THE FACTORS THAT INFLUENCE AIR STRATEGY:

HOW DO LEADERS CHOOSE AIR STRATEGY?

BY

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APPROVAL

The undersigned certify that this thesis meets master's-level standards of research, argumentation, and expression.

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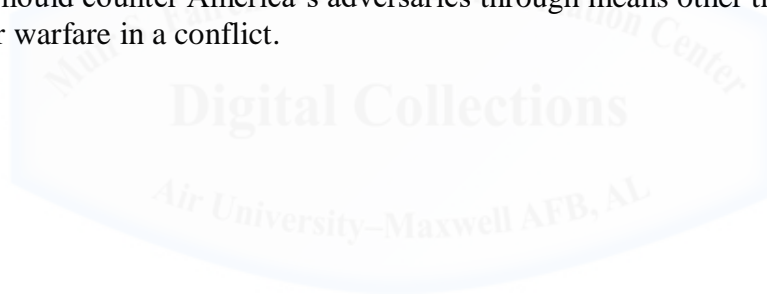
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ABSTRACT

This work explores how national decision-makers choose air strategy. The study explores the interaction between a chosen air strategy and seven factors over three cases. The factors in the study range from those that are tactical in nature, to those that concern grand strategy. I primarily seek to determine how the factors influence the choice of strategies related to attrition compared to maneuver. The studies include Germany's air strategy in the 1939-1940 campaigns of World War II, the British and American Combined Bomber Offensive air strategy of World War II, and Israel's air strategy of the 1973 Yom Kippur War. I find that the state's political objectives directly influenced the choice of air strategy. The six other factors influenced the choice of political objectives and indirectly influenced the choice of air strategy. The threat to national survival, economics, and military doctrine had the most influence over the political objectives of each state in my study. The size of a state's air force, the state's posture for war, and the aerial defenses of its enemy held lesser influence over the political objectives.

The implications of this study suggest that attritional strategies are ill-suited against adversaries with superior economies. The United States fought in wars from a position of material superiority over the past century, and therefore tended to favor strategies of attrition. A similar approach may be ill-suited for future peer-conflict. Therefore, US strategy should counter America's adversaries through means other than war or through maneuver warfare in a conflict.

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Introduction

This thesis seeks to explain how national decision-makers choose air strategy. National decision-makers are those leaders that hold the decision authority to implement a strategy, military service Chiefs of Staff and the President or Prime Minister of a state. Air strategy is air power's contribution to military strategy, which intends to achieve political ends through military means. In order to understand how decision-makers choose an air strategy, I strive to answer the following broad research questions.

First, why do some nations use air strategies of attrition, while others use air strategies nested within a military strategy of maneuver warfare? Most of my argument centers on answering this question. Next, how do elements of grand strategy influence a decision-maker's choice of air strategy? These core research questions form the foundation of my thesis and underpin more specific questions within each of the three case studies I present in this thesis.

I examine three cases that involve a variety of air strategies. The first two case studies involve the air strategies employed by Germany, the United States, and the United Kingdom in World War II (WWII). First, I explore the Luftwaffe's air strategy, which began as a strategy of maneuver at the beginning of WWII but shifted to an attritional strategy during the Battle of Britain. This case presents an excellent opportunity to explain how decision-makers develop and choose air strategies before conflict and subsequently adapt air strategy once the war begins.

The second study explores the Anglo-American air strategy employed in the European theater during WWII. The roots of the Anglo-American strategy grew from WWI and matured into an attritional strategy in the 1930s, primarily executed through the strategic bombing of cities and industrial centers. In addition to the topics I explore throughout the case, this case demonstrates how geography plays a role in the choice of

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air strategy.[1] The Anglo-American air strategy is best described as a strategy of attrition through "overall control of the air, to be gained by sheer numbers of aircraft..."[2]

The last case explores Israel's air strategy in the Yom Kippur War of 1973. The Israeli Air Force (IAF) intended to execute a strategy of maneuver, but last-minute geopolitical changes, such as the United States withholding its support of Israel if Israel became the aggressor of a war, precluded the IAF's use of preemptive strikes. The IAF was the decisive force of Israel's military strategy, and the strategy depended upon preemptive strikes to achieve surprise and begin the war with a high tempo—essential elements of any maneuver strategy—to gain an advantage early in conflict. Losing the ability to strike the Arab forces preemptively disrupted the IAF's air strategy. Consequently, the IAF's decisive contribution to Israel's victory over the Arabs came through a great battle of attrition.

Concepts of Attrition and Maneuver Warfare

Strategies of attrition and maneuver differ from each other in basic ways. Attrition warfare aims to "annihilate military equipment and manpower faster than they [can] be replaced," and often requires the full mobilization of national human and industrial resources if the war lasts more than a few months.[3] In contrast, maneuver warfare often seeks to minimize fighting, attempting to place the enemy at a maximum disadvantage by occupying favorable positions or taking the initiative. Once the fight has concluded, it seeks to exploit the maximum advantage of the situation by pursuing the enemy, keeping it off balance, and "striking into his vitals."[4] Americans tend to find

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[1] I identify the variables I explore later. Geography was not one of the variables I deliberately chose to explore beginning my research. However, in retrospect of my studies, it is apparent that geography does influence a decision-maker's choice of air strategy. My thesis does not explore the influence of geography in each case, which is a limitation to the study. Future research should explore the relationship between geography and the chosen air strategies.

[2] Phillips P. O'Brien, *How the War was Won* (Cambridge, UK: Cambridge University Press, 2015), 46. This quote refers to President Franklin D. Roosevelt's affinity for air power. Before the US's declaration of war, the President sought to reorient America's manufacturing base such that it would produce massive numbers of aircraft.

[3] Robert A. Pape, *Bombing to Win: Air Power and Coercion in War* (Ithaca, NY: Cornell University Press, 1996), 280.

[4] Martin van Creveld, Steven L. Canby, and Kenneth S. Brower, *Air Power and Maneuver Warfare* (Maxwell AFB, Alabama: Air University Press, 1994), 1.

maneuver warfare counterintuitive, perhaps because the United States has fought most wars with overwhelming material superiority.[5]

The two strategic approaches contain significant differences. Table 1 summarizes these differences. Though most of these differences are relatively straightforward, those related to firepower and the mitigation of threats are more complex.   Attritional strategies use firepower to inflict maximum destruction whereas strategies of maneuver use firepower to create a desired effect, one that enables some other action or objective, as desired by the commander.   Maneuver warfare, in other words, uses firepower for more than just destruction. With regard to threat mitigation, attritional strategies deal with threats through destruction. In contrast, maneuver strategies move up the level of war, such as from tactical to operational, to circumvent the threat. For example, to minimize the attrition of forces in tactical battles, a strategist could create an operational plan that makes tactical victory irrelevant and unnecessary, thereby "moving up" a level of war to mitigate threats. In WWII, the Germans demonstrated this concept by avoiding the French Maginot Line, which could have impeded the German's Blitzkrieg through France and the European Lowlands. Each strategy aims to neutralize the threat, but in vastly different ways. The best comparison between attrition and maneuver warfare is summed up by this axiom: attrition warfare attacks the enemy's strongest point, whereas maneuver warfare attacks the enemy's weakest point of great importance.

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[5] Creveld, Canby, Brower, *Air Power and Maneuver*, 8.

Table 1: The Characteristics of Attrition Compared to Maneuver Warfare

	Attrition Warfare	Maneuver Warfare
Readiness	Constant unit readiness	Screening actions and a large reserve force
Battlefield Ops	Linear operations, concentrated forces	"Thrust-line oriented"
Method of Victory	Sequential destruction of adversary's forces	Break down enemy connectivity through disrupting logistics, C2, or reserves
Priority of Effort	Attacks enemy strengths	Attacks enemy weaknesses
Defense and Attack	Attack and defense greatly differentiated	Attack and defense are difficult to differentiate
Firepower's Purpose	Uses firepower for maximum destruction	Firepower intended to create a specific effect
Distribution of Effort	Slow advancement; more supplies	Attack narrow, focused sectors; fewer supplies
Force Structure	Relatively fewer, yet larger units	Relatively more, yet smaller units; Common logistics
Threat Mitigation	Battlefield-centric focus, massive bloodshed	Move "up" a level of war to avoid bloodshed

Source: Recreated from Martin van Creveld, Steven L. Canby, and Kenneth S. Brower, Air Power and Maneuver Warfare (Maxwell AFB, Alabama: Air University Press, 1994), 8-14.

Maneuver warfare can be generalized as a three-step process. First, enemy weaknesses must be found and exploited at the correct time. Second, during the attack, a force must pin-down, or fix, the enemy while maneuver forces exploit enemy weaknesses in the flank or rear. If the flanks cannot be found, they must be artificially created through concentration and surprise. The final step is to continue to push forward while defending against counterattack. Air power is particularly useful in defending against or preventing the counterattack.[6]

Attritional warfare contrasts with maneuver warfare by exhausting the enemy through attacking or resisting the enemy's strength. Attritional strategies focus on

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[6] Creveld, Canby, and Brower, *Air Power and Maneuver*, pp 2-3 describe the process I labeled as a three-step process.

confronting the enemy strengths and demonstrating superiority through one's own strength over the enemy's strength. With both belligerents willingly engaged in attritional warfare, the victor is the side that forces the other to lose its strength in materiel, manpower, or will. Maneuver strategies avoid the contests in strength altogether by finding the enemy's weakness and then exploiting it for a decisive advantage that leads to the enemy's collapse faster than the enemy can react.

Maneuver strategies may devolve into attritional strategies because problems may impede the strategy or external factors may force the utilization of a strategy before its maturation through the three-step process generalized above. Attritional strategies are not necessarily bad and may be most appropriate in certain situations, depending on the certainty of known enemy weaknesses. With these critical concepts defined, I discuss the methodology of my research and the presentation of my findings next.

Methodology

I examine events to demonstrate how a particular factor impacted the choice of air strategy. In general, seven factors influence leaders' decisions regarding air strategies. Importantly, some play a more significant role than others.[7] Below are the seven topics explored in the study.

1. Political objectives
2. Existential threat to state survival
3. War-making economic capacity (e.g., GNP, military equipment production rates, military trade, etc.)
4. Air doctrine[8]
5. Size of air forces
6. Strategic posture of the war (e.g., aggressor or victim)
7. Adversary anti-air capabilities

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[7] I also considered the following topics in my research: The state's perception of the enemy's political objectives, the state's prediction of the enemy's anti-air capabilities, and the state's prediction of the enemy's strategy. While I do think these topics are essential considerations for building air strategies, I did not find enough evidence to ascertain their impact on the choice of air strategy. Therefore, I omit them from the discussion in this work.

[8] This also accounts for the military doctrine of the state. As the reader will see, air doctrine generally supports the greater military doctrine.

These seven topics cut across multiple elements of grand strategy and multiple levels of war, influencing decision-makers at each level regarding choices of air strategy. I studied areas mostly related to grand strategy and military strategy because an air strategy is chosen by leaders at strategic and grand strategic levels. Therefore, grand strategic and strategic considerations influence a decision-maker's choice of air strategy, or decision-makers' choices, more than tactical considerations because leaders generally avoid the nuances of tactics and leave those details for their subordinates.[9]

The Way Ahead

This thesis includes three substantive chapters and a conclusion. Chapter 1 examines German air strategy in WWII from beginning of hostilities when Germany invaded Poland in 1939 through the Battle of Britain. Germany's air strategy shifted in the Battle of Britain and the failure of the new strategy contrasts with the success of Germany's air strategy during the first year of the war. Chapter 2 analyzes the Anglo-American air strategy throughout WWII. I chose these two cases for several reasons. First, WWII provides a wealth of information, which presents the opportunity to find high-quality information on many subjects. Second, because WWII contained a broad set of belligerents, it allowed me to analyze belligerents of differing values—such as strategies, interests, geopolitics, and so on—while holding many contextual elements constant. This situation is particularly valuable because it enabled me to draw stronger conclusions by reducing ambiguity due to changing contextual elements between cases. Third, the German and Anglo-American air strategies were fundamentally different from one another at the beginning of the war.[10] The German air strategy was a component of

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[9] Though not an initial focus of this study, geography did play a role in at least two instances, as reflected in the German and the Anglo-American cases that follow. Further research is warranted to determine the extent of geography's influence on decisions regarding air strategy.

[10] The UK and US air forces developed doctrines during the interwar years that emphasized strategic bombing over other forms of air power. Both air forces expedited the development of bomber aircraft, until the British perceived an existential threat from Germany in the late 1930s and focused on fighters. While the UK and US air power doctrines were similar in many ways, the doctrines had vital differences. The UK and US air power doctrine differed primarily in their desired effects from air power. The British doctrine emphasized the strategic bombing of cities to break the enemy's will to fight—known as "morale bombing." American doctrine progressively changed from morale bombing to the high-altitude precision daylight bombing doctrine of the 1930s, which focused on denying the enemy's capacity to wage war by destroying its war economy. Despite the differences in doctrine, I consider the UK and US doctrine to be similar enough to consider them as one. I realize this generalization overlooks some of the unique differences between the UK and US air force doctrine and operations, but I accept the imperfection for simplicity of the argument.

the Wehrmacht's combined arms maneuver warfare doctrine, commonly referred to as Blitzkrieg today. In contrast, the Anglo-American air strategy is generally characterized by the sheer scale of production, the numbers of aircraft employed, and persistent bombing operations. The value of studying these strategies lay with determining why the German approach differed from the Anglo-American approach. Finally, WWII was the last total war in which at least two great powers fought each other in a physical confrontation. As the rhetoric between the United States and Chinese escalates, and United States Department of Defense policy places more emphasis on peer competition, strategists should study past wars of peer conflict to draw insights for future strategy.

Chapter 3 examines the Yom Kippur War of 1973, in which Israel began the war as the victim of Arab aggression, but ultimately won through a bloody war of attrition. Considering Israel's dramatic success in the 1967 Six-Day War, a war in which air power played a decisive role on all fronts, the Yom Kippur War surprised Israel, which narrowly avoided defeat during the war. Israel primarily fought with Western technology and Western methods, whereas the Arab Coalition fought with Soviet technology and methods. The war introduced the SA-6 and ZSU-23-4 air defense systems in combat with deadly effect. The efficacy of advanced mobile surface-to-air missile (SAM) and radar-guided anti-aircraft artillery (AAA) systems shocked the IAF and Western air forces.

The concluding chapter highlights the most significant findings from the thesis and proposes considerations for strategists. Additionally, it recommends areas of continued research. Lastly, I consider how my findings might apply to future strategies.

Preview of the Argument

The final portion of this introduction presents the primary tenets of my argument. Of note, the seven categories under consideration have varying levels of influence on a decision-maker's choice of air strategy. Political objectives directly influence the choice of air strategy. The remaining six areas indirectly influence the choice of air strategy through their influence on the political objectives. A nation's perception of threat to its survival, its economic situation, and the doctrine of its air force significantly influence the political objectives. To a lesser degree, the size of a state's air force, its posture in

war, and the enemy aerial defenses influence the political objectives. Figure 1 depicts these relationships. The size of the arrow represents the magnitude of influence.
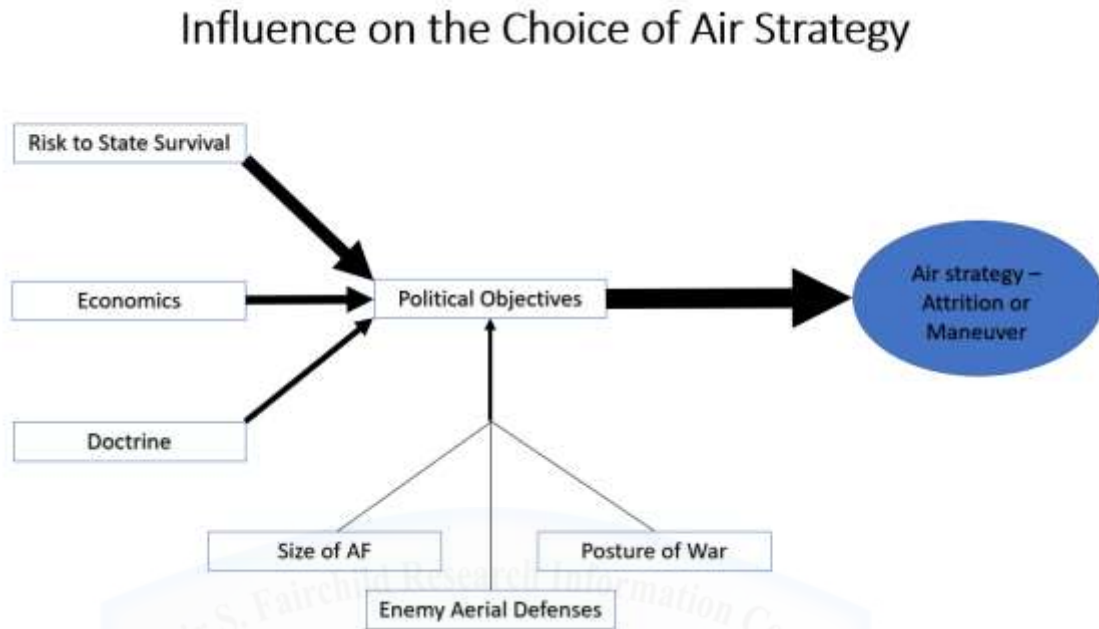
Figure 1: The weight of influence by each topic area.
Source: Author's original work

Political objectives directly influence the choice of air strategy, but as the figure shows, these objectives are shaped by several factors, the most important of which are level of threat to a state's survival, economics, air doctrine. Ultimately, political objectives reflect the level of effort a state intends to commit to the war, which is why the choice of air strategy depends so strongly on the political objectives.[11]

The risk to a state's survival posed by its enemy requires special consideration, due to its outsize influence. To the extent that leaders perceive a given threat to be existential, they will do what it takes to ensure the survival of their state. The existential threat may readjust the political priorities, which would in turn have a significant influence on the form of air strategy. Chapter 3's study of the IAF in the Yom Kippur War represents such a case. When Israel's leaders perceived the existential threat to their

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[11] Carl von Clausewitz, *On War*, eds. and trans. Michael Howard and Peter Paret (Princeton, NJ: Princeton University Press, 1984), 80.

nation's survival, the political objectives of the war changed to ensure Israel's survival. Israeli leaders became disproportionately focused on blunting the strength of the Arab invasion, which led to the adoption of an attritional air strategy.

Beyond risk to a state's survival, economic considerations have the greatest influence on the political objectives. Economic factors may play several roles in the determination of political objectives. They may underpin a given political objective, for instance, or constrain another. Military doctrine also has a significant influence on political objectives, but less so than either risk of survival or economic factors. Military doctrine indirectly influences the choice of air strategy by influencing the choice of political objectives through the shaping of thought, operations, and the force structure of the military. For example, IAF and Luftwaffe doctrine emphasized the defense of their nations, joint service integration, and speed in operations. Fighter and attack aircraft are better suited than bombers to defend a nation from attack, and the desire for joint service integration led to combined arms warfare. Lastly, the emphasis of speed in war operations motivated a high tempo in war. These ideas harmonize with maneuver strategies more than attritional strategies.

In the next chapter, I show how each of the seven factors led to the Luftwaffe's use of a maneuver strategy in the first part of WWII. I also explain how those same factors account for the choice to alter that strategy during the Battle of Britain, when the Germans moved from a strategy of maneuver to one of attrition. Dissecting the reasons why the Luftwaffe strategy changed in WWII demonstrates how the relationships between politics, an existential threat to state survival, economics, and military doctrine can lead to changes in air strategy during a war.

Chapter 1

German Air Strategy in World War II

The Germans were able to gain the aerial advantage over the Allied powers in the first years of the World War II not because they had overwhelming numbers of aircraft, but because their conceptions of a future air war and the training and equipment required for such a war was far more accurate than their opponents' air power vision.

James S. Corum, *The Luftwaffe*

Political objectives directly influenced the choice of air strategy, but two groups of factors influenced Germany's political objectives. Survival, economics, and air doctrine made up the "Big Three" influences on Germany's political objectives. The Big Three were tied to Germany's vital interests, which explains their significant influence on Germany's political objectives. The second group, which I call the "Little Three," influenced Germany's political objectives to a lesser degree. The Luftwaffe's size, Germany's war posture, and enemy aerial defenses make up the Little Three. The influences from the Big Three trumped the influences of the Little Three when tensions between the groups existed. Before proceeding, the reader may find it helpful to reference Figure 2 to see the visual relationship of the two groups of factors, political objectives, and the choice of air strategy.

Over the course of the war, Germany utilized two air strategies. The first, employed between the invasion of Poland in 1939 and up until the Battle of Britain in 1940, integrated into the Wehrmacht's doctrine of combined arms and quick and decisive battle. This air strategy reflected one of maneuver warfare. The second strategy emphasized attrition through independent Luftwaffe operations and strategic bombing to achieve victory. While the air strategy in the West shifted during the early stages of the war, a decision which this thesis focuses on, the Luftwaffe, for the most part, kept utilizing a strategy for maneuver warfare against the Soviet Union on the Eastern Front throughout the conflict.

Influence on the Choice of Air Strategy
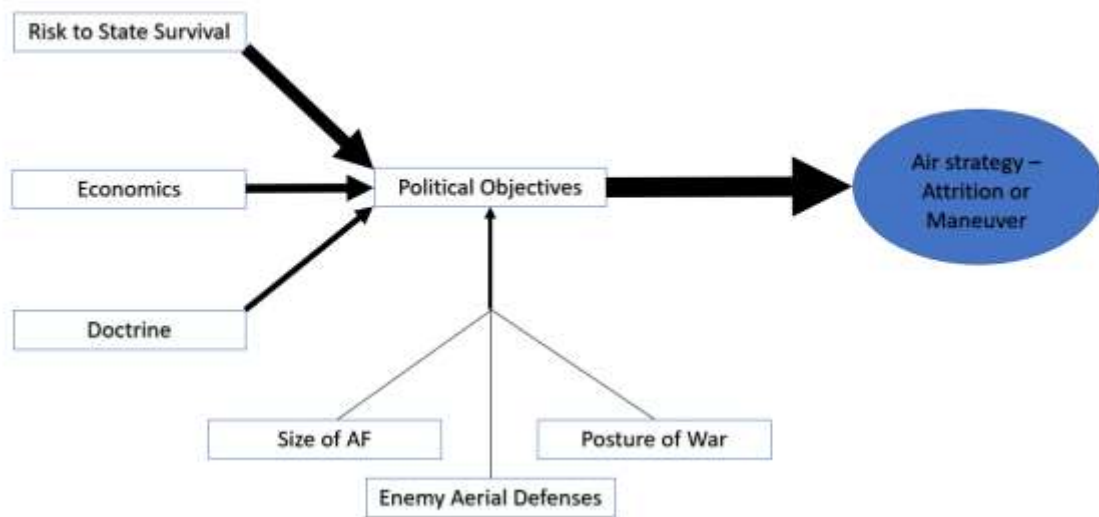
Figure 2: The weight of influence by each topic area.
Source: Author's original work

Hitler's political objectives directly impacted the choice of the Luftwaffe's maneuver strategy. Hitler's perception of America's existential threat to Germany, economic scarcity, and German military doctrine significantly influenced the development of his political objectives. Germany's economic limitations influenced political objectives, which in turn affected other elements that contributed to the choice of air strategy. For example, during the 1930s the economic constraints felt by Germany limited the development of the Luftwaffe and the force structure of the Luftwaffe.[12] German leaders anticipated economic constraints to future operations and emphasized the importance of speed to military campaigns in order to conserve resources. In another case, Germany's economic debts combined with the its lack of raw materials precluded the production of a four-engine heavy bomber force.[13] Without heavy bombers, the Luftwaffe could not conduct strikes deep within enemy territory. Germany's economic limitations, Hitler's worry over the existential threat posed by the United States, and

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[12] Williamson Murray, *Strategy for Defeat: The Luftwaffe 1933-1945* (Maxwell AFB: Air University Press, 1983), 3.
[13] Murray, *Strategy for Defeat*, 2-3.

Luftwaffe doctrine all influenced Germany's political objectives to demand war with quick victories, and maneuver warfare suited these objectives.

The Luftwaffe's size, Germany's aggressive posture, and the aerial defenses of Germany's enemies influenced Hitler's political objectives to a lesser degree. Therefore, these factors had less influence on Germany's choice of air strategy. These factors had less influence over Germany's political objectives because they were of less importance to the state. In contrast, Germany's survival and a healthy economy were of vital importance.

Germany's political objectives changed for the Battle of Britain, which explains why Luftwaffe strategy changed. Prior to the battle, Germany anticipated coercing Britain into submission without the use of force. Due to Germany's economic situation, it needed to continue the offensive into the Soviet Union as quickly as possible in order to capitalize on Germany's diminishing strategic advantage. Following the Battle of France, Germany learned the British would continue to resist German aggression. Attacking the Soviet Union with Britain as a hostile belligerent in the war infringed upon another political objective that required Germany to fight the war on a single front. Therefore, the new political objective required Germany to neutralize Britain through force. To support the new political objective, Luftwaffe strategy changed for the Battle of Britain, operating largely independent of the German army and navy. In this form, Luftwaffe strategy targeted Britain's strength—the Fighter Command's aircraft—in an attempt to establish air superiority through the attrition of Britain's defensive fighter forces. In this way, it changed from a strategy of maneuver into one of attrition in the Western front. Before revealing how German decision-makers chose their air strategy, I discuss the Luftwaffe's two strategies as they were used in the war.

The Luftwaffe's strategy through the first year of WWII fit neatly into the greater German military strategy of *Blitzkrieg*, meaning "lighting war." In the context of military campaigns, Blitzkrieg means "war conducted with great speed and force," or "a violent surprise offensive by massed air forces and mechanized ground forces in close coordination."[14] Germany's military strategy embodied a combined arms approach, seeking out quick and decisive battles intended to facilitate political resolution. The

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[14] *Merriam-Webster's Collegiate Dictionary*, s.v. "Blitzkrieg, n."

Luftwaffe was a critical component of Germany's maneuver warfare strategy and its role evolved through time.

The Luftwaffe's adoption of a maneuver-centric strategy began in the 1920s. Luftwaffe doctrine remained relatively coherent and progressive under its Chief of Staff's leadership with Han von Seeckt in the 1920s and Walter Wever in the 1930s. Under von Seeckt, Luftwaffe doctrine focused on air superiority and battlefield interdiction, which intended to disrupt adversary personnel and material mobilization.[15] A decade later, Wever assigned the Luftwaffe two strategic tasks to better support the German military doctrine that prescribed the use of combined arms and joint integration. The Luftwaffe's first task included the defense of Germany and its second was to defeat the enemy threatening German security.[16] In part due to the limitations of Germany's aircraft engine industry and to Wever's tasks, Luftwaffe procurement focused on fighters and attack aircraft to be used in a joint and multi-domain effort.[17]

Luftwaffe strategy continued to evolve and adapt to the evolving German grand strategy and foreign policy in the 1930s. German doctrine intended to minimize the chance of attritional warfare, which the German High Command and Hitler knew the German economy could not win.[18] Doctrine focused on quick, decisive, Blitzkrieg warfare to take advantage of Germany's strengths and exploit its enemy's weaknesses. During Germany's campaigns through Europe from September of 1939 through June of 1940, Luftwaffe strategy focused on three areas. First, the Luftwaffe aimed to create windows of opportunity for the joint force through gaining air superiority over the battle space. Second, it provided tactical windows of opportunity through the interdiction of tactical reinforcements as well as insertions of paratroopers at key terrain along the battlespace. Finally, the Luftwaffe focused the main effort of its battlefield interdiction on the Allied reserves, well behind the front.[19] In summary, the strategy established air

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[15] Kate Moore and the Imperial War Museum, *The Battle of Britain* (Oxford: Osprey Publishing, 2010), 58.

[16] James S. Corum, *The Luftwaffe: Creating the Operational Air War, 1918-1940* (Lawrence, Kansas: University Press of Kansas, 1997), 54.

[17] Kate Moore and the Imperial War Museum, *The Battle of Britain,* 61-63.

[18] Alfred C. Mierzejewski, *The Collapse of the German War Economy, 1944-1945* (Chapel Hill: University of North Carolina Press, 1988), 2.

[19] Martin van Creveld, Steven L. Canby, and Kenneth S. Brower, *Air Power and Maneuver Warfare* (Maxwell AFB, Alabama: Air University Press, 1994), 49.

superiority through airfield attack and aerial battle and disrupted enemy ground forces through operational interdiction and tactical insertion.

Operation Eagle, the Luftwaffe's name for its campaign in the Battle of Britain, differed from its predecessor in two ways. First, it operated independently of the other services and lacked a combined arms approach.[20] Second, it lacked the tempo of the original strategy because the Luftwaffe airbases operated further from the battle. As opposed to establishing temporary pockets of air superiority over the invasion forces, this strategy planned to establish air superiority over all of Britain in an effort to pave the way for Germany's invasion of Britain.[21] The Luftwaffe's strategy intended to establish air superiority through the bombing of airfields in an effort to destroy the Royal Air Force (RAF) on the ground, bombing London to draw the RAF into combat, and shooting down the defending aircraft. The Luftwaffe achieved barely more than a 1:1 kill ratio in the previous campaigns, and Operation Eagle planners estimated the Luftwaffe needed a 5:1 kill ratio to achieve air superiority, not accounting for Britain's ability to replenish lost fighters.[22] The strategy was ambitious and risky, which makes one wonder why Germany took the gamble. The answer to this question and determining how German decision-makers chose each air strategy, is the purpose of the next section.

Analysis: How and Why German Leaders Chose Luftwaffe Strategy

The Big Three factors had the most influence on Germany's political objectives. I discuss these factors first. The Little Three factors demonstrated less influence on Germany's political objectives. I discuss this group of factors second. Then, I show how the political objectives influenced the choice of air strategy. Finally, I discuss what factor changed to influence the change of political objectives and subsequently changed Luftwaffe air strategy for the Battle of Britain.

Threat to Germany's Survival

Hitler perceived an existential threat to Germany and had a great influence over Germany's political objectives. Hitler's understanding of the global order and his ideology affected Germany's perception of an existential threat. The alliance of Britain

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[20] Murray, *Strategy for Defeat*, 45.

[21] Murray, *Strategy for Defeat*, 45-46.

[22] Stephen Bungay, *The Most Dangerous Enemy: A History of the Battle of Britain* (London, UK: Aurum Press Ltd, 2000), 126.

and America against Germany would be a severe threat to Germany's grand strategy and its need to invade the Soviet Union. Hitler could not accept such a possibility and sought ways to avoid the manifestation of a Anglo-American alliance hostile to Germany. Hitler's fear of the future fed into the narrative of the existential threat to Germany. The threat had to be dealt with and Hitler's political objectives made sure of it.

Economic motivations and constraints on Germany

Hitler's fear of America's potential power underpinned his political objectives and the desire for preventive war. However, the limited capacity of Germany's economy constrained Hitler's ambitions and his political objectives. Because of Germany's economic limitations, his objectives required Germany to win wars quickly to preserve the strength his economy could provide. Yet, the Luftwaffe needed a large force structure, which emphasized quantity of aircraft, to win war quickly. Given the resource and production constraints of Germany's economy, the Germans prioritized smaller aircraft such as fighters, attack aircraft, and small bombers. These types of aircraft serve maneuver strategies better than attrition because of their flexibility, their capability to operate through combined arms, and their limited firepower. This is the framework of how economics influenced Germany's political objectives and the choice of air strategy in WWII. The subsequent paragraphs describe the details.

Hitler's fear of America inspired preventive war to expand the German economy and prepare for the future showdown with America. Since the United States posed an existential threat to Germany in Hitler's mind, his long-term strategy required economic parity with the United States to maintain strategic freedom. The problem was that in the 1930s, Germany was far from economic parity with the United States. In the fall of 1934, the German cotton industry had no more than two weeks of a reserve, rubber plants had two months' worth, and the petroleum industry had a reserve of about three and a half months.[23] Foreign creditors became skeptical of Germany's debt and Germany lived a "hand-to-mouth" existence for the remainder of the 1930s.[24] Therefore, early in Hitler's regime, he identified the relative weakness of Germany's economy compared to the United States and sought to catch up.

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[23] Murray, *Strategy for Defeat*, 2.
[24] Murray, *Strategy for Defeat*, 2.

The limitations of German economic capacity constrained Germany to wars of a short duration. In order to do so, Hitler needed a Luftwaffe with a large force structure. A large Luftwaffe would not only help him win wars quickly, he intended to exploit the Luftwaffe's numerical advantage for diplomatic coercion. He chose to intimidate through numbers.[25]

His decision remained tied to his political objective to restore German military power for conquest but acknowledged Germany's economic limitations. The Luftwaffe's failure to produce a heavy bomber demonstrates this point. The Luftwaffe's Chief of Staff ordered the development of four-engine heavy bombers in 1935, but the German war-economy failed to deliver. The problem lay with German engine technology. "German-designed engines were at the time incapable of delivering the necessary power to transport such a heavy plane together with its bomb load at sufficient speeds."[26] It took years for the German aircraft engine industry to produce an engine powerful enough for use in heavy bombers. Walter Wever ordered two four-engine types of heavy bombers because he understood the importance of strategic bombing, the larger payloads heavy bombers provided, and need for long-range strike aircraft to attack the Soviet Union.[27] However, the prototypes performed poorly. Consequently, the Luftwaffe air staff chose to skip the first generation of heavy bombers and intended to instead develop advanced heavy bombers when "the technology had effectively caught up with thinking."[28] The industry never caught up. In spite of the Luftwaffe's lack of a heavy bomber in the late 1930s, it had plentiful numbers of light, medium, and dive bombers. Despite the smaller payloads of these aircraft, the accuracy of these bombers supported operations with high tempo.

In addition to supporting Hitler's diplomatic strategy, building smaller aircraft accommodated a large force structure and economic constraints. The Luftwaffe lacked a

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[25] Derek Dempter and Derek Wood, *The Narrow Margin: The Battle of Britain & The Rise of Air Power 1930-1940* (Barnsley: Pen & Sword Aviation, 2010), 21.

[26] Kate Moore and the Imperial War Museum, *The Battle of Britain (*Oxford: Osprey Publishing, 2010), 61, 63.

[27] Kate Moore and the Imperial War Museum, *The Battle of Britain, 61.* See also, Corum, *The Luftwaffe*, 170.

[28] Kate Moore and the Imperial War Museum, *The Battle of Britain, 63. See also,* Corum, *The Luftwaffe,* 172-173.

platform to deliver massive bombloads, but it had precision bombing with its available bombers. Therefore, why would the Luftwaffe commit Germany's limited economic resources in the development of future technologies when it had good equipment already in service? Given Hitler's preference for aircraft quantity and Germany's economic constraints, it made sense for the Luftwaffe to pursue its numerical superiority through smaller aircraft. After Wever's death in 1936, Goering and his staff cancelled the plans to build heavy bombers because of the industry's lack of raw materials.[29] His decision solidified the Luftwaffe's force structure as an air force of fighters, attack aircraft, and light to medium bombers. The small, maneuverable, and relatively simple aircraft fulfilled the Wehrmacht's need for a flexible maneuver force. In contrast, these aircraft were a poor choice for attrition strategies because they lacked the firepower of heavy bombers. Therefore, it made sense that the Luftwaffe use a maneuver strategy.

In summary, Hitler's fear of America drove him to choose preventive war, but German leaders knew the limitations of their economy constrained war strategy. Quick and decisive victories supported their war aims best, which required a large force structure of small aircraft. Given this force structure, the best use of the Luftwaffe included its integration as part of the Wehrmacht's maneuver strategy. This is how economics influenced the choice of political objectives and why German decision-makers chose the air strategy of maneuver for the early campaigns of the war.

Luftwaffe Doctrine

Luftwaffe doctrine influenced Germany's political objectives, and the choice of air strategy, prior to the war but less so during the war. Luftwaffe doctrine did not intend to win wars alone. Rather, the Luftwaffe "believed that bombing was an essential instrument when other forms of warfare had reached a stalemate."[30] The doctrine's focus, however, concerned combined arms warfare with the army.

The Luftwaffe doctrine emphasized the speed and decisive action that German decision-makers sought. Doctrine influenced the development of air strategies that aligned with Hitler's political objectives and economic constraints. Choosing a strategy

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[29] Richard J. Overy, *The Air War 1939-1945* (Washington D.C.: Potomac Books, Inc., 2005), 103.
[30] Overy, *The Air War 1939-1945,* 103.

of maneuver made the most sense given the Luftwaffe's doctrine and force structure.[31] Therefore, Luftwaffe doctrine influenced German decision-makers' choice of strategy by emphasizing a high tempo in order to achieve quick victories and aligned well with Germany's political objectives and economic constraints.

The Luftwaffe strategy was well-suited for its first two major land campaigns in Poland and France. German intelligence thoroughly understood the vital elements of Polish and French warfighting means. For example, the Luftwaffe identified the Polish rail system as a primary target for its bomber force and intended to target the system to cripple the mobility of Poland's military. The Luftwaffe attached its Close Battle Division of aircraft with the German 10th army, which was spearheading the German assault on the Polish *Schwerpunkt*. The use of combined arms enabled the German army to advance with unprecedented tempo deep into Polish territory with little fear of counterattack.[32] The Wehrmacht's combined arms approach succeeded in the subsequent campaign in France.

Luftwaffe operations during the Battle of France demonstrate the fruition of Luftwaffe doctrine. The Luftwaffe front-line aircraft exceeded the Allied, 2,759 to 1,616.[33] Quantitatively, the Luftwaffe had the advantage. However, comparing the total numbers of sorties between the Luftwaffe and Allies reflects an even more dramatic difference in combat power. The German fighters flew an average of four sorties per day and Stukas, the chief close air support aircraft, flew even more. In contrast, the French fighters flew only 0.9 sorties per day and the bombers only 0.25 sorties per day.[34] This meant that the Luftwaffe effectively delivered the combat power of more than 10,000 aircraft per day compared to the Allies combat power of less than 1,400 aircraft per day. The results were dramatic. The Luftwaffe established air superiority within days and destroyed nearly a quarter of Allied aircraft on the ground.

With the fall of France and Britain's refusal to surrender, Germany had few options to defeat Britain quickly. The English Channel precluded the immediate use of

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[31] Luftwaffe doctrine focused on striking vital components of the enemy's forces that were weakly defended. In theory, the Luftwaffe did not need superior numbers in battle because it sought to avoid enemy strengths to minimize its own losses.

[32] Corum, *The Luftwaffe*, 272.

[33] Richard Overy, *Why the Allies Won* (London: W.W. Norton & Company, 1995)*,* 29.

[34] Corum, *The Luftwaffe*, 278.

combined arms because the German army could not fight until established in England and German doctrine did not integrate the navy in combined arms. Despite these limitations, German political objectives necessitated the use of force against Britain. The Luftwaffe was Hitler's prized possession and it proved extremely competent in the first year of war. The Luftwaffe and German leadership felt supremely confident in the superiority of the Luftwaffe over the RAF.[35] The Luftwaffe's numerical superiority over the RAF made the use of attrition appealing, which is how the size of the Luftwaffe contributed toward the decision to use attrition as Luftwaffe strategy for the Battle of Britain.

Luftwaffe Size

The size of the Luftwaffe makes up the first in the group of the Little Three influences on political objectives. The size of the Luftwaffe influenced its strategy but was dependent on the time horizon of a campaign and the perceived advantage or disadvantage of Germany's economic capability (see figure 3). While the Wehrmacht's doctrine focused on maneuver warfare, the Luftwaffe maintained relative numerical superiority over each adversary it encountered early in the war. For example, just prior to the Battle of France on 11 May 1940, the Luftwaffe had a total of 4,782 aircraft, including 1,356 single-seat fighters, 354 twin-engine fighters, and 2,125 bombers.[36] The French had only 1,200 combat aircraft of mostly obsolete designs.[37] The Luftwaffe dwarfed the air forces of its neighbors.
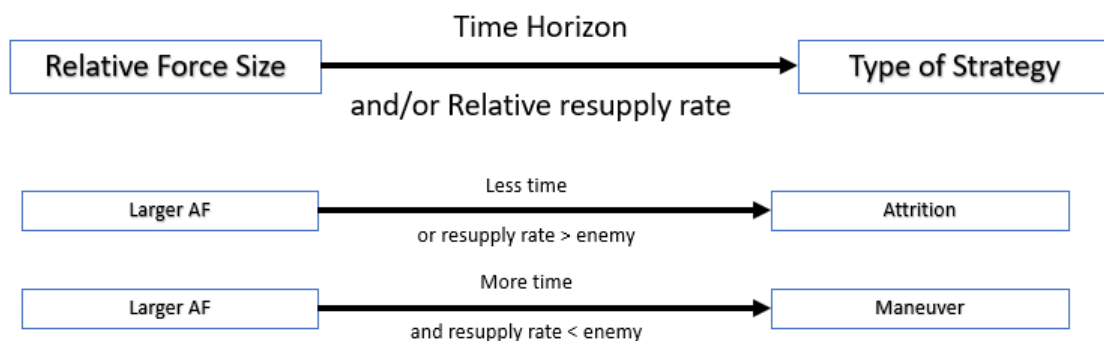
Figure 3: The relationship of the size of an air force and its chosen air strategy.
Source: Author's original work

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[35] Overy, *Why the Allies Won, 32*.
[36] Murray, *Strategy for Defeat*, 80.
[37] Kate Moore and the Imperial War Museum, *The Battle of Britain,* 84.

Figure 3 explains how the size of the Luftwaffe, combined with the expectations of campaign length and perceived resupply rates, influenced the choice of strategy. Germany planned for the war to be long but hoped for a swift victory. The maneuver strategy was the attempt to win quickly. Additionally, maneuver strategies work better for long wars in which states have economic disadvantages because they limit attrition. In contrast, Germany planned for the Battle of Britain to be short because of limited operations due to seasonal weather. In this case, the Luftwaffe's numerical advantage influenced the choice of attrition because Luftwaffe leaders expected the operation to be short, between two to four weeks.[38] Those that employ attritional strategies care about numbers because attritional strategies "win" through depleting the enemy's numerical strength more than one's own. In contrast, maneuver strategies achieve victory through striking vital components that are weakly defended.[39] These strategies do not necessarily need superior numbers to achieve victory, but the forces must attack the correct node at the correct time. In the 1930s, much of the Western world viewed war through the lens of attritional warfare.

The Luftwaffe's numerical superiority prior to the war was useful to Hitler's armed diplomacy strategy because it represented the Luftwaffe's strength through numbers. Hitler used the size of the Luftwaffe to demonstrate its relative superiority over other air forces. By emphasizing the size of the Luftwaffe, he spoke the same "language" as his adversaries. For example, during this same period, President Roosevelt aimed to increase the size of the USAAF to send Germany a message and deter aggression.[40] Hitler intended to coerce nations without conducting war by demonstrating the futility of fighting the Luftwaffe because it was larger than their own air forces. He hoped to coerce Britain to stand aside through this method of coercion. Hitler's armed diplomacy

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[38] Kate Moore and the Imperial War Museum, *The Battle of Britain,* 104.

[39] Creveld, Canby, and Brower, *Air Power and Maneuver*, 3. The Germans refer to this concept as *Schwerpunkt*, meaning focal effort at the center of gravity. Said another way, it is hitting the enemy at the right place, at the right time. Strategists must have intimate knowledge of the enemy to have a high probability of success.

[40] Jay A. Stout, *The Men Who Killed the Luftwaffe: The U.S. Army Air Forces Against Germany in World War II* (Mechanicsburg: Stackpole Books, 2010), 1-4.

worked until Germany invaded Poland and Britain declared war. Hitler expected war to occur. The Luftwaffe size always affected his use of armed diplomacy.

Posture of War

The fact that Germany intended to be the aggressor in war had a small influence in choosing the Luftwaffe maneuver strategy. Germany studied its historical enemies beginning immediately after WWI not because it intended to start another war, but because it needed to defend itself in case of war. By the time that Hitler made it clear to the military that he intended to initiate a preventive war, the Luftwaffe doctrine already favored maneuver warfare. However, Hitler's proclivity for war influenced the choice of maneuver strategy by its potential to maximize the advantage gained by a surprise attack.

Enemy Aerial Defenses

Germany's perception of its enemies' defenses further influenced the political objectives and the choice of maneuver strategy as the Luftwaffe's first form of strategy. For example, the Luftwaffe used surprise attacks during the German invasion of Poland and France for the purpose of destroying enemy aerial defenses as quickly as possible. Surprise attacks are one of the essential elements of a maneuver strategy in order to gain a significant advantage over the adversary.[41] Germany perceived its enemies had weak aerial defenses. This perception further influenced Germany's political objectives to demand quick victories. Therefore, Germany's perception of its enemies' aerial defenses influenced the choice of a maneuver strategy in order to gain a significant advantage through surprise. The six previous factors cumulatively influenced Germany's political objectives. The factors indirectly influenced the choice of air strategy through the political objectives, which are the topic of the next section.

Political objectives

Germany created four political objectives leading into the war based on the influences of the Big Three and Little Three. The first objective intended to restore German military power.[42] The Luftwaffe became an integral component to this objective. Then Germany planned to use the power to regain Germany's lost territory.[43] The third

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[41] Creveld, Canby, Brower, *Air Power and Maneuver*, 4-5.
[42] Richard Overy, *Why the Allies Won*, 11.
[43] Overy, *Why the Allies Won,* 11.

political objective planned to reunite the German-speaking populations.[44] The second and third objectives intended to achieve their ends through coercion, or force if necessary. Again, the Luftwaffe played a vital role in coercion and force. In either case, the objectives needed a large air force. Finally, Germany intended to claim "living space" in the east for the expected growth of the newly unified Germany and considered as the definitive objective of the war.[45] The final objective is known as *Lebensraum*—literally meaning living space in German—and is cognitively equivalent to America's concept of manifest destiny in its expansion across continental North America in the 1800s.[46] Hitler viewed *Lebensraum* as essential to Nazi-Germany's prosperity, and long-term survival. Furthermore, he knew such an objective could only occur through conquest.

Political objectives influenced Hitler's choice of air strategy in two ways. First, the political objectives going into the war demanded expedient military campaigns because of Germany's economic limitations, which influenced Hitler's decision to use Blitzkrieg warfare and an air strategy of maneuver. Second, German objectives required that Germany fight the war on a singular front. These factors operated in tension. Germany had to act quickly, but it also needed to fight one war at a time. Until mid-July 1940, Hitler believed that Britain would sue for peace and intended to grant it.[47] When diplomacy failed, Germany had to neutralize Britain through force before invading the Soviet Union. This reality caught Germany unprepared and it scrambled to develop a strategy. Hitler chose to use the Luftwaffe, as it was the only means available to neutralize Britain quickly. Therefore, political objectives influenced the choice of a maneuver air strategy early in the war by prioritizing the speed of operations. Conversely, it influenced the choice of an attrition air strategy in the Battle of Britain by emphasizing the necessity to defeat Britain at that moment, with a diminishing window of opportunity.

The Battle of Britain Strategy: The Luftwaffe Abandoned Maneuver for Attrition

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[44] Overy, *Why the Allies Won,* 11.

[45] Antony Beevor, *The Second World War* (New York: Little, Brown and Company, 2012), 1.

[46] *Merriam-Webster's Collegiate Dictionary*, s.v. "Lebensraum, n."

[47] Murray, *Strategy for Defeat: The Luftwaffe 1933-1945,* 44. Britain's actions throughout the 1930s supported Hitler's assumption.

Germany's political objectives changed during the war to include conquering continental Europe, neutralizing Britain to deny the United States access to Europe and defeating the Soviet Union to realize *Lebensraum.*[48] The new objectives tied the use of force to each objective. However, tension existed between these objectives. Conquering Europe and the Soviet Union necessitated a different military approach than neutralizing Britain due to the geography of the battlespace. Additionally, Hitler originally intended to coerce Britain through diplomacy rather than force. Hitler needed quick victories to achieve his political objectives before Western intervention could prevent his success. His need for expedient military operations influenced the development of Blitzkrieg and his preference to choose strategies that could win quickly. Strategies of maneuver offered the potential of quick victories. For the Wehrmacht, that meant a strategy of combined arms, joint integration, and decisive operations on concentrated objectives. The Luftwaffe strategy nested within the Wehrmacht's strategy, which aimed to deliver quick military victories. An attritional strategy like strategic bombing did not meet his needs because its effects would have required more time. Therefore, Germany did not use attrition as a strategy until the environment required its use for the Battle of Britain.

Having established the underpinnings of the maneuver air strategy employed during the early part of the war, I turn now to explain what factor caused Germany to adopt an attritional strategy as they prepared for the Battle of Britain. In short, geography complicated the use of Blitzkrieg in a timely matter, Germany's political objectives changed, and the economic urgency of Germany's situation required prompt action.

The geography of the battlespace made Germany consider an alternative strategy to Blitzkrieg because of the temporal constraint economics imposed on the political objectives. Germany could not wait to act on Britain because of the influences of economics on the political objectives. Blitzkrieg warfare intended to simultaneously fight on the land and through the air, but the English Channel complicated the use of operations in this manner without a significant alteration to its force structure. Germany would have likely continued the Blitzkrieg into England, if the English Channel did not exist or if Germany had more time to create the forces it needed to continue the

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[48] Douglas C. Dildy, *Battle of Britain 1940: The Luftwaffe's 'Eagle Attack'* (Oxford: Osprey Publishing, 2018), 4-5.

Blitzkrieg. Instead, the economic necessity to minimize the delay influenced the political objectives to act on Britain immediately. To defeat Britain, Germany needed to establish air superiority before it could invade and subsequently continue the Blitzkrieg. Without the use of combined arms, and the slower tempo of the operation due to the distances the Luftwaffe had to traverse, the use of attrition was most appropriate in Germany's situation. However, the geographic constraint on Germany's strategy does not explain why Germany chose to attack Britain, which required the new and hastily prepared Luftwaffe strategy.

Germany chose to attack Britain because its economic situation influenced the political objectives of the war to prioritize German momentum in the war. "[Hitler] was impatient to get on with things, and he was worried about the Russian threat. He really wanted a rapid decision."[49] Germany's relative strategic advantage diminished with time because its economic situation relative to their adversaries' declined through time. Despite the brilliant successes Germany enjoyed early in WWII, the conquered territories in Western Europe became more of an economic liability than an asset to Germany.[50]

Hitler needed to attack the Soviet Union to alleviate Germany's economic woes, but before he could do so, he needed Britain out of the war. The weather precluded the possibility of attacking Britain from October through March but waiting until spring of 1941 would have allowed Britain to rebuild its strength. Hence, time was of the essence, but an invasion required air superiority to minimize the risk to the German Navy and improve the invasion's probability of success.[51] This left the Luftwaffe to defeat the RAF

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[49] Bungay, *The Most Dangerous Enemy,* 32.

[50] Germany's economic conditions did not significantly improve once the war began. The conquered states of the new Nazi empire contributed towards the German war effort, but their contributions were pithy compared to America's contributions to the UK in the same period. For example, France was a significant industrially developed European state; yet, after its fall to Germany in June of 1940, German aircraft production increased to 12,000 per year in 1941, compared to 10,826 aircraft in 1940. (Tooze, *The Wages of Destruction,* 405) In comparison, at the end of June 1940, Britain contracted the United States to deliver at least 10,800 aircraft and 13,000 aircraft engines over the following eighteen months. Also, Britain planned to produce 15,000 military aircraft in the same period. Lastly, the United States and the UK developed ambitious plans to expand American aircraft deliveries to Britain up to 3,000 aircraft per month. (Tooze, *The Wages of Destruction,* 405-407) Before the war, the Luftwaffe had more aircraft than any of its neighbors by a significant margin, but the Allies prioritized aircraft production early in the war and quickly grew their air forces to be larger than the Luftwaffe.

[51] Had the German navy been comparable to the Royal Navy, Germany would have likely continued the Blitzkrieg into Britain under the protection of the Luftwaffe and Germany Navy. When forced to wage war against Britain, however, Germany's navy was inferior to the Royal Navy. The German navy's inferiority necessitated total air superiority prior to an invasion.

on its own, which precluded the use of maneuver at that current time, and meant Hitler had to accept the Luftwaffe's air strategy of attrition as the only means available to establish air superiority. Economics influenced the decision for the Luftwaffe to use a maneuver strategy going into the war, but geography complicated the use of maneuver against Britain. Therefore, the adoption of an attritional strategy in the Battle of Britain occurred due to the underlying economic factors that played into Hitler's strategic calculus.

Conclusion

Political objectives directly influenced Germany's choice of air strategy throughout WWII, with the Big Three holding the most influence over the political objectives. Hitler's fear of the existential threat America posed to Germany influenced his objectives to seek preventive war. Economics influenced the political objectives to demand quick victories in war and it constrained the Luftwaffe's force structure to large numbers of small aircraft. Those types of aircraft were best-suited for strategies of maneuver. The Luftwaffe's air doctrine nested within the Wehrmacht's combined arms theory of warfare and supported the political objectives to seek rapid victories in war. The Little Three factors had less influence on Germany's political objectives. The framework of factors explains how Germany chose an air strategy of maneuver for the first year of war, and how and why it chose an air strategy of attrition for the Battle of Britain.

Chapter 2

The Anglo-American Air Strategy of World War II

In the end, the war was won because the Allies had far more powerful and effectively equipped armed forces than did the Axis, and this equipment, particularly air and sea weapons of war, kept the Germans and the Japanese from moving. Bravery did not win or lose World War II. Air and sea power did.

Phillips P. O'Brien, *How the War was Won*

Politics, economics, and doctrine, respectively, had the most significant influence over the Anglo-American choice of air strategy. Each of these elements influenced decision-makers to choose an attritional air strategy. The Combined Bomber Offensive (CBO) represents the pinnacle of the Anglo-American attritional air strategy. The CBO's purpose was to isolate and destroy Germany's key industrial and economic targets to eliminate German air power and continue the destruction of the central areas of German industrial cities.[1] The CBO strategy meets the definition of an attritional strategy and the strategy served British and American politics first.

Political objectives focused the Anglo-American strategy and directly influenced the choice of air strategy. The United States and Great Britain enjoyed relative safety from German aggression due to their geographic separation and naval superiority, which reduced each nation's anxiety over survival. The strength of the British and American economies posed far fewer constraints on their political objectives and choice of strategy because of their potential for unprecedented war production. However, early in the war the British decision-makers primarily concerned themselves with the preservation of their economic empire. Doctrine had a greater influence on the British and American decision-makers' choice of air strategy than German decision-makers. British and American leaders had a political problem—German aggression—that RAF and USAAF doctrine prophesized could be solved through the strategic bombing of Germany, which

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[1] Richard Overy, *The Bombers and the Bombed* (New York: Penguin Group, 2013), 113-114.

politicians found appealing. In addition to these primary areas of influence, other areas such as the size of the British and American air forces, Britain and America's posture for war, and Germany's aerial defenses influenced decision-makers, though to a lesser extent (Reference Figure 4).
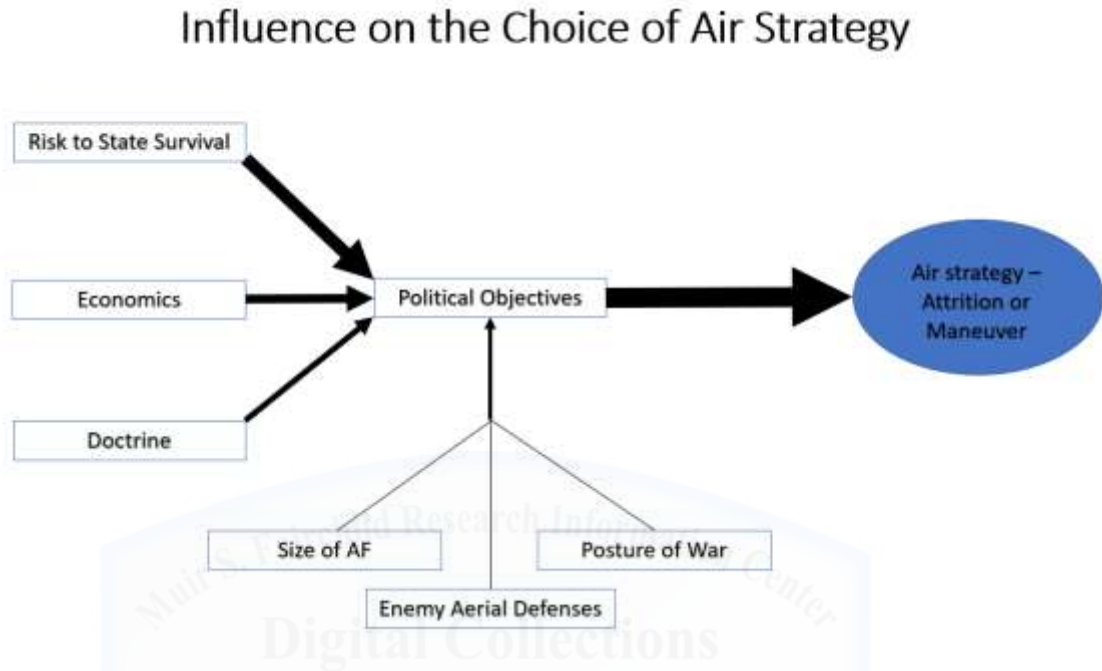
Figure 4: The weight of influence by each topic area.
Source: Author's original work

Much like geography constrained the Germans' use of Blitzkrieg for the Battle of Britain, it similarly influenced Anglo-American strategy. Geography influenced the development of the British and American doctrine by diminishing the threats of an invasion, and therefore diminished the need to develop a joint integration plan with the Army. Instead, geography afforded both the RAF and USAAF doctrine the opportunity to emphasize independent air operations through strategic bombing, staying true to many of Giulio Douhet's theories of the preeminence of offensive bombing. To the extent, then, that geography played a central role in the determination of risk to state survival, it deserves attention when analyzing how states make choices about air strategy.

The Anglo-American air strategy used attrition to wear down and "break" Germany. It intended to "destroy and dislocate the German 'military, industrial, and economic system' and to undermine the morale of the German people" to reduce German

power until it was "fatally weakened."[2] The remainder of this chapter explains how political objectives, economics, the threat to state survival, air doctrine, size of the British and American air forces, war posture, and German aerial defenses influenced the British and American decision-makers' choice of air strategy.

Analysis: Britain and America Chose to Fight the Long War

Generally, the seven areas I explore influenced both the British and Americans in the same way. There are some exceptions, which I break out explicitly throughout the analysis. Therefore, other than the exceptions, I consider the variance of influence on the British and American choice of air strategy as negligible for the purpose of this study.

One of the exceptions includes how varying levels of threat to each nation's survival influenced its political objectives. With the exception of the period following the bombing of Pearl Harbor on 7 December, 1941, the threat to the United States did not significantly influence its political objectives. In contrast, the British experienced an existential threat near the end of the Battle of France through the Battle of Britain and had a significant influence on the British political objectives during that period. Even after Britain defeated the Luftwaffe in the Battle of Britain, its economy felt the severe effects from Germany's U-boat blockade. To that end, Churchill remained preoccupied with the threat of economic strangulation until the Allies won the advantage in the Battle of the Atlantic in the spring of 1943.[3]

The Threat to State Survival

Britain and the United States approached the war, and their choice of air strategy, from a fundamentally different perspective than Germany. Leading up to the war, the two nations anticipated relative safety from aggression on the Continent, whereas Germany rationalized preventive war to avoid an inevitable existential threat. British and

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[2] Overy, *Bombers and the Bombed,* 112-113.

[3] "Battle of the Atlantic," HISTORY, 18 March 19, https://www.history.co.uk/history-of-ww2/battle-of-the-atlantic. Allied offensive efforts steadily increased throughout 1943 based on a handful of factors. First, the United States increased its efforts by doubling-down on its support to prioritize attacking "Germany-first" and concentrated more of its resources to the European theater of war. Second, aerial resources previously dedicated were freed for other operations following the culmination of the Battle of the Atlantic. Third, United States industrial production grew immensely, and the United States shipped vast quantities of war materials to the European theater.   By the end of 1943, the 8th Air Force had a sizeable bomber force that approached the size required to achieve the effects predicted by precision bombing doctrine. Finally, the Soviets began their eastern front offensive following the defeat of the German 6th Army at Stalingrad.

American air leaders warned of the vulnerabilities their nations faced from bombing raids, but their rhetoric intended to garner support for their service rather than to prepare defenses to thwart enemy air raiders. Generally speaking, the question of British and American survival had relatively less influence on each nation's political objectives than economics and air doctrine.

Anglo-American politicians primarily used Germany's threat to their nations' survival as a political tool to garner public cohesion and support to justify their political objectives, such as Germany's unconditional surrender. For example, President Roosevelt emphasized the German threat in his rhetoric to build support for his initiatives at a time when the American public did not feel threatened by Germany.[4] Beyond the Battle of Britain and the bombing of Pearl Harbor, neither nation faced an immediate and existential threat to their survival. Following the bombing of Pearl Harbor, the American public perceived a threat to their national security. America also sought retribution for the Japanese surprise attack. Due to both factors, Americans approved war, but the politicians did not truly fear for America's survival. Japan's attack on Pearl Harbor and Germany's declaration of war on America simply gave Roosevelt the opportunity he needed to commit the US to the war in Europe. With the public impression of American vulnerability, Roosevelt had the public support he needed to wage a war against Germany that would force its unconditional surrender, like he wanted. His ambitious political objectives, however, needed an economy able to deliver what he wanted.

Economic Capacity

Economics influenced the choice of attrition because a strategy of attrition played into the British and American strengths and it did not constrain their ambitious political objectives. British and American politicians wanted the unconditional surrender of Germany, which they expected to achieve through the annihilation of Germany. The British and American economies offered materiel superiority over Germany, and materiel superiority over Germany pushed decision-makers to choose a strategy of attrition

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[4] Stout, Jay A., *The Men Who Killed the Luftwaffe: The U.S. Army Air Forces Against Germany in World War II* (Mechanicsburg: Stackpole Books, 2010), 2. Most Americans wanted to remain isolated from world affairs through the 1930s.

because it exploited the Allies' significant advantage.[5] With Germany separated from Britain and America by sea and its navy inferior to the Anglo-American fleets, Germany had few ways to affect Britain and America other than attrition. Once the Allies won the war of attrition, they expected Germany's unconditional surrender. The British and American economic situation allowed for the choice of political objectives tailor-made for a strategy of attrition. Comparatively, the German economy could not compete with the British and Americans, which the Allies planned to exploit. Having established the broad impact of economics on the British and American choice of air strategy, the following paragraphs examine the details underpinning the relationship.

The potential of the British and American economies were one of their greatest strengths throughout the war. Economics influenced the decision-makers' choice of air strategy by becoming the foundation of an attritional strategy. Whereas economics constrained the Germans' choice of strategy, the potential of the British and American economies supported an attritional strategy because it posed very few constraints. At the heart of each nation's air doctrine was the requirement for massive quantities of bombers, which needed industrial production of enormous proportions. The reason Hitler feared the combined strength of the British and American's economies was that he expected the Allies' economic strength to manifest into long-term materiel superiority transforming the war into one Hitler knew he could not win, exactly the weakness Prime Minister Churchill and President Roosevelt intended to exploit.

The economic differences between the Allies and Germany are clear. In 1938, Britain and America produced 9.2% and 32.2% of the world's manufacturing output, respectively; in contrast, Germany and Italy produced 10.7% and 2.7%, respectively.[6] The Axis powers produced 60% of the aircraft that the Allies did in 1939, but the relative production steadily declined during the war and bottomed out near 30% in 1943.[7] Germany and its allies were not ready to compete in a war of economics, but the British and Americans were. By 1943, prior to the pinnacle of the CBO destructive capacity, the

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[5] Richard J. Overy, *The Air War 1939-1945* (Washington D.C.: Potomac Books, Inc., 2005), 150-151. Tables 12 and 13. The British and Americans had an economic advantage in aircraft production, population, labor force, and raw materials.
[6] Overy, *The Air War 1939-1945,* 151. Numbers pulled from Table 13.
[7] Overy, *The Air War 1939-1945,* 150. From Table 12C.

United States produced nearly five times the number of aero-engines as Germany, which exceeded the capacity of every other great power nation combined.[8] The British and American leaders intended to use the economic superiority of their nations to win the war.

Britain sought American economic assistance before the US's formal declaration of war as part of Britain's long-term strategy of attrition. On 23 July 1940, British procurement agents participated in a clandestine meeting in Washington with American industrial planners. Leaders at the meeting developed a scheme to expand the US aircraft industry to deliver more than 72,000 aircraft per year, which was three times America's then-current output.[9] As the war progressed, the Allies built an increasing quantitative advantage over Germany. How did these economic advantages influence air strategy?

The British and American economic advantages influenced the choice of strategy by producing large amounts of aircraft, required of the political objectives. Within the numbers of aircraft each nation produced, they manufactured vast quantities of four-engine heavy bombers which were primarily useful for independent attrition campaigns rather than a combined arms maneuver campaign. Before the invasion of Europe, the only way that the British or Americans could project power into Europe was through the air. Therefore, the British and Americans found themselves with the potential to build massive air forces that could be one of their only means to affect Germany.

Table 2. Comparative Economic Power of Warring States in Europe, 1943

	Population (millions)	Steel (millions of tons)	Hard coal (millions of tons)	*Aircraft (units)*	Tanks (units)
Britain	42	13.2	202.1	*26,263*	7,476
United States	137.3	82.1	535.3	*85,898*	29,497
Greater Germany	81.1	30.6	268.3	*25,200*	19,824

Source: Adapted from Alfred C. Mierzejewski, The Collapse of the German War Economy, 1944-1945, Table 4.1, p. 66.

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[8] Overy, *The Air War 1939-1945,* 150. From Table 12B. The US produced 227,116 engines compared to Germany's 50,700. The US production exceeded the combined production from the Soviet Union, Britain, Germany, and Japan through the end of the war.

[9] Adam Tooze, *The Wages of Destruction: The Making and Breaking of the Nazi Economy* (New York, NY: Penguin Group Inc., 2006), 407.

The United States and the United Kingdom capitalized on their economic advantage over Germany by building the largest air forces of the war. The British and American potential to produce oil, coal, steel, and food—critical requirements to an industrialized economy—far exceeded Germany's. Clearly, the British and Americans had an economic advantage in 1943. These resource advantages manifested as war materiel advantages throughout the conflict. Table 2 shows the material and aircraft advantage the British and Americans had over Germany in terms of industrial war production. In 1943, Britain and the United States had more than twice the population of Germany, produced more than three times the amount of steel, almost four and a half times the amount of aircraft, and nearly twice the number of tanks.[10] The British and Americans had a decisive economic advantage over Germany before and during the war. Their economic position greatly influenced political objectives and the choice of air strategy. Beyond supporting each nation's political objectives, the British and American economies supported the demands of the RAF and USAAF air doctrine.

Doctrine

The Anglo-American air doctrine indirectly influenced the choice of an attritional strategy because it called for the use of large numbers of four engine heavy bombers to breakdown enemy resistance through independent air power operations, which directly influenced the political objectives. The British doctrine aimed to destroy the enemy's resistance by targeting the enemy's will to fight. The American's doctrine aimed to destroy the enemy's resistance by targeting the enemy's means to fight. Both doctrines preached the systematic destruction of the enemy's economy. Factory workers became the primary targets of the British doctrine and critical nodes of industry, transportation, and energy became the primary targets of the American doctrine.

The British and American air doctrine influenced the political objectives in two ways. First, it was based on the assumption that air power could win wars more quickly and with less cost than a ground war. Second, the British and American economies could build the heavy bombers in the quantities required for the doctrine to succeed. In the early 1940s, British or American generals could have summed up their air doctrine as one

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[10] Alfred C. Mierzejewski, *The Collapse of the German War Economy, 1944-1945* (Chapel Hill: University of North Carolina Press, 1988), 66.

that intended to build the largest air force made up of the largest bombers known to man, and use those bombers to punish Germany until it will not and cannot fight any longer. Such a notion appealed to politicians. Therefore, politicians found it convenient to create political objectives that supported the use of air power according to the doctrine of their air forces.

Anglo-American air power doctrine sought to use massive concentrated bomber forces to bomb critical nodes of the German war economy through independent air actions. To start, since the doctrine preached independent air operations, it clearly did not align with maneuver warfare. The RAF's doctrine included attacking the German workforce as a method to target the German will to fight. The American doctrine sought to "precisely" bomb targets critical to the German economy. The intended targets of the American doctrine differed from the British because "in the 1920s and 1930s the Air Corps' leaders sought a coherent doctrine that would be acceptable to the American people and to politicians and that at the same time would be offensive in nature, thus necessitating an independent air service."[11] However, both the British and American doctrine supported strategies of attrition.

The American air doctrine of the strategic bombardment of critical infrastructure was based on the industrial web theory and included four assumptions. First, doctrine assumed "the bomber would get through." Second, American bombing doctrine assumed that the bombers could accurately find and hit their targets, and that bombing would produce the desired effect for the strategy. This assumption derived from the belief that "aerial bombardment of specific industrial objectives constituted the most effective and economical way to wage war."[12] Third, American bombing doctrine assumed that intelligence sources could identify the correct critical targets. Finally, the doctrine assumed their nation could deliver enough firepower in a short enough period to induce the rapid collapse of modern society. These assumptions made the doctrine more appealing to decision-makers because it improved the credibility of what air power could do to solve political problems. Beyond doctrine's influence on the choice of air strategy,

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[11] Conrad C. Crane, *American Airpower Strategy in World War II: Bombs, Cities, Civilians, and Oil* (Lawrence, KS: University Press of Kansas, 2016), 21.
[12] Crane, *American Airpower Strategy WWII*, 23.

it affected the force structure of the Anglo-American air forces which further influenced the choice of an attritional air strategy.

Anglo-American air doctrine hypothesized it could bring victory through the widespread destruction of Germany, which supported the British and American political objectives. The theory needed a tremendous number of bombers to achieve its ends. Anglo-American political objectives guided action, and their economies revealed the potential to meet their objectives, but air doctrine preached the means to victory. Anglo-American air doctrine of the 1930s proclaimed that strategic bombing with heavy bombers could win a war with less cost in blood and treasure. British and American leaders found the doctrine of their air forces appealing and gave their support.[13] For example, President Roosevelt supported USAAF's doctrine by prioritizing aircraft as America's industrial priority, an act that forced the US Army to reduce its planned number of divisions by half.[14] Therefore, Allied doctrine influenced the choice of air strategy by asserting the preeminence of strategic bombing, which required a large fleet of bombers and a large number of resources and manpower. Since a significant portion of the British and American economies had to be dedicated to achieving the effects promised by air advocates, it persuaded Allied decision-makers toward air strategies of attrition. In this manner, doctrine influenced the choice of an attritional air strategy.

Size of the British and American Air Forces

The size of the British and American air forces had little influence on the political objectives and subsequently on the choice of air strategy. At the beginning of the war the

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[13] Following the horrific consequences of WWI, Britain and America had much to debate about their foreign policies and way of war. Both nations sought to avoid another bloody war, but Germany's aggressive policies in the 1930s forced each country to become an active participant in the future war. Air power took a leading role in each nation's solution to German aggression because of the promise of air power's potential. The USAAF endorsed bomber-centric air power like the RAF, although for different reasons. America's strategic location left it vulnerable to little, other than naval power. Despite predictions that enemy aircraft could bomb American cities, most doubted it would happen because few aircraft had the combat range required to traverse the great distance between Europe and America. Ironically, precisely the same reason that made a bombing raid on America improbable became the primary reason the USAAF chose the bomber as its weapon of choice. Bombers had a long range and endurance needed for coastal defense, one of the USAAF's core missions in the 1930s. However, as war became more likely, America's military strategy changed from a defensive to an offensive posture in the mid-to-late 1930s. Conveniently, the same qualities—vast range and endurance—that made bombers good for coastal defense made them useful for offensive operations deep into enemy territory.

[14] Phillips P. O'Brien, *How the War was Won* (Cambridge, UK: Cambridge University Press, 2015), 52.

Luftwaffe had the largest air force in the world. At the beginning of the Battle of Britain the Luftwaffe outnumbered the RAF more than 2 to 1.[15] One year later, in December of 1941, the Luftwaffe had over 3,000 aircraft split between the Western and Eastern fronts.[16] In contrast, by 1942, RAF had only 802 bombers available.[17] The USAAF had just over 1,000 bombers available by the summer of 1942.[18] By 1944, however, the RAF had 1,023 bombers available, the majority of which could carry up to 22,000 pounds of ordnance.[19] Furthermore, the USAAF had 2,788 bombers stationed in England, another 1,297 bombers operating from Italy, and 1,942 escort fighters to protect the bombers.[20] The British and American air forces fought the first few years of the war with a numerically inferior force than the Luftwaffe. However, by the time that the Anglo-American air forces exceeded Germany's, in 1943, the economic foundation to the Anglo-American air strategy had been set five years prior. President Roosevelt met with General Arnold on 14 November 1938 to create the plan that began the expansion of the USAAF.[21] In 1944, once the British and American air forces exceeded the Luftwaffe and the Allies had air superiority over Germany, the Anglo-American strategy continued as an attritional one.

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[15] Richard Hough and Denis Richards, *The Battle of Britain* (New York: W.W. Norton and Company, 1989), 379. This book highlights the Luftwaffe's size on 10 August 1940. Kate Moore and the Imperial War Museum, *The Battle of Britain* (Oxford: Osprey Publishing, 2010), 191. Reference the Fighter Command strength on 10 August 1940. It is important to note that the total size of the Luftwaffe involved in the Battle of Britain exceed Fighter Command by 5:1, but the Luftwaffe had only an 1.5 to 1 advantage in fighters.

[16] O'Brien, *How War was Won,* 194. From Table 21. 1,563 aircraft on the Eastern Front and 1,650 aircraft on the Western Front. In the Western Front, the Luftwaffe split its forces further between Western Europe, the Mediterranean, and Africa. These numbers show how severe the two-front war affected the distribution of the Luftwaffe's forces, which is one reason Hitler wanted Britain out of the war.

[17] R. Cargill Hall, *Case Studies in Strategic Bombardment* (Washington DC: US Government Printing Office, 1998), 97.

[18] Hall, *Case Studies Strategic Bombardment*, 236. From the first data point on the graph for the USAAF heavy bombers.

[19] Mierzejewski, *Collapse German War Economy,* 67.

[20] Mierzejewski, *Collapse German War Economy,* 67-68.

[21] Stout, *Men Who Killed Luftwaffe,* 1-4. Initially, FDR viewed the expansion of the USAAF as an economical method to deter German aggression along with the benefits of making it a jobs program for the American economy. Once the war began, the economic underpinnings of this meeting paid off by enabling the massive production of aircraft.

Posture in the War

The British and Americans entered the war in a defensive posture which influenced the choice of an attritional strategy to a degree. When France fell in the summer of 1940, the German threat to Britain and America was through the sea and air only. The Allied navies had superiority over the German surface fleet. Germany's primary threat came from the Luftwaffe. From the British and American's perspective, the strength of the German threat lay with the Luftwaffe, and the Allies sought to defeat it. This is evident with the Anglo-American's strategy. It focused on the destruction of the Luftwaffe as its number one priority. It aimed to win superiority through attrition of the Luftwaffe forces and production facilities. Clearly, the Allies' anxiety over the Luftwaffe had an impact on their choice of strategy.

Germany's Aerial Defenses

Anglo-American interwar doctrine downplayed the lethality of aerial defenses to support the efficacy of their doctrine and supported the choice of attritional air strategies. Leaders of the USAAF saw the bomber as the epitome of air power and expected bombers to be America's salvation in the next war. Early air theorists such as Italian General Giulio Douhet and American Brigadier General William Mitchell promoted the offensive potential of bombers while ignoring their potential vulnerabilities. Douhet most adamantly discredited the threat of enemy air defenses. In his words, "the use of antiaircraft guns is a mere waste of energy and resources."[22] Douhet's belief in the bomber's survivability reverberated throughout the RAF and USAAF and influenced the development of their doctrine, which subsequently influenced the assumptions of the Anglo-American air strategy such as the survivability and lethality of bombers. However, during the war, German aerial defenses proved more effective than predicted.

The RAF and USAAF had to alter their tactics and operational approach early in the war because of the effectiveness of German air defenses, which in turn negatively affected the effectiveness of Allied air power over several years. The strategy still remained attritional, but the Luftwaffe defenses forced the RAF to bomb primarily at

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[22] Giulio Douhet, *The Command of the Air*, trans. Dino Ferrari (Washington, D.C., Office of Air Force History, 1983), 55.

night.[23] While the RAF avoided daytime raids to limit the attrition of their bombers, the Americans used daylight raids to take advantage of their precision bombing technology and doctrine.

Early raids, and the attrition sustained by German defenses during those raids, exposed fallacies in the assumptions of the USAAF bombing doctrine. American doctrine ignored that the enemy could react and adapt and it overemphasized the defensive capabilities of the flying boxed formations of bombers. The doctrine also ignored the fact that Germany could have effective flak systems that would seriously threaten large, slow bombers. These fallacies resulted in unsustainable losses of American aircraft and crews during air raids deep into Germany.

The American heavy bomber raids in late 1943 demonstrate the effectiveness of German air defenses and how they influenced a change in operational approach. On August 16th, 1943 Curtiss LeMay led 146 B-17s on a raid deep into Germany to bomb the Schweinfurt ball-bearing plant. The raid intended to hit targets within Germany and then fly to Africa to rearm, refuel, and return to England. The raid did not go as planned. Weather impacted the synchronization of bomber and escort groups. As a result, LeMay's bombers attacked unescorted and lost 24 of his bombers over Germany due to significant enemy defenses.[24] Studies conducted during the war reveal that the attrition rate of bomber crews in 1943 was between 75 and 80 per cent over the standard 25 mission tour.[25] German defenses were too strong, and the approach needed to change.

The 8th Air Force temporarily mitigated the attrition of their bombers and crews by attacking targets of lesser significance and protection from German aerial defenses. However, doing so limited the effectiveness of the strategic bombing campaign, and the 8th Air Force resumed deep strikes into Germany with severe consequences. These raids flew on October 8th, 10th, and 14th with catastrophic losses. Germany destroyed 88 bombers in the raids on October 8th and 10th, and another 60 bombers with 17 more

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[23] Overy, *Bombers and the Bombed,* 39.

[24] Mark K. Wells, *Courage and Air Warfare* (London: Frank Cass, 1995), 67. The psychological stress on the aircrew also imposed its great toll. This book details how the USAAF bomber crews endured hardships that led to extreme anxiety.

[25] Wells, *Courage and Air Warfare,* 101-102 .

damaged beyond repair on the 14 October raid.[26] The 14 October raid targeted the Schweinfurt ball-bearing plant for the second time with equally poor results. Unfortunately, the chaos that resulted from the German defenses affected the bomber's employment such that the raid had insignificant effects on the plant.[27] These raids showed that while the Luftwaffe maintained air superiority over Germany, the Allies could not achieve their strategic bombing goals without a change in behavior. While the Anglo-American ignorance of aerial defenses influenced the choice of bomber-centric attritional strategies early in the air war, the effectiveness of German aerial defenses influenced the modification of air strategy in 1943 through the end of the war.

The effectiveness of German aerial defenses forced decision-makers to modify the tactic from unescorted deep-strike strategic bombing to fully escorted deep-strike strategic bombing. It focused on establishing air superiority through the direct attrition of the Luftwaffe, rather than just bombing the aircraft and supply factories critical to Luftwaffe sustainment. Instead of continuing unescorted bombing raids, the 8th avoided deep-penetration raids for the remainder of 1943 until a technological solution arrived. In early 1944, the P-51 long-range escort fighter arrived which enabled the new tactics and was decisive to the air war. The Allies won air superiority within months of the P-51's arrival. The back of the "German air force had been broken not by precision bombing to cripple its supporting industrial structures but rather by a brutal campaign of attrition that destroyed aircraft and killed experienced pilots. This would not have been possible without the advent of the P-51 Mustang…"[28] The Luftwaffe's stiff resistance exposed the limitations of Allied air strategy; victory would not be quick, the air weapon did not avoid bloodshed, and it required massive amounts of resources to affect German resistance.

Political objectives

The Anglo-American political objectives influenced the choice of air strategy between each nation differently, but led to both nations choosing an attritional air

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[26] Wells, *Courage and Air Warfare,* 101. Also, Crane, *American Airpower Strategy WWII*, 38.
[27] Antony Beevor, *The Second World War* (New York: Little, Brown and Company, 2012), 454. Additionally, the bombers dropped insufficient ordnance to produce any meaningful damage to the equipment inside the plant. The 1,000-pound bombs simply lacked the necessary firepower.
[28] Crane, *American Airpower Strategy WWII*, 39.

strategy. The formation of the British and American political objectives was primarily the result of an interplay between the Big Three factors of the threat to each nation's survival, economics, and military doctrine. The Little Three factors of the size of the air force, posture for the war, and Germany's aerial defenses influenced the political objectives to a lesser degree. President Roosevelt's strategic plans needed air supremacy, which he intended to achieve through the massive production of aircraft.[29] America's political objective to focus on "Germany first" supported the use of bombers to defeat Germany through attrition by focusing most America's war efforts on Europe first.[30] In contrast, Britain's political objectives required it to survive the German onslaught before creating an alliance to defeat it. The defeat of France hardened British resolve against Germany. The Battle of Britain demonstrated Britain's resolve to survive and win the long war or attrition. Furthermore, British political objectives influenced the RAF's early strategy to use bombing as a tool to gain political support from key nations, like America.[31] Subsequently, the British victory became the foundation to enabling the Anglo-American attritional air strategy in the years that followed.[32]

In response to the German's threat to Western Europe in 1940, President Roosevelt laid the foundation of the Allies' overwhelming air superiority.[33] Once the US entered the war, the President demanded air dominance over Germany.[34] To that end, on August 24th, 1942, he asked the US Army and General Henry H. Arnold to draft a plan for it. Evidence supports President Roosevelt's affinity for air power and his belief that "overall control of the air, to be gained by sheer numbers of aircraft, was the United

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[29] Stout, *Men Who Killed Luftwaffe,* 21-22.

[30] Beevor, *The Second World War,* 180.

[31] Richard Overy, *The Bombing War: Europe 1939-1945* (London: Penguin Group, 2013), 624.

[32] Richard Overy, *Why the Allies Won* (London: W.W. Norton & Company, 1995), 14. The page gives more insight as to why Hitler wanted to defeat Britain. Hitler needed to keep America out of the war in Europe and a primary way to keep America out included Britain's defeat.

[33] Stout, *Men Who Killed Luftwaffe,* 13. As the Battle of France began, FDR asked Congress to fund that nation's aircraft industry to produce up to 50,000 aircraft per year. At this stage of the war, no European nation, or the combination thereof, could match the American ambition. By the end of the war, America annually produced more than double FDR's 1940 vision.

[34] Franklin D. Roosevelt, 32nd President of the United States, letter, to the US Secretary of War, 3 January 1942. President Roosevelt wrote that victory over America's enemies would be achieved through overwhelming mastery in the munitions of war, among bravery, skill and determination of the men. To that end, he directed the War Department to develop a plan to have American industry produce 45,000 aircraft in 1942 and 100,000 in 1943.

States' first industrial priority."[35] Therefore, early in the war, America set out to produce and deliver as many aircraft as possible to the war effort, while attempting to deny Germany the same.

President Franklin D. Roosevelt (FDR) personally supported Britain before America's official entry into the war, but isolationist movements within the United States Congress limited his flexibility to enlist America's support of Britain. Before America's declaration of war, the President supported Britain through armament and aircraft deliveries to bolster the British war reserves. For example, Britain bombed Germany before America's official entry into the war, but these raids came at a high cost to RAF bombers and men. Therefore, America's declaration of war on the Axis powers tipped the European balance of power firmly in the Allies' favor because of their combined economic and materiel superiority. The Allied leaders anticipated a long war to defeat Germany. The Casablanca conference, in early 1943, established the Allies' most coherent and enduring political objectives of the war. These objectives guided the choice of subsequent Anglo-American strategies, including their air strategy, in the war.

At the conference, the leaders of America, Britain, and the USSR met to determine the orientation of their combined grand strategies and established two primary political objectives. First, all agreed to focus their war efforts on Germany and the European theater because of Germany's threat to the Allied interests in Europe. Second, and more importantly, the Allies agreed that victory required the unconditional surrender of Germany.[36] The leaders chose the term, unconditional surrender, intentionally.

Roosevelt declared the need for Germany's unconditional surrender and the leaders rationalized the objective for two main reasons. First, and most pressing, it mitigated Stalin's concerns about collective action and incentivized Britain, the United States, and the Soviet Union to fight together until the unconditional surrender of Germany. Additionally, necessitating Germany's unconditional surrender hastened the strategic bombing campaign led by Britain and America against Germany which both Churchill and Roosevelt wanted to begin soonest.[37]

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[35] O'Brien, *How War was Won*, 46.
[36] Beevor, *The Second World War,* 404.
[37] Beevor, *The Second World War,* 404.

The Casablanca conference—a meeting intended to establish the Allied political objectives for the war—influenced the choice of the British and American attritional air strategy because it was there that they determined that an attritional approach would serve their political objectives best. The British would continue to pursue a Douhetian punishment strategy through the area bombing of German cities. Meanwhile, the Americans would focus their efforts on the precision bombing of industries critical to Germany's war production.[38] "The overall objective [of the CBO] recognized the desires of both [British and American] air campaigns; '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 the capacity for armed resistance is fatally weakened.' Hedging its bets, the CBO would target both means and will."[39] In short, the Anglo-American air strategy sought to destroy Germany systematically. For the United States and Britain, WWII was a war of economics, implemented in large part through their choice of air strategy as influenced by policy.

Conclusion

Political objectives had a direct influence over the choice of an attritional air strategy, through the strategic bombing of Germany with massive quantities of bombers. As each nation settled into the serious debate of a war-winning strategy, both realized the limits of their national power and the strengths of Germany's defenses in Europe. Attacking Europe through the air was the Allies' best chance to immediately affect Germany, even though pre-war air theories remained untested. The strategy required a significant amount of economic resources, but the Anglo-American economy was the world's largest and could support the ambitious political objectives and strategy. Additionally, Roosevelt's decision to prioritize the production of aircraft had far-reaching effects in the war, because the United States supplied Britain and the Soviet Union with many aircraft.[40] The fall of the Luftwaffe was largely the responsibility of Anglo-American air power.

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[38] Robert A. Pape, *Bombing to Win: Air Power and Coercion in War* (Ithaca, NY: Cornell University Press, 1996), 258-262.

[39] Crane, *American Airpower Strategy WWII,* 34.

[40] O'Brien, *How War was Won*, 485.

The Anglo-American air doctrine emphasized independent air action and strategic bombing and further influenced the choice of an attritional air strategy. Contrary to the integrated and joint nature of Luftwaffe operations, Anglo-American air forces intended to operate largely independent of other services. Targets lay far beyond friendly territory, and intelligence collection remained difficult and unreliable. However, Britain and America used the strengths of their economies to produce powerful bomber-fleets. Through the attrition delivered by their bombers, Britain and America would defeat Germany. The logic appealed to politicians because it supported their political objectives.

Finally, the aerial defenses influenced the choice of air strategy in two ways. First, the Anglo-American misperception of the effectiveness of aerial defenses supported the axiom that "the bomber will get through" and the efficacy of strategic bombing doctrine. Decision-makers placed a large emphasis on the importance of the RAF and USAAF bombers without appreciating the vulnerabilities of these aircraft. Therefore, the misperception fueled the desire to amass a significant bomber force that could inflict massive destruction on Germany. Second, the actual effectiveness of Germany's aerial defenses influenced military leaders to adjust their operational approach. Rather than continue unescorted deep raids into Germany, the Anglo-American air forces avoided risky raids until the long-range escort fighter arrived in theater. When it did, the Anglo-American air strategy realized its full potential.

Chapter 3

Israeli Air Strategy of the Yom Kippur War of 1973

Israel was profoundly humbled. The complacency that had gained hold of the Israeli psyche following the astounding 1967 victory was irrevocably shattered. For the first time since the establishment of their state, Israelis felt that its existence lay in the balance.

P.R. Kumaraswamy

Israel used an attritional air strategy in the Yom Kippur war due to the influences of its political objectives. The existential threat to Israel's survival and its economic situation had great influence over the political objectives. Both factors directly influenced the political objectives to focus on objectives that favored attrition. On the other hand, Israel's intention to fight wars of its choosing, the Israeli Air Force (IAF) doctrine, the numerical inferiority of the IAF compared to the Arab air forces, and the Arab's aerial defenses influenced leaders to want to use a maneuver strategy. This case demonstrates how the influences of existential threats and economics outweigh other factors. Ultimately, the weight of Israel's political objectives, influenced by the threat to Israel's national survival and its economic dependencies with the United States, held the most influence over the choice of an attritional air strategy (reference Figure 5).

The IAF strategy traditionally relied upon elements of maneuver, such as combined arms, surprise, and tempo to disrupt the war plans of Israel's adversaries and gain an initial advantage. The IAF used the asymmetric advantages from its strike fighters for preemptive strikes in the conflicts leading up to the Yom Kippur War. The preemptive strikes underpinned the IAF's strategy. However, the IAF learned only days prior to the war that the Israeli government did not support preemptive strikes, yielding the initiative to the Egyptians and Syrians. The decision to forego the use of preemption put Israel at a significant disadvantage early in the war.

Influence on the Choice of Air Strategy
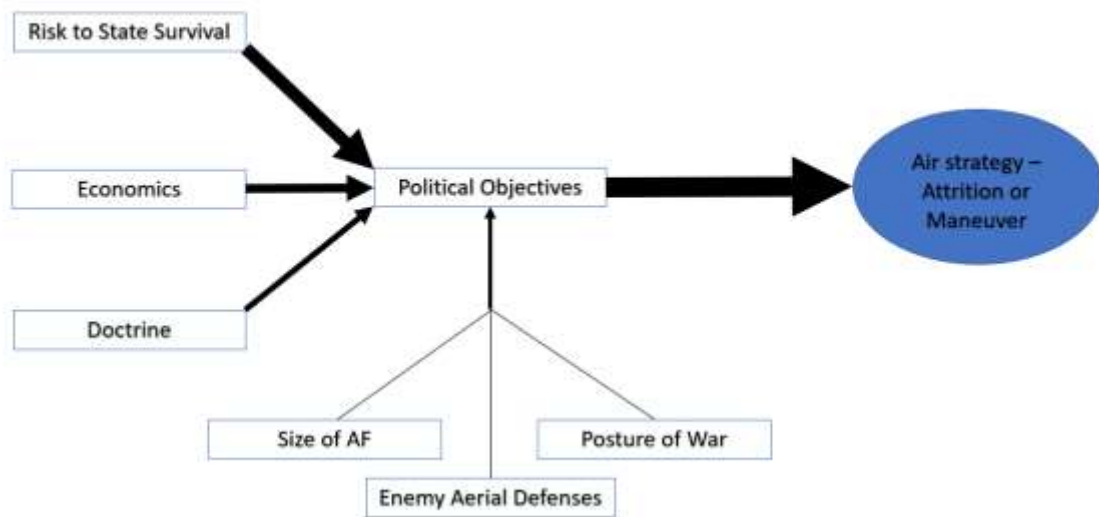
Figure 5: The weight of influence by each topic area.
Source: Author's original work

Israel's air strategy depended upon the elements of maneuver warfare for several reasons. First, Israel had a small economy that depended upon foreign aid from the United States and mobilizing IDF reservists that would fight in a war. Second, the relatively small IAF comprised of several hundred, fighter and attack aircraft that made up Israel's primary defense. Third and finally, Israel generally enjoyed the international community's "sympathy" which made surprise attacks and preemptive action political feasible.[1] Preemptive airstrikes made up one of the critical elements of Israel's air strategy. However, shortly before the war, America reaffirmed that its support of Israel was contingent upon Israel being the victim of Arab aggression. If Israel preemptively struck the Arabs, the US would not support Israel, which was problematic because the Israeli economy and military resources depended upon foreign aid from the United States.[2] Therefore, the primary reasons the IAF adopted an attritional air strategy stemmed from its political objectives. The first objective wanted to preserve its

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[1] Barry R. Posen, *The Sources of Military Doctrine (*Ithaca and London: Cornell University Press, 1984), 28.
[2] Posen, *Sources of Military Doctrine*, 28.

relationship with the United States which prevented the use of preemption. The second objective required that Israel survive the war, which the existential threat from the Arabs during the first days of the war challenged. Decision-maker's chose to confront the Arab threat with the IAF through a great battle of attrition

The war surprised Israel and the West because Israel decisively defeated the Arab coalition during the Six-Day War of 1967 and that left a perception of Israeli superiority over the Arab nations. The perception of superiority permeated Israeli institutions down to the individual Israeli citizen. Therefore, when war broke out on the 6th of October 1973, many in the West dismissed reports of the war. The following day, most expected news of an Israeli counterattack threatening the Arab forces; instead, headlines reported "brilliant Egyptian and Syrian successes and of the Israelis reeling in broken disorder."[3] As America read the headlines, the IAF had lost about 15% of its total combat aircraft in the first two days of combat.[4] Indeed, Israel found itself in a dire situation because the IAF was Israel's main fighting force. How did this occur? If the IAF was the decisive factor in the Six-Day War using a strategy of maneuver, why did the IAF use a strategy of attrition in the Yom Kippur War?[5]

Israel sought to avoid future wars by deterring the Arabs through qualitative superiority, but Israel's qualitative superiority steadily declined in the years leading up to the Yom Kippur War. In 1971, the Egyptians began to plan for a two-front offense against Israel. Through careful analysis the Egyptians identified "two key areas of Egyptian weakness: the ineffectiveness of the Egyptian Air Force when pitted against the IAF (the decisive factor in 1967) and the similar inferiority of the Egyptian armoured corps…"[6] Therefore, the Egyptian strategy to negate Israeli superiority included the acquisition of modern aircraft and the build-up of a modern IADS combined with military training from Soviet advisors.

Israel's strategy depended on several factors. First, it relied heavily on reserve ground troops to supply the bulk of the army's manpower. Israeli leadership needed to

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[3] Peter Allen, *The Yom Kippur War* (New York: Scribner, 1982), 2.
[4] Simon, Dunstan, *The Yom Kippur War: The Arab-Israeli War of 1973,* (New York, NY: Osprey Publishing, 2007), 175.
[5] Dunstan, *The Yom Kippur War,* 27.
[6] Dunstan, *The Yom Kippur War,* 27.

call up the reserves at a time that mobilizes the IDF prior to war, but not too early as to unnecessarily disrupt Israel's economy. Additionally, in order to activate the reserves at the correct time, the strategy depended on accurate intelligence to make timely and effective decisions. Finally, it depended upon the IAF to either deter or delay conflict until the IDF reserves mobilized. When the war began, Israeli leaders chose to use the IAF to blunt the strength of the Egyptian and Syrian ground assault instead of establishing air superiority. Consequently, Israel's air strategy primarily consisted of targeting its enemies' front-line troops at great cost. The IAF lost about 35% of its combat fleet throughout the war, more than half of which occurred in the first four days.[7]

The war became a costly military victory for Israel and a strategic success for Egypt. Syria, Jordan, and other supporting Arab nations lost more than they gained from the war. The conclusion of the Yom Kippur War set the foundation for a diplomatic peace between Egypt and Israel, the return of the Sinai Peninsula to Egypt, and Egypt's expulsion from the Arab League. Despite some of Israel's strategic losses, such as its shattered reputation as an invincible military power, the Yom Kippur War enhanced Israel's strategic interests in the long term.[8]

Analysis: How Israeli Leaders Chose the IAF Strategy

The IAF pre-war strategy reflected those of past wars, but the strategy significantly changed at the onset of hostilities. Pre-war IAF strategy supported Israel's traditional political objectives, its small economy and dependence on the US military trade relationship, and its relatively small air force. It is also significant to note that Israeli intelligence downplayed the advancements of Egypt and Syria's IADS leading up to the war and based much of their assessment on prior experiences in which the IAF tended to be superior to Arab IADS.[9] IAF doctrine emphasized preemptive strikes as well as joint and multi-domain operations to achieve maximum potency. In practice, this method of warfare used a layered operational approach to minimize risk to friendly forces while exploiting enemy weaknesses—much like the Wehrmacht's Blitzkrieg. However,

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[7] Dunstan, *The Yom Kippur War,* 30.

[8] P. R. Kumaraswamy, *Revisiting the Yom Kippur War* (London, UK: Frank Cass Publishers, 2000), 2.

[9] Elbridge Colby, Avner Cohen, William McCants, Bradley Morris, and William Rosenau, *The Israeli "Nuclear Alert" of 1973: Deterrence and Signaling in Crisis* (CNA Strategic Studies Division, Defense Technical Information Center, 2013), 12

the war caught Israel by surprise. It encountered an adversary far superior to that which they expected. Additionally, the IAF faced political restrictions that ruled out a preemptive strike. Finally, Israel suffered from an enemy strategy for which it lacked an immediate solution and had severe consequences in the war. Israel's hardship in the war and the impetus to change the IAF strategy began with Israel's political objectives.

Threat to State Survival

The existential threat to Israel's survival and its economic situation influenced Israel's political objectives to favor attrition. Related to Israel's second political objective was the grave threat to Israel's survival and its propensity to influence Israeli leaders to stop the Arabs at any cost. In the first days of the war, senior leaders doubted Israel would survive. Perhaps most significantly, "for the first time since its establishment, Israel was seen to be on the brink of collapse."[10] Israel misperceived the Arabs political objectives to be the total conquest of Israel and Israel's leaders, like Defense Minister Dayan, panicked. On 7 October, Israel's darkest day of the war, decision-makers created a strategy to ensure their nation's survival. The psychological shock felt by Israeli leaders had a powerful influence to focus on the political objective to ensure Israel survived, which in turn impacted how the IAF was employed.

When Dayan visited the Golan Heights on 7 October, he witnessed the army's dire situation, which had a dramatic effect on his decision making. Dayan saw the battle for the Golan Heights as decisive to Israel's survival and required victory at all costs. He immediately redirected the IAF's strategic effort to support the IDF at the Golan Heights. IAF doctrine recommended the establishment of air superiority through the destruction of enemy IADS prior to conducting secondary missions. Dayan, however, decided against following the recommendation because of the existential threat Israel faced from the Arab ground forces. Instead, he ordered the IAF give the IDF ground forces close air support (CAS) at the Golan Heights while simultaneously attempting to destroy the Syrian IADS. The IAF primarily supported the IDF ground troops in static battles of attrition against a well-fortified, well-defended Arab ground forces; however, the IAF lacked the command, control, communications and intelligence capabilities and avionics to succeed in such an

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[10] Kumaraswamy, *Revisiting Yom Kippur War,* 2.

environment.[11] The IAF suffered 60 aircraft destroyed in one day—more than 15% of its entire fleet. "The IAF was sent to fill the gaps in Israeli defensive positions. Subsequently, it was ordered to conduct similar missions against the bridges that the Egyptians had thrown across the Suez Canal. This was in total contradiction to prewar Israeli planning. Nevertheless, caught by strategic surprise and its prewar estimates of the correlations of forces clearly wrong, the Israeli General Staff had no immediate alternative."[12] Dayan's perception of the grave threat to Israel's survival directly influenced Israel's political objectives, which influenced the decision to commit the IAF strategy toward attrition for the remainder of the war.

Economics

Israel's economic relationship with the United States further influenced decision-makers to adopt a strategy of attrition in order to maintain Israel's trade relationship with the United States. If Israel preemptively struck the Arabs, the US would not support Israel, which was problematic because the Israeli economy and military depended upon foreign aid from the United States.

As the backbone to the IDF's defense strategy, the IAF had a significant dependence on aircraft procurement through foreign trade. Leading up to the Yom Kippur War the United States became a leading supplier of aircraft to the IAF, and it became crucial that Israel maintain an open link with trade partners like the United States for future aircraft purchases. Therefore, the vital importance of Israel's trade relationship with the United States is one of the primary reasons that Israel's political objectives necessitated its preservation.

Furthermore, Israel's small population constrained its strategy. In 1973, Israel had just 3 million citizens, with an active duty force of 94,000 and a reserve force of 180,000.[13] The IAF made up most of the active duty Israeli Defense Force. In comparison, Egypt and Syria had a combined active duty force of 380,000, with a reserve of an additional 700,000.[14] Israel expected their active duty force to be outnumbered by

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[11] Martin van Creveld, Steven L. Canby, and Kenneth S. Brower, *Air Power and Maneuver Warfare* (Maxwell AFB, Alabama: Air University Press, 1994), 184.

[12] Creveld, Canby, and Brower, *Air Power and Maneuver*, 181.

[13] Frank Aker, *October 1973: The Arab-Israeli War* (Hamden, CT: The Shoe String Press Inc, 1985), 11.

[14] Aker, *October 1973: Arab-Israeli War, 11.*

more than four to one. Therefore, the reserve played a crucial role in national security, but it could not remain active for long periods. Economically, Israel could not afford to commit nearly ten percent of its population to an active duty status. Hence, timing of the reserve mobilizations was a critical element of their strategy.

IAF Doctrine

Contrary to the two other Big Three factors, the IAF's doctrine influenced politicians toward maneuver, rather than attrition. IAF doctrine prioritized air superiority through the utilization of asymmetric advantages. The doctrine used preemptive airstrikes to attack enemy counterair assets as one of its first steps to establish air superiority. In the Six-Day War, Israel "had caught Egyptian planes conveniently parked, wingtip to wingtip; most of them were destroyed within three hours. The attacks were launched against nineteen airfields and gave the Israelis air supremacy for their annexation of the Sinai."[15] As a result of emerging surface-to-air missile (SAM) proliferation, the IAF doctrine changed between the Six-Day War and the Yom Kippur War such that the suppression of enemy air defenses (SEAD) became the IAF's first step in the establishment of air superiority. The IAF doctrine assigned three additional roles for the IAF including: 1) massive destruction of enemy ground forces with CAS and battlefield interdiction; 2) destruction of the Arab AF, but secondary to the destruction of Arab IADS; 3) destruction of strategic targets deep within enemy territory.[16]

Should deterrence fail, the IAF strategy included preemptive airstrikes to disrupt the operational balance of their enemy. Official IAF doctrine recommended preemptive airstrikes to occur at the very first opportunity. The rationale was rooted in Israel's national defense strategy and its dependence on ground reserves. "As long as the [IAF] doctrine endured, the main strength of the Israeli army could be held in reserve behind an air defense system that was permanently in a state of high alert."[17] If the airstrike did not dissuade their enemy from follow-on aggression, Israeli leaders expected it to yield operational advantages to subsequent operations. Despite their utility, the challenge with preemptive airstrikes is minimizing the negative perception it generates in international

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[15] Aker, *October 1973: Arab-Israeli War,* 6.
[16] Kumaraswamy, *Revisiting Yom Kippur War,* 223.
[17] Aker, *October 1973: Arab-Israeli War,* 17.

community. Therefore, preemption requires justification to warrant the potential cost of political capital such as a grave threat to national existence (e.g. knowledge that the enemy plans to use nuclear weapons), convincing evidence for the requirement of preemption, or perceived international support for such action.

Israeli intelligence was confident in its ability to warn Israel's leaders of Arab mobilization far enough in advance for Israel to prepare for war, but they were wrong. In April of 1973, the director of military intelligence, Major-General Eli Zeira, confidently stated to Prime Minister Golda Meir, "'I am sure [that if Egypt would launch a massive crossing of the Suez Canal] we will know about it ahead, and we will be able to give a warning, not only a tactical one but also an operational one, that is, a number of days in advance.'"[18] At the time, Israel assumed Egypt desired to retake their lost territory, and that this event would occur as a war along two fronts. However, Israel intelligence also concluded that despite the Arab's growing capability to attack, any offensive Arab operation would be limited in success because of their fear of the IDF's formidable capabilities.[19]

Therefore, Israel had little justification for preemption, despite the prescription for its use according to IAF doctrine. Israel perceived no existential threat to their security because it believed the IDF and IAF could easily defeat the Arabs, as they did in the Six Day War. Nor did Israel have evidence to justify its actions because it did not expect war in the first place. Finally, the message from the United States in the weeks prior to the war made it clear that Israel lacked international support for preemptive actions.

Size of the IAF

The relatively small size of the IAF compared to the Arab air forces favored a maneuver strategy and Israel's decision-makers knew it. The IAF possessed about 360 combat aircraft compared to the Arabs 1,600; additionally, the Arabs had more than 2,000 SAMs, many of which moved on mobile systems, in addition to the thousands of AAA pieces.[20] The IAF needed to use its resources wisely, which is what IAF strategy intended to do, until the political objectives required a different approach at the expense

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[18] Kumaraswamy, *Revisiting Yom Kippur War,* 11.
[19] Kumaraswamy, *Revisiting Yom Kippur War,* 11.
[20] Dunstan, *The Yom Kippur War,* 40.

of the IAF's welfare. In addition to the influences favoring maneuver, due to the IAF's doctrine and its relatively small size, other factors influenced the IAF's prewar maneuver strategy.

Posture of the War

Israel intended to fight at the time and place of its choosing. This perspective further influenced the Israeli military leaders to accept political objectives that preferred maneuver warfare. The overconfidence that developed from Israel's victory in 1967 influenced many aspects of Israel's national defense system. However, Israel had no apparent plan for a defensive war should key assumptions prove untrue.[21] For example, the IDF's strategy depended upon the assumption that it would receive four days advanced warning of an Arab attack because the IDF needed four days to mobilize its reserves. Should the IDF fail to receive four days warning, it depended upon the IAF to delay the Arab assault long enough for the IDF's mobilization. The strategy worked when the political objectives supported preemption and fell apart when the greater influence of economics on Israel's political objectives precluded a preemptive strike. Surprisingly, this weakness was not discovered until the preemptive strike was needed most. This example highlights how the Israeli paradigm of war was clearly one in which Israel would fight at the time and place of their choosing. In such a paradigm, one has the advantage to strike at the enemy's weakness when it is most vulnerable. In Israel's case during the Yom Kippur War, the Arabs struck Israel when it was vulnerable.

Enemy Air Defenses

Building from Israel's intention to wage wars at a time and place of its choosing, the Egyptian and Syrian air defenses furthered the IAF's preference for maneuver rather than attrition. To avoid its enemies' strengths and expose vulnerabilities, "the IAF had indicated to both the political echelon and the General Staff that with the technical means then at hand, air attacks on ground-based, surface-to-air missile systems had to be

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[21] Colby, Elbridge, Cohen, et al, *Israeli "Nuclear Alert" 1973,* 15. There were two assumptions that played a pivotal role in the IDF strategy and proved untrue in the Yom Kippur War. First, the strategy assumed that Israeli intelligence could provide four days warning. Second, it also assumed that the political objectives of future wars would allow the IAF use preemptive airstrikes.

precisely orchestrated actions."[22] Yet, the civilian leaders viewed this challenge differently than the military leaders.

Left to its own devices, the IAF strategy used preemption as the foundation to its maneuver strategy. However, the civilian leaders avoided the use of preemption out of concern over the political fallout with the United States preemption may cause. In this situation, the Arab air defenses exposed a rift in the strategic thought between the military and civilian decision-makers. The Arab air defenses drove the military toward preemption and maneuver; in contrast, the latter weighed the risks of preemption, decided against it, and accepted the risks to the IAF. Since the Israelis placed civilian authority above military, the IAF acquiesced and fought with the former's strategy. The IAF did not like the decision. Following the war, an IAF investigation suggested that in future wars "an air force must be allowed to conduct an antiair air operation prior to its full commitment to the ground battle."[23] Clearly, tensions between the IAF leaders and civilian leaders remained after the war.

The IDF was the center of gravity to Israel's security and the IAF was one of the critical requirements (CR) that enabled the IDF to secure and hold terrain. The IAF's critical vulnerability (CV) included its vulnerability to enemy mobile SAM and AAA systems. The Arab strategy exploited the IAF's CV. Joint Publication 5-0 specifies the requirement to identify and exploit enemy CVs while protecting one's own CVs. Israel did so in the Six-Day War but did not in the Yom Kippur War. Instead, the *Arabs* executed a strategy of maneuver against the IDF, and the IDF having no effective countermeasure had to respond with a strategy of attrition. The IAF leaders recognized the threat the Arab IADS posed to Israeli aircraft. Israel's leaders, however, failed to anticipate how faulty strategic intelligence and the IAF's vulnerability affected national defense. Therefore, while the enemy aerial defenses influenced IAF leaders towards maneuver, the Arab defenses had less of an influence on Israel's political objectives.

Political Objectives

Israel had two main political objectives for the war. The first objective required Israel to honor its diplomatic commitments with the United States to maintain its positive

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[22] Creveld, Canby, and Brower, *Air Power and Maneuver*, 180.
[23] Creveld, Canby, and Brower, *Air Power and Maneuver*, 186.

long-term and beneficial economic relationship. Following the Six-Day War, Israel pledged "to the United States, and specifically to National Security Advisor Henry Kissinger, not to preempt an Arab attack (as Israel had done in 1967)."[24] Israel may have been able to use a preemptive strike had they read the changing strategic environment and coordinated with the US in the weeks leading up to the war. However, Israeli leaders underestimated the chances of war and did not attempt to coordinate with the United States until it was too late. In light of Israel's situation, Defense Minister Dayan questioned the merits of preemption compared to the costs of losing political and economic support from the United States.[25] Additionally, prior to the Yom Kippur War the IDF did not contain *any plan* for a defensive war but had six to nine plans for an offensive one.[26] Therefore, the first objective burdened the IDF war plans.

Considering the first political objective, IAF strategy had to forego the preemptive strike and gave up maneuver as a viable strategy for several reasons.[27] First, foregoing the preemptive strike sacrificed a major element of surprise that the IAF strategy traditionally depended upon. Second, due to the failure of Israel's intelligence to provide advanced warning of the Arab's intentions, the IDF reserves remained inactive until the war began, which placed the IAF as the primary fighting force for the first four days of the war. Therefore, the IAF had to fight without the standard combined arms approach its strategy depended upon.

Third, yielding the initiative to the Arabs constrained the IAF war tempo. For example, an Egyptian air strike destroyed many IAF aircraft and contributed to the IAF's decreased tempo early in the war. "In 1967, Israel took the initiative and achieved operational surprise. In 1973, it was the Arabs who achieved strategic surprise. As a result, in 1967 the IAF was able to proceed with a high-tempo air operation that enabled it to rapidly achieve air supremacy on the first day, throwing the enemy off balance for

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[24] Colby, Elbridge, Cohen, et al, *Israeli "Nuclear Alert" 1973,* 14.
[25] Posen, *Sources of Military Doctrine,* 32.
[26] Colby, Elbridge, Cohen, et al, *Israeli "Nuclear Alert" 1973,* 15.
[27] Creveld, Canby, and Brower, *Air Power and Maneuver*, 180-181. One of the primary reasons the IAF strategy depended upon preemptive strikes was to surprise the Arab IADS and inflict severe damage. At that time, air strikes on SAMs required precisely orchestrated actions due to the technology that the IAF possessed. Therefore, the Israeli government's decision to forego preemptive strikes significantly impacted subsequent IAF operations.

the remainder of the war and preventing his recovery."[28] Had the IAF struck first, it could have prevented the Egyptian airstrikes and maintained a high-tempo war operation.[29]

Fourth and finally, the IAF prewar strategy knew where to focus its efforts—the Arab IADS—to maximize its effects on the Arab plans, but yielding the initiative left the IAF on the defensive attempting to fight a dynamic enemy. Israeli leaders did not know where to strike the Arabs to disrupt their offensive, other than by striking those forces that threatened Israel's security most. Consequently, the leading Arab divisions had significant protection from mobile aerial defenses that inflicted severe punishment against the attacking IAF aircraft. These four reasons explain how Israel's first political objective influenced the IAF's adoption of an attritional strategy. Despite the operational losses Israel experienced early in the war, its intact relationship with the US enabled the resupply of most of the IAF's losses and significantly contributed toward the Israeli victory.[30]

The second political objective required that Israel survive the war and was influenced by the Arab's existential threat. Israel's geography constrained Israeli strategy by its lack of strategic depth, which fed into the decision-maker's perception of the existential threat. The second political objective influenced the choice to use attrition to defend Israel at almost any cost.[31] Prior to the Six-Day War, Israel's major cities were within tens of miles of foreign borders. Jerusalem was within miles of Jordan occupied territory. Following the Six-Day War, Israel gained and maintained territory to provide the strategic depth it desired, and viewed the new territory as vital to Israel's security. To the west, the Israeli-occupied Sinai Peninsula provided about 60 miles of open desert buffer to Egypt, but at a strain on Israel logistics because of the harsh climate. To the north, the Golan Heights provided superior defensible terrain against Syrian aggression and an excellent observation position for advanced warning or offensive operations. To

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[28] Creveld, Canby, and Brower, *Air Power and Maneuver*, 184.

[29] Creveld, Canby, and Brower, *Air Power and Maneuver*, 183-184. "…by inflicting heavy losses at the outset of the war, the Arabs were able to reduce the IAF's sortie rate by nearly 50 percent for nine vital days. Consequently, the IAF was able to fly far fewer sorties during the war than it had planned. This, combined with inadequate command and control and limited per sortie lethality, considerably reduced the impact of the IAF on the war as a whole."

[30] Dunstan, *The Yom Kippur War,* 203.

[31] Aker, *October 1973: Arab-Israeli War,* 6.

the east, the occupation of the West Bank enabled Israel to mount a more defensible border along the Jordan River. Israel viewed the occupation of the Golan Heights and the West Bank as vital to its security. Due to the extended lines of communication, lack of resources, open-desert terrain, and inhospitable climate, the costs of occupying the Sinai Peninsula compared to the benefits it provided were relatively higher than the other occupied zones.

The existential threat the Arabs posed to Israel redirected the focus of Israeli leaders on blunting the Arab ground attack at almost any cost. This evidence suggests desperation given the context of the situation and a strategy of attrition. Maneuver warfare requires knowledge of enemy weaknesses and a plan to exploit such a weakness. Giving up the option of preemption, coupled with the failure of Israeli intelligence to provide enough strategic warning of war, left Israel in a tough situation. This case demonstrates the strong link between the influence of political objectives and the choice of air strategy.

Conclusion

This case demonstrates the preeminent influence of political objectives on the choice of air strategy. The link between the influences of national survival and economics on the choice of political objectives is nearly as strong. The influences of these factors trumped the influences of doctrine, the size of the IAF, Israel's posture for war, and the enemy aerial defenses. Four of seven areas influenced leaders (primarily military leaders) to favor an air strategy of maneuver, but the remaining three areas held the most influence because of their importance to the state. Therefore, Israeli leaders devoted the IAF to fight an attritional war even though they could have mitigated much of Israel's bloodshed with the IAF's original strategy. Israel's leaders, however, deemed the IAF's sacrifice necessary to preserve its relationship with the United States and to save the state.

Nearly 2,500 years ago Sun Tzu wrote, "To a surrounded enemy you must leave a way of escape; do not press an enemy at bay…'if they know there is no alternative they will fight to the death.'"[32] In the Yom Kippur War, the Arabs surrounded Israel on three

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[32] Sun Tzu, *The Illustrated Art of War: The Definitive English Translation by Samuel B. Griffith*. (New York: Oxford University Press, 2005), 168.

fronts, strategically surprised its leaders, and left Israel no apparent escape. Less than two days into the war, a discussion between Dayan and his aide revealed Israel's perception of its situation. Dayan's aid said, "I am afraid deep in my heart that it will be impossible to defend the State of Israel;"[33] Dayan concluded that only the IAF could save Israel, "consequently, he and the Chief of Staff directed the IAF to attack the penetrating armoured forces [at the Golan Heights] even before achieving air superiority, in unfavorable conditions, heavy fog of war and lack of intelligence, knowledge, data and well-specified targets."[34] Israel fought for its survival, and even took actions to ready its nuclear forces because it was prepared to use all means available.[35] At that moment, when Dayan focused the IAF operations to the Golan Heights, he changed the IAF strategy from maneuver to attrition.

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[33] Kumaraswamy, *Revisiting Yom Kippur War,* 226.
[34] Kumaraswamy, *Revisiting Yom Kippur War,* 227.
[35] Colby, Elbridge, Cohen, et al, *Israeli "Nuclear Alert" 1973,* 3.

Chapter 4

Looking into the Future

Measured by purchasing power parity, China has not only surpassed the US, but also now accounts for roughly 18 percent of world GDP, compared to just 2 percent in 1980.

Graham Allison, *Destined for War*

Each case examined here demonstrated that political objectives directly influenced the choice of air strategy. Survival, economics, and air doctrine had a significant influence on the political objectives, and therefore an indirect influence over the choice of air strategy. The German and Israeli leaders found themselves concerned with the survival of their states and the political objectives of the war reflect their concern for survival. In special cases, the air strategies of states that find its survival unexpectedly threated, like Israel in 1973, are disproportionately influenced by the existential threat to the detriment of other plans, military doctrine, and other factors. In Israel's case, it adopted an attritional strategy to confront the existential threat because the focus of the strategy was to blunt the enemy strength. Strategy that focuses its efforts to counter the enemy's strength categorically align with attrition rather than maneuver.

If states anticipate existential threats, leaders can create strategies that accommodate political objectives, economic limitations or potential, and doctrine. In this case, the anticipated existential threat becomes the mechanism to drive pragmatic strategies, as demonstrated by Germany's prewar strategy and its accommodation of political objectives and simultaneous recognition of constraints Germany's economy imposed upon strategy. Similarly, in each case economics significantly influenced the political objectives. Economics had the most influence over political objectives when survival was not in question. Therefore, political objectives and economics underpin most of the rationale as to how German, American, British, and Israeli leaders chose air strategy.

Yet in the German, British, and American cases, doctrine played a significant role too. For example, Luftwaffe doctrine emphasized principles of maneuver that aligned

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well with Hitler's political objectives of war and the doctrine recognized the constraints Germany's economy imposed upon Luftwaffe war strategy. Therefore, doctrine influenced Germany's political objectives and further pointed decision-makers toward maneuver. In contrast, the IAF's doctrine urged the methods of maneuver warfare such as surprise, tempo, and combined arms, but the IAF doctrine's influence on the political objectives paled in comparison to the threat to Israel's survival. Therefore, the doctrine acted as little more than a speed bump that leaders momentarily noted, and then cast aside to address more pressing issues.

The size of an air force, the state's posture for war, and the enemy's aerial defenses influenced the political objectives to a lesser degree, but they did have indirect influences on the choice of air strategy. For example, the British, Americans, and Israeli's faced stiff resistance from enemy aerial defenses. Despite the defenses and the attrition they caused, each nation continued its attritional strategy. Therefore, my research finds that the influences of the size of an air force, the posture for war, and enemy aerial defenses affect political objectives only when the influences of existential threats, economics, and air doctrine are benign. With the generalities of my thesis summarized, next are the details of my principle findings.

Political Factors Matter Most

Political factors exert a direct influence over a decision-maker's choice of air strategy. Hitler's political objectives and vision demanded speed and a high war tempo from the Wehrmacht and Luftwaffe. As the supreme political authority and commander-in-chief of Germany, he alone had the ability fuse the considerations of multiple grand strategic factors into military strategy. His consideration of politics drove his actions prior to the war and throughout much of the war. The Allied leaders of WWII and the Israeli leaders of the Yom Kippur War had to make similar considerations and their strategies reflected a similar obedience to policy.

Israel's actions in the Yom Kippur War marked a significant departure from Israel's normal behavior in war, and that departure was driven by political objectives. Israeli strategy, especially air strategy, depended upon surprise and preemptive strikes to asymmetrically attack its adversary to produce an advantage, much like the Luftwaffe operations early in WWII. However, Prime Minister Meir prohibited the use of

preemptive strikes in order to preserve Israel's relationship with the United States. She decided that the benefits of preserving the geopolitical relationship with the United States outweighed the costs of yielding the operational initiative to the Arabs. Yet, yielding the initiative for a strategic advantage created significant operational disadvantage and further influenced Israeli leaders to use air strategies of attrition during the war by undermining some of the major elements of the IDF's plan.

Politicians Prioritize State Survival

The influence of an existential threat to the political objectives is unmatched by any other factor. Due to the political constraints, Israel and the IAF found themselves at a significant disadvantage early in the war and Israeli leaders perceived a grave threat to Israel's survival. This case demonstrates that national leaders will accept grave risk to their forces to ensure state survival. In these situations, the political objectives change to focus strategy on the most threatening elements of the adversary's actions, which transform air strategies of maneuver into ones of attrition.

Leaders need only to *perceive* the threat to state survival. The adversary may not even intend to threaten state survival, but intentions did not matter in these cases. Hitler perceived a long-term existential threat to Germany and Dayan perceived an immediate existential threat to Israel; the (mis)perceptions of both leaders greatly influenced their choice of air strategy throughout each war. If survival is assured, economics hold the most influence over politics and therefore a significant influence on air strategy.

Economics as a Foundation to National Power

In each of the case studies, economics had a fundamental influence on the state's political objectives and the choice of strategy. Hitler believed improving Germany's economy solved Germany's grand strategic dilemma. Economic factors significantly contributed to Hitler's motivation for war, but the same economic factors became a significant constraint to the Luftwaffe's war strategy. The relative resource scarcity constrained German political objectives to demand quick victories in war. Therefore, German economics indirectly affected air strategy to use elements of maneuver warfare in order to preserve their limited resources and capitalize on their strategic window of opportunity for war. In contrast to the Nazi economy, the economies of Germany's adversaries enabled more opportunities.

The British and Americans political objectives sought to exhaust Germany and force its unconditional surrender because of the favorable economic situation Britain and America had over Germany. The Allies exploited the Nazis' economic vulnerabilities while depending upon their own economic strengths as the basis for their grand strategy. The Anglo-American grand strategy included the economic strangulation of Greater Germany through multiple instruments of national power. The British and Americans used the military instrument of power to blockade Nazi-occupied Europe and interdict the Wehrmacht through the deliberate targeting of the material production and workers associated with the Nazi war economy.

Factors related to economics lay at the heart of the Allied strategy for victory. The British and Americans pursued the preservation of their own economies while attempting to destroy Germany's. Britain's economy was at risk early in the war until the Allies gained the advantage during the Battle of the Atlantic in 1943. In contrast, America generally enjoyed little risk to its economy and became a significant asset to the Anglo-American strategy. The Allies utilized their economic strength through the production of war materials to achieve material superiority over Germany. The production of materials benefited the Anglo-American air strategy most. Every great power nation in WWII prioritized the production of air power over all else. However, the breadth and depth of the British and American economies supported an air strategy of tremendous destructive potential. The Allies did not need to find Germany's weakly defended vital centers quickly because they could endure a long war while steadily inflicting massive amounts of destruction until Germany's the vital centers surfaced. Geopolitics and the strategic environment favored the Allies' strategic approach, but Israel did not enjoy the same luxury in their war of 1973.

Economics contributed to Israel's strategic decisions prior to the Yom Kippur War that impacted the IAF's strategy. Reserve forces comprised most of Israel's ground forces, and the reservists normally worked as civilians as part of Israel's economy. This approach benefited Israel's economy during peacetime, but it came with its own liabilities in war. Prime Minister Meir exercised caution before calling up Israel's reserves in order to minimize the disruption to Israel's economy. Historically, economics influenced Israeli leaders to use air strategies of maneuver, but the Yom Kippur War was

a unique exception because of the change in Israel's geopolitical relationship with the United States shortly before the war. The United States would not support Israel as the aggressor and effectively eliminated the use of preemptive strikes—a critical element to the IAF's strategy. Faced with this operational disadvantage, Israeli leaders used attritional air strategies to blunt the Arab attack, while simultaneously calling up reserves and working through diplomatic means to obtain resources from the United States to resupply Israeli losses.

Military Doctrine's Indirect Influence on Air Strategy

The fourth and final principle finding is that military doctrine indirectly influences a decision-maker's choice of air strategy. Military doctrine sets a standard and produces normative military behavior, plans, and strategies. However, some strategies ignored the influences of military doctrine to serve the political objectives, like the Luftwaffe's Operation Eagle and the IAF in the Yom Kippur War. Doctrine may be incongruent with state policy in situations where communications between the civil and military leadership suffer. Therefore, military doctrine generally influences a decision-maker's choice of air strategy most when communication between the military and civilian leaders is frequent and honest.

Time plays a crucial role in this discussion. Leading up to the war, the Luftwaffe developed air strategies, based upon its current doctrine, that generally harmonized with Germany's military strategy and Hitler's political objectives. When deviations in harmony occurred, the Luftwaffe generally had the time it needed to modify its doctrine and strategy. Once war began, the lack of time significantly constrained the development of new Luftwaffe strategies. The Anglo-American air doctrine generally aligned with grand strategic factors of Britain and America when WWII began. For example, both nations had large economies, and both were geographically separated from Continental Europe; these factors supported the Anglo-American doctrinal preference for strategic bombing with a great number of heavy bombers. However, in Britain's case, when it became increasingly obvious that Germany posed a threat to British security, politicians became more critical of the RAF's strategic bombing doctrine and set to strengthen Fighter Command and improve its ability to defend Britain. In contrast, the IAF's doctrine aligned well with Israel's political objectives in the Six-Day War in 1967, but

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six years later became irrelevant to Israel's political objectives going into the Yom Kippur War. Therefore, IAF strategy did not support the needs of Israeli leaders, which forced Israel to use attrition.

Implications

I began my research asking why some nations fought wars using air power for attrition, when others use air power as part of a larger strategy of maneuver, and the primary findings of how decision-makers chose strategy provide useful insights to strategists and leaders. For example, nations with economic superiority and industrial capacity over its adversary can support strategies of attrition or maneuver. However, nations that go to war with an economic disadvantage or lesser industrial capacity are less likely to win in wars of attrition. These basic implications highlight the importance of strategic assessments that anticipate future trends, which inform strategists of possible futures. In turn, these assessments should become the bedrock to the strategy of possible futures that underpin strategic planning. For example, what type of air strategy should we expect from a nation like China, with an economy likely larger than America's based on current trends?[1] The answer depends primarily upon China's political objectives and its leaders' perception of an existential threat. My study suggests that China could use a strategy of attrition or maneuver with a reasonable chance that either would work.

Beyond anticipating the possible strategies of the adversary, decision-makers and strategists need to recognize the limits of the strategy used to serve a specific situation and include the shortfalls as part of the risk analysis for policy decisions. For example, in the years leading up to the invasion of Poland, Hitler understood the constraints Germany's economy imposed on strategy and made policy that demanded the Wehrmacht win wars quickly. His policies accelerated the development of Germany's Blitzkrieg doctrine.[2] Additionally, Hitler used the Luftwaffe as part of his armed

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[1] "The World Factbook," Central Intelligence Agency, 8 May 19, https://www.cia.gov/library/publications/the-world-factbook/geos/ch.html. If China's economy has not already surpassed the US. According to the CIA, purchasing power parity (PPP) measures economic potential best and China's economic PPP exceeded the United States' economic PPP in 2014, making it the world's largest economy. In 2017, the PPP of China's GDP was $23.12 trillion (official exchange rate GDP of $12.01 trillion), compared to the PPP of the US's GDP of $19.49 trillion (official exchange rate GDP of the same, $19.49 trillion).
[2] Barry R. Posen, *The Sources of Military Doctrine* (Ithaca and London: Cornell University Press, 1984), 212.

diplomacy in order to coerce weaker powers and preserve German power for future wars. Despite Germany's foresight and ingenuity that led to its early successes in WWII, Germany failed to recognize the shortfalls of Hitler's grand strategy with its dependence on an alliance with Britain. If Britain had allied with Germany, the Luftwaffe's maneuver warfare strategy intended for continental war was ideal, but it had little utility for the Battle of Britain, which required the Luftwaffe to create a haphazard strategy under significant temporal constraints. Therefore, Hitler's gamble to attack Britain carried extraordinary risk to Germany's success in the war.

Finally, political objectives command nations and their strategies. Politicians are most concerned with the survival of their nation and all other concerns become an afterthought to the overpowering demands of the need to survive. In Germany's case, Hitler perceived the existential threat to Germany to be so great that he accepted extreme risk throughout the war to meet his political objectives. The irony of Germany's outcome in the war is that Hitler's political objectives intended to create a prosperous Germany to rival the United States; yet, through his aggressive policies and campaigns, Hitler may have created the very situation he feared most: an Anglo-American alliance determined to eradicate the Nazi regime.

America's strategic assessment of its geopolitical future informs the strategy of the future. It may dictate the adoption of maneuver warfare throughout the US military. Yet, this form of warfare has its limitations. Overcoming these limitations requires a coordinated and synchronized application of the four instruments of power. Mastering such grand strategy is an art, and the last time the United States faced such a grand test ended about 30 years ago with the fall of the Soviet Union. However, at that time, America had the world's largest economy, most powerful military, and a significant technological edge over the rest of the world. The US will likely face strong competition in all three areas over the next few decades, which begs the question of how it will affect America's grand strategy, military strategy, and naturally, its choice of air strategy.

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