43} However, despite the impressive nature of these new performance parameters, the B-29 was struggling to deliver in a consistent, dependable fashion.

Almost everything about the new bomber pushed technological boundaries—pressurized fuselage to permit high-altitude operations; semi-automated gun turret system to defend against enemy fighters; cutting edge engines of enormous size and complexity; and huge propellers far bigger than anything found on a legacy bomber.\textsuperscript{44}


\textsuperscript{41} Wolk, \textit{Cataclysm: General Hap Arnold and the Defeat of Japan}, 77.


\textsuperscript{44} Lieutenant General Kenneth Wolfe, interview by Robert Piper, June 1966, interview K239.0548-788, transcript, U.S. Air Force Oral History Program, Maxwell Air Force Base, AL.
All of this had to be developed, tested, and fielded in a highly compressed schedule of unprecedented brevity.  

Boeing and AAF engineers worked at a fever pitch to make the new planes ready for combat. They spent a then-record sum of $3 billion in this quest—a reflection of the perceived importance of the aircraft and the imperative that it enter combat as soon as possible. Despite the overwhelming scale and scope of this effort, B-29s continued to face significant mechanical problems. General Curtis LeMay, a commander closely associated with the B-29, remarked with frustration that: “B-29s had as many bugs as the entomological department of the Smithsonian Institution.”

By January 1944, the situation was bleak. Of the ninety-seven B-29s produced, eighty-one were grounded due to mechanical problems. Crew training fell dramatically behind schedule amidst the dearth of available aircraft. The war in Europe was progressing and soon it would be time to turn to the Pacific. Recent victories against Japan meant that long range strike missions were coming within the realm of geographic possibility. The question facing General Arnold was whether the B-29

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would be able to make it into the war in time. The entire notion of strategic bombing against Japan rested upon the success of the new bomber.49

While Army Air Force officials and Boeing engineers wrestled with the B-29, American and British leaders were starting to lay the groundwork for Japan’s defeat.50 President Roosevelt set the baseline objective while meeting in Casablanca, Morocco with Prime Minister Winston Churchill early in 1943. As far as the US Commander in Chief was concerned, the goal for the Pacific was simple: “It is a policy of fighting hard on all fronts and ending the war as quickly as we can on the uncompromising terms of unconditional surrender.”51 Churchill concurred. Allied forces would strike Japan in the most expeditious and effective fashion possible to win total victory. There would be no compromised stance.

Roosevelt and Churchill met again in August 1943 at the Quebec-hosted QUADRANT Conference. Discussing operations in the Pacific, leaders agreed that Japan should be defeated within one year of Germany’s surrender.52 To facilitate this goal, Hap Arnold proposed a strategy bluntly titled: “Air Plan for the Defeat of Japan.”53 The Army Air Force Commanding General explained that the B-29’s range


50 Hayes, The History of the Joint Chiefs of Staff in World War II: The War Against Japan, 307.

51 Wolk, Cataclysm: General Hap Arnold and the Defeat of Japan, 65.

52 Craven and Crate, The Pacific: Matterhorn to Nagasaki, June 1944 to August 1945, 16.

53 Combined Chiefs of Staff, Air Plan for the Defeat of Japan, 1.
attributes would allow American airmen to commence strategic strikes against core Japanese targets well ahead of the advancing land forces. Arnold claimed that his new bombers could facilitate:

…the destruction of Japanese resources to such a point that the enemy’s capacity for effective and armed resistance is substantially exhausted…by bombing operations of 10-20 B-29 groups based in an area of unoccupied China within 1,500 miles of the center of the Japanese industrial zone.\(^{54}\)

Harnessing data from his Committee of Operations Analysts (COA), the group of economic and industrial experts who helped devise the AAF bombing strategy against Germany, Arnold explained that Japanese industry appeared to be concentrated in a small number of locations.\(^{55}\) For example, coke production—a key ingredient for making steel—was centralized in a few manufacturing plants on the Home Island of Kyushu, in Manchuria and on the Korean Peninsula. COA analysts projected that destruction of these facilities would reduce Japan’s steel production by 66 percent.\(^{56}\)

Employing this line of thought across the war-making enterprise, Arnold’s analysts honed the initial guidance outlined in AWPD-42 and developed a bombing strategy that centered upon eight target systems: aircraft production, non-ferrous metals, naval bases and shipyards, iron and steel production, oil, the chemical industry, the automobile sector, and rubber production. This yielded a target list of fifty-seven individual facilities whose destruction would net the greatest strategic effect in the

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\(^{55}\) Ibid., 3.

\(^{56}\) Hansell, *The Strategic Air War Against Germany and Japan*, 143.
most efficient manner possible.57 Haywood Hansell explained: “The initial primary air aims were practically the same as those in Germany—the paralysis of the military, economic, industrial, and social structure supporting the will and the ability of the Japanese nation to wage war.”58 The Combined Chiefs of Staff accepted this report as CCS323 and recommended that a joint group of American and British strategists—the Combined Staff Planners—analyze the details of the proposal.59

Arnold was in a positive mood as he departed the QUADRANT conference. Allied leaders were open to his proposal. This marked significant progress regarding the way in which officials perceived the concept of strategic strike.

This enthusiasm did not extend to the Combined Staff Planners. B-29s were mammoth aircraft whose operation demanded significant resources—fuel, spare parts, munitions, support personnel, and continuous combat replacements. Basing such an operation out of China was bound to create problems because there were no direct mass transportation links.60 Japanese forces controlled the seaports along the entire eastern coast as well as the land routes throughout Southeast Asia. With the Himalaya Mountains impeding land access from the west, all supplies had to be flown into the


58 Hansell, The Strategic Air War Against Germany and Japan, 178.

59 Hayes, The History of the Joint Chiefs of Staff in World War II: The War Against Japan, 492-494.

60 Joint Staff Planners, Plans for the Defeat of Japan Within 12 Months After the Defeat of Germany, 16 September 1943, Air Force Historical Office, Bolling Air Force Base, DC, 1.
theater. This was a monumental challenge. According to post-QUADRANT War Department analysis: “Logistical study here of the lift required to maintain the bomber force formed, as conceived in CCS323, shows us conclusively that the plan as envisaged is incapable of achievement on this score alone.”61 B-29s could be flown into China, but sustaining them for regular combat missions appeared unrealistic at best.

As General Arnold and War Department planners struggled for alternate options to initiate strategic bombing operations against Japan, President Roosevelt grew increasingly frustrated. He complained to Chief of Staff of the Army General George Marshall: “I am still pretty thoroughly disgusted with the India-China matters. The last straw was the report from Arnold that he could not get the B-29s operating out of China until March or April of next year. Everything seems to go wrong.”62 Roosevelt wanted to defeat Japan as quickly as possible. He was not in the mood to hear excuses why bombing operations would not succeed. War Department staff considered various plans, including missions flown from bases in the Soviet Union, but each of these proposed substitutes met with failure for one reason or another.63

In an attempt to salvage the concept of strategic air operations from China, military commanders devised a modified construct codenamed TWILIGHT. Instead of

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61 Hayes, *The History of the Joint Chiefs of Staff in World War II: The War Against Japan*, 495.


stationing the bombers entirely in China, this new plan proposed reducing logistical demands by basing primary aircraft sustainment activities in Calcutta, India. B-29s would then fly to staging bases in Chengtu, China that were within range of the designated targets.\(^6^4\) Dedicated transport aircraft would ferry necessary supplies to the advance operating fields as required.\(^6^5\)

Top war planners were still skeptical regarding the operation’s chance for success. Even though the bases in Chengtu would be maintained on a skeletal status, simply fueling and arming B-29s for a combat mission would require tremendous logistical support. Every gallon of gas and each bomb would have to be flown over one thousand miles of extremely hostile terrain. However, given Presidential pressure to make the plan work, the Joint Chiefs of Staff approved the endeavor on November 9, 1943 as Operation MATTERHORN.\(^6^6\) The Combined Chiefs of Staff were slated to consider the plan later that month at the SEXTANT conference.\(^6^7\)

\(^{6^4}\) Joint Staff Planners, *Enclosure: Plans For the Defeat of Japan Within 12 Months After the Defeat of Germany*, memorandum from the Army Air Force Member, 4 October 1943, Air Force Historical Office, Bolling Air Force Base, DC, 2.

\(^{6^5}\) Ibid.


\(^{6^7}\) Cline, *Washington Command Post: The Operations Division*, 229.
President Roosevelt was exceedingly pleased with the potential promised by the new bombing operation. On November 10, 1943 he wrote to Churchill in an effort to garner the Prime Minister’s support:

We have under development a project whereby we can strike a heavy blow at our enemy in the Pacific early next year with our new heavy bombers. Japanese military, naval and shipping strength is dependent upon the steel industry, which is strained to the limit. Half of the coke for that steel can be reached and destroyed by long range bombers operating from the Chengtu area of China…This is a bold but entirely feasible project. Together by this operation, we can partially cripple the Japanese naval and military power and hasten the victory for our forces in Asia.68

This statement embodied the core strategic strike principles airmen had long-advocated. Precise, focused target destruction to net a strategic effect within the enemy’s war making system. Nor was the President alone in his enthusiasm for the new campaign. At a Joint Plans staff meeting in the fall of 1943, Haywood Hansell boldly predicted that he “was not sure that invasion was necessary to accomplish Japan’s defeat.”69 While he was ultimately proven correct, he could not have foreseen the way in which this was bound to occur.

American, British and Chinese leaders approved Operation MATTERHORN during the November, 1943 SEXTANT conference.70 Official guidance stipulated that the airmen were to: “To achieve the earliest possible progressive dislocation of the

68 Hansell, Strategic Air War Against Japan, 82.

69 Hayes, The History of the Joint Chiefs of Staff in World War II: The War Against Japan, 503.

70 Cline, Washington Command Post: The Operations Division, 229.
Japanese military, industrial, and economic systems….”\textsuperscript{71} Strategic bombing operations were scheduled to begin from India and China in June 1944.\textsuperscript{72}

Despite this approval, the Joint Chiefs realized that they needed a secondary option to sustain B-29 operations free from logistical impediments found in China.\textsuperscript{73} This meant turning to the Marianas Islands of the Pacific. This territory would bring the B-29s within range of Japan’s Home Islands and missions would be sustained thanks to the regular resupply efforts afforded by sealift. The top military commanders issued guidance dictating: “Plans for the acceleration of the defeat of Japan should place emphasis upon the seizure of the Marianas at the earliest possible date, with the establishment of heavy bomber bases as the primary mission.”\textsuperscript{74} These landings commenced in June 1944.\textsuperscript{75}

Even though the Marianas would be of immense utility later in the war, Arnold needed to begin operations with his B-29s as soon as possible. This meant pressing ahead with missions from China. Three days after MATTERHORN was approved, the COA issued a new list emphasizing six enemy target systems: merchant shipping, steel production, urban areas laden with small industry, aircraft plants, antifriction bearing

\textsuperscript{71} Craven and Crate, \textit{The Pacific: Matterhorn to Nagasaki, June 1944 to August 1945}, 748.


\textsuperscript{73} Hayes, \textit{The History of the Joint Chiefs of Staff in World War II: The War Against Japan}, 493.

\textsuperscript{74} Joint Staff Planners, \textit{Plans for the Defeat of Japan Within 12 Months After the Defeat of Germany}, 4.

industry, and the electronics industry.\footnote{Colonel Guido R. Perera, Memorandum for General Kuter, “Progress of Far Eastern Study Being Conducted by the Committee of Operations Analysts,” 1 September 1943, Air Force Historical Office, Bolling Air Force Base, DC, 2.} The inclusion of urban areas was notable, for the planners highlighted that these sectors were vulnerable to incendiary attack. This insight was bound to have major implications for future strikes. However, at this point in the planning, precision strikes designed to net maximum effect was still the driving theme:

The timing of the war against Japan justifies attack upon industries lying relatively deep in the stack of war production. When limitations of time do not require exclusive concentration upon immediate military effect, the most serious long-term damage can be inflicted by disrupting the production of basic materials like steel.\footnote{Craven and Crate, \textit{The Pacific: Matterhorn to Nagasaki, June 1944 to August 1945}, 26-27.}

Little did the COA analysts know that the essence of time would escalate as the principle driver of the air campaign against Japan. It would completely reshape the parameters defining the merits of an effective attack.

As individuals pressed ahead to get the B-29 units ready for combat, Hap Arnold waged an aggressive campaign to proactively address lessons-learned from Europe. He did not intend on repeating past mistakes. First and foremost, Arnold sought a unified command. Strategic air efforts against Germany lacked focused consistency due to the disruptive influence of political officials and various theater commanders. Whether diverting the bombers to strike German submarine facilities or to support ground troops in the months following D-Day, American bombing efforts in
Europe constantly struggled to regularly strike their primary targets as defined by the Combined Bomber Offensive guidance. As General Curtis LeMay explained:

> When airpower came under the command of the theater commander, as it did in Europe, we expended a lot of effort on ground support targets—strictly tactical targets, which gave immediate support to the troops in the field, but didn’t let heavy bombers live up to their full potential. Those of us in the Eighth Air Force thought we should be using our B-17s against strategic targets—targets deep in Germany itself, whose elimination would have a direct effect on the enemy’s ability to wage war.\(^78\)

B-29 units flying in the Pacific risked similar diversion of effort, especially given the multiple areas of responsibility in the region. Arnold could not afford for this to occur yet again. Bombing operations would only work if they were concentrated in scale and scope.

The challenge in the Pacific stemmed from a March 1942 Joint Chiefs of Staff decision that separated the Pacific Theater into two major commands: the Southwest Pacific under General Douglas MacArthur and the Central Pacific under Admiral Chester Nimitz. The dividing line stood east of 110 degrees west and south of 15 degrees north.\(^79\) Separate theater commanders also existed for China and Southeast Asia.\(^80\) The situation was further confused because of the B-29’s unparalleled range. It could fly over several commands on a given mission. It would be based in one


\(^{79}\) Hayes, *The History of the Joint Chiefs of Staff in World War II: The War Against Japan*, 100.

geographic area of responsibility, yet strike in a wholly different zone. This was a new consideration for top military leaders. This sort of flexibility and reach did not exist in previous wars. Power projection was historically facilitated within regional pockets. Haywood Hansell elaborated upon these dynamics:

Each of these base areas was under a separate theater commander, and these field commanders were powerful people. Each had strategic purposes to be achieved. Each wanted to apply the B-29s to his own strategic theater purposes, and each resented any area of control. Yet there was one area in which unity of command and continuity of effort was imperative, and that was the target area itself, Japan, which was under the control of none of them.

From General Arnold’s perspective, these competing authorities reminded him of what happened to the Eighth Air Force in 1942 when resource reapportionment to Operation TORCH nearly crippled American strategic bombing efforts against Germany.

As expected, when word of the Pacific B-29 deployment reached theater commanders, they all wanted to harness the new bombers for their own respective goals. Lieutenant General George Kenney—General MacArthur’s air commander in the Southwest Pacific Theater—sent a note to Arnold enthusiastically explaining: “If you want the B-29 used efficiently and effectively where it will do the most good in the shortest amount of time, the Southwest Pacific area is the place and the Fifth Air

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81 LeMay and Kantor, Mission With LeMay: My Story, 328.

82 Hansell, Strategic Air War Against Japan, 26.

Force can do the job.” Kenney’s note hit upon the critical point: Arnold did not want to focus upon the Southwest Pacific; he wanted to strike Japan directly. If he were going to succeed in this mission, he had to figure out a way to maintain control over the B-29s.

Arnold sought an unprecedented solution to address this problem. Beginning in the fall of 1943, he negotiated for the B-29s to fall under control of the Joint Chiefs of Staff. The aircraft would not be assigned to the existing leaders in the Pacific. The Commanding General of the Army Air Force would create a new air arm, the Twentieth Air Force, which he would personally control as the executive agent of the Joint Chiefs. This strategic air arm’s operations would be sub-divided in two regional facets, with XX Bomber Command flying from China and XXI Bomber Command based in the Marianas. This new construct was approved in April, 1944 through a policy directive termed JCS 472: “Control, including deployment, of VLR [very long range—i.e. B-29s] bombers be retained directly under the Joint Chiefs of Staff in order that VLR forces may be employed and deployed to meet the developments in the

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85 Craven and Crate, The Pacific: Matterhorn to Nagasaki, June 1944 to August 1945, 12.


87 Joint Chiefs of Staff, Command Relationships, VLR Units, India-China, memorandum by the Chief of Staff, U.S. Army, 15 January 1944, Air Force Historical Office, Bolling Air Force Base, DC, 1-2.
Reflecting upon the gravity of this decision, General Curtis LeMay declared: “We succeeded with the B-29 because of the Joint Chiefs unity of purpose regarding the Twentieth Air Force and the application of strategic air power.” General Haywood Hansell concurred, remarking that “…the wartime establishment of the Twentieth Air Force was one of the most important events on the United States’ Air Force history.” Keeping the bombs on target in a recurring, constant fashion was the airmen’s ultimate goal. The Joint Chiefs gave them the command authority to make it happen.

Now that Arnold had strategic control over his new bombers, he bore ultimate responsibility for their success or failure. The Air Chief alluded to this in a note to General Marshall: “The use of the B-29 Superfortress in combat brings actuality to an Air Forces plan made several years in advance for truly global aerial warfare….I assume the heavy responsibility for its employment…. Three billion dollars, tremendous political capital, and the future of strategic airpower stood in the balance. Airmen going back to World War One had dedicated themselves to this quest. If Arnold could deliver with the Twentieth Air Force, he and his aircrews would be

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88 Hayes, *The History of the Joint Chiefs of Staff in World War II: The War Against Japan*, 593.


90 Hansell, *The Strategic Air War Against Germany and Japan*, 159.

lauded as heroes. If they failed, everything for which he and so many air leaders had fought would be lost.

This all came down to effective, efficient target destruction. In Arnold’s words, an aerial striking force “…must have a free hand to drop the greatest number of bombs in the shortest possible time.” 92 His airmen had not been able to achieve this objective in Europe until 1944. Producing a large force structure, training airmen, building the necessary operating infrastructure, undertaking diversionary missions, and balancing resource allocation amidst a global war inhibited the ability to attain concurrent mass throughout 1942 and 1943. Arnold explained this to Secretary of War Henry Stimson in a 1944 letter: “Our airpower in Europe has been built slowly because of the needs of the other fronts, aircraft losses and the sheer physical complexity of the bases required. At last we are ready for the job ahead.” 93 Pacific operations were slated to take place in a far more constrained period of time, primarily in the latter half of 1944 and throughout 1945. Arnold had to hit the ground running to ensure he attained maximum desired effects within this defined window of time. He could not afford to repeat the slow build up experienced in the European Theater. It all came down to President Roosevelt’s stated intent: “It is a policy of fighting hard on all fronts and ending the war as quickly as we can on the uncompromising terms of unconditional surrender.” 94

92 Arnold, Global Mission, 567.
In order to ensure his B-29s had enough physical striking power once they arrived in theater, Arnold structured his units around the construct of a wing—a tier of organization in which four bomb groups and their associated sixteen squadrons flew as a single unit. Seven bombers were assigned to a squadron. Four squadrons were attached to a bomb group, thereby fielding twenty-eight aircraft. The wing consisted of four bomb groups, which yielded a total of 112 B-29s flying as a unified team. General Ira Eaker—Commander of the Eighth Air Force in England—could not regularly execute missions in excess of one hundred bombers until the spring of 1943. He simply did not have the resources. The Twentieth Air Force was specifically engineered to avoid this problem. Each deployed unit was designed with an ample baseline inventory. By June 1944, 133 B-29s were supposed to be assigned in theater and this number was expected to build rapidly to an eventual goal in excess of one thousand bombers by the summer of 1945. Given that the B-29 had the potential to carry over three times the bomb tonnage of the B-17 or B-24, the Twentieth Air Force promised to afford significant combat power.

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95 Craven and Crate, *The Pacific: Matterhorn to Nagasaki, June 1944 to August 1945*, vol 5 of *The Army Air Forces In World War II*, 55.


97 Hansell, *Strategic Air War Against Japan*, 86.

During April 1944, aircrews of the 58th Bomb Wing, XX Bomber Command boarded one hundred and fifty Kansas-based B-29s and took off for India. This accomplishment was the product of tremendous effort and determination. Boeing and associated firms involved in the manufacturing of the B-29 had taken radical measures to compress the design, prototyping, testing, and production of the new bomber. Their accomplishment yielded the most sophisticated and capable aircraft in the world. Airmen too had to go above and beyond to tackle the nuances of this new plane—whether mastering it in the air or servicing it on the ground. When training commenced in November 1943, there was only one B-29 allocated per twelve crews. Green mechanics straight out of training were overwhelmed by the complexity of the new bombers. As one Army Air Force officer remarked, “It was a fight against time, fatigue, confusion and the weather with little time for sleeping or eating.” The entire program—men and machines—really needed more preparation before they began combat operations. However, wartime pressure demanded the force now. Five B-29s were lost on the 11,500 mile transit to India. A combination of mechanical failures and crew errors hindered the global crossing. Following the pattern set by the Eighth Air

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100 Craven and Crate, *The Pacific: Matterhorn to Nagasaki, June 1944 to August 1945*, vol 5 of *The Army Air Forces In World War II*, 56.


Force, the airmen bound for Asia would have to learn on the job amidst the pressures of combat.

Despite these challenges, Hap Arnold insisted on flying the first mission “on or before 15 June, weather permitting.”\(^{103}\) He had staked the entire promise of strategic airpower, $3 billion, and the overarching course of the war against Japan on the new bomber. He was determined that the Twentieth Air Force, the B-29 and his crews would succeed.\(^{104}\)

Once the airmen arrived in India, they readily discovered that combat missions comprised a fraction of their worries. As specified in the TWILIGHT plan, the vast majority of support activities were slated to occur at bases in India. These facilities were not within range of the strategic targets outlined by the COA, so B-29s would shuttle to advance airstrips in Chengtu, China as the launching pad for actual combat missions. Spare parts, fuel, munitions, and basic sustenance items for crews had to be airlifted from India to China across the treacherous Himalaya Mountains.\(^{105}\) This was a mobility challenge of unprecedented complexity. Brigadier General Ken Wolfe, the commander of the 58\(^{th}\) Bomb Wing, estimated that he would need 4,600 tons of supplies just to launch the first two missions.\(^{106}\) A single B-29 required twenty tons of


\(^{104}\) Hansell, *The Strategic Air War Against Germany and Japan*, 141.


\(^{106}\) Craven and Crate, *The Pacific: Matterhorn to Nagasaki, June 1944 to August 1945*, vol 5 of *The Army Air Forces In World War II*, 85.
supplies to participate in a single mission. For every gallon of fuel off-loaded at Chengtu for combat use, twelve gallons was consumed in transporting it across the mountains. With a dearth of cargo aircraft in theater, Wolfe had to bridge the gap with his B-29s. The new bombers spent thousands of hours in the air shuttling supplies to sustain operations. It took an average of seven resupply trips with B-29s to launch one combat mission. General Wolfe even went so far as to convert two dozen of the new bombers into dedicated tanker aircraft. For a unit whose mission was to strike key Japanese targets in a regular fashion, such logistical impositions proved crippling. Just one-seventh of their effort was dedicated to combat sorties. The B-29 crews were logisticians first, strategic airmen second. This was an untenable operation. As Curtis LeMay later explained, “What this commander, and any subsequent commander, was faced with was an utterly impossible situation.”

General Wolfe launched the 58th Bomb Wing’s first mission on June 5, 1944. Ninety-eight B-29s prepared to strike a Japanese military rail installation in Bangkok,

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111 Hansell, Strategic Air War Against Japan, 46.

112 LeMay and Kantor, Mission with LeMay: My Story, 322.
Thailand. Two of the bombers crashed on take-off. Fourteen additional aircraft aborted due to mechanical difficulty on the way to the target. Of all the bombs dropped, only sixteen hit within the general zone of the aim point. Things were not bound to improve.

By the middle of October 1944, the XX Bomber Command had only flown eleven missions. It took the men upwards of two weeks to resupply the forward bases in-between combat sorties. The airmen attacked various targets throughout Southeast Asia, China, and occasional trips to the Japanese Home Island of Kyushu. General Arnold grew increasingly frustrated with the anemic mission results and ordered General Wolfe to return home on July 4, 1944. Major General Curtis LeMay took over as the new head of XX Bomber Command. He was no stranger to strategic bombing. LeMay demonstrated tremendous determination, innovation, and bravery as a bomb group commander in the Eighth Air Force. Upon arriving in theater, he described the logistical arrangements as “utterly absurd.”

113 LeMay and Yenne, *Superfortress: The B-29 and American Air Power*, 76.


116 Ibid., 130.


to Brigadier General Lauris Norstad, Chief of Staff of the Twentieth Air Force, in a September 18, 1944 memorandum:

I feel that the operation of this command under the conditions existing in this theater is basically unsound in that it is impossible to exploit our capabilities. It is justified by the fact that there is no other area from which VLR units can operate against Japan. I do not believe that additional units should be committed to these same conditions if there is any possible alternative.¹²⁰

Even with the odds against him in China, LeMay worked to hone the prowess of his airmen. They practiced formation flying, developing standard operating procedures, and worked to improve bombing accuracy.¹²¹ Crews on the ground also sharpened their skills and increased aircraft availability rates from 40 percent in June 1944 to 77 percent in January 1945.¹²²

No amount of hard work could surmount the logistical factors that restricted regular, concurrent heavy bomber operations from China. On January 15, 1945, General Arnold finally ordered XX Bomber Command to join XXI Bomber Command

¹²⁰ Werrell, Blankets of Fire: U.S. Bombers of Japan During World War II, 120.


B-29s operating from the Marianas. It took until April to transfer all the men, support equipment and their aircraft.\textsuperscript{123}

Despite the swell of activity to support Operation MATTERHORN, XX Bomber Command only flew forty-nine missions during its time in China. This record even stood below the Eighth Air Force’s anemic total during its first year of combat operations.\textsuperscript{124} While the COA intended for the B-29s to focus on strategic targets, just 55 percent of the missions flown managed to hit these priority installations.\textsuperscript{125} Range considerations dramatically hindered the bombers’ ability to strike most strategic targets in Japan, with just the Home Island of Kyushu lying in reach.\textsuperscript{126} The B-29s only flew nine missions to Japan during Operation MATTERHORN. This comprised just one-tenth of the total bomb tonnage dropped from the China-based bombers.\textsuperscript{127}

The failure of B-29s in China to deliver strategic results sharply increased the pressure upon Arnold. Top Allied leaders lacked confidence in his strategic air operations. At the September, 1944 OCTAGON conference, the Combined Chiefs of Staff formally approved plans to invade the Home Islands of Japan. Landings were slated for the island of Kyushu in October 1945, followed by in invasion on the Tokyo

\textsuperscript{123} Craven and Crate, \textit{The Pacific: Matterhorn to Nagasaki, June 1944 to August 1945}, vol 5 of \textit{The Army Air Forces In World War II}, 629.

\textsuperscript{124} Lee Kennett, \textit{A History of Strategic Bombing} (New York: Charles Scribner’s Sons, 1982), 167.

\textsuperscript{125} Hansell, \textit{Strategic Air War Against Japan}, 20.

\textsuperscript{126} Werrell, \textit{Blankets of Fire: U.S. Bombers of Japan During World War II}, 119.

Plain later in December. In the meantime, the Combined Chiefs of Staff ordered B-29s to keep flying missions against their strategic target sets. The orders read: “Maintain and extend unremitting pressure against Japan with the purpose of continually reducing her military power and attaining positions from which ultimate surrender can be forced.” Arnold’s gamble with the B-29 had yet to attain anything remotely close to this objective. If he and his airmen were going to prove the value of strategic bombing, they had to net results with utmost brevity. If he failed, American personnel would face untold carnage on the shores of Japan. Their sacrifice would stand as an ominous reminder regarding the failed promise of strategic airpower.

During the spring and summer of 1944, American ground forces captured the Marianas Islands of Guam, Saipan, and Tinian. These venues lay within 1,500 hundred miles of Tokyo. The Japanese capitol city was within striking range of Allied forces for the first time since the 1942 Doolittle Raid. Military construction units built airfields for the B-29s while the fighting still raged. These new facilities were of unprecedented scale and scope, eventually featuring six separate bases and eleven runways. The airfield on Tinian held the record as the world’s largest aviation

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130 Hansell, *The Strategic Air War Against Germany and Japan*, 238.
installation at the time it was constructed. General Hansell, commander of the Twentieth Air Force’s XXI Bomber Command, was at the controls of the first B-29 to touch down in the Marianas on October 12, 1944. Over one thousand B-29s would follow by the summer of 1945.

Airmen in the Marianas faced immense pressure. The XX Bomber Command was a total failure. If strategic airpower in the Pacific was going to succeed, it was going to come down to what the men of XXI Bomber Command could deliver. They had very little time to net the desired results. Hansell was exceedingly aware of his circumstances, explaining:

The Twentieth Air Force was under extreme pressure to perform. One major slip and the critics would have had their way—the Twentieth Air Force would have been dismembered and parceled out to the various theaters. An understanding of this tension and pressure is vital to an understanding of the early struggle of the XXI Bomber Command to meet its commitments. We had given a pledge to launch and air offensive against Japan in November 1944…the target had to be met, to be demonstrated, if strategic airpower was to reach fruition in the Pacific.

Arnold was bound to succeed and did not hesitate to let Hansell know what was at stake: “You realize as well as anyone the important part that you and the XXI Bomber Command will play in the Twentieth Air Force program, and consequently, in the

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134 Hansell, Lecture and interview at the United States Air Force Academy, vol 1, 1.


137 Hansell, *Strategic Air War Against Japan*, 31.
program of the entire Army Air Forces.”138 The B-29 was always more than an airplane and Twentieth Air Force was far more than just another command, they collectively represented everything for which airmen had been advocating since World War I. This meant attaining desired combat objectives through precise, concerted projection of power against defined strategic objectives to avoid the unnecessary loss of life wrought by traditional linear land campaigns. In this particular instance, airmen fervently sought to bring an end to the war without invading the Japanese Home Islands.139

The airmen of XXI Bomber Command were not well postured to accept this immense responsibility. As with XX Bomber Command, their training was wholly inadequate. Aircraft shortages, maintenance problems, and the inclusion of so many raw recruits hampered everything.140 Precision strategic bombing in the heat of combat was a complex proposition for seasoned veterans, let alone green airmen who were struggling to master the basics of their airplanes. The magnitude of the problem was best illustrated by what happened when four B-29s launched from their base in Kansas on a training mission to Cuba. Individual aircraft became separated en route, navigators grew disoriented, and each one of the bombers landed at separate fields throughout the southeast. Every crew was lost. A similar exercise held shortly


139 Hansell, The Strategic Air War Against Germany and Japan, 166.

thereafter saw eighteen B-29s launch for Cuba, with just five arriving successfully.\(^{141}\) If airmen could not find their way around the peaceful skies of America, their ability to successfully employ precision bombing tactics appeared dubious at best.

General Hansell was aware of the limitations: “The crews averaged less than one hundred hours of total flying time in the B-29, and the average high altitude formation flying experience was less than twelve hours.”\(^{142}\) Facing similar challenges in China, General LeMay sympathized with his counterpart’s predicament: “Their lack of experience with the B-29 prior to the arrival in this theater was sadly lacking. Many crews had never dropped a bomb from the B-29…”\(^{143}\) Such shortfalls did not matter to General Arnold. He wanted missions against Japan now and it was up to XXI Bomber Command to deliver.

On November 24, 1944, the airmen of the XXI Bomber Command boarded their B-29s and launched for Tokyo.\(^{144}\) The *Cleveland Plain Dealer* reported with

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\(^{142}\) Hansell, *Strategic Air War Against Japan*, 33.

\(^{143}\) Wolk, *Cataclysm: General Hap Arnold and the Defeat of Japan*, 104.

\(^{144}\) Kennett, *A History of Strategic Bombing*, 167.
utmost pride regarding the accomplishment:

The United States has today what amounts to an independent air service. It is the Twentieth Air Force, which was organized to conduct operations of the B-29 Superfortresses…this situation is a natural result of the evolution of the long range bomber. The great range of the B-29s enables them to fly beyond the limits of normal operations in any theater of war and strike heavy blows at the heart of the enemy.\footnote{Wolk, Cataclysm: General Hap Arnold and the Defeat of Japan, 100.}

The release would have made the most ardent airpower advocate proud. The problem was that it was not true. Airmen were able to span great distances in the B-29s, but the blows against the enemy were lacking when it came to intensity, accuracy, and concurrency.

Initial bombing operations against Japan emphasized precision strike as defined through classic strategic airpower doctrine. Twentieth Air Force Chief of Staff, Brigadier General Lauris Norstad, highlighted this in a note to Haywood Hansell. He explained that it was not enough to “…merely to bomb Japan. Targets selected, the timing, the weight must be chosen with surgical skill.”\footnote{Ibid., 97.} Norstad continued in his guidance, stipulating the necessity of destroying Japan’s “…means of fighting by destroying those economic and industrial establishments upon which her military strength depends.”\footnote{Ibid.}

The Joint Chiefs of Staff targeting priorities included the aircraft...
industry, industrial areas, and shipping. Initial target analysis suggested that many facilities were centralized in the cities like Tokyo, Nagoya, and Osaka.\textsuperscript{148}

Unfortunately, targeting guidance that appeared clear to analysts in Washington proved far more problematic for the airmen charged with actually flying the missions. As General Hansell explained: “The exact location and description of these plants was a mystery to us in the fall of 1944.”\textsuperscript{149} Curtis LeMay concurred, explaining: “When the war started we had nothing in the way of real intelligence on Japan, and three years later in 1944 we still knew nothing.”\textsuperscript{150} Strategic strike doctrine was worthless if the airmen did not know where to direct their bombs.

In an attempt to gather further data, Hansell dispatched a photo-reconnaissance variant of a B-29—an F-13—to Tokyo on November 1, 1944.\textsuperscript{151} The crew had just flown in from the United States and upon touching down, they were promptly informed that they possessed the only long range reconnaissance aircraft in the entire Pacific Theater. They took off for Japan five hours later and managed to take over seven thousand photographs of key target areas on this single mission.\textsuperscript{152}


\textsuperscript{149} Hansell, Strategic Air War Against Japan, 32.

\textsuperscript{150} LeMay and Yenne, Superfortress: The B-29 and American Air Power, 118.


\textsuperscript{152} Haywood S. Hansell, Lecture and interview at the United States Air Force Academy by the Oral History Committee, vol 2, 19 April 1967, Air Force Historical Office, Bolling Air Force Base, DC, 5.
returned to Japan forty-nine more times during November and December, but cloud cover obscured objective areas on thirty of these missions. Airmen did the best they could with this new data, but as General Hansell explained: “Strategic intelligence upon which the selection of vital organic systems and targets would rest was admittedly inaccurate at the time of the initiation of the bombing offensive in November 1944.” As with training, the men would have to make due with suboptimal circumstances.

Even when airmen knew where to aim their bombs, actually hitting the assigned targets proved exceedingly difficult. Japan was often covered with a thick blanket of clouds, which made visual targeting impossible. As General Hansell explained, “Weather over Japan was our most implacable and inscrutable enemy.” From December through February, the weather afforded just eighteen days of the clear conditions necessary for visual bombing. Facing similar challenges in Europe, airmen in the Eighth and Fifteenth Air Forces reverted to radar-guided bombing. Keeping the pressure upon the enemy was of paramount importance, even if accuracy suffered. B-29s were also equipped with radar, but airmen were woefully

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154 Hansell, Strategic Air War Against Japan, 76.

155 Ibid., 45.


undertrained in its use. In fact, the position of radar operator was usually manned by an airman who proved inept in gunnery training. This translated into placing mission success on the shoulders of the lowest common denominator.\textsuperscript{158} Even if a radar operator could decipher how to properly use his equipment, crews lacked radar maps that were essential for translating data into intelligible position locations. As with target intelligence, no one had gathered the sufficient information necessary for constructing radar maps.\textsuperscript{159} The technology was so new that such preparation was simply not practicable.\textsuperscript{160} Summarizing the entire situation, Hansell explained: “Japanese weather made visual bombing difficult and undependable. Radar precision bombing was on the way, but its successful application would take time.…”\textsuperscript{161}

Even if the targets could be properly located and the bombs were released directly over the aim point, it was doubtful that they would find their mark. Extremely powerful jet stream winds gusted above Japan in excess of two hundred miles per-hour.\textsuperscript{162} Bombers flying into this as a headwind struggled to make headway, while the ones going downstream rocketed along with ground speeds in excess of 550 miles per-

\textsuperscript{158} General Curtis E. Lemay, interview by Air Force Historical Division, K1D5.5-30Acy 1, January 12, 26, 27, 1965, Air Force Historical Office, Bolling Air Force Base, DC, 1.


\textsuperscript{161} Hansell, \textit{Strategic Air War Against Japan}, 74.

\textsuperscript{162} Hansell, Lecture and interview at the United States Air Force Academy, vol 1, 20.
hour. These factors could not be programmed into the bombsights and even if that was possible, the powerful winds scattered bombs as they dropped to the ground below.\textsuperscript{163} Ordnance landed miles from the intended targets. With memories of the losses suffered over Europe fresh in airmen’s minds, the crews were loath to fly at lower altitudes where they would be far more vulnerable to defenses.\textsuperscript{164} In December 1944 and January 1945, XXI Bomber Command flew almost all of its missions in the heart of the jet stream.\textsuperscript{165}

Taking all these challenges into account, airmen winging their way to Tokyo faced stiff odds. Out of the 277.5 tons of bombs dropped on the first mission, only 7 percent of the ordnance hit the targeted Nakajima aircraft engine factory.\textsuperscript{166} Poor bomb aiming was exacerbated by 130 mile per-hour winds that propelled aircraft along at a ground speed of 445 miles per-hour.\textsuperscript{167} Any hope for a precise, destructive strike was dashed.\textsuperscript{168}

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\textsuperscript{164} Overy, \textit{The Air War, 1939-1945}, 98.

\textsuperscript{165} Office of Statistical Control, \textit{Army Air Forces Statistical Digest (World War II)}, 287.

\textsuperscript{166} Griffith, \textit{The Quest: Haywood Hansell and American Strategic Bombing in World War II}, 176.

\textsuperscript{167} Craven and Crate, \textit{The Pacific: Matterhorn to Nagasaki, June 1944 to August 1945}, vol 5 of \textit{The Army Air Forces In World War II}, 554.

\textsuperscript{168} Hansell, \textit{The Strategic Air War Against Germany and Japan}, 189.
\end{flushleft}
Subsequent missions mirrored these same problems. Even though General Hansell possessed tremendous potential striking power in his XXI Bomber Command, airmen were unable to put their bombs on the desired targets. B-29s attempted to strike the Nakajima engine factory in Tokyo eleven separate times over the next few months, but continually failed to destroy it.\textsuperscript{169} Just as with efforts in China, the strategic bombers were failing to net ample results. Hansell readily admitted this shortcoming: “By year’s end, neither the XX Bomber Command nor the XXI had shown any real effectiveness or approached the power which was latent in the B-29.”\textsuperscript{170}

Something had to change. None of the top eight targets were destroyed during the first three months of bombing. Only 10 percent of the bombs released landed near their intended aim points.\textsuperscript{171} Out of the nineteen missions flown by mid-January, only one had yielded promising results—a strike against a Kawasaki aircraft manufacturing plant in Akashi.\textsuperscript{172} Twenty-one percent of the bombs landed within one thousand feet of the aim point, damaging nearly 20 percent of the facility.\textsuperscript{173} To Arnold’s dismay, such positive results proved exceedingly rare. Airmen had to find a way to destroy targets in a rapid fashion. Victory was nearing in Europe and subsequent Pacific island

\textsuperscript{169} Kennett, \textit{A History of Strategic Bombing}, 168.

\textsuperscript{170} Hansell, \textit{Strategic Air War Against Japan}, 48.

\textsuperscript{171} Kennett, \textit{A History of Strategic Bombing}, 169.

\textsuperscript{172} Griffith, \textit{The Quest: Haywood Hansell and American Strategic Bombing in World War II}, 194.

\textsuperscript{173} Werrell, \textit{Blankets of Fire: U.S. Bombers of Japan During World War II}, 134.
invasions were edging closer to Japan. Half a year had passed since B-29s entered the fray. Despite dropping seven thousand tons of bombs, they had little to show for their effort.\(^{174}\) When General Hansell briefed his crews for their first mission against Tokyo, he explained: “If we do our job, this is the beginning of the end for Japan. Put the bombs on target. You can do it.”\(^{175}\) Airmen still fervently believed in the potential afforded by strategic bombing. They just needed to find a way to get the bombs on target.

On January 6, 1945, General Norstad touched down on Guam for a meeting with Haywood Hansell. His message was simple: General Arnold had lost faith in the XXI Bomber Commander’s ability to net results.\(^{176}\) He was going to transfer General Curtis LeMay from XX Bomber Command to take charge of strategic air operations in the Pacific.\(^{177}\) Reflecting on the moment, Hansell explained, “General Arnold wanted and demanded measurable results at once.”\(^{178}\) When General LeMay arrived the following day to meet with Norstad, he received a stern warning: “You go ahead and get results with the B-29. If you don’t get results, you’ll be fired.”\(^{179}\) Explaining the


\(^{175}\) Hansell, *The Strategic Air War Against Germany and Japan*, 186.

\(^{176}\) Craven and Crate, *The Pacific: Matterhorn to Nagasaki, June 1944 to August 1945*, vol 5 of *The Army Air Forces In World War II*, 567.

\(^{177}\) Major General Curtis E. LeMay, General Orders No. 11, Assumption of Command, 20 January 1945, Air Force Historical Office, Bolling Air Force Base, DC, 1.

\(^{178}\) Hansell, *The Strategic Air War Against Germany and Japan*, 212.

\(^{179}\) LeMay and Kantor, *Mission with LeMay: My Story*, 347.
broader circumstances, Norstad emphasized: “If you don’t get results, they’ll be a mass amphibious invasion of Japan, to cost probably half-a-million more American lives.”

General Norstad’s warning was no idle threat. Top War Department leaders firmly believed that Japan would only surrender after the Allies occupied its Home Islands. As an April 24, 1944 War Department memo declared: “The collapse of Japan as a result of a blockade and air bombardment alone is very doubtful. The collapse of Japan can be assured only by invasion of Japan proper.”

Allied leaders meeting in Yalta in February 1945 further cemented plans for the anticipated invasion. Subsequent meetings saw landing dates set for the fall of 1945 on the Home Island of Kyushu in addition to the Tokyo Plain. This was a course of action airmen fervently sought to avoid. Their entire focus since World War I was fixed upon securing objectives through strategic power projection against key target sets, not a linear land campaign based upon the tenets of occupation and attrition. As Hap Arnold explained, “If we could win the war by bombing, it would be unnecessary for the ground troops to make a landing on the shores of Japan. Personally, I was convinced it could be done.”

Pacific casualty rates had been especially brutal, with American troops

\[\text{\textsuperscript{180} Ibid.}\]

\[\text{\textsuperscript{181} Wolk, \textit{Cataclysm: General Hap Arnold and the Defeat of Japan}, 71.}\]

\[\text{\textsuperscript{182} Ibid., 73.}\]

\[\text{\textsuperscript{183} Arnold, \textit{Global Mission}, 596.}\]

\[\text{\textsuperscript{184} Hansell, \textit{Strategic Air War Against Japan}, 69.}\]
suffering a 7.45 percent casualty rate, versus 2.16 percent in Europe.\textsuperscript{185} Top Army and Navy leaders estimated that American forces invading the Home Islands of Japan would suffer casualty rates upwards of 35 percent. That translated to 268,000 out of the planned 766,700-man Allied invasion force.\textsuperscript{186}

Nor was pressure for a rapid victory in Japan isolated to forward-based Pacific commanders. Haywood Hansell explained that General Arnold was, “… under constant pressure from his associates on the JCS and from higher authority to explain what his Twentieth Air Force was accomplishing.”\textsuperscript{187} Leaders in Washington wanted results. General Hansell elaborated that: “Washington placed great stress on a quick end to the war, emphasizing that this carnage must not go on a single week longer than necessary to achieve victory.”\textsuperscript{188} These dynamics took their tool upon Arnold, who suffered a heart attack at the end of January 1945. It was his fourth heart attack in two years.\textsuperscript{189}

Upon taking command of the Pacific-based B-29 operations, General LeMay continued to execute daylight strikes against key target sets.\textsuperscript{190}

\textsuperscript{185} Hayes, \textit{The History of the Joint Chiefs of Staff in World War II: The War Against Japan}, 702.

\textsuperscript{186} Hansell, \textit{Strategic Air War Against Japan}, 69.

\textsuperscript{187} Ibid., 48.

\textsuperscript{188} Hansell, \textit{The Strategic Air War Against Germany and Japan}, 213.

\textsuperscript{189} Werrell, \textit{Blankets of Fire: U.S. Bombers of Japan During World War II}, 139.

\textsuperscript{190} Craven and Crate, \textit{The Pacific: Matterhorn to Nagasaki, June 1944 to August 1945}, vol 5 of \textit{The Army Air Forces In World War II}, 568.
mission data, the new commander was struck by the number of bombers that were failing to return after each mission. From November through January, XXI Bomber Command was averaging losses in excess of 5 percent.\textsuperscript{191} That meant a crew was statistically dead after twenty missions. While some airplanes were downed in combat, the vast majority were ditching in the ocean as a result of mechanical failure and fuel starvation.\textsuperscript{192} XXI Bomber Command’s loss rate actually equaled that of the Eighth Air Force during the bleak years of 1942 and 1943. This was not sustainable. Too many aircraft were being lost. Too many men were meeting their fate in the vast Pacific Ocean.\textsuperscript{193} Arnold was also quite concerned regarding the losses. Prior to LeMay’s arrival, the AAF Commanding General explained to Hansell:

\begin{quote}
In my opinion the B-29 cannot be treated in the same way that we treat a fighter, medium bomber or even a Flying Fortress. We must consider the B-29 more in terms of a naval vessel, and we do not lose naval vessels in threes and fours without a very thorough analysis in causes and what preventative measures may be taken to avoid losses in the future.\textsuperscript{194}
\end{quote}

In January 1945, 22.7 percent of the B-29s failed to bomb their assigned primary targets due to mechanical difficulties.\textsuperscript{195} Such failures could not continue indefinitely. Desired effects could only be attained by placing the maximum number of bombers

\begin{itemize}
\item \textsuperscript{191} Ibid., 575.
\item \textsuperscript{192} Office of Statistical Control, \textit{Army Air Forces Statistical Digest (World War II)}, 261.
\item \textsuperscript{193} Tillman, \textit{Whirlwind: The Air War Against Japan 1942-1945}, 89.
\item \textsuperscript{194} Craven and Crate, \textit{The Pacific: Matterhorn to Nagasaki, June 1944 to August 1945}, vol 5 of \textit{The Army Air Forces In World War II}, 601.
\item \textsuperscript{195} Ibid., 545.
\end{itemize}

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over the target day-after-day. This goal could not be attained unless crews and their aircraft returned home to fly another day.

Throughout the planning and execution of the strategic air campaign against Japan, the target list included a provision referencing “urban industrial centers.” The reason was simple—a large percentage of the Japanese war economy resided in cottage industries located throughout urban sectors. Individually, these sub-assembly production sites did not amount to much. Collectively, they represented a sizable amount of output on which the primary production centers relied. Targeting these small facilities on an individual basis was an impossible task, but burning them en masse was a feasible option. Eighty percent of the buildings in Japanese cities were constructed from wood. As a June 1944 COA report explained, “An analysis of the principal Japanese industrial cities indicates that they are highly vulnerable to incendiary attack. Their predominantly wooden construction and high degree of congestion renders the susceptible to sweeping fires….” Vannever Bush, of the War Department’s Office of

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197 Lt Gen Ira C. Eaker, interview by Dr. Goldberg & Dr. Hildreth, 22 May 1962, K239.0512-627, United States Air Force Oral History Program, Albert F. Simpson Historical Research Center, Air University Maxwell Air Force Base, AL, 3.

198 Werrell, Blankets of Fire: U.S. Bombers of Japan During World War II, 47.

Scientific and Research Development, wrote to General Arnold highlighting this point in an October 1, 1944 memorandum:

Advance estimates of force required and the damage to Japanese war potential expected from incendiary bombing of Japanese cities indicates that this mode of attack may be the golden opportunity of strategic bombardment in this war—and possibly one of the outstanding opportunities in all history to do the greatest damage to the enemy for minimum effort. Estimates of economic damage indicate that incendiary attack of Japanese cities maybe at least five times as effective, ton for ton, as precision bombing of selected strategic targets as practiced in the European Theater.  

Bush’s conclusions were substantiated by Army Air Force tests conducted at bombing ranges in Utah and Florida, in which mock Japanese cities were bombed with incendiary munitions. The buildings were consumed by flames within minutes.

Despite the potential afforded through incendiary attacks, senior airmen initially favored classic daylight precision strikes against Japan. As General Norstad emphasized to Haywood Hansell in the fall of 1944, it was not enough to “…merely to bomb Japan. Targets selected, the timing, the weight must be chosen with surgical skill.” Air leaders sought desired effects via a scalpel, not a sledgehammer. The sheer dearth of positive results secured by this method prompted Twentieth Air Force commanders to reevaluate their approach. As a January 15, 1945 Army Air Force memo explained: “the bombing which has been done so far by the B-29s has not been


202 Wolk, Cataclysm: General Hap Arnold and the Defeat of Japan, 97.
uniformly good….The vulnerability of Japanese cities to fire is still a tempting point for argument.” Arm Air Force officials had to deliver, even if it meant adjusting the means by which they attained desired results. Strategic target destruction was the ultimate goal. Attempts at precision were of little value if they did not destroy key target systems.

Back in the Marianas, LeMay’s airmen were still failing to hit their targets. The situation demanded change. As he later explained, “We weren’t going to be able to defeat Japan using high altitude precision bombing before the scheduled invasion was to begin. We had to do something really different.” Overcast weather, brutal jet stream winds, inadequate crew training, and continued mechanical challenges were severely degrading mission results. LeMay considered these challenges and devised an alternate plan: low altitude night incendiary raids in which B-29s would strike urban target zones identified by target analysts as hosting significant industrial activity. As LeMay explained to Norstad in a March 3, 1945 memo, “We cannot keep the force on the ground waiting for good weather, which does not exist over Japan at this time of year.”

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204 LeMay and Yenne, Superfortress: The B-29 and American Air Power, 120.


206 Werrell, Blankets of Fire: U.S. Bombers of Japan During World War II, 156.
By flying at low altitude, the B-29s would operate below the overcast, jet stream winds would no longer hamper bomb trajectories, mechanical reliability would likely improve without the strain induced by high-altitude operations, airplanes could carry more bombs without having to climb so high, and the night sky would shield the aircraft from defending Japanese forces.\(^{207}\) Precision strikes would be impossible at night, but that would not limit target destruction given the sweeping potential afforded by incendiary munitions. In many ways, this decision to alter strike tactics to net desired effects reflected the decision airmen in Europe made when they chose to use radar technology to sustain missions during periods of adverse weather. Target destruction had to occur and it was up to airmen to improvise solutions to make this happen even if it meant challenging doctrinal precepts.\(^{208}\) General LeMay summarized his bottom line in making this decision: “If we could shorten the war, we wanted to shorten it.”\(^{209}\) Even Haywood Hansell, a prime proponent of precision strike tactics, concurred with this shift: “If airpower was going to end the war without a massive bloodletting on the ground, its application could not be delayed. A dramatic reappraise was in order. LeMay made it.”\(^{210}\) The end result was what truly mattered, not a myopic focus on the method.

\(^{207}\) LeMay, interview, March 1965, 7-8.

\(^{208}\) Craven and Crate, *The Pacific: Matterhorn to Nagasaki, June 1944 to August 1945*, vol 5 of *The Army Air Forces In World War II*, 612.

\(^{209}\) LeMay and Kantor, *Mission with LeMay: My Story*, 381.

\(^{210}\) Hansell, *The Strategic Air War Against Germany and Japan*, 228.
On March 9, 1945, Curtis LeMay launched the first major American fire raid of the war. As he later explained: “I made the decision. If it failed, Arnold could have chosen someone else for my job.” Two hundred and seventy-nine B-29s struck a quadrant of Tokyo with 1,665 tons of incendiary munitions. Eight major war plants were destroyed, upwards of ninety to one hundred thousand people were killed, and over a dozen square miles of Tokyo were ravaged. New York Times correspondent Bruce Roe summarized the scene in a March 10, 1945 report: “A blanket of fire was thrown over an area of fifteen square miles in the heart of Tokyo earlier today.” Emphasizing the intent of the raid, an official XXI Bomber Command summary of the mission emphasized “The object of these attacks was not to indiscriminately bomb civilian populations. The object was to destroy the industrial and strategic targets concentrated in the urban areas.” Target destruction was the goal, not blatant carnage.

This raid proved especially destructive against the cottage industries. As General Carl Spaatz explained after the war: “In Japan a lot of the components of manufacturing were scattered all around the place; you couldn’t attack the factory

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211 LeMay, interview by Air Force Historical Division, January 12, 26, 27, 1965, 1.


215 Ibid., 157.
because the component was in the houses around the community.”

General Arnold’s Committee of Operations Analysts summarized the net effect of this situation in a September 4, 1944 report, “No other industrial nation is dependent upon so small an area for so much substantial a portion of its manufactured products.” Work in the major production centers ground to a halt without the material provided by the feeder facilities. In LeMay’s opinion, “The March 10, 1945 incendiary attack was easily the turning point in the air war and quite possibly of the entire war in the Pacific.”

Historian Barrett Tillman explains the consequence of General LeMay’s decision in very clear terms: “Make no mistake—Curtis LeMay not only saved the B-29 program, he also saved Hap Arnold and, with him, perhaps the future of an independent Air Force.”

LeMay continued fire raids for ten days, striking Nagoya, Osaka, Kobe, and a return trip back to Nagoya. His basic tactic was to compress as many bombers over the target as possible in a given amount of time to maximize the incendiary effects of the bombs. Losses for the American airmen stood at 4.2 percent, an acceptable

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218 LeMay and Yenne, Superfortress: The B-29 and American Air Power, 124.


221 Tillman, Whirlwind: The Air War Against Japan 1942-1945, 135.
number given the level of effect attained.\textsuperscript{222} The impact of these missions cannot be understated. As Lieutenant General Boboru Tazoe, Commander of the Fifth Air Division explained, “It became apparent in March 1945 that Japan could not win the war when the B-29s wrought extensive damage, especially in the case of small factories scattered throughout the cities.”\textsuperscript{223} LeMay concurred, explaining: “Industries suddenly ceased to exist…”\textsuperscript{224} XXI Bomber Command’s string of fire raids were temporarily curtailed when the airmen ran out of incendiary munitions. Mission requirements had exceeded the resupply flow rate.

Nor did bomb inventories present the only challenge. Operations were building at such a rapid rate that Army Air Force leaders struggled to keep the force manned with an adequate pool of airmen. Ira Eaker—now the Deputy Commanding General of the Army Air Force—explained to Twentieth Air Force commanders:

You will be gratified to know that everybody here is working hard to give you what you want. It appears now, however, that…we will have to accept some reduction in standard. We have told you of these reductions and have asked you whether you want the crews on that basis.\textsuperscript{225}

With mission demand still high, the men of the Twentieth would have to make due with increasingly raw recruits. Mass strike tactics were far simpler than those involved

\textsuperscript{222} Craven and Crate, \textit{The Pacific: Matterhorn to Nagasaki, June 1944 to August 1945}, vol 5 of \textit{The Army Air Forces In World War II}, 615.


\textsuperscript{224} LeMay and Kantor, \textit{Mission with LeMay: My Story}, 354.

with precision bombing. This enabled the green airmen to achieve mission success. Maximum pressure upon Japan was unquestionably deemed the top priority.

As LeMay waited for more incendiary bombs to arrive, his airmen flew in support of the invasion at Okinawa. Throughout April and the beginning of May, they attacked airfields on the Home Island of Kyushu to stop Japanese Kamikaze pilots from launching against the Naval Task Force supporting the landings.226 While such tactical assignments mirrored D-Day support missions flown by the Eighth Air Force in 1944, such diversionary activities stood as an exception in the Pacific. The unique command and control arrangements for the Twentieth Air Force shielded the strategic air arm from the vast majority of ancillary support requirements. Just 5 percent of the bomb tonnage released by the B-29s was devoted to tactical missions—leaving 95 percent for strategic aims.227

Airmen also devoted much time and attention to aerial mining efforts. As an island nation, Japan was exceedingly dependent upon raw material imports. Eighty percent of the country’s petroleum products, 88 percent of its iron ore, 20 percent of the nation’s food, and 24 percent of required coal was imported via sea-lanes.228 Beginning in March 1945, B-29s flew daily missions releasing mines throughout these shipping channels. Such strikes were comparable to B-17s and B-24s striking bridges,


228 Ibid., 173.
rail lines, and other associated logistics infrastructure in Europe. The strategic bombers sunk 293 ships as a result of these efforts. Admiral Chester Nimitz lauded the B-29s and their crews for bringing about “very efficient destruction” in the maritime domain. Without supplies, Japanese war production would quickly grind to a halt.

Nor did the advent of incendiary bombing bring an end to the Army Air Force’s quest for precision. In June 1945, the 315th Bomb Group arrived in theater. Their B-29s were equipped with a brand new AN/APQ-7 “Eagle” radar system, which was optimized to identify bombing aim points. General LeMay ordered these airmen to strike Japan’s petroleum infrastructure. These targets were far from city centers and did not lend themselves to area incendiary strike. The new unit’s first mission targeted the Utsube oil refinery. Flying over the next half-dozen weeks, the 315th destroyed 60 percent of Japan’s petroleum refining capacity. This new radar system was exceedingly effective, technology that would have been very useful during past missions in both Europe and the Pacific.

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229 Tillman, Whirlwind: The Air War Against Japan 1942-1945, 124.


232 W. N. Tuttle, memorandum to Chief of Staff, Twentieth Air Force, Subject: Problems in Radar Bombing in Relation to Contemplated 315th Wing Operations, 2 January 1945, Air Force Historical Office, Bolling Air Force Base, DC, 1.


234 Office of Statistical Control, Army Air Forces Statistical Digest (World War II), 293.
Pressure also continued to mount on Japan via mass incendiary strikes. These proved especially important in circumventing the restrictions imposed by adverse weather. In April and May, overcast conditions limited traditional daylight precision strikes to three days. Things did not improve in June, with just one day affording the clear skies necessary for accurate aiming.\(^{235}\) Seventy-five percent of all bombs dropped during this period were incendiary.\(^{236}\) No matter the weather over Japan, B-29 crews could still net major effects through their fire raids.

On March 18, the COA released new targeting guidance. After studying fresh intelligence information from the aerial reconnaissance flights, Arnold’s analysts concluded:

> With the notable exception of aircraft engine plants, there are no known strategic bottle necks in the Japanese industrial and economic system that now present suitable targets for attack, but Japanese industry as a whole is vulnerable to attacks at the principle urban industrial areas.\(^{237}\)

The cottage industry-dependent system made it exceedingly difficult to strike single installations and net strategic-level effects. Precision strike was only useful if valid targets lent themselves to attack. Japan appeared to have a dearth of such facilities. From April through June 1945, B-29s leveled 105.6 square miles of Japan’s urban

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\(^{235}\) Craven and Crate, *The Pacific: Matterhorn to Nagasaki, June 1944 to August 1945*, vol 5 of *The Army Air Forces In World War II*, 645.


areas. Bombers flew their last incendiary raid to Tokyo on May 25, 1945. There was simply nothing left standing of sufficient value to warrant a subsequent mission.

General LeMay was exceedingly pleased with the results of his incendiary campaign. On April 25, 1945, he wrote to General Norstad that “I am influenced by the conviction that the present stage of the development of the air war against Japan presents the AAF for the first time with the opportunity of proving the power of the strategic air arm.” Explaining his thoughts, he highlighted that, “I consider that for the first time strategic bombardment faces a situation in which its strength is proportionate to the magnitude of the task. I feel that the destruction of Japan’s capability to wage war lies within the capability of this command…” Events would subsequently validate his conclusions.

Curtis LeMay now had five bomb wings available to dispatch against a singular objective: destroying Japan’s capacity to continue the war. This represented an unprecedented level of striking power, which would grow to 1,437 B-29s in theater by

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August 1945.\textsuperscript{243} The rapid escalation of this force is best illustrated when considering that 90 percent of the bombs dropped by the Twentieth Air Force were released in the final five months of the war.\textsuperscript{244} XXI Bomber Command combat flying time increased from 7,595 hours in December 1944, to 91,579 hours in July 1945.\textsuperscript{245} Mass, concurrent striking power honed to paralyze an enemy’s capacity to wage war stood as airmen’s primary goal since World War I. They had finally reached their objective.

With Allied leaders still planning to forcibly occupy Japan, airmen continued to face tremendous pressure to keep delivering results. On June 19, President Harry Truman approved plans for the invasion of the Home Islands.\textsuperscript{246} At the Potsdam Conference in July 1945, the Combined Chiefs of Staff approved November 15, 1946 as the end date for hostilities with Japan.\textsuperscript{247} A year’s worth of brutal ground combat was something the airmen fundamentally sought to prevent. Japan still possessed two and a half million troops, nine thousand combat aircraft, and a civilian population preparing to resist the invading Allied forces.\textsuperscript{248}

\textsuperscript{243} Craven and Crate, \textit{The Pacific: Matterhorn to Nagasaki, June 1944 to August 1945}, vol 5 of \textit{The Army Air Forces In World War II}, 539.

\textsuperscript{244} Office of Statistical Control, \textit{Army Air Forces Statistical Digest (World War II)}, 227.

\textsuperscript{245} Ibid., 281.

\textsuperscript{246} Wolk, \textit{Cataclysm: General Hap Arnold and the Defeat of Japan}, 151.

\textsuperscript{247} Hayes, \textit{The History of the Joint Chiefs of Staff in World War II: The War Against Japan}, 714.

\textsuperscript{248} Hansell, \textit{Strategic Air War Against Japan}, 72.
On July 16, 1945, General Arnold concluded; “Japan, in fact, will become a nation without cities, her transportation disrupted and will have tremendous difficulty in holding her people together for continued resistance to our terms of unconditional surrender.”\(^{249}\) He was right. Japan surrendered to the Allies on August 15, 1945. In addition to the continuous fire raids, logistical suffocation via mining and on-going precision strikes, the country was also struck with two atomic bombs on August 6 and 9.\(^{250}\) Lest Japan have any doubts regarding its chances for continued survival, Russia entered the war against the ailing Axis power in-between the atomic strikes on August 8.\(^{251}\)

Despite these last measures, airmen were convinced that their sustained fire raids were the prime motivator for surrender. As General Carl Spaatz later explained, “I sent a message right after I got over there and looked at all the strike photos—sent a message back that unless the Japanese were intent to commit national suicide they would surrender under the present strategic bombing.”\(^{252}\) General Barney Giles, Commanding General of the Army Air Forces in the Pacific, concurred: “The destruction of industry, the cutting of supply lines, battering of Japanese shipping (primarily through airpower), so reduced Japanese capacity to wage war that they were


\(^{252}\) Spaatz, interview by Mr. Arthur Goldberg, 23.
ready to sure for peace before the atomic bomb was dropped.” Japanese officials concurred with these assessments. Lieutenant General Masakazu Kawabe, Inspector General of Aviation for the Japanese Air Force, explained: “One of the biggest things leading to the surrender was the bombing of industrial cities….your bombing of small industrial cities and the use of fire bombs was very effective.” So too thought Prime Minister Kantaro Suzuki: “It seemed to me unavoidable that in the long run Japan would almost be destroyed by air attack, so that merely on the basis of the B-29s alone I was convinced that Japan should sue for peace.”

Air commanders’ decision to switch from precision strategic strike tactics to mass firebombing represented a monumental adjustment. Fundamental concepts that airman had spent their lives advancing were rapidly shunted aside in the heat of battle. The reason was quite simple: netting the strategic paralysis of the Japanese war-making enterprise to hasten the Axis nation’s surrender was the overarching goal, not a rigid adherence to doctrine at the expense of mission success. Targets had to be destroyed. Traditional methods were not working, so airmen adjusted their tactics. While the means for destruction may have changed, the desired effect did not alter. General LeMay tried to explain this point years after the war: “We were going after military targets. No point in slaughtering civilians for the sake of slaughter. Of course

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253 Wolk, Cataclysm: General Hap Arnold and the Defeat of Japan, 221.
254 Tillman, Whirlwind: The Air War Against Japan 1942-1945, 76.
255 Kerr, Flames Over Tokyo, The U.S. Army Air Forces’ Incendiary Campaign Against Japan 1944-1945, 293.
there is a pretty thin veneer in Japan, but the veneer was there.\footnote{256} This logic is very similar to the one adopted by air commanders in Europe who utilized radar bombing even though they knew it effectively meant mass strikes.

Air leaders in Europe and the Pacific had an overriding goal of netting the greatest effect in the most expedient manner possible to bring the war to an end. In Europe this amounted to defending precision strike doctrine because that was deemed to be the most efficient application of force against a defined set of targets. This was especially true when airmen had to maximize the effect of their small force structure. Precision strikes against Japan failed due to weather, wind, poor training, and loss rates exacerbated by demanding high altitude operations. Seven thousand tons of bombs were dropped to little or no effect.\footnote{257} General LeMay adopted a new approach to destroy targets in the quickest fashion possible. Japanese urban construction was exceedingly vulnerable to fire, enabling him to harness a comparatively small amount of force to net a pronounced strategic effect. This is best exemplified when considering that Germany was struck with 1.5 million tons of bombs throughout the Second World War. Japan was hit with just 171,060 tons of bombs.\footnote{258}

The scale of damage wrought over Japan was simply overwhelming, with General Arnold calling it “the severest and most concentrated bombing campaign in

\footnote{256} LeMay and Kantor, \textit{Mission with LeMay: My Story}, 384.

\footnote{257} Kennett, \textit{A History of Strategic Bombing}, 170.

\footnote{258} Office of Statistical Control, \textit{Army Air Forces Statistical Digest (World War II)}, 239.
history.” This represented the point of the entire effort: massed, concurrent force. As General LeMay concluded: “Actually, I think it’s more immoral to use less force than necessary. If you use less force, you kill off more humanity in the long run, because you are merely protracting the struggle.” LeMay had the force available to him and so he used it. In doing so, he brought the war to an end without an invasion of the Japanese Home Islands. Taken in that view, the fire raids proved to be rather limited in their scale and scope versus the destruction and carnage associated with an invasion. This is precisely what airmen had advocated from World War I. Victory truly could be attained through the effective employment of airpower.

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259 Wolk, Cataclysm: General Hap Arnold and the Defeat of Japan, 2.

260 LeMay and Kantor, Mission with LeMay: My Story, 382.
CHAPTER SIX
CONCLUSION: VICTORY THROUGH AIRPOWER

A few months after the conclusion of World War II, General Carl Spaatz reflected upon the Army Air Force’s strategic bombing effort. The newly appointed Army Air Force Chief of Staff explained:

Airpower in this war developed a strategy and tactic of its own, peculiar to the third dimension. It achieved the principle of mass, in the highest degree ever known, by its capacity to concentrate all available units of striking power from widely distributed bases over one point—the enemy’s heart.¹

Between 1942 and 1945, American airmen dropped 1,622,664 tons of bombs against targets in Europe and the Home Islands of Japan.² Their goal was simple: to deprive Axis powers the means to fight. The effects of these strikes were pronounced, with the United States Strategic Bombing Survey (USSBS) concluding that: “…no nation can long survive the free exploitation of air weapons over its homeland.”³ Ravaged target centers in Germany and Japan stood in testament to this point.

The vision for strategic aerial attack first developed during World War I, when airmen flying over the battlefields of France determined that they could offer a more


effective and efficient avenue to victory. Instead of beating back enemy forces mile-
by-mile through a series of battles, airmen predicted that they could circumvent much of this carnage by simply flying over the opposing army and striking at the heart of its war-making capacity—factories, command and control centers, logistics lines, etc. Deprived of the tools necessary to sustain war, the opposing nation would face defeat.  

As airmen honed their concepts throughout the 1920s and 1930s, they determined that modern societies functioned through an “industrial web”—a series of capabilities, technologies and functions interrelated to one another. Interrupt a key point in this system and the overarching enterprise would likely falter. For example, airmen bombing an electrical plant would degrade an enemy’s war-making capacity as factories ground to a halt without power.  

Major General Frank Andrews of General Headquarters, Air Force outlined this theory in a 1939 speech:

> Since the existence of the highly industrialized modern nation is dependent upon the continued functioning of an intricate economic structure, and since that structure is highly sensitive to air attack, it is obvious that air strategy dictates the selection of vital targets within that economic structure as the objectives for such an attack.

Strike the right targets and an enemy nation’s ability to fight would erode. As Major Muir Fairchild of the Air Corps Tactical School summarized in a 1938 lecture: “Where

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5 Wesley Frank Craven and James Lea Cate, eds., *Plans and Early Operations, January 1939 to August 1942*, vol 1 of *The Army Air Forces In World War II* (New York: Van Rees Press, 1948), 52.  

the economic life of a nation is within the range of an air force, no reason exists to
doubt the ability of that air force to attack that nation with devastating results.”

Precision strike against key nodes within an enemy’s system was the key to
victory as far as the American airmen were concerned. Maximizing the effect of an
attack meant directing every bomb against a specific aim point. When the British
Royal Air Force adopted indiscriminate bombing methods at the beginning of World
War II, American airmen derisively concluded: “…improper tactics indicate that the
British lack appreciation of the value of accuracy in bombing…. [They] do not even
bother to use their bombsights but have restored to the improvised methods of the last
war.” The proponents of precision strike did not intend on making this same mistake.
As General Spaatz explained: “Our stand was that we’d bomb only strategic targets—
not areas. I believed that we could win the war more quickly that way.”

American airmen were afforded the opportunity to put their precision strike
theories to the test in response to escalating events in Europe and the Pacific. In August
1941, they argued for the “…application of airpower for the breakdown of the
industrial and economic structure of Germany” in the Air War Plans Division-1

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7 Major Muir S. Fairchild, “Primary Strategic Objectives of Air Forces” (lecture, Air Corps
Tactical School, Maxwell Field, AL, April 11, 1939), AF-14-C, Air Force Historical Office, Bolling Air
Force Base, DC, 5.

8 Colonel Edgar P. Sorenson to The Chief of the Air Corps, memorandum, Subject:
Effectiveness of Air Power, 20 May 1941, Air Force Historical Office, Bolling Air Force Base, DC, 1.

9 General Carl A. Spaatz, interview by Brig. Gen. Noel F. Parrish and Dr. Alfred Goldberg, 21
requirements document.\textsuperscript{10} This vision expanded to include Japan the following year via
the Air War Plans Division-42 report. In 1943, the Casablanca Directive, the
Combined Bomber Offensive and The Air Plan for the Defeat of Japan provided
additional detail defining the precision strategic strike vision. Amidst these policy
documents, air commanders fought against adopting indiscriminate methods of
bombing. War industries, not diffuse population centers, were the priority targets. As
bomber commander General Ira Eaker later explained, “I never thought morale
bombing made any sense.”\textsuperscript{11}

By the spring of 1944, with Germany’s defeat in sight, air commanders began
to think about assessing the ultimate effectiveness of their strategic bombing
campaigns. As Henry “Hap” Arnold, Commanding General of the Army Air Forces,
explained to the Joint Chiefs of Staff in a June 6, 1944 memo:

I propose to initiate as practicable a critical survey of the results of the
Combined Bomber Offensive in Germany and the occupied
countries….1) Of immediate value would be the lessons which we
might employ in the furtherance of our aerial warfare against Japan. 2) Of
the greatest importance is the possible determination of our whole
future air policy.\textsuperscript{12}

\textsuperscript{10} Haywood S. Hansell, Jr., \textit{The Air Plan that Defeated Hitler} (Atlanta, GA: Higgins-

\textsuperscript{11} Lt Gen Ira C. Eaker, interview by Dr. Goldberg & Dr. Hildreth, 22 May 1962, K239.0512-
627, United States Air Force Oral History Program, Albert F. Simpson Historical Research Center, Air
University Maxwell Air Force Base, AL, 2.

\textsuperscript{12} MacIsaac, \textit{Strategic Bombing in World War Two: The Story of the United States Strategic
Bombing Survey}, 41.
Secretary of War Henry Stimson authorized the analytical effort—termed the United States Strategic Bombing Survey (USSBS)—in November 1944. Headed by Franklin D’Olier, president of the Prudential Life Insurance Company, the study was staffed by three hundred civilian analysts, three hundred-and-fifty military officers, and five hundred enlisted personnel. Their charge was direct. As D’Olier declared: “We shall proceed in an open-minded manner, without prejudice, without any preconceived theories, to gather the facts. We are simply to seek the truth.”

After much investigation and research, USSBS analysts ultimately determined that America’s strategic bombing was a “decisive” factor in securing the Allies’ victory over Germany. The strikes: “…brought the economy which sustained the enemy’s armed forces to virtual collapse.” Of particular interest, the report declared:

The importance of careful selection of targets for air attack is emphasized by the German experience. The Germans were far more concerned over attacks on one or more of their basic industries and services—their oil, chemical, or steel industries, or their power, or transportation network—than they were over attacks on their armament industry or city areas. The most serious attacks were those which destroyed the industry or service which indispensably served other industries.

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13 The United States Strategic Bombing Survey, *The United States Strategic Bombing Survey: Over-all Report (European War)*, (Washington D.C., September 30, 1945), IX.


16 Ibid.

17 Ibid., 108.
Airmen’s perseverance and dedication was vindicated. Precision strategic bombing fundamentally shaped the course of the war.

However, the USSBS report highlighted that “decisive” should not be conflated with the notion of a flawless air campaign. The analysts concluded that bombing: “…might have been employed differently or better in some respects.”18 They emphasized three main points for air commanders to consider: the dubious value of unfocused area strikes; the necessity to mount robust, recurring attacks; and the critical importance of informed target selection.

When it came to selecting between precision strike and general area attack, officials engineered the Combined Bomber Offensive to satisfy both methods. American bombers flew against specific targets by day and British crews hit mass areas by night. This plan was based upon the Casablanca Directive’s call for both: “Progressive destruction and dislocation of the German military, industrial, and economic system, and the undermining of the morale of the German people to a point where their capacity for armed resistance is fatally weakened.”19 While these two forms of bombing yielded a tremendous amount of damage, USSBS analysts concluded that raw destruction should not be conflated with effective strategic

18 Ibid., 107.

19 Combined Chiefs of Staff, Plan for Combined Bomber Offensive from the United Kingdom, 14 May 1943, Air Force Historical Office, Bolling Air Force Base, DC, 1.
paralysis. According to the survey:

The major cities of Germany present a spectacle of destruction so appalling as to suggest a complete breakdown of all aspects of urban activity. On the first impression, it would appear that the area attacks which laid waste to these cities must have substantially eliminated the industrial capacity of Germany. Yet this was not the case. The attacks did not so reduce the German war production as to have a decisive effect on the outcome of the war.20

Destructive power was only effective if it struck a target relevant to the war-making enterprise. While the mass urban bombing certainly made life harder for the German people, it was something that they could endure.

Albert Speer, Germany’s Minister of Armaments and War Production, concurred with this assessment. He explained that “the American method [of bombing] was more dangerous because it was an economic war technique, while the British were aiming for centers of cities.”21 As far as these urban strikes were concerned, Speer explained: “Air raids had shown life could continue on an orderly basis in the severely affected cities. Tax revenues, for instance, went on being paid even after bombs falling on treasury offices had destroyed the documents.”22 He surmised that: “The war could largely have been decided in 1943 if, instead of vast pointless area bombing, the


planes had concentrated on the centers of armament production." General Eaker undoubtedly would have appreciated this precision bombing endorsement when he was defending the Eighth Air Force’s accomplishments to Prime Minister Winston Churchill at the 1943 Casablanca Conference.

Past their support for precision strike, USSBS analysts also emphasized the necessity of striking with sustained mass. When the Japanese attacked Pearl Harbor on December 7, 1941, the Air Corps inventory contained a total of 159 heavy bombers. It took two years to expand this small force into one capable of projecting massed raids of sufficient destructive intensity. Of all the bombs dropped in Germany by American bombers, just 17 percent fell before January 1, 1944. This limited striking power was too small to effectively collapse the production system. While airmen entered the war understanding that “mass must be applied against the critical point,” they lacked the means to turn their doctrinal principles into reality until 1944.

The challenges associated with inadequate striking power are best illustrated through the Eighth Air Force’s campaign against the German ball bearing industry. These components were vital for nearly all mechanized products—airplanes, tanks,

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23 Ibid., 280.


trucks, engines, etc. Considering that the industry was centralized in a few key locations, target analysts determined that a disproportionally large effect could be secured by bombing a handful of plants. Eliminate these factories and the production of the associated finished products would grind to a halt. American bombers struck the primary production facility in Schweinfurt, Germany in August and October 1943.\textsuperscript{27} According to Albert Speer, these raids “…had a very serious effect on us. Aiming was good and production at Schweinfurt was nearly paralyzed.”\textsuperscript{28} However, such accomplishment came at a price. Nearly one hundred bombers were shot down over the course of two missions. Continuing the raids meant annihilating the American bomber force. This was a price air commanders could not afford to pay.\textsuperscript{29}

A critical target system was spared because the American airmen were not adequately equipped to execute a sustained campaign. As Speer later explained: “What really saved us was the fact that from this time on, the enemy to our astonishment once

\textsuperscript{27} Arnold, \textit{Air War: Official Report of the Commanding General of the Army Air Forces to the Secretary of War}, 29.

\textsuperscript{28} \textit{Interrogation of Reichminister Albert Speer}, 72.

\textsuperscript{29} The United States Strategic Bombing Survey, \textit{The United States Strategic Bombing Survey: Over-all Report (European War)}, 27-29.
again ceased his attacks on the ball bearing industry.”

The history of the attack upon the anti-friction bearing industry indicated that even in the case of a very concentrated industry, very heavy and continuous attacks must be made, since otherwise the enemy, if he can survive the initial shock, will be able to take successful countermeasures. At the time of the attacks on Schweinfurt in 1943 the limited operations upon the capability of the Air Force…were such to make that kind of attack impossible. The Germans were able to survive the initial shock.

Analysts studying this experience highlighted a vital conclusion: “Whatever the target system, no indispensable industry was permanently put out of commission by a single attack. Persistent re-attack was necessary.”

As Speer succinctly concluded, “The idea was correct, the execution was defective.”

Adequate force structure finally arrived in 1944. Aircraft inventories surged and bombing raids in excess of one thousand aircraft frequently launched for Germany. During February 1944, airmen managed to drop four thousand tons of bombs in just one week. It took crews five months to accomplish that same goal in 1943. Bomb tonnage expanded from a total of 135,092 tons in 1942 and 1943 to

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30 *Inside the Third Reich: Memoirs by Albert Speer*, 286.


32 Ibid., 108.

33 *Inside the Third Reich: Memoirs by Albert Speer*, 352.

34 Hansell, *The Air Plan that Defeated Hitler*, 201.

35 The United States Strategic Bombing Survey, *The United States Strategic Bombing Survey: Over-all Report (European War)*, 16.
1,328,331 tons in 1944 and 1945.\textsuperscript{36} Effective, lasting damage correlated with the rise in sustained striking power.

Aside from building an adequate force, air commanders also had to ensure they were striking the right set of targets. Certain industries were more vulnerable to bombing than others. Excess production capacity, a diversified supply base, and resilient construction techniques helped buffer select target systems. Airframe production fell into this category. According to the German Air Inspector General Field Marshall Erhard Milch: “It is true that air attacks on the airframe factories did hold up our production, but they did not reduce it.”\textsuperscript{37} By striking airframe production, air commanders were clearly trying to degrade German air opposition. However, there was another way to secure the same objective. As Milch explained: “I never understood why you did not attack the engine factories in 1944. If you had attacked them straight away, it would have been far worse. You needn’t have attacked the airframe factories at all.”\textsuperscript{38} Speer concurred, remarking that: “There were only a few big factories for motors….If you would have attacked the motors at first and not the airframes we would have been finished.”\textsuperscript{39} If air commanders had a better

\textsuperscript{36} Hansell, \textit{The Air Plan that Defeated Hitler}, 200.

\textsuperscript{37} The United States Strategic Bombing Survey, \textit{The United States Strategic Bombing Survey: Over-all Report (European War)}, 22.

\textsuperscript{38} Ibid.

\textsuperscript{39} \textit{Interrogation of Reichminster Albert Speer}, 30.
understanding of the German production system’s strengths and weaknesses, they could have made far better use of their finite supply of striking assets.

Deciding whether to hit airframe factories or engine production plants demanded robust intelligence. According to USSBS analysts: “The information on the German economy available to the United States Air Forces at the outset of the war was inadequate.” No matter how valid strategic strike may have been in theory, it could only succeed if airmen knew where to aim.

American airmen finally managed to direct their burgeoning force against a concentrated, vulnerable target set in the spring of 1944. The petroleum, oil and lubricants (POL) industry was centralized in a few locations throughout Europe. Production equipment was exceedingly susceptible to bomb damage and the facilities were too complex to relocate or diversify. These factors enabled bombers of the Eighth and Fifteenth Air Forces to net major results when they began flying against this target set in the spring of 1944. Albert Speer explained to Adolf Hitler:

Our aviation gasoline production was badly hit in May and June. The enemy succeeded in increasing our losses of aviation gasoline up to 90 percent by June 22….It is not possible for us to protect these plants, we will be forced to curtail the flow of supplies to the Army in September, which will mean from that time on there will be a terrible bottleneck which may lead to the most tragic consequences.  

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40 The United States Strategic Bombing Survey, *The United States Strategic Bombing Survey: Over-all Report (European War)*, 108.


42 The United States Strategic Bombing Survey, *The United States Strategic Bombing Survey: Over-all Report (European War)*, 41.
Speer’s predictions were correct. American airmen dropped 114 tons of bombs against the German POL enterprise in January 1944. By September this figure escalated to 26,370 tons.\(^{43}\) Consistent, focused attack against a vulnerable target set was the key to success. As the bombing survey explained, “Repeated air attacks, rather than the severity of any single raid, caused the almost complete breakdown of German oil production.”\(^{44}\)

Without POL, the Germans struggled to sustain combat operations, train replacement forces, and continue war material production.\(^{45}\) It was a quintessential target representing the power inherent within precision strategic strike—one target set yielding a series of debilitating effects. Now that the airmen had found this point of vulnerability, they refused to let up the pressure. As Albert Speer explained: “There had certainly been critical situations before this—the bombing of the Ruhr reservoirs, for instance or the ball bearing plants—but the enemy had always demonstrated a lack of consistency; he switched from target to target.”\(^{46}\) The American airmen would not repeat their past mistakes. They knew that a concerted focus on POL was undermining Germany’s ability to continue the war. According to Speer: “It meant the end of German armaments production.”\(^{47}\)

\(^{43}\) Ibid.

\(^{44}\) Ibid., 42.

\(^{45}\) Interrogation of Reichminister Albert Speer, 63.

\(^{46}\) Inside the Third Reich: Memoirs by Albert Speer, 347.

\(^{47}\) Ibid., 346.
The net effect of the bombing campaign was so pronounced by 1945 that the USSBS report concluded:

Even if the final military victories that carried the Allied armies across the Rhine and Oder had not taken place, almost all war production would have come to a virtual standstill by May. The indicators are convincing that the German armies, completely bereft of ammunition and motive power, would have to cease fighting—any effective fighting—within a few months.\(^{48}\)

The airstrikes flown in 1944 and 1945 yielded effects so pronounced that the analysts estimated that the Germany’s territorial losses only accounted for 10 percent of the overall production decline.\(^{49}\) Production capacity was faltering due to the bombing, not the loss of facilities to advancing armies. As far as the USSBS was concerned:

“Germany was mortally wounded.”\(^{50}\)

In 1938, Air Corps doctrine boldly proclaimed that: “Where the economic life of a nation is within range of an Air Force, no reason exists to doubt the ability of that air force to attack that nation with devastating results.”\(^{51}\) The survey’s overarching conclusion ultimately validated this assertion: “The German experience suggests that even a first class military power—rugged and resilient as Germany was—cannot live long under full scale and free exploitation of air weapons over the heart of its

\(^{48}\) The United States Strategic Bombing Survey, The United States Strategic Bombing Survey: Over-all Report (European War), 38.

\(^{49}\) Ibid.

\(^{50}\) Ibid., 107.

\(^{51}\) Fairchild, “Primary Strategic Objectives of Air Forces,” 5.
territory.”\textsuperscript{52} 1,461, 864 tons of bombs dropped over the course of 754,818 individual sorties truly demonstrated the concept of “Victory through Airpower.”\textsuperscript{53}

While USSBS analysts hypothesized that Germany’s final surrender could have been prompted exclusively through bombing, no such predictions were required for Japan. An aggressive year-long strike campaign in which B-29s dropped 160,800 tons of ordnance on the Home Islands drove the remaining Axis power to surrender to the Allies without a final ground assault.\textsuperscript{54} As the analysts concluded,

\begin{quote}
The program for the very heavy bombardment of Japan to which the B-29 was committed, in spite of many problems and complexities, was soundly conceived and executed, and the weapon itself proved capable of meeting the requirements for which that force was created: “to achieve the earliest possible progressive dislocation of the Japanese military, industrial, and economic systems…to a point where their capacity and will to wage war is decisively weakened.”\textsuperscript{55}
\end{quote}

However, air commanders did not attain this goal through precision strike. A combination of conditions—overcast weather, aggressive winds, and reliability challenges with their new B-29 bombers—precluded the airmen from putting enough bombs on target. From December 1944 through February 1945 airmen flew just

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\textsuperscript{52} The United States Strategic Bombing Survey, \textit{The United States Strategic Bombing Survey: Over-all Report (European War)}, 107.
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\textsuperscript{53} Ibid., X.
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\textsuperscript{54} The United States Strategic Bombing Survey, \textit{The Effects of Air Attack on Japanese Urban Economy: Summary Report}, 5.
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eighteen missions against Japan. Something had to change, for as the USSBS analysts reported, “…to retard the tempo of the bombing operations could not be accepted.” Wartime experience in Europe clearly illustrated the necessity of regular strikes against targets in a constant, overwhelming fashion. Standard precision methods were not delivering these results.

Seeking an alternative, General Curtis LeMay of XXI Bomber Command decided to strike Japanese industrial zones with incendiary munitions. This was not a snap decision. General Arnold’s Committee of Operations Analysts (COA) assessed this approach in 1944 and concluded: “An analysis of the principle Japanese industrial cities indicates that most are highly vulnerable to incendiary attack. Their predominantly wood construction…and high degree of congestion…renders them susceptible to sweeping fires.” Broad destruction in specific areas enabled overarching war aims because as the analysts discovered: “The larger urban industrial areas are characterized by densely-congested residential districts in which are located a substantial number of large factories and hundreds of small household shops.” The location of the production centers in highly flammable city districts meant airmen


57 The United States Strategic Bombing Survey, The Strategic Air Operation of Very Heavy Bombardment in the War Against Japan (Twentieth Air Force): Final Report, 32.


59 Ibid.
could rapidly destroy a vast proportion of the Japanese war-making enterprise in a
decisive fashion.

Even General Ira Eaker, the champion of precision strategic strike in Europe,
acknowledged the value inherent within this new approach: “There was a tremendous
difference between urban bombing in Europe and Japan. The Japanese were making
munitions in small shops in the cities. These areas were difficult to target
individually.”60 Given that 80 percent of Japanese cities were built from wood, versus
just 5 percent in Europe, the target areas were exceedingly vulnerable to incendiary
attacks.61 This was not a strike against population centers akin to the Royal Air Force’s
European urban bombing campaign. Area incendiary strikes were directed against war
industries that happened to be co-located with population centers. Sixty-four percent of
Japan’s industry was concentrated in the cities.62 Precision tactics were simply not
delivering the desired results. As General Eaker concluded, “We had to be sure of
hitting something.”63

60 Lt Gen Ira C. Eaker, interview by Dr. Goldberg & Dr. Hildreth, 22 May 1962, K239.0512-627, United States Air Force Oral History Program, Albert F. Simpson Historical Research Center, Air University Maxwell Air Force Base, AL, 3.


63 Eaker interview, 22 May 1962, 3.
On the night of March 9, 1945, B-29s loaded with incendiary munitions headed for Tokyo. Air commanders were hopeful their new mass strike tactics would yield success, for as the COA analysts explained, the Japanese capitol city represented:

…the largest concentration of industrial capacity, particularly important for aircraft, shipbuilding, motor vehicles, rubber products, electrical equipment, machines, and tools, and oil refining. It is estimated that over 20 percent of the key industrial objectives in Japan proper are in this area.\(^{64}\)

The impact of this first major fire raid was staggering. General LeMay ordered successive strikes. According to USSBS analysis, “The urban incendiary attacks eliminated completely the residential and smaller commercial and industrial structures of the affected areas and a significant number of important plants.”\(^{65}\) The high concentration of industrial facilities housed in combustible structures enabled airmen to net mass target destruction in an incredibly effective, efficient fashion.

Raids were flown at a pronounced rate, with 94,000 tons of incendiary bombs dropped between March and August 1945.\(^{66}\) Despite the ferocity of these strikes, it is important to point out that the airmen were not bent on raw destruction. Target planning analysts focused specifically upon select industrial sectors and avoided areas without a direct connection to the war effort. As a COA report explained: “Many large


\(^{65}\) United States Strategic Bombing Survey, *Summary Report (Pacific War)*, 17.

cities, such as Kyoto and Sendai, etc. were not included because their small number of industrial and other military objectives does not justify large-scale incendiary attack."

Nor did airmen wholly cede their precision methods. When weather conditions allowed for adequate aiming, airmen flew standard precision missions against facilities located outside urban centers. Traditional bombing methods were the still the most effective means for destroying such targets. As the USSBS explained: “Thus two parallel systems of targets were developed: the key industrial objectives such as aircraft plants, arsenals, marshaling yards, oil installations, etc. as one system, and the urban industrial centers as the other.”

Two different methods of attack both focused upon a common objective: to rapidly destroy as much Japanese war-making capacity as possible before the anticipated invasion. Precision strikes comprised 22 percent of all bombing missions flown between March and August 1945.

By the summer of 1945, the bombing campaign was escalating at a prodigious rate. Jiro Horikashi, a Japanese aircraft designer living in Nagoya, explained that: “Bomb damage had become so great throughout the entire country that everybody

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70 United States Strategic Bombing Survey, Summary Report (Pacific War), 18.
realized that the war could not possibly be won.”

Admiral Soemu Toyoda, Chief of Naval General Staff, concurred with this assessment. He reported to the USSBS analysts: “The main consideration that led to the decision to cease hostilities was, after all, the overall weakening of the nation’s production capacity, loss of material, etc.”

Comparing October 1944 production figures to corresponding data from July 1945, USSBS analysts noted the decline precipitated by the attacks:

- In plants which were hit by bombing: 73%
- In plants not hit by bombing but located in bombed cities: 49%
- In both hit and un-hit plants in bombed cities: 67%
- In un-hit plants located in un-bombed cities: 6%

The difference between targeted regions and unaffected areas was pronounced, with production in bombed regions down by two-thirds. As the USSBS analysts explained:

“The urban air attacks, when they reached significant weight in early 1945, fell upon an ideal target—an economic structure with neither the means nor the spirit to offer strong resistance.” In fact, the incendiary bombing was so destructive that out of the fifty-eight cities hit between June and August 1945, only three required repeated attacks.

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74 Ibid., 3.

75 The United States Strategic Bombing Survey, The Strategic Air Operation of Very Heavy Bombardment in the War Against Japan (Twentieth Air Force): Final Report, 15-16.
These raids destroyed six hundred war material factories, including twenty-five aircraft production plants and eighteen POL installations. While this method may have been far from precise, the intent outlined by airmen prior to the war—to destroy the enemy nation’s war making capacity effectively and efficiently—was fully realized.

In 1936, Chief of the Air Corps Major General Oscar Westover predicted: “That aircraft will play an important part in any war of the future is incontestable.” Prior to World War II, the scale and scope of airpower’s role was a contentious subject. Traditional Army commanders favored a force optimized to support standard ground offensives, much like what occurred during World War I. This was evidenced in 1941, when the Joint Army-Navy Board declared: “It should be recognized as an almost invariable rule that only land armies can finally win wars.” Airmen disagreed. Instead of battling an enemy on the periphery, they favored striking core targets that enabled the overarching war effort. As General Arnold explained, “…the objective of our bomber offensive is the smashing of industrial targets vital to the enemy’s military strength….” Deprived of the means to fight, an enemy would have to surrender.

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76 Ibid., 6.


78 Hansell, The Strategic Air War Against Germany and Japan, 40.

American airmen strove to include strategic bombardment as a central mission in both Europe and the Pacific. Initial experiences in both theaters rapidly emphasized that this undertaking was going to be far more arduous and complex than originally envisioned. General William Mitchell’s prediction that “airpower is the only element of national defense that promises any hope for a speedy decision in a war of the future” contrasted sharply with the brutal air wars waged above Germany and Japan. Instead of striking a discrete number of targets to rapidly collapse an enemy state’s war-making enterprise, airmen readily understood that victory through airpower demanded massive, sustained, concurrent assaults.

Air commanders in Europe persevered with their precision strike tactics, striving to boost the scale of the force to net requisite target destruction. When weather threatened to undermine their efforts, they harnessed new radar technology to sustain the rate of attack. While such raids saw decreased accuracy, this was a price commanders were willing to pay to ensure a robust operations tempo. Airmen also discovered that many of their key target sets were enmeshed deep within cities. Ordnance targeting technology of the time lacked the necessary precision to hit these aim points in an exclusive fashion. Surrounding areas suffered extremely high collateral damage—the most notorious of these being Dresden. However, whether bombing with radar or striking an urban target, airmen’s intent was abundantly clear. They were trying to hit specific war enterprise targets. Dubious accuracy resulted from

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technological shortfalls, not commander’s intent. True to the Casablanca Directive and the associated Combined Bomber Offensive, American airmen fought and flew to “accomplish the progressive destruction and dislocation of the German military, industrial and economic system….” This demanded getting their bombs on the aim point.

Airmen flying over Japan intended to pursue a nearly identical strategy of precision targeting. The Air Plan for the Defeat of Japan explicitly called for: “…the destruction of selected systems critical to the Japanese industry, the accomplishment of which will reduce the Japanese war effort to impotency.” From June 1944 through February 1945, B-29 crewmen struggled to release their ordnance on individual industrial targets. Post-strike analysis clearly indicated these missions were failing to attain their desired objectives. Flying high above enemy defenses meant that cloud cover, wind, and associated mechanical challenges were severely degrading strike results. Airmen needed to find a different tactical approach to ensure target destruction. Allied leaders planned to launch a massive set of ground invasions on the Home Islands of Japan at the end of 1945. Airmen had to net strategic effects rapidly if they were going to avert what promised to be an incredibly brutal set of battles.

Using intelligence data gathered by General Arnold’s Committee of Operations Analysts, General Curtis LeMay shifted the bulk of his bombers from precision strikes

\[81\text{ Combined Chiefs of Staff, } \textit{Plan for Combined Bomber Offensive from the United Kingdom, 5.}\]

\[82\text{ Combined Chiefs of Staff, } \textit{Air Plan for the Defeat of Japan, 20 August 1943, Air Force Historical Office, Bolling Air Force Base, DC, 2.}\]
to mass incendiary raids against urban industrial centers. Bombers were able to secure near-total target destruction on nearly every mission they flew. Much like the decision to adopt radar bombing techniques in Europe, air leaders understood that they could not let a rigid adherence to doctrine undermine their ability to net desired mission effects. Collateral damage was simply a byproduct of the revised strategy, not its ultimate purpose. As General LeMay later discussed: “We were going after military targets. No point in slaughtering civilians for the sake of slaughter. Of course there is a pretty thin veneer in Japan, but the veneer was there.” Nor did General LeMay end precision strikes. Airmen continued to fly those sorts of missions when they were deemed the most effective means of destroying specific industries. The overarching aim was target destruction in the most rapid, overwhelming fashion possible. Despite the brutality wrought by these missions, they were deemed far less destructive than an invasion of the Home Islands.

Whether flying over Germany or Japan, the airmen’s intent was the same: end the war as rapidly as possible without reverting to the costly tactics of attrition and occupation. This stems directly back to the air-minded vision outlined by the original

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air leaders. General Mitchell explained:

Armies proved conclusively in the last war [World War I] that they could not gain victory. For four years they faced each other across a lot of ditches in northern France and went backward and forward only a few miles. Millions of men were killed and wounded; billions of dollars were spent; lines of transportation and communication were destroyed or greatly impaired. All that happened only went to prove that the armies, following an entirely worn-out theory that they could capture the vital centers of the enemy against an opposing army, had not taken a proper count of modern means of defense, such as the machine gun, the rapid fire cannon, and toxic gasses. By their ignorance of modern methods and devices, they brought the world to the verge of ruin.  

The architects of strategic bombardment in World War II: Arnold, Spaatz, Eaker, Hansell, and LeMay fundamentally agreed with Mitchell. That is why they persevered against the most daunting of odds—fighting not only the Axis powers, but also competing Service commanders and Allied leaders who did not embrace their “air-minded” strategic vision.

As testament to the airmen’s vision, Allied armies rapidly advanced from the beaches of Normandy to the heart of Germany in less than a year. Territory that was the scene of brutal stalemated slaughter throughout World War I was captured in a matter of months. In Japan, airmen were able to concentrate their efforts into a massive strategic strike campaign of unparalleled effectiveness and efficiency. True to General Arnold’s original plan, this bombing campaign evolved into an “Air Plan for the Defeat of Japan.” Instead of continuing the war into 1946 as stipulated by Allied invasion plans, Japan surrendered in August 1945.

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With World War II at an end, the air leaders came home to fight a new battle: one for an independent Air Force. Airmen who spent the inter-war years battling against the institutional Army wanted to shield future air commanders from such onerous bureaucratic struggles. If the vision for strategic airpower championed in the World War II was going to survive in the post-war world, airmen fervently believed their air arm needed to exist as an independent military branch. As Ira Eaker explained to Carl Spaatz in the spring of 1945, “I think it is a tragedy that we have to come home from a war, three-and-a-half years of hard work, to start the toughest struggle of our lives, but we can either do that or see the whole thing fall apart.”

Eaker and his compatriots were willing to wage this fight because they fundamentally believed in the value of strategic airpower. General Arnold addressed this point while testifying before the Senate Committee on Military Affairs in the fall of 1945:

> It is uniformly true that each new crisis in our history has found our armed forces far from effectively, efficiently, or economically organized. With each new crisis modernization and coordination have been hammered out under great pressure at great waste of resources, to be allowed in large measure to lapse when the crisis is over. The question of effective, efficient and economical organization comes before the country after every war, as each successive generation seeks—hitherto unsuccessfully—to profit the full lessons learned in war. Today that question is with us again and this time more urgently than ever.  

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Ever since World War I, airmen strove to build a strategic air force capable of executing their vision for effective, efficient power projection. They finally succeeded on September 18, 1947 with the passage of the National Security Act of 1947. An independent Air Force was finally a reality.87

Over the ensuing years, airpower’s capability and capacity to net strategic goals has expanded at a tremendous rate. The airmen who fly and fight in defense of our Nation are now equipped with capabilities their predecessors could have barely imagined. Modern aircraft protected by the virtues of speed and stealth can span the globe, releasing precision ordnance on incredibly specific targets. As Air Force Lieutenant General David Deptula (ret), a key air planner in the 1991 Gulf War, explained, “In some cases, a single aircraft and one precision-guided munition achieved the same result during the Gulf War as a one thousand plane raid with over nine thousand bombs in World War II—and without the collateral damage.”88 Such technological advancements have redefined the way in which military leaders harness airpower. Complex precision strikes that were fundamentally impossible to execute during World War II, are now routine activities in today’s military engagements.

While the technology governing military hardware has evolved, one thing that has remained constant is the notion of “air-minded” intent. Airmen still seek to attain strategic results using the same guiding intellectual principles as their World War II

87 Mets, Master of Airpower: Carl A. Spaatz, 322.

predecessors. This continuity was aptly illustrated by an episode from the 1991 Gulf War. Shortly before Iraq invaded Kuwait, then-Lieutenant Colonel David Deptula was reading General Haywood Hansell’s memoir. As he later explained: “I found it fascinating in providing insight into how an airman of that age designed an air campaign based on desired effects.”89 Within a matter of weeks, Deptula’s interest in air campaigns rapidly expanded past the theoretical domain:

Little did I know the challenges that Hansell faced in the early 1940’s were ones that I would soon face just weeks later as the key planner of the Desert Storm Air Campaign. The difference between the two of us in philosophy of approach was little...the difference in aerospace technology and capability from 1940 to 1990 was enormous.90

Focusing on strategic objectives, Deptula and his fellow war planners designed an air campaign of unparalleled strategic effect.

Airmen launched for Iraq on the night of January 17, 1991. They successfully hit more targets in one day than the Eighth Air Force struck in all of 1942 and 1943.91 Even though Iraq possessed the fourth-largest military in the world, American forces and their Allied partners secured victory in less than two months. Air operations defined the conflict, with a ground assault launched one hundred hours prior to the declaration of a ceasefire.92 As a point of contrast, Iraq and Iran had spent the prior

89 David A. Deptula, e-mail message to author, March 2, 2013.

90 Ibid.

91 Deptula, Effects-Based Operations: Change in the Nature of Warfare, 2.

decade locked in a brutal stalemate in which both sides reverted to attrition-based tactics reminiscent of those used in World War I. Nearly half-a-million combatants died and neither side was able to secure a decisive victory. Air-minded strategy precluded a similar outcome in 1991.93

Reflecting on the historic context of the air campaign, Deptula explained: “The principals of what we were trying to achieve were the same—capitalizing upon the advantages of airpower to directly achieve the national security objectives of our respective times. It was an incredible link across generations of airmen.” Pairing strategic air theory with the attributes of modern technology, Deptula and his fellow airmen secured national objectives rapidly and decisively.94 Such results are a fitting legacy for Billy Mitchell, Hap Arnold, Carl Spaatz, Ira Eaker, Haywood Hansell, and Curtis LeMay. Their quest for “a better way” is still empowering the nation.

93 Ibid., 290.

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