

UNIVERSITY OF CALGARY

Masters of Controlled Chaos: Antifragility and American Space Strategy, 1953-1963

by

Carter Brust

A THESIS

SUBMITTED TO THE FACULTY OF GRADUATE STUDIES
IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE
DEGREE OF MASTER OF ARTS

GRADUATE PROGRAM IN HISTORY

CALGARY, ALBERTA

SEPTEMBER, 2022

© Carter Brust 2022

ABSTRACT

In 1957, the launch of *Sputnik* fundamentally altered the existing Cold War dynamic. The Soviet Union, a country left in tatters in 1945, had caught the most powerful nation in the world off guard. Despite this initial success by the Soviet Union, it was ultimately Americans who would go on to plant their nation's flag on the moon. Why was this? How were the Americans able to come from behind in the Space Race? In order to answer these questions, this thesis considers how crisis shaped and influenced the ability of the United States to build institutional virility and refocus its strategy between 1953 and 1963. While individual events such as the launch of *Sputnik* and the Cuban Missile Crisis have been considered in-depth by established Cold War scholars, the wider relationship between crisis and strategy in the early Cold War has not yet been considered to the same extent. This thesis argues that the decisions made by key policy makers contributed to the building and maintenance of an antifragile system, leading to long-term strategic viability and allowing the United States to pursue a moonshot. In doing so, this analysis will also demonstrate the American capacity for agility, power conversion, and learning in response to crisis, shocks, and stressors during this period. Furthermore, it shows how antifragility was built and maintained during the administrations of Dwight D. Eisenhower and John F. Kennedy. It considers change and continuity between the two presidents both in how these leaders viewed and responded to crisis. The thesis concludes with an examination of the transformative nature of the Space Race as well as implications surrounding state antifragility. Exploration into the connection between crisis, leadership, and strategy in the past can provide useful tools for present day policy makers and assist in ongoing strategic synthesis.

ACKNOWLEDGEMENTS

First, I would like to thank my supervisor Dr. Paul Chastko for his unwavering support and direction. I am grateful not only for his insight and direction, but also for his patience in the completion of this project. I would also like to thank all of the professors that I have had over the last six years. You have all played a massive role in my decision to pursue graduate studies.

Second, this project would not been possible without the support of my family and friends. To my parents, who have been there every step of the way, I am forever grateful for the opportunity you have both given me to pursue what makes me happy. To my friends, who have contributed their thoughts, time, and drift; the memories made over the last few years will never be forgotten.

*For my mother, who always wanted her own MA,
And for my father, who told me to keep going.*

TABLE OF CONTENTS

Abstract.....	i
Acknowledgement.....	ii
Table of Contents.....	iv
Introduction.....	1
Chapter I: History, Theory, Framework.....	5
Chapter II: High Noon at Mid-Century: The American Security Establishment, 1945-1953.....	28
Chapter III: The Race to Space: Soviet Satellites and American Antifragility, 1956-1961.....	44
Chapter IV: John F. Kennedy and the Origins of the American Moonshot, 1961-1963.....	70
Conclusions: State Antifragility in Perspective.....	110
Bibliography.....	117

Introduction

On July 16, 1969, around one million people gathered around the roads and fields around the Kennedy Space Centre to witness history. At 9:32am local time, a *Saturn V* rocket carrying Neil Armstrong, Edwin “Buzz” Aldrin, and Michael Collins lifted off into the hazy south Florida sky. Four days later, Armstrong and Aldrin would be the first to walk on the lunar surface, broadcast live around the world. As a technological achievement, the moon landing stands as one of the unequivocal landmarks of human achievement. On a national level, the event was also heralded as a significant victory for the United States. The culmination of a fifteen-year competition between the United States and the Soviet Union, the moon landing in the summer of 1969 marked the first time the Americans had upstaged the Soviets in the Space Race. Just over a decade earlier, it was the Soviets who had the initiative, upstaging the Americans.

From the late 1940s onward, the American liberal democratic system was put to the test by the wider communist world on all fronts by a series of crises that altered the way Americans perceived the world. As the international atmosphere evolved in the first two decades of the Cold War, American military, political, and economic policy makers argued over the best means to efficiently manage the Cold War and deal with the Soviet Union. A key aspect of this competition occurred in science and technology. In 1949, the Soviets ended the American monopoly on atomic weapons, and by 1957 had beaten them to space. Yet it was ultimately the Americans who landed on the moon in 1969. What caused this change, and why did it happen? How did crisis shape and influence the United States’ ability to build institutions and refocus its strategy? In order to answer these questions, this analysis will attempt to unpack and examine American antifragility. Defined as the ability of a system to become stronger as a result of a series of stressors or crises, building and maintaining an antifragile system is the key to long-

term strategic viability. An antifragile system is characterized by three factors: agility, power conversion, and learning. Starting in 1953 and especially following the launch of *Sputnik* in 1957, the United States under the leadership of presidents Dwight D. Eisenhower and John F. Kennedy, fostered each of these three characteristics. Overall, it is clear that due to the decisions made and policies implemented by these two administrations, the United States was able to build and maintain an antifragile system and overtake the Soviet Union, thus ensuring their continued and future success in space achievement and indeed long-term strategic viability.

This is not a study of the moon landing, nor is it a narrative study of the space race. Both have been undertaken by numerous academics working in the realms of American and scientific history. It is a story about how the United States went from humiliation at the hands of the Soviet Union to actualizing its potential and mobilizing men and material to synthesize an effective space strategy. The analysis is broken down into four thematic chapters. Chapter 1 unpacks the existing historiography and theoretical framework that underpins the thesis. The goal is to not only situate this analysis within the historical literature, but to suggest the ways in which this thesis draws on existing theory surrounding leadership, crisis, and antifragility. While chapter 1 provides the framework, chapter 2 introduces the historical context. A short chapter, it briefly explores the development and trajectory of American strategy and security policy from 1945 to Eisenhower's inauguration in January 1953. It sets the stage for the Space Race and provides the necessary background in order to help the reader understand the evolution of the Cold War. Taken together, the first two chapters provide the reader with the information necessary to fully appreciate the case studies that follow.

Chapters 3 and 4 serve as the case studies, looking at the Eisenhower and Kennedy administrations respectively. These chapters both draw upon the theory expounded upon in Chapter 1 while continuing the narrative laid out in Chapter 2. The goal of the two chapters is to show how each leader demonstrated agility, power conversion, and learning during the Space Race, thus contributing to the building and maintenance of an antifragile system. Chapter 3 picks up the narrative started in the previous chapter, going from Eisenhower's inauguration through to his famous farewell speech in January 1961. While the chapter starts in 1953, considerable attention is paid to his second administration, specifically the launch of *Sputnik* and its aftermath. It evaluates Eisenhower and his administration's response to the Soviet satellite suggesting that while a considerable disruption, the event served as a catalyst for the building and strengthening of American antifragility. Chapter 4 builds on this narrative with the Kennedy administration. While Kennedy criticized the Eisenhower administration's handling of Cold War competition, he built on the framework set by his predecessor. Kennedy brought a new vigour to the White House and the Space Race, supplementing powerful speeches with tours of NASA facilities while folding American achievement in space into his broader New Frontier agenda. Like his predecessor, Kennedy contributed to American antifragility. By exercising agility in his strategy, fostering American soft power, and learning from past mistakes, Kennedy built on the foundations laid by Eisenhower. Throughout these two chapters, significant attention is paid to how each president maintained agility and flexibility, converted American hard and soft power into tangible action, as well as how each administration learned from events to foster long-term strategic viability through antifragility.

The thesis concludes with a look at immediate implications of American antifragility as well as future applications of the concept as it pertains to leadership, crisis management, and

strategic synthesis. Antifragility as a model or theory has received little attention in the academic fields of political science and international relations, let alone history. The goal of this thesis is to demonstrate the principle in action and to show the genesis and maturation of an antifragile system. The two case studies illustrate how the decisions of individuals in positions of power and influence can contribute to such a system. Further research and application of the principle over time and space will not only foster interdisciplinary studies in the fields of history, political science, international relations, and strategic studies, but will help clarify and crystalize antifragility as an important concept in these disciplines.

Chapter I

History, Theory, Framework

This is not a work of theory, however it is necessary to explore the ideas and frameworks that underpin this analysis and briefly discuss the historiography drawn upon throughout. The goal of this chapter is to situate the arguments of this thesis within the existing historical literature as well as introduce Nassim Nicholas Taleb's concept of antifragility. The first section will briefly recap the existing and established literature on Presidents Dwight D. Eisenhower and John F. Kennedy, especially as it pertains to their leadership and strategy. The second section will discuss the historiography of the Space Race as well as the wider Cold War from 1949-1963. The third section explores the relationship between leadership and crisis, a key theme that is drawn upon throughout the paper. The final section is devoted to antifragility, its definition, related subthemes, as well as its application in this paper. Overall, the goal of this chapter is to provide the framework and situate this analysis within the broader theory and historiography of American strategy and leadership during the first decade of the Space Race.

On Eisenhower

The historiography on Dwight D. Eisenhower's leadership has gone through three distinct phases.¹ Initial appraisals by commentators in the immediate aftermath of his administration reflected the partisan positions and revealed more about the evaluators than the president himself. Early works on Eisenhower include Sherman Adams' *Firsthand Report* (1961), Richard Nixon's *Six Crises* (1962), and Arthur Larson's *Eisenhower: The President Nobody Knew*

¹ For a full discuss on the historiography of Eisenhower and his presidency, see Chester Pach Jr., ed. *A Companion to Dwight D. Eisenhower* (New York: John Wiley & Sons, 2017).

(1968). These preliminary assessments were augmented by Eisenhower's own two-volume memoir *The White House Years* (1963, 1965). Although these early works provided new information, they lacked historical perspective and were therefore unable to offer a sufficiently broad analysis of the presidency. By the 1970s, scholars acquired greater access to manuscript collections and by the 1980s, a wave of Eisenhower revisionism replaced the initial appraisals. In contrast to earlier works that relied on publicly available information and memoirs, these new studies examined in depth numerous aspects of the Eisenhower administration and painted a more nuanced and generally favourable portrait of the president and his leadership style. One of the most influential scholars of this period was Fred Greenstein, whose 1991 depiction of Eisenhower's "hidden-hand" leadership epitomized the state of the field. His thesis argues that despite his appearance as lazy and out of touch, Eisenhower nonetheless employed a deft and competent hand to guide American policy and shape opinion. Other notable works include Stephen Ambrose's *Eisenhower: The President (1952-1969)* (1984), Martin J. Medhurst's *Dwight D. Eisenhower: Strategic Communicator* (1993), and Robert Bowie and David Immerman's *Waging Peace* (1998). Within the last twenty years, a variant of Eisenhower post-revisionism has emerged, accepting the basic tenets of the hidden-hand thesis but providing a more critical analysis of the effectiveness of Eisenhower's leadership style and the policies that ensued. Notable post-revisionist works include Richard V. Damms' *The Eisenhower Presidency, 1953-1961* (2002) and William Hitchcock's *The Age of Eisenhower* (2018).

Although this analysis mainly considers Eisenhower's security policy, it draws primarily from the post-revisionist school of Eisenhower historiography. It considers his deficiencies and shortcomings, especially those surrounding his leadership capacity, but also sheds light on his accomplishments. While Eisenhower had his faults, he was able to successfully guide the United

States through one of the most turbulent periods in its history. Overall, the goal is to paint a holistic picture of the president's strategy over both terms in an attempt to make sense of his policies surrounding defense, nuclear weapons, and the Space Race and determine whether or not his actions and decisions contributed to American antifragility.

On Kennedy

Unlike Eisenhower, John F. Kennedy's presidency has been interpreted a bit differently, largely due to his assassination on November 22, 1963. Most of the early works on Kennedy were heavily shaped by so-called "court historians" where the author's opinion of and/or relation to the former president influenced their perceptions of his administration. Following his death, there was a flood of works that painted Kennedy as a fallen martyr whose promising administration was tragically cut short. This was partly due to Theodore White's idyllic essay in *Life* magazine immediately following the Kennedy assassination. They praise the vigour of his character, highlight his bravery surrounding Cuba, and showcase his progressive stance on Civil Rights. While descriptive and detailed, they often lack the context and perspective that characterized later studies. These early works include Arthur Schlesinger Jr.'s *A Thousand Days* (1965) and Ted Sorensen's *Kennedy* (1965). Following the initial wave of scholarship in the second half of the 1960s, the historiography turned revisionist as scholars gained access to archival material related to Kennedy in the late 1980s and early 1990s. Part of the reason why initial works tended to be overwhelmingly positive was due to the significant control exerted by the Kennedy family over primary source material. As this control waned, scholars were able to adopt a more critical tone and approach. These works tend to highlight Kennedy's faults and shortcomings in an attempt to offer a counter to the existing literature. Notable works of the

Kennedy revisionist wave include Henry Fairlie's *The Kennedy Promise* (1973) and Bruce Miroff's *Pragmatic Illusions* (1979), with the final being Thomas Paterson's *Kennedy's Quest for Victory* (1989). As the revisionist wave receded, it was replaced with a post-revisionist turn in the 1980s through to the present. These studies tend to be a lot more balanced and nuanced, focusing on a specific aspect of Kennedy's life of presidency. On the topic of the Space Race, Douglas Brinkley's *American Moonshot* (2019) and James Shesol's *Mercury Rising* (2021) highlight the important role played by the president in the advancement of the American space program. Despite the presence of critical works, the overall attitude of historians towards Kennedy and his administration continues to remain overwhelmingly positive.²

This thesis attempts to take a balanced approach to Kennedy, fitting in with the overall positive image of the president. Along with numerous key individuals in his administration, Kennedy served as the poster boy of his generation, yet like Eisenhower, Kennedy had his faults. While his vanity and hubris may count against him, Kennedy's ability to command a room and capture an audience is among the best. Overall, this analysis attempts to take a more down-the-middle view. He may not have been the fallen martyr described by those authors close to him, yet Kennedy's contributions, particularly surrounding the Space Race, place him as one of the most iconic and dynamic individuals ever to occupy the Oval Office.

On the Space Race

There is no shortage of works on the Space Race or indeed the early Cold War. The two-decade competition between the Soviet Union and the United States for pre-eminence in space

² For a full discussion on the historiography of Kennedy and his presidency, see Marc J. Selverstone, ed. *A Companion to John F. Kennedy* (New York: John Wiley & Sons, 2014), and Andrew Hoberek, ed. *The Cambridge Companion to John F. Kennedy* (Cambridge: Cambridge University Press, 2015).

has drawn attention from authors writing for both popular and academic audiences. While there was considerable press coverage of the Space Race from the 1950s through to the 1970s, most academic works on the Space Race have emerged over the last forty years due to the classified nature of much of the primary source material. Since then, three subcategories have emerged: specific, general, and the popular. Specific works tend to pick on one aspect, event, or person going in-depth to make detailed and nuanced arguments. This includes biographies, such as James Harford's *Korolev* (1997), Bob Ward's *Dr. Space: The Life of Wernher von Braun* (2009), and Colin Burgess's *Selecting the Mercury Seven* (2011). *Sputnik* has also rightly drawn significant attention from scholars, with Robert Divine's *The Sputnik Challenge* (1993), Asif Siddiqi's *Sputnik and the Soviet Space Challenge* (2003), and Yanek Mieczkowski's *Eisenhower's Sputnik Moment* (2013) all providing excellent coverage. Likewise, the moon landing is a common topic among historians. In addition to Brinkley's *American Moonshot*, John M. Logsdon's *The Decision to Go to the Moon* (1976) and *John F. Kennedy and the Race to the Moon* (2011), along with Andrew Chaikin's *A Man on the Moon* (1994) all tell the story of what may be mankind's greatest achievement.

General histories of the period emerged as the archives opened up in the 1980s and 1990s. Scholars adopted a wider approach, studying the Space Race within the context of the wider Cold War. Walter McDougall's *...The Heavens and the Earth* (1985) remains the definitive academic work on the Space Race. In addition to the considerable academic attention, the compelling narrative of the Space Race has led to numerous authors retelling the story for a popular audience. Deborah Cadbury's *Space Race* (2006) and Tom Wolfe's *The Right Stuff* (2004) are the key books here. Other significant works on the Cold War mention the Space Race, but focus more on the Cold War itself. John Lewis Gaddis's *Strategies of Containment* (1982,

revised edition 2005) considers American foreign policy, while Campbell Craig and Fredrik Logevall's *America's Cold War* (2012), and Julian Zelizer's *Arsenal of Democracy* (2009) look at American domestic politics. Like literature on the Space Race, the majority of through works on the Cold War have been published in the last thirty years. As scholars gain access to classified material, the detail and focus of the Cold War literature has increased.

While most studies of the Space Race tend to focus on either *Sputnik* or the Apollo program, there are few that seek to make a deliberate connection between the two events. Those that focus on *Sputnik* tend to either end with Kennedy's election and include the rest of the space race in the conclusion or in an epilogue. While studies on the Apollo program or the moon landing cover *Sputnik*, they often do so in a matter-of-fact manner, leading to an analysis that can be a bit superficial. This thesis attempts to not only connect *Sputnik* to Kennedy's decision to go to the moon, but also to unpack the deeper aspects of presidential decision making between 1957 and 1963. In doing so, it borrows aspects from both the more narrative Space Race literature as well as the academic studies on Cold War security and foreign policy to present a detailed look at how American leaders and policy makers adapted to a dynamic, stressful, and rapidly changing environment.

On Leadership

In addition to the existing historiography, this analysis also draws on a few key works of theory. Leadership, and more specifically presidential leadership is a well-established field of study. Much has been written on how presidents have used their position to affect change and communicate their agenda. Despite this, there is no consensus on what effective leadership looks like. The manner in which leaders exercise their power and authority varies over time and space

remains highly contextual. Much of studies on presidential leadership published during the Cold War are closely tied to the biographical literature. While the biography of any leader, regardless of publication date is bound to discuss aspects of leadership, more theoretical studies on the topic emerged in the 1980s and 1990s. First published in 2000, Fred Greenstein's *The Presidential Difference* continues to be a key work in the field, with its third edition published in 2009. In this edition, he puts forth five qualities that bear on presidential performance: effectiveness as a public communicator, organizational capacity, political skill, vision, and emotional intelligence.³ In this case, effectiveness is not tied to any particular policy or end, but rather in their ability to present themselves as the public face of a thought out, well developed, and coherent strategy.

How leaders perceive the world is of utmost important in understanding how these strategies are developed. The landmark book in this subcategory is Robert Jervis's *Perception and Misperception in International Politics* (1976). Jervis demonstrates that decision makers' perceptions of the world and of other actors diverge from reality in detectable patterns that may be understood.⁴ To do so, he analyzes the methods by which decision makers process information and from, maintain, and change their beliefs about the world around them. Two key themes that permeate his analysis are relevant for this thesis: First, he asserts that what one learns from key events in international history is an important factor in determining images that shape the interpretation of incoming information.⁵ In other words, how the past is understood by a leader (in this case the president) will shape his or her view of the present. Eisenhower was profoundly influenced by his experience in World War II. His status as Supreme Commander of Allied Forces Europe provided an administrative template that he used as president. As a keen

³ Fred I. Greenstein, *The Presidential Difference* 3rd Edition (Princeton: Princeton University Press, 2009), 225-228.

⁴ Robert Jervis, *Perceptions and Misperceptions in International Politics* (Princeton: Princeton University Press, 1976), 3.

⁵ Jervis, *Perceptions and Misperceptions in International Politics*, 222.

student of history, Kennedy had a particular perception of the nature of his election. As will be demonstrated in chapter four, he saw himself as the vanguard of a new chapter in American history. In order to move the country forward, he sought to re-ignite the frontier spirit that had played a significant role in the shaping of the American identity and mythos. Second, Jervis further argues that a common misperception is to see the actions of others as more centralized, planned, and coordinated than they really are. He points out that this is a manifestation of the drive to squeeze complex and unrelated events into a coherent pattern.⁶ This is closely tied in with the concept of the paper tiger: an agent or actor that is outwardly powerful and dangerous but inwardly weak and disorganized. This can be seen in subsequent American administrations' attitude towards the Soviet Union in the early years of the Cold War. While the United States engaged in various forms of espionage and intelligence gathering, it was impossible to get a full understanding of the Kremlin's true intentions. Speculation abounded as American policy makers attempted to pre-empt and counter Soviet moves around the world. Misperception of Soviet capabilities contributed to the missile gap hypothesis, in which the Soviet Union was alleged to possess superior weapons delivery systems, in both number and quality. As will be demonstrated, how leaders, especially presidents, perceive (and misperceive) the world around them has a massive impact on their ability to manage major projects, whether it be domestic economic restructuring or competition in space.

Once a leader has identified an issue or cause worth spending time and money on, they need to build and maintain support for it. Within a democratic system, the linkage between the president and public is a crucial element. As the public face of a large bureaucratic machine, the

⁶ Jervis, *Perceptions and Misperceptions in International Politics*, 319.

president must adopt the role of communicator-in-chief.⁷ But the President also has a personal relationship with the American people that is unlike that of any other elected official. In times of uncertainty, people turn to the president for guidance. Both Eisenhower and Kennedy understood the Space Race through the prism of the Cold War, and both had strong views on what was, and what was not necessary to wage the Cold War effectively. While charisma may help in the delivery of speeches, the most effective presidential communicators have been able to identify the issues that matter to voters.⁸ On the other hand, it is up to the leader to articulate a vision and convince people to go along. This is not always easy. Should leaders take a more bottom-up populist stance, drawing their cues from the public and try to accommodate public wishes? Or should they pursue a more top-down, “experts-know-best” methodology in order to instill confidence in the strategy and institutions of government? Either way, it is important to make people feel that the government belongs to them and that those in power are acting in their best interest.

Effective communication is more than just word choice: image and presentation are also important, since running for and holding public office has become an intensely personal affair. Policies and worldview are also key, but candidates often sell themselves first on the basis of their character.⁹ A leader may be the most brilliant speechwriter but may struggle to relate or identify with voters. Communication is also related to perception, this time from the population. Going public is a potent weapon the president’s arsenal, both for advancing his own agenda and

⁷ George C. Edwards and Stephen J. Wayne, *Presidential Leadership: Politics and Policy Making* (New York: St. Martin’s Press, 1985), 11.

⁸ Doris A. Graber, “The President and the Public Revisited” in *In the Public Domain: Presidents and the Challenges of Public Leadership*, ed Lori Cox Han and Diane J. Heath (New York: State University of New York Press, 2005), 5.

⁹ Stephen J. Farnsworth, *Spinner in Chief: How Presidents Sell their Policies and Themselves* (New York, Routledge, 2015), 59.

blocking initiatives from his political adversaries in congress. There are tremendous risks when it comes to going public with a certain policy or appeal, since how the public perceives a leader will have a tremendous impact on the ability to pursue his agenda. Effective communication as leader is about finding an Aristotelian balance between being perceived as assertive and amicable. This ties into what Greenstein labels as “emotional intelligence.”¹⁰ Overall, effective leaders are the best communicators. These individuals are able to rally people behind their causes through charisma and image management while not letting emotion diminish their ability to do so. As we will see later on, this balance was not always easy to cultivate and maintain.

Leading the United States is neither easy nor forgiving. Constant scrutiny by the press and public weigh heavily on a president’s ability to get stuff done. Each individual who assumes the presidency is presented with a unique set of historical circumstances that requires careful policy formulation and a skillful public relations campaign. Stephen Farnsworth points out that because policy accomplishments are often limited by Congress or other external factors, administrations often turn to public relations to keep public goodwill, portraying “a mountain of success where only a molehill exists.”¹¹ Despite what fervent supporters may argue, presidents have a finite amount of power and political capital. Aligning potentially unlimited ends with necessarily finite means is the hallmark of effective strategy. Upon taking office a president must decide what is worth pursuing and direct resources towards those goals. Hard, nitty-gritty policy details may appeal to some voters, but for the most part, public attention for most policy matters is limited. For many citizens, budgets are boring, lawmaking is tedious, and international problems often seem distant. Given this limited public attention in government operations,

¹⁰ Greenstein, *The Presidential Difference*, 6.

¹¹ Farnsworth, *Spinner in Chief*, 60.

effective White House communication aimed at citizens is not explicitly issue-based.¹² Instead, such communication often appeals to emotion and is designed to generate a positive assessment of the president and his agenda. Reading the room and understanding the historical circumstances of their election and presidency helps the president in power to tailor his message accordingly.

Effective leadership becomes even more important when unanticipated problems or curveballs begin to derail and interfere with a president's established strategy. Every president during their time in office has been forced to change their agenda, whether because of changes in Congress, the actions of some domestic or foreign agent, or some other unforeseen set of circumstances. For the purposes of this analysis, crisis will be defined as an event or a series of events in which an agent or actor's strategy or worldview is abruptly and significantly challenged or disturbed to the extent that action on behalf of that is required in response. A crisis may last a couple days, a couple months, or a couple years, depending on the severity of the disruption to the status quo. As the leader of a state, crises can arise in a number of places from various external and internal factors. The first step in responding to one is being honest and accurately identifying the nature of the problem. When assessing threats or crises that upend the status quo, what is more important: the past or the present? Should each event or crisis be understood as a unique product of its time, or does the past hold clues that help leaders make sense of them? The answer lies somewhere in the middle. On the one hand, history has an impact on the present. The actions taken and decisions made by agents in the past undoubtedly have an impact on whatever is happening in the present. Consider the breakup of the Eastern Bloc and subsequent collapse of the Soviet Union as the culmination of historical grievances. On the other hand, crises can be

¹² Farnsworth, *Spinner in Chief*, 61.

spontaneous. One event leads to another and through a snowball effect, events can quickly spiral out of control in a matter of days or weeks. Consider the COVID-19 pandemic. With this ongoing crisis, it is less a product of history and accelerated quickly in the spring of 2020. With any crisis, it is important to remember the role of hindsight. Looking back, it is often easy to point to the chain of events. Connections are not always evident at the time and may often only be understood when looking back years or decades after the event.

As both products of history and of the present, all crises provide information, exposing vulnerabilities or inadequacies within a system.¹³ In some cases, the crisis may uncover unforeseen areas that require attention. At the political level, such disruptions illuminate gaps or holes in the current strategy. A terrorist attack requires changes to airport security, while losing an election often forces a change in electoral strategy. While systems, institutions and organizations work to mitigate the risk of future crises through forecasting and modelling, mitigation is impossible without studying previous events. An effective leader will identify these shortcomings and through careful examination update existing policies, procedures, and practices so as to better prepare for what might come next. According to Melvyn Leffler, there are three things that condition a leader's response to crisis: ideology, personality, and history.¹⁴ Their responses are bound by their framework and worldview, and some options or policies will be off the table due to the political worldview of the individual. Likewise, the character and personality of a leader also imposes limitations on this power. Knowledge or ignorance with respect to a particular issue also conditions an individual's response. Finally, history, or more specifically an individual's understanding of history, will also shape any response. Reflecting on those who

¹³ Nassim Nicholas Taleb, *Antifragile: Things That Gain from Disorder*. New York: Random House, 2014), 106.

¹⁴ Melvyn P. Leffler, *For the Soul of Mankind: The United States, The Soviet Union and The Cold War* (New York: Hill and Wang, 2007), 94, 101.

came before, a leader will view certain means or ways as effective or ineffective and formulate strategy to reflect this.

In addition to providing information, crises are often used as an opportunity. Having exposed the shortcomings or vulnerabilities of an existing system, crises provide leaders a chance to push change. This is best summed up in a quote often attributed to British Prime Minister Winston Churchill: ‘never let a good crisis go to waste.’ A crisis upsets the status quo, alters the parameters of debate, and often shifts the range of acceptable policy options. A skilled politician seeking advancement will capitalize on this disruption to change course. This frequently involves capitalizing on fear or uncertainty. During a crisis, people will typically turn to the government, looking for answers. They look to the people in power to do something to restore some sense of stability, and a frightened public will take comfort in times of crisis in the thought that the person at the helm is fully capable of coping with looming calamities.¹⁵ Rather than return to pre-crisis norms, decision makers often cite crisis-induced instability to push new policies and bring in new people or ideas. However, pursuing this change involves a high capacity of political skill. First, adjustments in policy or strategy are usually tied to the crisis. The further away from the crisis the change is, the less likely it will be seen as a necessary or legitimate change. Second, the degree of change is typically proportional to the size of the crisis. However, with both of these there is a degree of flexibility. A foreign policy event may be cited by a president to pursue domestic education reform. Likewise, a crisis may actually be quite small or short, but a president may exaggerate its impact in order to serve an agenda. Conversely, the size of a crisis may also be downplayed to serve a particular agenda. This crisis management ties in with the points on communication and leadership mentioned above. The skilled public

¹⁵ Graber, “The President and the Public Revisited” in *In the Public Domain*, 7.

communicator can not only identify a crisis but can use it as an opportunity to win support for a specific policy. The rhetoric may look something like this: ‘crisis *X* has shown that we are deficient in area *Y* so support me and I will pursue policy *Z* to ensure that there will never be another crisis *X*.’ Learning from the mistakes and successes of predecessors is key when it comes to identifying and managing crises and will play a major role in the success or failure of any given strategy.

What does this mean for leadership during a crisis? Is it possible to manipulate and shape our environment rather than simply become the victim of forces beyond one’s control? The short answer is yes—but acuity and awareness are key. While organizational structure and forces beyond the control of presidents will continue to shape decisions, actors still possess the capacity to determine how they choose to react to curveballs thrown their way. Some leaders may shirk crises as minor hiccups whose impact should be downplayed, while others make the most of these disruptions to usher in new policies. Either way, accurately perceiving a crisis and understanding its implications precedes any change. As Greenstein points out, presidents who steep themselves in the record of their predecessors will be better equipped for their responsibilities as a result of doing so.¹⁶ That being said, learning *about* the past is one thing, learning *from* it is another. Being honest about the nature of the issue and identifying where and when to change strategy is not an easy task. Every crisis provides information, yet not everyone will draw the same conclusions. An adversary’s technological achievement will reveal the shortcomings of an education system to one, while to another it demonstrates the ineffectiveness of those at the top.

¹⁶ Greenstein, *The Presidential Difference*, 219.

Communication matters when it comes to effective leadership, especially for those in a democratic system. Presentation, demeanour, image, and vocabulary are all means by which a president may improve communication. Accurately perceiving crises and stressors is the first step to effective leadership. Presidents reach decisions by methods that are similar to those employed by others facing important, hard choices and armed with uncertain knowledge and ambiguous information. How a president perceives key events will have a significant impact on their strategic choices and having identified the key issues to be addressed, the effective leader will be skilled at formulating an agenda and communicating it. Whether this be to his advisors, the general public, or foreign adversaries, a president's organizational capacity will be judged on his ability to mobilize support behind his agenda draw people to his cause. For the purposes of this paper, presidential leadership is about how individuals act within and respond to structural forces. As we will see both Eisenhower and Kennedy were presented with challenges and forced to make tough decisions. In this sense, their effectiveness as president is predicated on their ability to maintain the integrity of American institutions and values in the face of challenge.

On Antifragility

As mentioned above, crises can have a dramatic effect on how actors and systems operate. While crises may seem like a destructive or disruptive event, these events can have a positive effect on political systems and the individuals within them. How can a system benefit from crises or other stressors? The answer lies in the concept of antifragility. Made popular by the author Nassim Nicholas Taleb, antifragility is defined simply as the opposite of fragile.¹⁷ Antifragility is a property of a system which they increase in capability to thrive as a result of

¹⁷ Taleb, *Antifragile*, 3.

stressors, shocks, volatility, mistakes, faults, attacks, or failures. In other words, something that is antifragile grows having experienced some sort of setback. The goal of this subsection will be to unpack the concept, look at how it works, and apply antifragility to broader systems of organization to show how antifragile political systems and institutions are built, and more importantly, how they are maintained.

Initially conceived as a mathematical concept first expressed in a 2013 article for the journal *Nature*, Taleb expanded the concept in his 2014 book *Antifragile: Things that Gain from Disorder*. In the book, he stresses the differences between antifragile and robust/resilient, stating that “antifragility is beyond resilience or robustness. The resilient resists shocks and stays the same; the antifragile gets better.”¹⁸ Antifragility is best illustrated through examples, the most prominent being the human immune system. In its most basic distillation, the immune system is network of biological processes that protects a person or other living organism from diseases. It does so by detecting and responding to various pathogen that enter the body. While humans do have some innate protection, the immune system adapts to provide a tailored response by learning to recognize pathogens it has previously encountered. As a result, the more times an immune system encounters a specific virus, the better it is at fighting it. In order to build up strength to tackle pathogens, the system needs to be exposed to a low level of disease, whether naturally through previous infection or artificially through vaccination or immunization. Through exposure to low levels of stressors, the system becomes stronger as a result. The larger point, according to Taleb, is that depriving systems of vital stressors is not necessarily a good thing and can be downright harmful, as the avoidance of small mistakes makes the larger ones more severe.¹⁹

¹⁸ Taleb, *Antifragile*, 3.

¹⁹ Taleb, *Antifragile*, 85.

It is easy to see antifragility with the human immune system, but can the same principle be applied to political and economic domains? As with the human immune system, depriving political systems of volatility harms them, as controlled environments encourage complacency, making it harder to cope when control eventually breaks down.²⁰ Crises and volatility provide information. The problem with artificially suppressed volatility is not just that the system tends to become extremely fragile, it is that at the same time, the system appears to be stable on the surface. After all, leaders will do everything in their power to maintain a sense of stability and inhibit fluctuations when it comes to society or the economy. Without minor disruptions, systems become complacent. A political party may win subsequent elections, but in order to grow and change, they must suffer some losses in order to stay relevant with voters. Likewise, security practices must keep evolving in order to deter future terrorist attacks. While no one has perfect foresight, the best strategies accommodate for minor disruptions, lest such disruptions derail the entire system. The longer it takes a blow-up to occur, the worse the resulting harm to both the economic and political systems.²¹ Complex adaptive systems thrive from the need to respond frequently, but not too frequently to the unforeseen. Constant disruptions, however, prevent recuperation and learning. This is not something that is set up top-down but instead a process that emerges over time through skilled management. The point is that without the presence of stressors, there is not as much impetus for change or growth, which in geopolitical competitions can result in conceptual envelopment or strategic stagnation.

What then, makes a state political system antifragile? In order answer this question, it is necessary to unpack fragility. In 2015, Taleb and Gregory F. Treverton wrote an article in *Foreign Affairs* magazine in the aftermath of the Arab Spring, outlining five characteristics of

²⁰ Taleb, *Antifragile*, 81.

²¹ Taleb, *Antifragile*, 106.

state fragility. First is the centralization of government and the decision-making process. According to Taleb and Treverton, this magnifies the consequences of stressors and crises that do occur. Rather than diffuse tensions, centralization concentrates turmoil. In other words, a single decapitating event or strike can render an entire system redundant. This is why dictatorships are fragile, while democracies are more antifragile. The second factor is the absence of economic diversity. Building an economy or indeed a strategy around a single factor increases its vulnerability. The third factor is being highly indebted and highly leveraged. Debt makes an entity more sensitive to shortfalls in revenue, while leverage reduces profit margins and compounds the effect a potential shortfall or crisis may have. The fourth factor is the lack of political variability. Genuinely stable countries experience moderate political changes, continually switching government and reversing their political orientation. By responding to pressures in the body politic and international arena, these changes promote stability, provided their magnitude is not too large. Finally, fragile states and systems have no history of surviving past shocks. States that survive shocks and crises in the past are more likely to be stable than those that have not. This is due to the ability of actors within these states to learn from the past and put in place policies in attempt to mitigate the damage of future crises.²²

In 2021, state antifragility was expanded upon by Rebecca Lee Law in her doctoral thesis *State Antifragility: An Agent-Based Modelling Approach to Understanding State Behaviour*. In this dissertation, Law developed a framework for the study of antifragility by identifying three variables (agility, power conversion, and learning) that comprise a state's capacity for dealing

²² Nassim Nicholas Taleb and Gregory F. Treverton, "The Calm Before the Storm: Why Volatility Signals Stability, and Vice Versa," *Foreign Affairs*, January/February, 2015, Accessed February 4, 2022, https://www.foreignaffairs.com/articles/africa/calm-storm?check_logged_in=1.

with various stressors in the international environment.²³ The first of these is agility. Law defines agility as “the speed and magnitude with which states sense, respond, adjust and adapt their strategies, as a function of changing circumstances.”²⁴ At the core of a state’s agility to think, understand, and maneuver quickly with ease. Agility is tied in closely with flexibility and learning. A state becomes agile through small changes, where each change builds on the existing framework. In this sense, individuals within the system identify the shortcomings of an existing policy and move quickly to update it based on tweaking and incrementalism. They accurately identify the problem and are able to quickly come up with various solutions to it. An example of this can be seen in modern American defense planning. Either the Secretary of Defense or the president will task the Department of Defense to provide various plans or actions for real, potential, or hypothetical scenarios. Should one of these scenarios actually transpire the president will have a set of options to choose from. Overall, agility is predicated on both having multiple options as well as being able to quickly change course if necessary.

The second factor is power conversion, which is defined as “getting from resources to behavioral outcomes.”²⁵ Resources can be anything from hard currency, weapons stockpiles, population size, natural resources, an industrial base, cultural influence. Power in this case exists on a spectrum with military force and financial leverage on one end, with agenda framing, persuasion, and other forms of soft power on the other. This is the ability of a state to get stuff done, particularly after a crisis. States and systems that are quick to mobilize to address disruptions or react to crisis tend to bounce back quicker. This often requires sound management and strategic thinking. In order to achieve a desired end or goal, both resources and a conversion

²³ Rebecca Lee Law, “State Antifragility: An Agent-Based Modelling Approach to Understanding State Behaviour,” PhD diss., (Old Dominion University, 2021), ii.

²⁴ Law, “State Antifragility,” 53.

²⁵ Law, “State Antifragility,” 60.

strategy must be present. Leaders that are effective in utilizing a combination of both will achieve their desired goals. In other words, it is the ability of leaders and/or institutions to be able to carry out the desires of the state, which in turn generates power. Power conversion can be seen in a variety of situations and contexts. In the hard power realm, this often involves providing a well-trained and well-equipped military. Consider the United States, China, Russia or even North Korea. A state rich in resources may also leverage their power and gain influence through the skilled management of those resources. Consider the oil-rich Gulf states or mineral-rich states in Africa. Finally, a state might use its cultural and soft power influence to shape opinion and narratives. Again, consider the United States, Russia, and China. When engaging in power conversion, states will typically use a combination of means that will play to its strengths and minimize its weaknesses.

The third factor is learning, tied in closely with the other two. Defined as “a process of exercising a judgement based on an experience or some other kind of input that leads actors to select a different view of how things happen and what courses of action should be taken.”²⁶ What constitutes learning is highly contextual and depends on a variety of factors. In its simplest form, learning means not repeating mistakes. This is tied in with perception. If leaders of a state cannot identify shortcomings, then no change of policy can take place. Likewise, they must also learn from it and draw the right lessons from the information provided by the crisis. It is important to point out that state learning is different than individual learning. While individual learning is based on the individual’s capacity to gain knowledge and experience, state learning is predicated on the ability of a group or collective to gain knowledge and experience. Within the halls of power, this involves the creation and maintenance of a competent bureaucracy to put forth

²⁶ Law, “State Antifragility,” 65.

policies, study their effectiveness, quickly identify any areas of failure or weakness, and subsequently improve the policies.

As a concept, antifragility is a systems-level phenomenon. However, individual actors within that system can make decisions that enhance or degrade antifragility. Adaptation, especially self-organization needs to be fostered. Antifragility is not inevitable, and very few institutions set out to build such a system with such an end in mind. That being said, certain systems of organization, management, and policy making are better suited to learn and grow from stressors. Since political systems are fundamentally run by humans, how these individuals perceive of and exercise their role in the system matters. This is connected to the influence of ideology, personality and history discussed above. Antifragility is still an evolving concept and requires much more attention than has been given in the years since Taleb's initial article. As we will see in the case studies, the ability to learn from crises and grow as a result of stressors is key to strategic synthesis. Crises, disruptive as they are, are not the end. They should be seen as learning moments, and if accurately perceived by a receptive group of people with the right mindset, crises can be utilized to push massive change. Antifragility is more than just robustness and resilience. Systems that are antifragile are built by individuals over time, and require stressors in order to grow. As Friedrich Nietzsche suggested,

Test the life of the best and most productive men and nations, and ask yourselves whether a tree which is to grow proudly heavenward can dispense with bad weather and tempests; whether disfavor and opposition from without...do not belong to the favoring circumstances without which a great growth in virtue is hardly possible? The poison by which the weaker nature is destroyed is strengthening to the strong individual—and he does not call it poison.²⁷

The same can be seen in political systems: a government that experiences no challenges has no impetus to change, alter its strategy, or grow to meet changing circumstances.

²⁷ Friedrich Nietzsche, *The Gay Science* trans. Thomas Common (New York: MacMillan Company, 1924 (1882)), 56-57.

While Law's dissertation applied the concept to the social sciences, the strengths and limitations of antifragility as a useful concept of analysis are still being flushed out. Since it is a systems-level phenomenon, antifragility can be studied across time and space and is therefore not confined to a single discipline. As long as there is a system in place that exists and is exposed to change over time, one can look for antifragility. This is what makes the concept useful: the potential for its widespread application. As for its limitations, antifragility is hard to operationalize and test. What is it that separates a resilient system from one that is antifragile? The answer is (perhaps too) simple: learning. As long as the system gets stronger following exposure to stressors or crises, the system demonstrates some degree of antifragility. At the moment, there is no set threshold of change that indicates antifragility. In other words, it is still up for debate as to how much change or improvements constitutes antifragility. For the purposes of this thesis, any improvement in the wake of a crisis.

Conclusion

Drawing on existing historiography and building on the evolving work surrounding antifragility, this thesis applies these concepts to the past, to show what an antifragile state looks like, and demonstrates how a leader can contribute to this process. Perception is key when it comes to identifying issues and trends in world politics. As a president, the capacity to make policy and pursue an effective strategy comes down to your ability to make sense of and understand the world around you. When it comes to crises, shocks, or stressors that challenge your strategy, it is necessary to draw information from these crises. This is necessary in order to alter one's strategy so as to avoid a more major disruption in the future. Learning from crises allows for this growth, whether it be bringing in new people, new ideas, or a new strategy

altogether. This process is important because building such an antifragile system results in long term strategic viability. As we will see in the following chapters, a system that does not do so runs the risk of being left behind. Both Eisenhower and Kennedy were presented with significant challenges that tested the institutional integrity and values of their country. As the United States and Soviet Union competed to see who could be first in space, the ability to maintain antifragility played a key role in America's ability to come from behind and win the race to the moon.

Chapter II

High Noon at Mid-Century: The American Security Establishment, 1945-1953

On January 20, 1953, Dwight D. Eisenhower was sworn in as President of the United States, the first Republican to hold the office since 1933. In his inaugural address, the former general commented on his nation's newfound power, stating that "we have passed through the anxieties of depression and of war to a summit unmatched in man's history."¹ Eisenhower inherited a country coming to the end of its postwar euphoria and looked to steady the ship by containing the spread of communism and reduce federal deficits. However, the growing power of the Soviet Union unsettled American policy makers. In August 1949, the Soviets successfully tested an atomic weapon, ending the American monopoly on nuclear weapons and ushering in a new age of American-Soviet competition. No longer confined to Europe, the Cold War took on new dimensions, one of those being the technological race between the two superpowers. During the first Eisenhower administration, the Soviet Union made significant advances in missile technology and scientific achievement, triggering a frantic response in Washington. This chapter seeks to unpack the historical context of the first ten years of the Cold War and discuss the origin of the Space Race. The first section looks at the deep origins of American antifragility coming out of the Second World War as well as the development of the American national security state. The second half of the chapter looks at Eisenhower's leadership strategy, both on a personal and political level during his first administration. It unpacks the quest for a new strategic outlook following the Korean War and tells the story of how concern over missiles led to the race for

¹ Dwight D. Eisenhower, "Inaugural Address," transcript of speech delivered in Washington D.C., January 20, 1953, *The American Presidency Project*, <https://www.presidency.ucsb.edu/documents/inaugural-address-3>.

space pre-eminence. Overall, it is clear that despite his hesitancy to pursue significant change, Eisenhower during his first six years in office took considerable steps to set the United States for success in the future.

New Challenges for an Old Man

Before diving into Eisenhower's handling of the Space Race, it is necessary to briefly backtrack and recount the development of American strategy and security from 1945 to 1953. Since its victory over the Axis powers in 1945, the onset of the Cold War with the Soviet Union transformed the United States. Even before the end of the Second World War, *Time Life* Publisher Harry Luce proclaimed the onset of the "American Century," pointing to the United States as one of the most powerful countries on Earth both in terms of hard and soft power. The United States was the only major belligerent power to see its standard of living improve during the war. The American economy served as the great "Arsenal of Democracy," for the collection of states united against the Axis, using Lend-Lease to transfer previously unheard-of levels of military and industrial goods to its allies across the world's oceans. It fought two separate and distinct wars in Europe and the Pacific, transported men, equipment, weapons, food, and oil across thousands of miles of ocean and still deployed a military that substituted technology for manpower to bludgeon and overpower its enemies into submission. Its scientists and universities joined together with the Army to stage a billion-dollar research project to investigate the possibility of creating a superweapon. When told there were multiple avenues of research that might produce a weapon in time to use during the war, the administration of Franklin D. Roosevelt launched an all-out effort to investigate all avenues simultaneously, producing two nuclear bombs that ultimately ended the Second World War. At war's end, the United States

retained a monopoly on nuclear weapons and possessed a massive defense establishment.

American values of liberal internationalism were embedded into the founding of the United Nations and the institutions created by the Bretton Woods agreements, which would serve as key actors for decades to come.

At home, the passage of the National Security Act in 1947 reorganized the American defense establishment to meet the new challenges of the Cold War. National security theorists posit this as the transformation point for the creation of the backbone of the American national security state, as the Act formalized the creation of the Department of Defense, Central Intelligence Agency, and National Security Association. There was also a move outside of government to provide answers to pressing questions facing the country: where is our strategy coming up short? How can we take lessons learned and use them to change, improve, enhance or strengthen our strategy? The need to answer these questions was a key motivation behind the official incorporation of Project RAND (Research and Development) as a non-profit in May 1948. RAND was established to “strengthen public policy through research and analysis” and “help policy makers make decisions that are based on the best available information” during the early Cold War.² Guiding American policy makers through the turbulent postwar period, the organization not only collected and synthesized information about the world, but pioneered methods of analysis to provide solutions to complex problems facing the United States. Back in May 1946, Project RAND’s first report, *Preliminary Design of an Experimental World-Circling Spaceship* discussed the potential design, performance, and use of artificial satellites.³ Taken together, these institutions produced more militarized foreign and domestic policy, permanently

² RAND, “About the RAND Corporation,” accessed January 24, 2022. <https://www.rand.org/about.html>.

³ RAND, “Preliminary Design of an Experimental World Circling Spaceship,” Santa Monica, California, RAND Corporation, 1946, https://www.rand.org/pubs/special_memoranda/SM11827.html.

large military budgets, and greater military influence (through spending) on economic, cultural, political, scientific and social life. This interrelatedness of political, economic, and military spheres pushed the boundaries to include new areas and topics under the umbrella of “national security.” Historian Walter McDougall characterized the new state as a “technocracy”, or as “the management of society by technical experts.”⁴ Compared to any potential adversary, the United States was in a relatively secure position in 1947 and 1948.

A Changing World

This hegemonic moment did not last long, and before the decade was finished, the brief American hegemony ended. 1949 was a pivotal year in shaping American strategy for the decades that followed. Events around the world played a major role in altering American perceptions of the Soviet Union as well as communist capabilities in general. The Berlin Crisis of 1948-49, the formation of NATO on April 4, the detonation of a Soviet atomic bomb (largely a direct copy of the American bomb used at Hiroshima due to Soviet espionage in the United States) in August 1949, and Mao’s victory in the Chinese Civil War on October 1 resulted in a reassessment of national security priorities. Out of this hostile climate arose the perception that the United States was vulnerable and needed to have sufficient power to protect its interests, values, and credibility. In April of 1950, *The United States Objectives and Programs for National Security*, better known as NSC 68, portrayed the Soviet Union as a superpower seeking complete world domination utilizing fiery and aggressive language. NSC 68 also highlighted the importance of the maintenance of American prestige, stating that

Since everything that gives us or others respect for our institutions is a suitable object for attack, it also fits the Kremlin’s design that where, with impunity, we can be insulted and made to suffer indignity the

⁴ Walter A. McDougall, ...*The Heavens and the Earth: A Political History of the Space Age* (Baltimore: Johns Hopkins University Press, 1985), 5.

opportunity shall not be missed, particularly in any context which can be used to cast dishonor on our country, our system, our motives, or our methods.⁵

Had it not been for the North Korean invasion of South Korea on June 25, 1950, NSC 68 would likely not hold the same significance. It was this atmosphere that produced the impetus for scientific achievement where technological pre-eminence was tied directly to national security prestige. Truman increased the military's budget and quickly approved plans that would start a nuclear arms race by beginning work on more powerful nuclear weapons. While the United States sought to retain its technological superiority from World War II, NSC 68 demonstrated that the Cold War would not only be a matter of having the biggest military. Inherent in the ideological struggle, soft power factors were also becoming important.⁶ The nation which could successfully demonstrate the superiority of its values and institutions through various means and ways would ultimately be victorious. It was in this turbulent atmosphere that Dwight D. Eisenhower entered American politics.

Eisenhower was part of a generation defined by war, entering early adulthood during World War I. Born in 1890, Eisenhower entered West Point in 1911 and was part of the army during World War I but never saw action in Europe. Despite his later success Eisenhower finished near the middle of his class, and according to historian William Hitchcock, struggled with the Academy's obsessive attitude towards discipline and rules.⁷ Nonetheless, West Point taught Eisenhower responsibility and gave him an appreciation for technological change and the military art. Eisenhower grew up in a society that was more literate, consumerist, and media-saturated than ever before, but which also tended to maintain strict conservative social values.

⁵ National Security Council Report 68, "United States Objectives and Programs for National Security" April 14, 1950, History and Public Policy Program Digital Archive, US National Archives, 35, <http://digitalarchive.wilsoncenter.org/document/116191>.

⁶ See Joseph Nye, Jr., *Soft Power: The Means to Success in World Politics* (New York: Public Affairs, 2004), 5-11.

⁷ William Hitchcock, *The Age of Eisenhower: America and the World in the 1950s* (New York: Simon & Schuster, 2018), 8.

For the most part, Eisenhower embodied this adherence to more traditional and formal outlook and generally espoused conservative sentiments, both at home and abroad. However, he was reluctant to push for significant change on either side of the political spectrum, describing himself as a “progressive conservative.”⁸ Despite waging a highly partisan conservative campaign against what he termed the “creeping socialism” of the New and Fair Deals, he continued all the major New Deal programs established by the previous two presidents. His administration concerned itself mostly with foreign affairs (an area in which the career-military president had more knowledge) and generally pursued a hands-off, limited government domestic policy. This approach has led to differing interpretations of Eisenhower’s political and leadership philosophy. Early works such as Chief of Staff Sherman Adams’s *Firsthand Report* and speechwriter Emmet Hughes’s *Ordeal of Power* were very critical of Eisenhower’s “hands off” approach as lackluster and lazy. Meanwhile scholarly revisionist works such as political scientist Fred Greenstein’s *The Hidden Hand Presidency* paint him as an informed, thoughtful, articulate, and engaged president in both foreign and domestic affairs.⁹ More recent scholarship, such as William Hitchcock’s *The Age of Eisenhower* argue that while Eisenhower had his faults, his leadership style allowed his administration to make significant contributions to American history. Looking to moderation and cooperation as a means of governance, Eisenhower in his first term sought to hold the line rather than pursue world-beating change.

Widely seen as moderate, Eisenhower won a broad base of support to secure the Republican nomination. A poll conducted by Gallup days before the Republican Convention showed Eisenhower leading by 25% over Truman and 16% over Taft, the presumptive

⁸ David Eisenhower and Julie Nixon Eisenhower, *Going Home to Glory: A Memoir of Life with Dwight D. Eisenhower* (New York: Simon & Schuster, 2011), 126.

⁹ For a full discussion on the historiography, see Richard V. Damms, “Leadership and Decision Making,” in *A Companion to Dwight D. Eisenhower*, ed. Chester J. Pach (New York: John Wiley & Sons, 2017), 169-188.

Republican nominee before Eisenhower entered the race.¹⁰ This popularity was reflected in a landslide election victory, defeating Democratic nominee Adlai Stevenson by a margin of 353 electoral votes. What made Eisenhower so popular? A key factor was name recognition. By the time he entered politics in 1952, Eisenhower already had a distinguished career which included his victory in World War II as Supreme Commander Allied Forces Europe. Another factor was his age. The last president born in the nineteenth century, he was the oldest president-elect at age 62 since James Buchanan in 1856. His age reflected experience: someone who knew what it took to fight and win. In his speech accepting the Republican nomination, he shamelessly invoked the titles of his bestselling memoir of World War II *Crusade in Europe*, by proclaiming that his presidency would be a “great crusade;” something of which he knew “the solemn responsibility of.”¹¹ His age and experience led many to view him as a grandfatherly figure, a man tempered by war who would guide the nation responsibly. According to Hitchcock, Eisenhower was “a man touched by success, comfortable in command, and unafraid of great responsibility.”¹²

The General Assumes Office

Following his shining success as during World War II and the years following, the former general was reluctant to enter politics. The “Draft Eisenhower” movement involved both Democrats and Republicans vying for the former general’s attention. The effort was a long struggle. Eisenhower had to be convinced that political circumstances had created a genuine obligation for him to serve as a candidate for president and that there was broad public support.

¹⁰ Julian Zelizer, *Arsenal of Democracy: The Politics of National Security from World War II to the War on Terrorism* (New York: Basic Books, 2010), 116.

¹¹ Dwight D. Eisenhower, “Address Accepting the Presidential Nomination at the Republican National Convention,” transcript of speech delivered in Chicago, July 11, 1952, *The American Presidency Project*, <https://www.presidency.ucsb.edu/documents/address-accepting-the-presidential-nomination-the-republican-national-convention-chicago-0>.

¹² Hitchcock, *The Age of Eisenhower*, 83.

Despite his initial hesitancy to enter politics, Eisenhower, particularly in 1952 articulated a clear vision for the country. Unlike other candidates who offer a forward-oriented vision of hope and change, Eisenhower's platform centered around better management and striking a balance. Even though Eisenhower was involved in the crafting of Truman's national security strategy, he felt the Truman administration had become corrupt and that the next president would have to reform the government without having to defend past policies.¹³ A fiscal conservative, Eisenhower was against what he considered to be wasteful and profligate spending of the Truman administration, particularly with regard to the Korean War. He also vehemently disagreed with NSC 68's argument that the United States needed to prepare for a year of maximum danger.¹⁴ However, New Deal policies and institutions still enjoyed support, so he ran on the position of "I can do it better."

Tinkering was the order of the day in 1953: balance the budget, end the Korean War, defend vital interests at lower cost through nuclear deterrent, and end price and wage controls. However, Eisenhower assumed office at a time when Cold War tensions were high. Technological change created an atmosphere of vulnerability that upset conventional plans and patterns of defense. Outgoing Truman officials Dean Acheson and Robert Lovett warned the incoming Eisenhower administration that, despite the arsenal of atomic weapons, the United States could not stop a Soviet first strike. NSC 141 estimated the effectiveness of the American air shield at 15% and concluded that American defenses were inadequate "to prevent, neutralize or seriously deter" a Soviet attack.¹⁵ Only a crash program of investment in defense technology

¹³ Zelizer, *Arsenal of Democracy*, 116.

¹⁴ Hitchcock, *The Age of Eisenhower*, 67-68.

¹⁵ "Memorandum for the President by the Secretaries of State and Defense and the Director for Mutual Security," January 16, 1953, *Foreign Relations of the United States (FRUS), 1952-1954, National Security Affairs, Volume II, Part I*, 215, <https://history.state.gov/historicaldocuments/frus1952-54v02p1/d80>.

could help the nation survive. By 1953, Truman publicly declared nuclear weapons to be taboo in the sense that they could not and should not be used by a rational leader. Eisenhower disagreed with Truman's public stance; however his attitude towards nuclear projects and programs was ambivalent at best. On the one hand, he understood deterrence and the need for the United States to possess a credible threat in the form a first-strike capability. In order to do so, nuclear weapons had to be classified as "just another weapon" in the arsenal. On the other hand, he never really reconciled the utility of nuclear weapons with their destructive power, and in a sense characterized them as a necessary evil.

On April 16, 1953, shortly after the death of Josef Stalin, the new President addressed the American Society of Newspaper Editors in what has become known as the "Chance for Peace," or the "Cross of Iron" speech. Eisenhower likened arms spending to stealing from the people, stating that

this world in arms is not spending money alone. It is spending the wealth of its laborers, the genius of its scientists, the hopes of its children. The cost of one modern heavy bomber is this: a modern brick school in more than 30 cities. It is two electric power plants, each serving a town of 60,000 population. It is two fine, fully equipped hospitals. It is some 50 miles of concrete highway. We pay for a single fighter plane with half a million bushels of wheat. We pay for a single destroyer with new homes that could have housed more than 8,000 people. This, I repeat is the best way of life to be found on the road the world has been taking. This is not a way of life at all, in any true sense.¹⁶

Evoking words uttered by the famous Democratic politician William Jennings Bryan in 1896, Eisenhower commented that "under the cloud of threatening war, it is humanity hanging from a cross of iron."¹⁷ On the heels of his "Cross of Iron" speech in April 1953, Eisenhower was increasingly concerned about the trajectory of American foreign policy, which took a militaristic approach to the Soviet Union. This was nothing new, as Eisenhower's campaign platform

¹⁶ Dwight D. Eisenhower, "Address Delivered Before the American Society of Newspaper Editors," transcript of speech delivered in Washington D.C., April 16, 1953, *The American Presidency Project*, <https://www.presidency.ucsb.edu/documents/address-the-chance-for-peace-delivered-before-the-american-society-newspaper-editors>.

¹⁷ Eisenhower, "Address Delivered Before the American Society of Newspaper Editors."

included criticism of unsustainable and unfocused military expenditures as a danger to the stability and long-term growth of the American economy.

The inability of Eisenhower to definitively answer the question regarding the status and utility of nuclear weapons has prompted historian H.W. Brands to conclude that although Eisenhower was knowledgeable about the issues and firmly in charge, he was also “slow to realize the importance of revolutionary changes confronting America and unable to control the bureaucracy that made policy in his name.”¹⁸ Although Eisenhower spoke out against military spending, the Cold War was deepening and the president faced increased political pressure to counter the changing nature of the Soviet threat. The pressure was to reduce American vulnerabilities that were emerging since the end of World War II, coming from both isolationists who wanted no American troops deployed around the world, and hawks who wanted a stronger and more aggressive American defense posture. Under Eisenhower, there would be a distinct shift to nuclear weapons in an attempt to balance these pressures. Despite his concerns, Eisenhower understood that the United States needed to possess such weapons in order to deter the Soviet Union. In the end, the arms race for Eisenhower was about management and balance rather than just having more bombs and planes than the Soviet Union.

Project Solarium and the Quest for a New Strategy

Seeking to strike this new balance between fiscal responsibility and credible deterrence, Eisenhower needed to develop a coherent strategy for dealing with the new threat posed by the nuclear arms race with the Soviet Union. As weapons and delivery systems grew more complex and powerful, how should the United States compete with the Soviet Union? What did effective

¹⁸ H.W. Brands, “The Age of Vulnerability: Eisenhower and the National Insecurity State,” *American Historical Review* vol. 94, no. 4 (1989), 963.

or successful competition look like? In the summer of 1953, Eisenhower began consulting with senior policy officials, including Secretary of State John Foster Dulles and former diplomat George Kennan in the Solarium room at the White House. Through these conversations, Eisenhower came to two key conclusions. First, the strategic guidance laid out in NSC 68 was insufficient to address the breadth of issues facing the United States in the summer of 1953. Second, he found that his own government was divided.¹⁹ Political posturing in Congress and within the national security community threatened to undermine policy planning and strategic synthesis going forward. First, there was the disagreement within Eisenhower's inner circle. Secretary of State Dulles favoured a more aggressive rollback, where pre-emptive and/preventative action would be taken to meet, mitigate, and counter Soviet gains or advances. Eisenhower favoured a more modified containment. Soviet gains or advances should be met; however, the president believed that the American response should be focused on containing rather than on actively countering Soviet moves. Second, there was the broader split within the Republican party. Eisenhower faced challenges from the isolationists, such as Senate Majority Leader Robert Taft, who cited the costs of an active and overly aggressive posture on the international stage.

In an attempt to bring about some sort of consensus, Eisenhower gathered together leading experts from the federal and academia known for their particular knowledge of Soviet strategy, politics, economics, military capability, intelligence activities, diplomatic posture and history. The goal of the exercise was to produce consensus among officials in the national security community on the most effective way to counter Soviet expansionism. Project Solarium produced five key conclusions. First, the Soviet Union should be viewed as a long-term threat,

¹⁹ Hitchcock, *The Age of Eisenhower*, 108.

whose power would be diminished by prudent American action. Second, while conventional power remained a key measurement of military capacity, the successful deployment of nuclear weapons would be key. Third, in order to maintain long-term strategic viability, the United States needed to avoid both public alarm and complacency, striking a balance between the two. Fourth, the United States needed to move away from rollback of communist advances (such as in Korea) and focus more on containing communist expansion. Finally, it was determined that the best strategy for competing effectively with the Soviet Union would be political and educational.²⁰

As an exercise, Project Solarium was never designed to be a completely unguided intellectual enterprise in which the individuals selected were free to come to their own unfettered conclusions on the future of American strategy. Eisenhower was looking for answers to specific questions regarding the adequacy of current American strategy, what should be changed, and how that change should be brought about. The goal was to identify shortcomings and then improve future strategy. Rather than have a few individuals draft a policy document, as was the case with NSC-68, different approaches would be analyzed in a decentralized manner with the best proposal being selected and drafted into an official policy document.

The summary report from Project Solarium formed the basis for NSC 162/2 that underpinned the Eisenhower administration's New Look, and ultimately guided American policy toward the Soviet Union for the bulk of the Cold War.²¹ Much more concise than NSC 68, NSC 162/2 was presented to the President in October 30, 1953 and combined the diplomatic mindset

²⁰ "Memorandum to the National Security Council by the Executive Secretary," S/S-NSC file , Lot 66 D 148, "Solarium," July 22, 1953, *Foreign Relations of the United States (FRUS), 1952-1954, National Security Affairs, Volume II, Part I*, <https://history.state.gov/historicaldocuments/frus1952-54v02p1/d80>.

²¹ Gregory Mitrovich, *Undermining the Kremlin: America's Strategy to Subvert the Soviet Bloc, 1947-1956* (Ithaca: Cornell University Press, 2000), 145.

of George Kennan with his emphasis on containment, the hawkish spirit of military superiority of NSC 68 author Paul Nitze, and Eisenhower's own concerns about military spending. The blending of these three lines of thought produced a document that prescribed a strategy that would "avoid seriously weakening the U.S. economy or undermining our fundamental institutions."²² In other words, emphasis would be placed on the long-term growth and viability of the American economy, and by extension, the ability to compete effectively.

Three key themes can be seen throughout the document. First, there an emphasis on alliances and productive work with like-minded peoples, groups, nations, and states. Second, the United States must continue to build up its nuclear capacity. Third, any strategy should take into consideration fiscal dexterity and responsibility. The goal was to play to American strengths while undermining the Soviet Union's ability to expand. Throughout the document there is an emphasis on measures short of war as the primary means of containing Soviet aggression, including measures to "discredit Soviet prestige and ideology"²³ as well as "maintenance of morale and free institutions and the willingness of the U.S. people to support the measures necessary for national security."²⁴

The document also called for the full mobilization of society to ward off the communist threat. Not only more and bigger nuclear weapons and delivery systems, but a robust intelligence network to analyze Soviet behaviour and security measures to combat domestic espionage. It promoted a nation-wide manpower program, emphasizing scientific and technical training to serve military needs; securing stockpiles of essential raw materials and industrial plants;

²² "A Report to the National Security Council by the Executive Secretary on Basic National Security Policy," October 30, 1953, (referred to hereafter as NSC 162/2) *Foreign Relations of the United States (FRUS), 1952-1954, National Security Affairs, Volume II, Part 1*, 578, 590. https://history.state.gov/historicaldocuments/frus1952-54v02p1/pg_578.

²³ NSC 162/2, *FRUS*, 595.

²⁴ NSC 162/2, *FRUS*, 582.

overhauling military service requirements for citizens, including longer tours of duty, inclusion of women in the armed forces, and the enlistment of civilians for maintenance work. Despite Eisenhower's conviction that a more expansive military buildup would ultimately create a garrison state that undermined democracy at home and threatened the world with nuclear annihilation, NSC 162/2 provided the basis for such a mindset. According to Hitchcock, it served as a blueprint for a warfare state: a plan to mobilize the nation and put in on permanent war footing capable of waging a prolonged geopolitical and ideological struggle by transforming American capabilities and mindsets.²⁵ Overall, NSC 162/2 and the New Look represented an updated approach to strategy, seeking to balance long-term security needs with budgetary constraints. As Eisenhower settled into office, United States would adopt a total Cold War mentality in which all facets of society could and should be used to fight and win.

As an exercise, Solarium is often overlooked and underappreciated in the existing studies on policy formulation and strategic synthesis. As an exercise in national strategy design, a Solarium-style exercise has yet to be repeated in in any comprehensive fashion. Eisenhower realized that unless his administration could agree on a narrative for countering the Soviet Union, efforts to further competing agendas would produce incoherence instead. Decentralization and learning are key here, as individuals networked with each other to develop a strategy before presenting their findings to the president. Half-baked or impractical ideas could be weeded out through debate and dialogue. Past crises provided information on which aspects of existing strategy worked and which did not. Its product, NSC 162/2 guided American strategic thinking for the rest of the Cold War, a testament to the project's ability to bring together individuals to hash out ideas.

²⁵ Hitchcock, *The Age of Eisenhower*, 109-110.

What then do we make of Eisenhower and his administration's leadership going into the Space Race? During his campaign, (and perhaps before entering politics) Eisenhower developed a kind of humble hubris when it came to leadership and decision making. He critiqued the previous administration's lack of leadership, especially as it pertained to the economy and believed that no one had the ability to make tough decisions about such matters.²⁶ As a military man, Eisenhower tended to place a premium on competence. He thought he could treat the White House in the same way that George Marshall had him run the Second World War: put competent people in the right places, and you do not have to run back to the person in charge every time a decision needed to be made. As the public face of the government bureaucracy, the president needs to present a coherent and cohesive narrative in order for people to back and support the administration's policies, whether it be the public or congress. In his first term in office, the administration's New Look sought to manage the Cold War better by balancing the Cold War military commitment of the United States with the nation's financial resources.²⁷ To do so, Eisenhower and his administration assembled a network of individuals to study previous shortcoming with the goal of refocus American strategy and priorities. As nuclear strategy came to dominate American strategy and foreign policy, the conclusion was that the United States needed to become better at using and channelling its power in order to effectively compete with the Soviet Union. Despite challenges in Iran, Guatemala, Taiwan, Egypt, and Hungary in his first term, by the time voters went to the polls in November 1956 the United States was in a relatively stable position with respect to the Soviet Union and the Cold War. In the eight months leading up to the election, Eisenhower's job approval rating over six polls remained in the low seventies and

²⁶ William M. McClenahan Jr. and William H. Becker, *Eisenhower and the Cold War Economy* (Baltimore: Johns Hopkins University Press, 2011), 14-20.

²⁷ Michael J. Hogan, *A Cross of Iron: Harry S. Truman and the Origins of the National Security State, 1945-1954* (Cambridge: Cambridge University Press, 1998), 366-368.

high sixties.²⁸ Most Americans were content that their country was in the hands of a competent leader. The United States was not involved in any foreign wars and the domestic economic situation was optimistic. Seen as the wise grandfather who would pursue a steady course, Eisenhower came into office not to push drastic change, but hold the line: to retrench, regroup, and reorganize. While the American people were keen to settle in and enjoy 1950s suburbia, policy makers in Washington knew that the Cold War was heating up. With a new leader in power, the Soviet Union would look to find new ways to gain the initiative and challenge American primacy.

²⁸ “Dwight D. Eisenhower Public Approval,” April 19, 1956 to August 3, 1956, *The American Presidency Project*, <https://www.presidency.ucsb.edu/statistics/data/dwight-d-eisenhower-public-approval>.

Chapter III

The Race to Space: Soviet Satellites and American Antifragility, 1956-1961

On January 20, 1957 Eisenhower was sworn in for his second term in office. Ten days earlier at his State of the Union Address, Eisenhower spoke of the importance of American power in a changing world: “the cost of peace is something we must face boldly, fearlessly. Beyond money, it involves changes in attitudes, the renunciation of old prejudices, even the sacrifice of some seeming self-interest.”¹ This chapter focuses on the case study of *Sputnik* to assess Eisenhower’s crisis management and leadership in action. Finally, the third section will consider the fallout and assess Eisenhower’s response to the Soviet challenge. How did Eisenhower manage this crisis, and what does this say about American antifragility, strategic synthesis, and long-term strategic viability? In order to answer this question, this chapter will explore how Eisenhower and his administration contributed to American antifragility through agility, power conversion, and learning. While he may not have possessed the same bravado and charisma that characterized his more vibrant and dynamic successor, it is clear that Eisenhower laid significant groundwork after *Sputnik* that paved the way for long-term American success. By moving quick to recognize and learn from American deficiencies and shortcomings made clear by the event, he successfully moved to mobilize American resources to build the necessary infrastructure to ensure that the United States would be better equipped to compete strategically with the Soviet Union in space.

¹ Dwight D. Eisenhower, “Annual Message to Congress on the State of the Union,” transcript of remarks delivered in Washington D.C., January 10, 1957, *Dwight D. Eisenhower Presidential Library*, https://www.eisenhowerlibrary.gov/sites/default/files/file/1957_state_of_the_union.pdf.

From Missiles to Satellites

The Soviet detonation of an atomic bomb in 1949 demonstrated that the Soviet Union had bounced back from its losses and was not only keeping up with the United States, but gaining ground fast in the fields of science and technology. After stealing American atomic secrets, it took the Soviet Union four years to catch up to the Americans in the development of a nuclear weapon. It took less than a year after the first American thermonuclear detonation on November 1, 1952, for the Soviets to detonate their own thermonuclear device on October 12, 1953.² Perhaps even more alarming was Andrei Sakharov's RDS-37 in 1955. Featuring a layer-cake design, it was the first uniquely Russian-design bomb and not merely a copy of American technology. Now that they had nuclear warheads that could decimate an entire city, both sides were looking for efficient delivery systems. Inspired by the potential of the Nazi V2 rocket, both sides were convinced that the cruise missile would play a major role in future wars and an effective means to deliver a nuclear strike. On August 21, 1957, it was the Soviet Union, not the United States, that successfully tested the world's first Intercontinental Ballistic Missile (ICBM), the R7 Semyorka. With a range of 8,800 kilometers, the R7 could easily reach the mainland United States.

Fearful that the Soviet Union might be ahead of them, American policy makers were quick to proclaim a deficiency in what would become colloquially known as the "Missile Gap." Despite the alarmism, classified intelligence reports seemed to indicate that the Americans were ahead.³ While policy makers publicly boasted about the superiority of American capability, the

² See Richard Rhodes's *Dark Sun: The Making of the Hydrogen Bomb*, and David Holloway's *Stalin and the Bomb: The Soviet Union and Atomic Energy, 1939-1956* for more information on the development of thermonuclear weapons.

³ Campbell Craig and Fredrik Logevall, *America's Cold War: The Politics of Insecurity*. (Cambridge: Belknap Press of Harvard University Press, 2009), 175.

reality was much more complex. The intelligence sources cited were based on a combination of U2 overflights of the Soviet Union and radar tracking. These sources demonstrated that Soviets were building a large weapons and missile program, but could not provide crucial information: How far could these missiles travel? How many were being built? How accurate were they? What were the intentions behind their development? This last question was the subject of numerous debates in Washington. Most of the claims of a discrepancy in development were delivered to Lyndon Johnson's Preparedness Subcommittee Hearings of the Senate's Armed Services Committee in which a range of administration officials testified that the United States was behind.⁴ What would become known as the Space Race originated from this competition in missile development between an apparently declining and stagnating United States and a confident and aggressive Soviet Union. Eisenhower attempted to mediate and reinforce calm, but the moral panic over American shortcomings in science and technology had already begun.

Until 1957, the idea of outer space being a key Cold War battlefield did not receive any attention. While it may have been on the minds of leading scientists, the thought of competing with the Soviets in space did not feature in any significant manner in strategic synthesis. However, technological intent did feature in NSC 162/2. The document stated that in order to meet the challenges posed by the Soviet Union, the United States should "conduct and foster scientific research and development so as to insure [*sic*] superiority in quantity and quality of weapons systems."⁵ Interest in space exploration on the other hand was nothing new, even at the start of the decade. Following a meeting on April 5, 1950, several American scientists

⁴ Walter A. McDougall, ...*The Heavens and the Earth: A Political History of the Space Age* (Baltimore: Johns Hopkins University Press, 1985), 151-156.

⁵ "A Report to the National Security Council by the Executive Secretary on Basic National Security Policy," October 30, 1953, (referred to hereafter as NSC 162/2) *Foreign Relations of the United States (FRUS), 1952-1954, National Security Affairs, Volume II, Part 1*, 582. https://history.state.gov/historicaldocuments/frus1952-54v02p1/pg_578.

formulated the idea for what would become The International Geophysical Year (IGY) 1957-1958. Both the Americans and the Soviets pledged to launch satellites within the IGY. In a memorandum for the Director of Central Intelligence, Herbert Scoville Jr., Assistant Director of Scientific Intelligence pointed out on April 10, 1956 that “abandonment or deferment of the [American satellite] program in the face of what may well be a successful Soviet counterpart program might impair world confidence in US advanced scientific and technical capabilities.”⁶

It is clear that the United States recognized the importance of being the first to launch a satellite. In a January 1955 letter to the Secretary of Defense Charles Wilson, the Director of Central Intelligence, Allen Dulles echoed Scoville Jr.’s perspective proclaiming that “in addition to the cogent scientific arguments...there is little doubt but what the nation that first successful launches the earth’s satellite, and thereby introduces the age of space travel, will gain incalculable international prestige and recognition” and that “in many respects it will be comparable to the first release of atomic energy.”⁷ Despite this, Eisenhower spoke little in public of achievement in space as a key national goal. Any achievements in space exploration were nice projects in the name of military research, but American pre-eminence in space was never seen as an end in itself.

In the years and months leading up to October 1957, there was significant chatter behind the scenes and within the halls of Washington about the potential launch of a Soviet satellite. Numerous intelligence reports spoke of Soviet technological capabilities, launch sites, and even

⁶ Herbert Scoville Jr., “Memorandum for DCI: NSC 5520, Earth Satellite Program,” April 10, 1956, *Intelligence Warning of the 1957 Launch of Sputnik*, Central Intelligence Agency, 4. Accessed February 10, 2022. <https://www.cia.gov/library/readingroom/document/0006687259>.

⁷ Allen W. Dulles to Charles Wilson, January 29, 1955, *Intelligence Warning of the 1957 Launch of Sputnik*, Central Intelligence Agency, 1. Accessed February 9, 2022. <https://www.cia.gov/library/readingroom/document/0006513734>.

made predictions as to when such an event might occur. A National Security Council briefing on January 24, 1956 concluded that

on the bases of our estimate of Soviet guided missile capabilities, skills, and other resources required to develop, build, and orbit an unmanned earth satellite vehicle. We believe that the USSR has the capabilities of orbiting, in early 1957 a satellite vehicle which could acquire scientific information and data of limited military value.⁸

Presented with this information, Eisenhower and his cabinet some decisions to make. How credible were these reports? Did the Soviets actually possess capabilities? If so, what did this mean for the United States? Eisenhower knew that technology was changing, and that any successful nation needed to embrace it. Nuclear weapons had to be integrated into the overall American defense posture, yet the president struggled to come to terms with their utility.

Warheads were becoming smaller and more powerful at the same time missile technology was advancing. Eisenhower feared that he might cause an international incident and be labelled a warmonger if he were to use military missiles as the platform for the launch of a satellite.⁹ He selected the untried Naval Research Laboratory's *Vanguard* rocket, which was earmarked for research. This meant that the military team, headed by former Nazi rocket scientist Wernher von Braun was no given permission to use their *Jupiter-C* rocket because of its intended use as a future military vehicle.

This strategic ambivalence presented Moscow with an opportunity, as the arms race transformed from an issue of nuclear sufficiency to nuclear superiority. It was no longer about simply possessing the technology, but about getting one up over your opponent. On September 20, 1956 von Braun and his team launched a *Jupiter-C* capable of putting a satellite into orbit,

⁸ Central Intelligence Agency, "NSC Briefing: Soviet Earth Satellite Capabilities," January 24, 1957, *Intelligence Warning of the 1957 Launch of Sputnik*, Central Intelligence Agency, 2.
<https://www.cia.gov/library/readingroom/document/0006687229>.

⁹ James Schefter, *The Race: The Uncensored Story of how America beat Russia to the Moon* (New York: Doubleday, 1999), 15-18.

but the launch was used only as a sub-orbital test of re-entry vehicle technology. When Sergei Korolev, head of the Soviet space program received word about the September 1956 launch, he mistakenly interpreted it as a failed satellite mission and expedited plans to get a Soviet satellite in orbit. This was compounded when word came through that the United States was planning to announce a major breakthrough at an IGY conference at the National Academy of Sciences in Washington with a paper titled “Satellite Over the Planet” that included the date October 6, 1957. Korolev anticipated that von Braun might launch a *Jupiter-C* missile with a satellite payload around October 4 or 5, in conjunction with the paper.¹⁰ Not to be undercut, he moved the launch of the Soviet satellite up to October 4.

Soviet Satellites and American Failure

The launch of *Sputnik I* from the dusty Kazakh steppe on the morning of October 4, 1957 fundamentally altered the existing Cold War dynamic. A country that was left in tatters in 1945 had caught the most powerful nation in the world off guard. Following the decline of the British Empire, the United States had assumed the responsibility of leader of the free world, and according to Walter McDougall, maintained it on two premises. The first was the apparent superiority of American institutions, as the United States almost single-handedly led the rebuilding of Western Europe and Japan after World War II. The second was the overwhelming American superiority in the technology of mass destruction that shielded not only itself but also American allies in Europe and beyond.¹¹ The success of the Soviet satellite appeared to discredit both. The Soviet Union followed up their successful launch of *Sputnik I* with the launch of

¹⁰ Deborah Cadbury, *Space Race: The Epic Battle Between America and the Soviet Union for Dominance in Space* (New York: Harper Collins, 2006), 163.

¹¹ McDougall, *...the Heavens and the Earth*, 7.

Sputnik 2 just one month later on November 3, 1957. This time the payload was not just a metal sphere, but also included a live animal—a stray dog named Laika—raising the weight to over 1,000 pounds. Twice in a matter of weeks the Soviets has beaten the United States. In a letter to Allen Dulles, several top security advisors argued that “the country is in a grave national emergency.”¹²

The Soviets laid down the gauntlet and it was clear to the Americans that something had to be done. While the Committee for a SANE Nuclear Policy argued for disarmament, most policy makers called for an immediate response. Senator Styles Bridges, a New Hampshire Republican, caught the mood the day after the Kremlin announcement when he said “[t]he time has clearly come to be less concerned with the bile on the new broadloom rug or the height of the tailfin on the new car and to be more prepared to shed blood, sweat and tears if this country and the free world are to survive.”¹³ In order to reset the balance of power, the United States needed to launch its own satellite, and fast. Eisenhower and American engineers were put under immense pressure to respond, and American satellite preparations for January 1958 were moved up to December 1957. The Soviets scored an even bigger propaganda victory on December 6 when the American answer to *Sputnik*, *Vanguard 1*, exploded on the launch pad. In the weeks following the disaster, the failure became an international joke with the American satellite appearing in newspapers under the names of “*Flopnik*,” “*Stayputnik*,” “*Kaputnik*,” and “*Dudnik*.”¹⁴ At the UN, the Soviet ambassador Arbydy Sobolev as a cruel joke rubbed salt into

¹² Robert R. McMath, Lawrence A. Hyland, George B. Kistiakowsky, and Francis H. Clauser to Allen W. Dulles, October 23, 1957, *Intelligence Warning of the 1957 Launch of Sputnik*, Central Intelligence Agency, 3. Accessed February 11, 2022. <https://www.cia.gov/library/readingroom/document/0003030512>.

¹³ Quoted in Philip Taubman, *Secret Empire: Eisenhower, the CIA, and the Hidden Story of America's Space Espionage* (New York: Simon & Schuster, 2003), 214.

¹⁴ Terry O’Niell, *The Nuclear Age* (San Diego: Greenhaven, 2002), 146.

the already gaping wounds by offering the United States aid under the Soviet program of “technical assistance to backward nations.”¹⁵

On November 26, 1957, CIA director Allen Dulles gave a top secret briefing about Soviet military and technological capabilities. According to Dulles, the CIA was now worried about the pace of Soviet missile production and pointed to a “missile gap” opening in favour of the Soviet Union. CIA analysts concluded that they had underestimated Soviet missile capabilities and raised alarm bells and projected that the Soviet Union would have an ICBM capable of carrying a one-ton nuclear warhead 5,000 miles by 1958.¹⁶ Despite the loud alarm bells, President Eisenhower knew that while the Soviet Union had scored a tremendous short-term propaganda victory, the Soviets remained well behind on in nuclear warhead, bomber, and even ICBM technology.¹⁷ This information was not shared with the incredulous American public who were consumed by the fear of a Soviet satellite flying over their homes. After much hysteria about the potential existence of a Missile Gap in the years and months leading up to *Sputnik*, there was now a physical manifestation of a Soviet technological advantage, and by extension, American stagnation. The Soviet Union appeared to be visibly dominating space, and by implication the Earth. Oceanic barriers we no longer deemed sufficient to ensure American security.

To the average American, the Soviet Union was no longer just some backwards empire on the other side of the world but a potent force that could now pose an existential threat to the United States and everything it stood for. The fervour surrounding the Missile Gap boiled over as the media took no time to portray the event as the biggest crisis since Pearl Harbor. According to

¹⁵ O’Niell, *The Nuclear Age*, 146.

¹⁶ Director of Central Intelligence, “Special National Intelligence Estimate Number 11-10-57,” November 2, 1957, *National Intelligence Council (NIC) Collection*, Central Intelligence Agency, 2, Accessed March 19, 2022, <https://www.cia.gov/readingroom/document/0000267695>.

¹⁷ George C. Herring, *From Colony to Superpower: U.S. Foreign Relations since 1776* (New York: Oxford University Press, 2008), 692.

John Lewis Gaddis, *Sputnik* had a similar psychological impact with American citizens suddenly experiencing the same constant fear and pressure that Europeans had lived with for centuries.¹⁸ It took Eisenhower five days after the launch of *Sputnik* to speak to the press, in which he discussed the implications of the satellite. In response to a question as to whether America should have done more to be first, he stated that

if we were doing it for science, and not for security, which we were doing, I don't know of any reasons why the scientists should have come in and urged that we do this before anybody else could do it. Now, quite naturally you will say, "well the Soviets gained a great psychological advantage throughout the world," and I think that in the political sense that is possibly true; but in the scientific sense it is not true except for the proof of the one thing, that they have got the propellants and the projectors that will put these things in the air.¹⁹

Throughout the entire press conference Eisenhower expressed little sense of urgency. He hoped to project calm as he was still coming to grips with the gravity of the situation. When asked about American strategy, Eisenhower simply stated "I don't know what we could have done more" and that "no one ever suggested to me as anything of a race."²⁰

Within the halls of Washington, the fallout was just as pronounced. Lyndon Johnson, then Senate Majority Leader, was hosting a barbeque when he heard the announcement of *Sputnik's* launch on the radio. He walked his guests down to the river by his Texas ranch that evening and kept coming back to *Sputnik*. He said of that night "now, somehow, in some new way, the sky seemed almost alien. I also remember the profound shock of realizing that it might be possible for another nation to achieve technological superiority over this great country of ours."²¹ In hearings conducted by Johnson beginning in late November, the Democrats began to

¹⁸ John Lewis Gaddis, *Strategies of Containment: A Critical Appraisal of Postwar American National Security Policy, Revised and Expanded Edition* (New York: Oxford University Press, 2005), 182.

¹⁹ Dwight D. Eisenhower, "The President's News Conference," transcript of remarks delivered in Washington D.C., October 9, 1957, *The American Presidency Project*, <https://www.presidency.ucsb.edu/documents/the-presidents-news-conference-308>.

²⁰ Dwight D. Eisenhower, "The President's News Conference," October 9, 1957.

²¹ Quoted in Roger D. Launius, "Sputnik and the Origins of the Space Race," *NASA*, Accessed March 9, 2022, <https://history.nasa.gov/sputnik/sputorig.html>.

land some heavy blows against Eisenhower. The president asked Congress for a supplemental spending package of \$1.3 billion for missile production and to improve early warning systems; the defense budget itself increased from \$1.5 billion to \$40 billion as the administration began to plow money into defense. It is this period that the American nuclear arsenal grew from ~1,000 (1953) to ~6,000 (1957) to ~22,000 (1961) – a 250% increase during Eisenhower’s second term.²² Tensions with NATO also increased as a result of *Sputnik* as Western Europeans began to doubt the validity of extended American deterrence. Philip Nash in *The Other Missiles of October* demonstrates how *Sputnik* prompted Eisenhower to offer some NATO members IRBMs in December 1957 (the UK, Italy, and Turkey – deployed between 1959 to 1963) that were obsolescent, provocative, and produced unfortunate long-term consequences.²³ Nevertheless, Eisenhower persisted with the planned deployment because he feared that cancelling it would encourage Soviet aggression and erode the allies’ confidence in Washington. Indeed, Khrushchev saw the deployment of the *Jupiter* missiles to Turkey as a factor in his decision to deploy Soviet SS-4 missiles to Cuba.

Democrats seized on *Sputnik* as a useful tool to beat up on Eisenhower and the Republicans, especially during the 1958 midterm elections. Eisenhower’s Republicans lost 48 seats in the House and 13 seats in the Senate to the Democrats. The next time Republicans gained a majority in Congress would be in the 1980 presidential election. Eisenhower cast himself as a president who understood the nuances of national security, and the United States was upstaged by the Soviet Union. When asked whether or not he was worried by the security implications raised by the launch of *Sputnik*, he stated that “I see nothing at this moment, at this

²² Robert Norris and Hans M. Kristensen. “Global Nuclear Weapons Inventories, 1945-2010,” *Bulletin of the Atomic Scientists* vol. 66, no. 4 (July 2010), 81.

²³ Phillip Nash, *The Other Missiles of October: Eisenhower, Kennedy, and the Jupiters, 1957-1963* (Chapel Hill: University of North Carolina Press, 1997), 35.

stage of development, that is significant in that development as far as security is concerned.”²⁴

His narrative was that yes, *Sputnik* is important, but it should not fundamentally alter American grand strategy. To a certain extent, he was correct. The United States should learn from the crisis, but not engage in rash or rushed decisions.

Sputnik and *Vanguard* highlighted two apparent deficiencies. The first was the president himself. The attacks on Eisenhower over the *Sputnik* crisis became a personal referendum on the president’s fitness for office. On September 24, 1955, while vacationing in Colorado, Eisenhower suffered a serious heart attack. The heart attack resulted in a six-week hospital stay, during which, prior to the passage of the 25th amendment in 1965, Vice President Richard Nixon, Secretary of State John Foster Dulles, and White House Chief of Staff Sherman Adams assumed administrative duties and provided communication with the President. As a consequence of his heart attack, Eisenhower developed a left ventricular aneurysm, which was in turn the cause of a mild stroke on November 25, 1957, nearly three full weeks after the launch of *Sputnik II* and the day after Allen Dulles’ top secret warning to the administration. At the same time the Soviets were taking the lead in space exploration, the President of the United States was incapacitated. While he ultimately recovered from his personal health crises, the broader crisis had a significant impact on Eisenhower’s presidency. His leadership had clearly changed from his first term, where his keen political awareness enabled him to accurately perceive and defuse crises. Now, his political instincts seemingly failed at precisely the moment when his ability to communicate effectively with the American people declined. Eisenhower simply did not see *Sputnik* the same way as the American people. He recognized the propaganda victory, but commented to the press

²⁴ Dwight D. Eisenhower, “The President’s News Conference,” transcript of remarks delivered in Washington D.C., October 9, 1957, *The American Presidency Project*, <https://www.presidency.ucsb.edu/documents/the-presidents-news-conference-308>.

that there “didn’t seem to be a reason for just trying to grow hysterical about it.”²⁵ This dissonance demonstrated the generational divide that would become a key pillar of Kennedy’s campaign. The younger members of the Eisenhower administration—particularly Richard Nixon—grasped immediately that this a problem and said so to the president’s Cabinet.²⁶

The second deficiency was with the American system more broadly, both on a domestic and international level. At home, there was growing concern about the enduring viability of American values, institutions, and strategy. On November 7, a report titled *Deterrence & Survival in the Nuclear Age*, commonly referred to as the Gaither Report after its lead author, was submitted to the President along with the United States National Security Council. Prepared by the Science Advisory Committee at the Office of Defense Mobilization, the group was tasked by Eisenhower to assess current strategy and propose changes that would strengthen American defense systems. The Gaither Report called for an urgent strengthening of American missile technology along with offensive and defensive military capabilities. It also called for a 50% increase in military spending and a “radical redesign” of the Department of Defense.²⁷ Overall, the findings suggested that Eisenhower’s policy of balancing security and defense needs with fiscal responsibility was untenable and inadequate. As a result, the president ignored the report. If Eisenhower was not worried by the missile gap argument, why then the accelerating arms race in the waning three years of the Eisenhower administration as defense spending increased dramatically?

²⁵ Dwight D. Eisenhower, “The President’s News Conference,” October 9, 1957.

²⁶ Jeffrey Frank, *Ike and Dick: Portrait of a Strange Political Marriage* (New York: Simon & Schuster, 2013), 157-161.

²⁷ Security Resources Panel of the Science Advisory Committee, “Deterrence and Survival in the Nuclear Age,” November 7, 1957, *NSA Archives*, 9.

As George Herring points out, for decades the superiority of American science was assumed to be the bedrock of the nation's security as well as prestige both at home and abroad.²⁸ During the 1950s, it was axiomatic that the United States was both better and mightier than its chief rival in the eyes of both Americans at home and allies abroad. *Sputnik* seemed to discredit this in the eyes of the American people. The 184-pound sphere of metal launched by the Soviets in October 1957 posed no great security challenge, but the American people saw it differently. What explains this disconnect between Eisenhower and those, including members of his Cabinet, who expressed significant concern? In other words, why did Eisenhower downplay the launch of *Sputnik* in its immediate aftermath? Was it part of a concerted plan to present calm in the face of crisis or did his intransigence reflect a lack of comprehension? There is no simple or single answer to these questions, as there were a couple factors that contributed to his behaviour. First, there is the generational divide. Every major biographer of Eisenhower relates to how he, perhaps more than anyone else in the Army of the 1920s and 1930s understood the importance of technology.²⁹ While serving as Army Chief of Staff, he remained acutely aware of the importance of integrating nuclear weapons and technology into the armed forces. However, technological change also played a role. Born in 1890, Eisenhower was already 13 when the Wright brothers flew at Kitty Hawk and 37 when Charles Lindbergh flew the Atlantic. At the same time, radio evolved into television and the internal combustion engine transformed the world. While it is hard to quantify, there is, in an ever-changing world, a finite amount of technological change that a person can adjust to over the course of their life time. Science fiction writer Douglas Adams, author of *The Hitchhiker's Guide to the Galaxy*, sums this up nicely:

²⁸ Herring, *From Colony to Superpower*, 691.

²⁹ Nicholas Evan Sarantakes, "Eisenhower in World War II," in *A Companion to Dwight D. Eisenhower*, ed. Chester J. Pach (New York: John Wiley & Sons, 2017), 44.

I've come up with a set of rules that describe our reactions to technologies: 1. Anything that is in the world when you're born is normal and ordinary and is just a natural part of the way the world works. 2. Anything that's invented between when you're fifteen and thirty-five is new and exciting and revolutionary and you can probably get a career in it. 3. Anything invented after you're thirty-five is against the natural order of things.³⁰

Eisenhower was not alone in his reaction to *Sputnik*. Several senior members of his Cabinet echoed his rhetoric. With this in mind, the explanation becomes incredulity and a failure of imagination rather than incompetence or malice.

However, with age comes experience. Jumping to conclusions often leads to reactive policies that may or not be the best in the long run. Eisenhower was well aware that the Soviets were planning on launching a small satellite into orbit. He was also privy to information that discredited the theory that the Soviet Union with its expedient development of missile technology, had already exceeded the technical achievements made by the United States in ICBM research. The authors of the Gaither Report relied on inaccurate intelligence that estimated the number of Soviet ICBMs to be in the hundreds or even thousands. In reality, this was an enormous overestimation. Newly-developed satellite photography would make this ever clearer four years later. Even by 1961, the number of operational Soviet ICBMs was around four.³¹ That being said, none of this information was available to the American people in the months following *Sputnik*. As a leader, you want to appear in charge. Crises are destabilizing, and it often takes time to react effectively to new situations and circumstances. ICBMs were a new technology, but their use and significance had yet to be fully hashed out. If we assume that Eisenhower was aware of the hysteria yet unaware of the significance, then Eisenhower required time to reflect on the event and gather information before announcing a course of action. What

³⁰ Douglas Adams, *The Salmon of Doubt: Hitchhiking the Galaxy One Last Time* (New York: Pocket Books, 2002), 117.

³¹ Theodore Voorhees Jr. *The Silent Guns of Two Octobers: Kennedy and Khrushchev Play the Double Game* (Ann Arbor: University of Michigan Press, 2020), 20-24.

was the significance of *Sputnik*, and why were so many Americans buying into this moral panic over such a tiny satellite? Speaking with experts, policy makers, and strategists, Eisenhower took time to collect himself before his State of the Union Address on January 9, 1958.

Controlling the Chaos

Despite a press conference on October 9 and brief radio and television address on November 7, it would not be until January 1958 that Eisenhower addressed the nation on American space policy. His 1958 State of the Union Address was the first formal, thought-out policy response to *Sputnik*. There would be no more ad hoc measures and the United States would mobilize its resources behind purposeful projects, policies, and programs. He commented on the changing nature of the Soviet threat, suggesting that Cold War competition was now “all-inclusive.” As such, “trade, economic development, military power, arts, sciences, education, [and] the whole world of ideas” were now avenues of Cold War competition.³² The Soviet satellite was only mentioned once, with Eisenhower acknowledging that “most of us did not anticipate the psychological impact upon the world of the launching of the first earth satellite.” He called for vigilance so that the United States would “not make the same mistake in another field, by failing to anticipate the much more serious impact of the Soviet economic offensive.”³³ While Eisenhower had yet to take any steps in rectifying the situation at hand, accurate perception of the problem was an important first step. The crisis provided information and Eisenhower could now move to mobilize American resources to prevent or at least mitigate future crises.

³² Dwight D. Eisenhower, “Annual Message to Congress on the State of the Union,” transcript of speech delivered in Washington D.C., January 9, 1958, *The American Presidency Project*, <https://www.presidency.ucsb.edu/documents/annual-message-the-congress-the-state-the-union-10>.

³³ Eisenhower, “State of the Union,” January 9, 1958.

Eisenhower hoped that once American satellites were up, the panic would subside, While the United States succeeded on January 31, 1958 at putting their own satellite, *Explorer 1*, into orbit, the deep questions surrounding American viability persisted. As Robert Divine argues in his book *The Sputnik Challenge*, the Soviet satellite appeared to undermine the basic principles of Massive Retaliation and Eisenhower's New Look, adding substance to Nikita Khrushchev's rocket rattling rhetoric.³⁴ Aside from implying Soviet scientific superiority, the *Sputnik* crisis altered American perceptions of institutional viability and leadership. McDougall points out that since its origins in the 1940s, the Cold War was a military and political struggle in which the United States needed only to send aid and comfort to its allies on the front lines and arm itself with enough missiles to deter any potential Soviet strike.³⁵ With the Soviets gaining and retaining the initiative in the Space Race, the Cold War could no longer viewed as a series of proxy wars fought somewhere out in the world. It tested American leadership and the nation's ability to deal with crises in an entirely new dimension. *Sputnik* forced American leaders and policy makers to look inward and reflect on why they had been beaten, and what it meant for the American image and system.

Prior to *Sputnik*, Eisenhower's support of the nation's fledgling space program was relatively modest. In 1958, he began to push for change launching a national campaign that funded not only space exploration, but also encouraged the strengthening of science and higher education. The National Advisory Committee for Aeronautics (NACA) took the blame for the *Vanguard* failure because it was both inefficient and understaffed. It was clear to everyone, especially Eisenhower that a more formal and organized institution was required. The National

³⁴ Robert A. Divine, *The Sputnik Challenge: Eisenhower's Response to the Soviet Satellite* (New York: Oxford University Press, 1992), 205.

³⁵ McDougall, *...the Heavens and the Earth*, 8.

Aeronautics and Space Administration (NASA) emerged out of a consensus that the White House forged out of interest groups that included scientists and engineers committed to research, bureaucrats in the Pentagon determined to match Soviet military achievement in space, corporate America looking for new business, and a strong new trend in public opinion invested in space exploration. On January 14, 1958, NACA's Hugh Dryden stated that

It is of great urgency and importance to our country both from [a] consideration of our prestige as a nation as well as military necessity that this challenge be met by an energetic program of research and development for the conquest of space. It is accordingly proposed that the scientific research be the responsibility of a national civilian agency. NACA is capable, by rapid extension and expansion of its effort, of providing leadership in space technology.³⁶

Eisenhower agreed and on July 29, 1958 he signed the National Aeronautics and Space Act establishing NASA as a civilian space agency that would take over all existing projects. The *Sputnik* crisis evoked calls from intellectuals for a refocus from the era's self-indulgent and ostentatious consumer culture to a higher national purpose. The creation of NASA was an important first step, demonstrating two things: first, space exploration and achievement was deemed important enough to have its own governing agency, and second, that it belonged outside of the government.

However, simply creating the organization did not constitute a plan or a strategy for the American space program. NASA inherited the chores of trying to sort out in conjunction with the administration, the complex issues of civil military relations, cooperation verses competition with other nations, and the appropriate spending levels for space R&D. It would also be tasked with identifying the role of the space program in determining the future relationship between the state and the creation of new knowledge within a capitalist democracy. Although the United States had been working on missiles and space exploration, *Sputnik* highlighted the inefficiency

³⁶ Mark Erickson, *Into the Unknown Together: The DOD, NASA, and Early Spaceflight* (Maxwell: Air University Press, 2005), 51.

of existing agencies and institutions. It thrust space into the conversation surrounding national defense and security and forced policy makers to do something. NASA did not provide the ends, but it did provide the means and ways: despite the lingering questions surrounding its purpose (and budget) it paved the way for American success in the future. Overall, NASA was a quick response to *Sputnik*. It gave Eisenhower something to point to that demonstrated the fact that his administration was learning and taking steps forward to convert American resources into tangible action.

As mentioned by Eisenhower in his 1958 State of the Union Address, it was clear that the Cold War was taking on new dimensions, literally and figuratively. Following the anti-colonial and independence movements sweeping Asia, Africa, and the Middle East, the battle for the hearts and minds of millions of people around the world became more important. If the Soviet development model could produce modernity quickly and technology superior to that of the United States, then what did that mean for the image and reputation of American values and institutions in the developing world? The Cold War was increasingly a competition for the loyalty and trust that was to be fought in all areas of social achievement in which textbooks, teachers, and scientists were just as much tools of foreign policy as missiles, diplomats and spies.³⁷ In addition to creating NASA, Eisenhower passed the National Defense Education Act (NDEA) on September 7, 1958. The goal was to “strengthen our American system of education so that it can meet the broad and increasing demands imposed upon it by considerations of basic national security.” Eisenhower called the act an “emergency undertaking,” calling on the American people to “redouble their efforts towards this end.”³⁸ But what was this end? What did

³⁷ McDougall, ...*the Heavens and the Earth*, 8.

³⁸ Dwight D. Eisenhower, “Statement by the President Upon Signing the National Defense Education Act,” transcript of remarks delivered in Newport R.I, September 2, 1958, *The American Presidency Project*,

success look like? The launch of *Sputnik* added credence to the perception that the American education system lagged behind the Soviet Union in the core disciplines that produced scientific and technological innovation. In order to ensure American primacy in these fields and prevent another Soviet shock, the NDEA created federal funding for math and science in schools and loans for college students pursuing the hard sciences. As with NASA, educational funding speaks to the means rather than the ends associated with strategy. Passing the NDEA did not guarantee an immediate turn around, as any education impact would take at least a generation to be felt, but it once again demonstrated that the Eisenhower administration was learning and beginning to convert its power into tangible benefits.

The American education system was not the only institution that received attention in 1958. Concerned that American research and development were lagging behind the Soviet Union in a broader sense, Eisenhower created the Advanced Research Projects Agency on February 7, 1958. As a collaborative effort between academia, industry, and government partners, the agency was tasked with forming and executing research and development projects to expand the frontiers of technology and science, with the aim of reaching far beyond immediate military requirements.³⁹ The creation of ARPA was an important step in regaining the initiative from the Soviet Union, where the United States would no longer be the victim of technological surprises. Instead, the United States would invest significant time and money into projects and research that was “high-risk,” “high-gain”, and “far out,” a posture that was enthusiastically embraced by the nation’s scientists and research universities. In 1959, ARPA played an important role in Transit, a predecessor to the Global Positioning System. While most of its space-related

<https://www.presidency.ucsb.edu/documents/statement-the-president-upon-signing-the-national-defense-education-act>.

³⁹ “About DARPA,” *Defense Advanced Research Projects Agency*, Accessed February 15, 2022. <https://www.darpa.mil/about-us/about-darpa>.

projected would be transferred to NASA in 1960, ARPA concentrated its efforts on Project DEFENDER (ballistic missile defense) Project VELA (nuclear test detection) and Project AGILE (counterinsurgency R&D). Over the years the agency expanded to work on behavioural and material sciences, later focusing on computer processing, artificial intelligence, machine learning. Groundbreaking work in these fields led to the creation of ARPANET, the predecessor for the modern internet in the late 1960s.⁴⁰ While the organization's projects varied over the years following its founding, the core underlying mission remained unchanged: to secure America's position at the forefront of technological innovation, research, and development. Scarred by *Sputnik* shock, the United States would be the initiator and not the victim of strategic technological surprises.

For all the talk of the missile gap and technological inferiority both before and after *Sputnik*, the United States had a relatively strong missile and rocket program. Rather than have a centralized agency tasked with the sole responsibility of building a rocket like the Soviet Union, competing branches of the military along with various defense contractors all built their own delivery systems. *Redstone* was the United States' first attempt at an ICBM, designed built from 1950 to 1952 before being tested in 1953. A product of the Army Ballistic Missile Agency (ABMA) at Redstone Arsenal in Huntsville Alabama, the rocket was a direct descendent of the German *V2* rocket. Under the direction of Wernher von Braun, it was designed as a surface-to-surface missile for the United States Army. *Redstone* evolved into the *Jupiter* series of rockets, which were used for a series of suborbital spaceflights in 1956 and 1957 before *Juno-I*, a variant of *Jupiter-C* rocket, launched *Explorer I* on January 31, 1958. While von Braun's team at the ABMA had the capacity to launch a small satellite in August 1956, the Eisenhower

⁴⁰ For a full list of projects and innovations, see "Innovation Timeline," *Defense Advanced Research Projects Agency*, Accessed February 15, 2022. <https://www.darpa.mil/about-us/about-darpa>.

administration wanted the first American satellite to be launched by a civilian rocket developed by American engineers instead of a rocket built by Germans and derived from a military missile program. He selected the Naval Research Laboratory's *Vanguard* rocket, which was used between 1957 and 1959. The Air Force was also working on their own missile technology, with the *Atlas* (1957) and *Titan* (1959) vehicles. The *Atlas* was developed under the direction of the Convair Division of the defense contractor General Dynamics in conjunction with the Air Force, while *Titan* was built by the Martin Company. Variations of the *Redstone*, *Atlas*, and *Titan* launch vehicles would take American astronauts to space as part of the Mercury and Gemini programs. NASA would eventually take over responsibility for the rocket and space programs, while the military focused on ICBM development. This competition between the various branches for funding and attention was fierce, leading some to critique the exercise as a mess.⁴¹ However, decentralization resulted in the branches competing to produce the best delivery system, with inferior or insufficient models being weeded out. This is a key aspect of antifragility: in a centralized system, a single hiccup or stressor is more likely to cause derailment and damage. With multiple projects, the likelihood of all of them being disrupted by a stressor is much less. Had it not been for Eisenhower's interference, perhaps the Americans could have beat the Soviets to space.

After the successful launch of *Explorer 1* in 1958, crewed spaceflight became the next goal. While *Sputnik* sent the nation into a space frenzy, Eisenhower did not match the sentiment. The entire idea of humans going to space, let alone landing on the moon was a bit foreign to him. Nonetheless, Project Mercury was approved on December 7, 1958 with NASA announcing the first group of American astronauts—the Mercury Seven—on April 9, 1959. NASA planners

⁴¹ McDougall, ...*the Heavens and the Earth*, 126.

projected that human spaceflight would give the Americans the edge over the Soviets, however there was little interest in investing time, energy, and resources into it at the time. When NASA submitted its 1962 fiscal budget request in May 1960, Eisenhower learned for the first time about the agency's plans for a lunar landing program. He asked Presidential Science advisor George Kistiakowsky to study "the goals, the missions and the costs" of a potential manned spaceflight program. Presented to the president in December of that same year, Eisenhower suggested that at the time, he was not willing to "hock his jewels"⁴² to send people to the moon. The report concluded that "man-in-space could not be justified" on the grounds of it being too costly.⁴³ Incremental achievements in space might have been nice to have for defense purposes, but the United States according to Eisenhower should be content with what it has.

For all his support in building the foundations of the American space program, Eisenhower could never get on board due to his focus on financial constraint. The giant price tag for him was just not worth it, famously commenting to Republican members of Congress in 1963 that "anyone who would spend \$40 billion in a race to the moon for national prestige is nuts."⁴⁴ In March 1961, NASA Administrator James Webb summarized Eisenhower's outlook in a presentation to the incoming John F. Kennedy:

The U.S. civilian space effort is based on a ten year plan. When prepared in 1959, this ten years plan was designed to go hand in hand with our military programs and permit a steady closing of the gap caused by Russian successes. Prior to this plan, U.S. procrastination for a number of years had been based in part on a very real skepticism by President Eisenhower personally as to the necessity for the large expenditures required, and the validity of the goals sought through the space effort.⁴⁵

⁴² Referring to the decision by Spanish monarchs Ferdinand and Isabella to finance the initial expedition of Christopher Columbus.

⁴³ The President's Science Advisory Committee, "Report of the Ad Hoc Panel on Man-in-Space," December 16, 1960, *NASA Historical Reference Collection, History Office*, NASA Headquarters, Washington D.C. Accessed February 9, 2022. <https://www.hq.nasa.gov/office/pao/History/report60.html>.

⁴⁴ Richard Reeves, *President Kennedy: Profile of Power* (New York: Touchstone, 1993), 457.

⁴⁵ James Webb, "Presentation by the Administrator of the National Aeronautics and Space Administration to President Kennedy," Kennedy Library, National Security Files, Departments and Agencies Series, NASA, 1961, Box 282. <https://history.state.gov/historicaldocuments/frus1961-63v25/d359>.

In the 1962 budget, Eisenhower reduced the \$1.35 billion requested by the Space Agency to just \$240 million and specifically eliminated funds to proceed with manned space flight projects beyond Mercury. According to Webb his decision “emasculated the ten year plan, before it was even one year old, and unless reversed guaranteed that the Russians will, for the next five to ten years, beat us to every spectacular exploratory flight.”⁴⁶ In the end, it would take fresh faces and ideas to move forward, offering new insight and finding new ways to align means and ends.

In his famous farewell address, Eisenhower lamented the growth of the security establishment, stating that “only an alert and knowledgeable citizenry can compel the proper meshing of the huge industrial and military machinery of defense with our peaceful methods and goals, so that security and liberty may prosper together” He proclaimed that although “steady progress towards our ultimate goal has been made,” “crises there will continue to be.”⁴⁷ In the end, Eisenhower slowed, but did not reverse the trend towards militarism. America’s political culture and domestic insecurities, the march of technology, and Eisenhower’s own failure to articulate an alternative Cold War containment strategy fed the Soviet-American arms race and accounted for the president’s failure to rein in the swelling military-industrial complex. Perhaps the biggest irony is how much he contributed to it. As much as he railed against excess spending on defense projects, NSC 162/2 laid out the framework⁴⁸ and the steps he took in the immediate aftermath of *Sputnik* fueled its growth. Despite the president’s concerns, NASA continued to expand slowly and space exploration continued. Apart from the human spaceflight programs, military applications were also being explored. When asked in the aftermath of *Sputnik* about the

⁴⁶ Webb, “Presentation by the Administrator of the National Aeronautics and Space Administration to President Kennedy,”

⁴⁷ Dwight D. Eisenhower, “Farewell Radio and Television Address to the American People,” transcript of speech delivered in Washington D.C., January 17, 1961, *The American Presidency Project*, <https://www.presidency.ucsb.edu/documents/farewell-radio-and-television-address-the-american-people>.

⁴⁸ William Hitchcock, *The Age of Eisenhower: America and the World in the 1950s* (New York: Simon & Schuster, 2018), 108-110.

use of satellites as platforms for strategic surveillance, Eisenhower dismissed such notions stating that “that period is a long ways off.”⁴⁹ In reality, it would take just three years. In 1959, the United States launched a series of satellites under the CORONA program to be used for photographic surveillance of the Soviet Union and China. The CORONA program was pushed forward rapidly following another crisis, the downing of an American U-2 spy plane over the Soviet Union on May 1, 1960.⁵⁰ For all its power, might, and progress, the United States was still experiencing crises. While the shutdown of the U-2 presented a PR nightmare for the outgoing Eisenhower administration, it did not fundamentally alter American strategy. The United States also never gave up first strike capabilities under Eisenhower, and by the time Americans went to the polls in November 1960, the United States was in a much more competitive position vis-à-vis the Soviet Union than it had been in three years earlier, due in no small part to the president’s actions in the wake of *Sputnik*.

Conclusions

It is easy to point fingers at Eisenhower over *Sputnik* and the chaos that characterized the following months. Many historians are quick to point out Eisenhower’s lack of interest in the American space program. However, he was the first president to deal with space in any considerable measure. As McDougall points out, the confusion and inefficiency were perhaps no more than could be expected to attend the birth of a new technological age.⁵¹ The comparison is often made with his successor, who was able to mobilize an entire country behind his space

⁴⁹ Dwight D. Eisenhower, “The President’s News Conference,” transcript of remarks delivered in Washington D.C., October 9, 1957, *The American Presidency Project*, <https://www.presidency.ucsb.edu/documents/the-presidents-news-conference-308>.

⁵⁰ Taubman, *Secret Empire*, 189.

⁵¹ McDougall, ...*the Heavens and the Earth*, 126.

vision. However, none of what was achieved in the 1960s and beyond would be possible without the foundation laid down by Eisenhower in the 1950s. The creation of ARPA and NASA along with the passing of the NDEA were crucial steps in re-asserting American strategic initiative, but innovation does not happen overnight. *Vanguard I* may have exploded, but by the start of the new decade the framework for success in space was built. In this sense, *Sputnik* should not be understood as a great catastrophe, but as a great catalyst.

It is important to remember that antifragility characterizes systems rather than individuals. However, those systems are still comprised of people who make decisions that affect the world around them. In response to *Sputnik* and the national outcry that followed, Eisenhower took initiatives with which he was not wholly comfortable. He accelerated military R&D, approved unprecedented peacetime funding of civilian science, moved the federal government to fund and direct education, and created a new agency dedicated to state-financed and state-directed R&D in critical and ‘civilian’ technology. The question is not whether Eisenhower himself was antifragile, but whether the decisions made by him and his administration contributed to the building of an antifragile system. During his time in office, Eisenhower was no stranger to crisis. In Korea (1953), Indochina (1954), the Taiwan Straits (1954, 1958), and Berlin (1959), American success was predicated on its ability to deter opponents by dint of its nuclear supremacy. With *Sputnik*, this comes into question. Structurally and institutionally, the United States developed over the course of history corrective mechanisms to adapt, learn, and fix mistakes: a powerful and free media and a strong civil society. The key here is the ability of the American system to handle these stressors, tensions, and crises: the system is built, tested, and refined in turn. *Sputnik* was a massive crisis, yet it provided information as to where the United States was coming up short. Even though it took a few months, the Eisenhower administration

identified these areas for improvement. As a result, science and technology R&D was prioritized both at the local level (NDEA) and at the federal level (NASA, ARPA). Eisenhower's reaction demonstrated the ability of the United States to learn and adapt in the wake of a crisis. His response can be understood as a reflection of America more broadly, whether it be specifically in science and technology, or in the virility of American institutions more broadly. The United States would move on undeterred, converting its resources to pursue excellence in science and technology. However, Eisenhower could only take it so far. As we will see in the next chapter, this leaves the door open for the next generation, full of hope, energy, and vigour, to take the lessons learned, strengthen the country, and charge headlong into the space age.

Chapter IV

John F. Kennedy and the Origins of the American Moonshot, 1961-1963

John Fitzgerald Kennedy inherited a country at a crossroads. By 1961, the Soviet Union had parlayed its propaganda victory with the *Sputnik* launch into a global offensive for hearts and minds, particularly in the newly independent states of the developing world. The public message was clear: American technological superiority could no longer be taken for granted in any realm of achievement. After Eisenhower, the administrations of John F. Kennedy and Lyndon B. Johnson set out in the wake of *Sputnik* of to reassert the superiority of American science, technology, and institutions. The goal of this chapter is to explore how the United States moved from being behind in the Space Race to regaining the initiative by refocusing its strategy under Kennedy. How did Kennedy and his administration manage to turn the tide in the Space Race to no longer experience *Sputnik* shocks? In order to answer this question, this chapter is divided into three subsections that consider the Kennedy administration's antifragile response to Soviet challenges. The first considers Kennedy's leadership and worldview, comparing and contrasting it with that of his predecessor paying particular attention to how the Kennedy administration learned from previous crises. The second looks at Kennedy's crisis management with a focus on agility. Kennedy's temperament and strategic sensibilities enabled him to go back and forth between competition and cooperation depending on the circumstances. The third considers how Kennedy engaged in power conversion, and how the decision to pursue a moonshot embodied this. The overall goal of this chapter is to unpack and make sense of America's ability to come from behind in the Space Race through the building of an antifragile system. Overall, Kennedy was able to maintain such a system because he and his administration learned from past crisis,

demonstrated agility and flexibility in strategic synthesis, and effectively mobilized human and material resources convert rhetoric into tangible policy.

A New Vision

The United States in 1961 was very different from the one Eisenhower took charge of in 1953. While the Cold War still loomed large in the public consciousness, the immediate postwar period had ended and new issues were on the minds of Americans. Many still enjoyed the white picket fence idyl of suburbia, but issues surrounding the spread of suburbia, youth culture, second-wave feminism, and Civil Rights challenged American society and institutions. A new generation of Americans born in the postwar period entered the electorate with new political, social, and cultural attitudes and priorities. In the industrialized West, the overall economic trend in the 1960s was one of prosperity, expansion of the middle class, and the proliferation of new domestic technology. Competition between the Soviet Union and the United States expanded beyond Europe and into Latin America, Africa, and Asia as decolonization created new nations and countries. Under Khrushchev, the Soviet Union moved from being a regional to a global superpower, vying for influence in developing world. With just forty years between the Bolshevik Revolution and the launch of *Sputnik*, Khrushchev's Soviet Union offered a viable and appealing alternative to the Western model of economic and political development. Technology remained the key arena in which the two states demonstrated their prowess. Following the success of the American *Explorer* and Soviet *Sputnik* programs, the Space Race entered a new phase with manned spaceflight as the next target. Despite the new challenges facing their country and its leaders, many Americans viewed the new decade with cautious optimism.

By the time Kennedy assumed the presidency in January 1961 he had a distinguished record of public service. During World War II, Kennedy served as a PT boat captain and became a hero after a Japanese destroyer sank his boat. After the war, he served in both the House of Representatives (1947-1953) and the Senate (1953-1960) as a representative from Massachusetts. Kennedy rose to national prominence in 1956 when he presented Illinois Governor Adlai Stevenson as the Democratic nominee for president, coming close to earning the second spot on the ticket by delivering a memorable address to the Democratic National Convention. Although the bid came up short, it left Kennedy well positioned after the 1956 convention to set his sights on securing the nomination in 1960. With his father financing and running his campaign under the slogan “the new generation offers a leader” Kennedy won the 1960 Democratic nomination for president with 42% of the vote, defeating ten other candidates. Much of Kennedy’s success stemmed from his ability to carry himself, appeal to people, and command a room; traits similar to those that carried Eisenhower to the presidency in 1953. Ted Sorensen, a top Kennedy advisor called him “a natural leader,” and someone who “when he grinned, even on television, viewers smiled back at him.”¹ In his biography of Kennedy, historian Fredrik Logevall called him a “dynamic young figure” who “seized the mantle of leadership” to “summon the narrative of American hope.”²

During his time in Congress, Kennedy devoted significant time and energy to foreign affairs, building on the publication of his Harvard thesis *Why England Slept* in 1940. By the time of his presidential run in 1960 Kennedy had developed a clear vision for the country at the conceptual level. In January of 1960 he published *The Strategy for Peace*, which outlined his

¹ Ted Sorensen, *Counselor: A Life at the Edge of History* (New York: Harper Collins, 2008), 102-103.

² Fredrik Logevall, *JFK: Coming of Age in the American Century, 1917-1956* (New York: Random House, 2020), 25.

foreign policy agenda and strategic approach. Throughout the book, Kennedy attempted to “convert men to a more strenuous and idealistic mood”³ in his discussion of peace, defense and foreign policy. In the introduction, written by Columbia University historian Allan Nevins, stated that the goal of the book was to show courage, resourcefulness, originality, and flexibility. Kennedy wished that the nation “be kept strong militarily and economically, but it must use its strength with a vision which in recent years has been lacking.”⁴ He lamented the strategy of the previous administration, stating that

We move from crisis to crisis for two reasons: first, because we have not developed a strategy for peace that is relevant to the new world in which we live; and secondly, because we have not been paying the price which the strategy demands—a price measured not merely in money and military preparedness, but in social inventiveness, in moral stamina, in physical courage.⁵

Kennedy’s campaign centred around this desire not only for better leadership, but a better vision entirely. He states that “we need to find, it is said, a new sense of great purpose.”⁶ Throughout Kennedy’s rhetoric leading up to the election and his inauguration there is an emphasis on embracing a new vision; to learn from the past and move forward beyond Eisenhower.

While Kennedy toned down the religious connotations often invoked by Eisenhower, the language is strikingly similar, especially in his acceptance speech at the 1960 Democratic National Convention:

Today some would say that those struggles are all over, that all the horizons have been explored, that all the battles have been won that there is no longer an American frontier. But...the problems are not all solved and the battles are not all won, and we stand today on the edge of a new frontier—the frontier of the 1960s, a frontier of unknown opportunities and paths, a frontier of unfulfilled hopes and threats... The new frontier of which I speak is not a set of promises—it is a set of challenges. ...It would be easier to shrink back from that frontier, to look to the safe mediocrity of the past. ...But I believe the times demand invention, innovation, imagination, decision. I am asking each of you to be new pioneers on that new frontier. ...For the harsh facts of the matter are that we stand on this frontier at a turning point in history.⁷

³ John F. Kennedy, *The Strategy for Peace* (New York: Harper & Brothers, 1960), xi.

⁴ Kennedy, *The Strategy for Peace*, xiv.

⁵ Kennedy, *The Strategy for Peace*, 3-4.

⁶ Kennedy, *The Strategy for Peace*, 6.

⁷ Kennedy, “Acceptance of Democratic Nomination for President.”

The goal was not to provide a clear, step-by-step plan for national renewal, but to roughly define the ends of American policy, whether that be in space, abroad, or at home. It was time for a new approach; one that emphasized progress, agility, and renewal characterized by cautious optimism.

Kennedy's relationship with Eisenhower is complicated as there was both change and continuity between the two administrations despite the campaign rhetoric that saw Kennedy minimize the achievements of the Eisenhower administration, and the Kennedy campaign's success at depicting Eisenhower as a disengaged, out-of-touch leader. Indeed, Logevall makes clear that Kennedy greatly admired Eisenhower but knew he could not get elected by saying so publicly.⁸ Perhaps the starkest contrast between Kennedy and his predecessor was the difference in age. Twenty-six years younger, Kennedy was just forty-three at the time of his inauguration. In his inaugural address, Kennedy commented on this, declaring that

the torch has been passed to a new generation of Americans—born in this century, tempered by war, disciplined by a hard and bitter peace, proud of our ancient heritage—and unwilling to witness or permit the slow undoing of those human rights to which this nation has always been committed, and to which we are committed today at home and around the world.⁹

Kennedy's youth and perceived inexperience were a common target for his political opponents, however his charisma and eloquence earned him numerous supporters. In the polls leading up to the 1960 election, Kennedy's lead over other Democratic contenders increased from four points in January¹⁰ 1960 to twenty points in May.¹¹ While Kennedy's popularity among Democrats was secure heading into the general election, he did not enjoy a similar gulf over the Republican nominee, vice president Nixon. The final Gallup Poll released on Monday November 6, 1960,

⁸ Logevall, *JFK*, 689-690.

⁹ John F. Kennedy, "Inaugural Address," transcript of speech delivered in Washington D.C., January 20, 1961, *The American Presidency Project*, <https://www.presidency.ucsb.edu/documents/inaugural-address-2>.

¹⁰ George Gallup, "Kennedy Scores Gain in Democrat Backing," *Los Angeles Times*, January 29, 1960, 6.

¹¹ George Gallup, "Kennedy In Same Spot as Previous Candidates," *The Hartford Daily Courant*, May 27, 1960, 17.

the day before the election, was 48% for Kennedy, 47% for Nixon, and undecided at 5%.¹² Nixon was only four years older than Kennedy, but was lumped in by Kennedy and the Democrats as just another part of the stagnant and stuffy Republican establishment. Born in 1917, Kennedy indeed represented a new generation of Americans; a generation that looked forward with both fear and hope. These men and women would lead the country into not only a new decade, but a new period in American history. Evoking a similar tone to Eisenhower's 1952 message of a crusade, Kennedy called on his generation to "bear the burden of a long twilight struggle" where "the energy, the faith, the devotion which we bring to this endeavor will light our country and all who serve it—and the glow from that fire can truly light the world."¹³ The election of 1960 was tightly fought. Kennedy won a 303 to 219 Electoral College victory, and the national popular vote by 112,827 votes, a margin of 0.17 percent. During his inauguration, Kennedy sent a message to those who questioned his aptitude, forcefully proclaiming that "I do not shrink from this responsibility—I welcome it."¹⁴

Upon taking office, Kennedy faced the same prospect as all incoming presidents: what to do with the existing strategy and policies of the outgoing administration. On the one hand, Kennedy sought to revisit and rework many of Eisenhower's policies. In his speech accepting the Democratic Party's nomination at the Democratic National Convention in July 1960, Kennedy painted Eisenhower and his administration as stagnant, slumbering, and out of touch. He claimed that there had been a "slippage" in the nation's moral and intellectual strength where

¹² Paul Perry, "Gallup Poll Election Survey Experience, 1950 to 1960," *The Public Opinion Quarterly* 26, no.2 (Summer 1962), 272.

¹³ Kennedy, "Inaugural Address."

¹⁴ Kennedy, "Inaugural Address."

[s]even years of drought and famine have withered a field of ideas. Blight has descended on our regulatory agencies—and a dry rot, beginning in Washington, is seeping into every corner of America.... Too many Americans have lost their way, their ill, and their sense of historic purpose.¹⁵

Having laid out the state of affairs, he went on to question the nation's ability to compete in science and technology:

Can a nation organized and governed such as ours endure? ... Have we the nerve and the will? Can we carry through in an age where we will witness not only new breakthroughs in weapons of destruction—but also a race for mastery of thy sky and the rain, the ocean and the tides, the far side of space and inside of men's minds?¹⁶

Kennedy alleged that a 'space gap' emerged under Eisenhower, famously stating that

we are in a strategic space race with the Russians, and we have been losing... Control of space will be decided in the next decade. If the Soviets control space, they can control Earth, as in the past centuries the nations that controlled the seas dominated the continents."¹⁷

On the other hand, there was a great deal more continuity between the two administrations than Kennedy's supporters would like to admit. On a personal level, there was little animosity. In a meeting between the two shortly after Kennedy's election, Eisenhower called him one of the "ablest, brightest young minds I've ever come across."¹⁸ By all accounts, Kennedy had great respect and admiration for the former general as mentioned above, even if he was reluctant to admit it. Kennedy sought Eisenhower's advice after the Bay of Pigs invasion and conferred with him during the Cuban Missile Crisis. Like Eisenhower and Truman, Kennedy was a dedicated Cold Warrior: he sought to use the hard and soft power of the United States to contain and counter Soviet expansion. The difference was not the means or ends, but in the ways. Kennedy came into office with the promise that he (and by extension his generation) could wage the Cold

¹⁵ John F. Kennedy, "Acceptance of Democratic Nomination for President," transcript of speech delivered in Los Angeles, July 15, 1960, *JFK Presidential Library*, <https://www.jfklibrary.org/learn/about-jfk/historic-speeches/acceptance-of-democratic-nomination-for-president>.

¹⁶ Kennedy, "Acceptance of Democratic Nomination for President."

¹⁷ "An Open Letter to Richard Nixon and John Kennedy," *Missiles and Rockets*, VII (Oct. 3, 1960), 10-11; John F. Kennedy, "If the Soviets Control Space They Can Control Earth," *Missiles and Rockets*, VII (Oct. 10, 1960), 12-13. Cf. a similar set of questions and answers in *Western Aviation, Missile and Space Industries* (Nov. 1960). See also Edward C. Welsh, interview, Washington, Sept. 1, 1965.

¹⁸ Frederick Kempe, *Berlin 1961: Kennedy, Khrushchev, and the Most Dangerous Place on Earth* (New York: G.P. Putnam's Sons, 2011), 51.

War better. Despite his rhetoric, the reality was that the steps Eisenhower took in response to the Soviet Union were in the right direction. This was especially true when it came to the Space Race. While the Soviet Union was still ahead, Eisenhower built the institutional framework necessary for American success with NASA, ARPA, and the passing of the NDEA. Rather than tear it all down and start fresh, Kennedy understood its value and built on it.

At the time Kennedy was developing his strategy, the world grew more complex. With the postwar economic hegemony gradually waning, America's place in the world was less familiar and less secure. In his inaugural address, Kennedy grimly noted the global crisis, speaking of the "hour of maximum danger."¹⁹ One of the most pressing issues facing Eisenhower during his second administration was the Missile Gap. This growing public perception of American technological inferiority compared to the Soviet Union was reinforced during the *Sputnik* crisis when the contents of the top-secret Gaither Report detailing the anticipated shortcomings of the American nuclear weapons program, was leaked to the media in December 1957. The *Sputnik* launches attracted considerable attention among the general public; now the findings of the Security Resources Panel generated anxiety among lawmakers and policy makers in Washington about the nation's ability to stand up to the Soviets. Known as the Gaither Report after the principal author, the document echoed the increasingly pessimistic attitudes of the late 1950s. The introduction stated that the panelist had "found no evidence...to refute the conclusion that USSR intentions are expansionist." Consequently, the Gaither panelists warned of "an increasing threat which may become critical in 1959 or early 1960"²⁰ and went on to highlight the widening disparity between American and Soviet weapons programs. The report concluded

¹⁹ Kennedy, "Inaugural Address."

²⁰ *Deterrence and Survival in the Nuclear Age* (hereafter referred to as *The Gaither Report*), Washington D.C.: Government Printing Office, November 7, 1957), 1.

by advocating an acceleration of American programs, at an estimated cost of an additional \$44 billion in order to close the gap.²¹ As mentioned above, Eisenhower disagreed with the committee's findings and objected to the high costs of the report's proposals.²² However, Democrats seized the opportunity to point out the apparent disconnect between Eisenhower, members of his administration, and the public. In August 1958, Kennedy called out the Eisenhower administration's strategic shortcomings in an address to the Senate:

To sound the alarm is not to panic— it is not to sell America short. It gives the enemy no encouragement he did not already possess. But the sound of the alarm does warn us that time is running out—that no matter how complex the problems, how discouraging the prospects, or how unpopular the decisions, these facts must be faced. Complacency or hysteria will not help. Sustained and well-informed constructive effort will help—not provide all the answers for the future, but to help assure us that there will be a future.²³

In other words, Kennedy called for a middle ground. The United States must not panic, for hysteria does not lead to rational thinking. At the same time, complacency had led to stagnation and more needed to be done in order to compete effectively. On the surface it seemed like American policy makers were not learning from the crises their country was experiencing.

While Kennedy may have kept some of Eisenhower's programs and institutions, he understood that the country needed a new strategy for dealing with the Soviet Union. In his acceptance speech in July 1960, Kennedy stated bluntly that "the world is changing. The old era is ending, the old ways will not do."²⁴ Despite the rhetoric, Kennedy was not in favour of a complete break with the past. The ends remained the same: compete effectively with the Soviets. It was the means and ways that needed to be updated. Serving in Congress during the 1950s, he witnessed first-hand the paucity of American response due to a lack of agility and flexibility. As was the case with Eisenhower, the succession of crises in the 1950s provided Kennedy with

²¹ *The Gaither Report*, 24.

²² Christopher A. Preble, *John F. Kennedy and the Missile Gap* (DeKalb: Northern Illinois University Press, 2004), 35.

²³ Kennedy, *The Strategy for Peace*, 44-45.

²⁴ Kennedy, "Acceptance of Democratic Nomination for President."

information on where the United States was coming up short. Upon taking office, Kennedy could no longer cite the Missile Gap as the chief factor. In reality, Eisenhower had left the United States in an enviable position, despite Soviet firsts in space.²⁵ Under the Eisenhower administration, the strategy of the United States was Massive Retaliation. With this strategy, the United States would respond to Soviet aggression with an overwhelming show of force, up to and including the use of nuclear weapons. NSC 68 and NSC 162/2 both called for an expansion in the nuclear arsenal, and it would not be until the late 1960s that American nuclear stockpiles were significantly reduced. While Kennedy was concerned about both vertical and horizontal proliferation of nuclear weapons, he recognized that they still played a role in American strategy. The key problem was the inflexibility of American strategy, and in order to effectively contain the increasingly global threat posed by the Soviet Union and its allies American strategy needed revision. Under Kennedy's emerging policy of Flexible Response, the conventional and nuclear striking force of the United States increased substantially.

What would come to be known as Flexible Response can be traced back to a 1960 book by then Army Chief of Staff Maxwell Taylor titled *The Uncertain Trumpet*. As Army Chief of Staff, Taylor was an outspoken critic of the Eisenhower administration's New Look. He viewed the strategy as dangerously over-reliant on nuclear arms and neglectful of conventional forces, pointing out that Massive Retaliation offered only two choices: nuclear war or compromise and retreat.²⁶ He suggested that the United States was "playing a losing game,"²⁷ and that the United

²⁵ Walter A. McDougall, ...*The Heavens and the Earth: A Political History of the Space Age* (Baltimore: Johns Hopkins University Press, 1985), 327-329.

²⁶ Maxwell D. Taylor, *The Uncertain Trumpet* (New York: Harper & Brothers, 1960), 5.

²⁷ Taylor, *The Uncertain Trumpet*, 6.

States could not afford to be in second place in the military league in which they were playing.²⁸

In order to become a more certain trumpet, the United States

[s]hould take into account the new factors which make this appraisal necessary, evaluate their impact as well as the effect of the quick fixes, and establish specific objectives for the new program.²⁹

Kennedy echoed this sentiment, writing in *The Strategy for Peace* that

[t]he need for decisions and action on immediate crisis too frequently seems to preclude the serious, careful study of fundamental and long-range problems that is so essential to foresighted leadership.³⁰

In essence, Flexible Response called for the creation of a more diverse tool kit and a less-rigid and ham-handed response to crisis. The goal would be to “deter limited aggression anywhere, and to make provision for essential survival measures in the unhappy events that general war is not deterred or comes through miscalculation.”³¹ For Taylor, a more certain and flexible United States would not only be able to better counter Communist aggression around the world, but would also be better situated to anticipate and undercut those moves in the first place.

Furthermore, this would give the United States more confidence, something it desperately needed as crises continued. Predicated on the belief that the strategic lassitude of the United States was controlled largely by factors that had become outmoded, Taylor’s ideas played a significant role in Kennedy’s attacks on the Eisenhower administration during the 1960 presidential campaign. Taylor would be appointed by Kennedy as Chairman of the Joint Chiefs of Staff in 1962, with his ideas serving as the bedrock for American strategy.

The Kennedy administration’s space philosophy would come to borrow from both Flexible Response and Massive Retaliation. With Flexible Response, there is a desire to match aggression without resorting to an overwhelming use of force. According to Cold War historian

²⁸ Taylor, *The Uncertain Trumpet*, 174.

²⁹ Taylor, *The Uncertain Trumpet*, 145.

³⁰ Kennedy, *The Strategy for Peace*, 32.

³¹ Taylor, *The Uncertain Trumpet*, 145.

and strategist John Lewis Gaddis, Flexible Response permitted the United States to respond symmetrically to Soviet challenges and encroachments rather than the asymmetrical approach that characterized Massive Retaliation.³² In the Space Race, policy gradually became more flexible in the sense that there were even more options on the table. As technology evolved and rockets became more powerful and sophisticated, more stuff could be done. Space exploration and competition soon evolved beyond simply who could build the biggest rocket or carry the heaviest payload into orbit. Strategists, policy makers, and scientists could get creative. While the United States and the Soviet Union both pursued similar goals with their space programs, there was more room for deviation and experimentation. From Massive Retaliation, Kennedy continued with the notion of asymmetric response. The premise of Massive Retaliation is to respond to any form of aggression by an adversary with an overwhelming and asymmetrical show of force, no matter the nature of the initial aggression. We can see this with the moon landing. While the United States would continue to achieve incremental progress in the realm of space exploration, the moon landing represented an asymmetrical response to the challenges posed by the Soviets. While there was no single document delineating Kennedy's overall space strategy, it is clear that there is significant continuity from the Eisenhower administration, even if it was relegated to the conceptual realm.

By the time Kennedy assumed office in 1961, the nature of the Soviet threat had changed. A more formidable and confident power, especially in the aftermath of *Sputnik*, the Soviet Union was more willing to engage and project its power around the world. It was also led by an experienced leader who was not afraid to gamble, bluff, and bluster to push Cold War boundaries. Kennedy referred to Khrushchev as "shrewd, tough, vigorous, well-informed and

³² John Lewis Gaddis, *Strategies of Containment: A Critical Appraisal of American National Security Policy during the Cold War*, Revised and Expanded Edition (Oxford: Oxford University Press, 2005), 213.

confident” and who was a “tough minded, articulate, hard-reasoning, spokesman for a system in which he was thoroughly versed in and which he thoroughly believed.”³³ Any strategy required nuance, and an acknowledgement that the United States was not in the same position as it had been a decade earlier. In terms of pure hard-power assets, the United States was in a much stronger position vis-à-vis the Soviet Union in the early 1960s. However, there was still a perception that the United States was somehow lacking or coming up short. As Taylor suggested in 1960, “the US faces a period of several years in which we will be inferior to the USSR both in general war and in conventional counter attritional forces. It will be a period in which our leaders will be hard put to maintain our world position in the face of increased Soviet pressures.”³⁴ In reality, the United States was still in the process of learning and building its space-related institutions and strategy coming out of the 1950s. At the heart of Kennedy’s shift in strategy was the desire for the United States to take the lead and stop being upstaged by the Soviet Union. He lays this out in *The Strategy for Peace*, suggesting that

[o]ur policy makers on too many levels and in too many fields have become narrow and cautious, and in the literal sense reactionary. It is time to stop reacting to our adversary’s moves, and to start acting like the bold, hopeful inventive people that we were born to be, ready to build and begin anew, ready to make a reality of man’s oldest dream, world peace.³⁵

By the turn of the 1960s the Soviet Union had recovered economically from World War II, and its increasing ability and willingness to project its power abroad, especially in the developing world, challenged existing American assumptions and strategy. In order to contain and counter Soviet advances in space or around the world, the United States needed to learn from the past and be more agile.

³³ Kennedy, *The Strategy for Peace*, 9.

³⁴ Taylor, *The Uncertain Trumpet*, 139.

³⁵ Kennedy, *The Strategy for Peace*, 30.

With Kennedy there is a distinct change in mood from the previous administration. Under Eisenhower, it was about being secure, content, and balanced at home. With Kennedy in charge, there is desire to push to the future, to learn from the past and tackle challenges head on, not shy away from pushing the boundaries. Upon assuming office, Kennedy was hemmed in by his rhetoric during his campaign which presented a dilemma: he wanted to present himself as an agent of action and change, yet he could not simply undo everything Eisenhower had built and promised. Kennedy sought to introduce new means and ways to revitalize a stagnant space strategy. In a 1964 interview, Kennedy's close advisor Ted Sorensen commented that

our lagging space effort was symbolic, [in which Kennedy] thought of everything of which he complained in the Eisenhower Administration: the lack of effort, the lack of initiative, the lack of imagination, vitality, and vision; and the more Russians gained in space during the last few years in the fifties, the more he thought it showed up the Eisenhower Administration's lag in this area damaged the prestige of the United States abroad.³⁶

Much of this vision as communicated to the public can be seen in Kennedy's nomination acceptance speech in July 1960 and his inaugural address in January 1961. He asked

are we up to the task—are we equal to the challenge? Are we willing to match the Russian sacrifice of the present for the future—or must we sacrifice our future in order to enjoy the present? This is the question of the New Frontier. That is the choice our nation must make—a choice that lies not merely between two political parties, but between public interest and private comfort—between national greatness and national decline—between the fresh air of progress and the stale, dank atmosphere of 'normalcy'—between determined dedication and creeping mediocrity.³⁷

According to historian and Kennedy confidante Arthur Schlesinger Jr., Kennedy's inaugural address set out three goals: to express the spirit of the postwar generation, to summon America to new exertions and new initiatives, and to summon the world to a new mood beyond the clichés of the Cold War.³⁸ For Kennedy, this included cooperation with the Soviet Union. Kennedy believed that if arms control talks were not possible immediately, working with the Soviets in a

³⁶ Theodore Sorensen, transcript of an oral history conducted March 26, 1964, by Carl Kaysen, John F. Kennedy Presidential Library, 1.

³⁷ Kennedy, "Acceptance of Democratic Nomination for President."

³⁸ Arthur Schlesinger Jr. *A Thousand Day: John F. Kennedy in the White House* (Boston: Houghton Mifflin Company, 1965), 163.

related field might present the opportunity to explore space together. By February 1961, a White House task force began work identifying areas of potential U.S.-Soviet cooperation in space.³⁹ This flexible back and forth between cooperation and competition would continue throughout Kennedy's presidency, hinging on the international atmosphere and Kennedy's perception of American strategy.

Eisenhower built key institutions in the wake of *Sputnik*, and now Kennedy could utilize them to alter the means and ways of American strategy in order to move forward into a new era. Just what this new look would be was still to be determined as Kennedy settled into office in early 1961. Nonetheless, having witnessed the Eisenhower administration's bungled public response to *Sputnik*, Kennedy knew that something had to be done to get the best out of the institutions created by the outgoing administration. This would take time and require great sacrifice on behalf of the American people. It challenged Kennedy's ability to define the national character and to mobilize science and society behind it. A key part of effective leadership and the fostering of antifragility is being able to not only identify where the current vision or strategy is coming up short, but to learn from these mistakes and push to the future utilizing the resources at hand to build a system that is not shaken or disrupted by crisis. At the beginning of his inaugural address, Kennedy lays this out: "All this will not be finished in the first one hundred days. Nor will it be finished in the first one thousand days, nor in the life of this Administration, nor even perhaps in our lifetime on this planet. But let us begin."⁴⁰

Taking the Reigns

³⁹ E.B. Skolnikoff, "Abstract of Possible Projects for International Cooperation," Papers of John F. Kennedy, National Aeronautics and Space Administration, 1961: January-March, 27-30. *JFK Presidential Library*, <https://www.jfklibrary.org/asset-viewer/archives/JFKPOF/082/JFKPOF-082-007>.

⁴⁰ Kennedy, "Inaugural Address."

Upon assuming office in January of 1961, Kennedy had a lot on his plate and was the first president to set up a transition team to advise him on the key issues he would face. His transition team on space was chaired by MIT professor Jerome Wiesner. A member of Eisenhower's President's Science Advisory Committee, Wiesner was familiar with the ins and outs of American Space policy, programs, and strategy. Ten days before his inauguration, Kennedy was presented with a memorandum drafted by Wiesner about the feasibility of the American space program. The report called for more effective management and coordination of the American space effort, stating that "neither NASA as presently operated nor the fractionated military space program nor the long-dormant space council have been adequate to meet the challenge that the Soviet thrust into space has posed to our military security and our position of leadership in the world."⁴¹ The report also reflected the widespread skepticism within the scientific elite of the country over the value and feasibility of human spaceflight. It cautioned the president that this must not be rushed, citing the potential for national embarrassment should such a mission end in failure. In the end, the report made five recommendations: first, the Space Council needed to be an effective agency for managing the nation's space program. Second, the United States should establish a single responsibility within the military establishment for managing the military aspects of the program. Third, NASA needed "vigorous, imaginative, and technically competent" leadership. Fourth, the United States should review the space program in its entirety to redefine and clarify its objectives. Finally, the organizational machinery within the government must be updated in order to manage and administer an "industry-government civilian space program." Overall, the report made it clear that American space strategy needed a revamp, and that such a change must happen to secure American primacy: "During the next few

⁴¹ Wiesner Committee, "Report to the President-Elect of the Ad Hoc Committee on Space," January 10, 1961. *NASA History Archives*, <https://www.hq.nasa.gov/office/pao/History/report61.html>.

years the prestige of the United States will in part be determined by the leadership we demonstrate in space activities.”⁴²

In his inaugural address, Kennedy promised a better, brighter, and more dynamic future, but wasted no time in highlighting the challenges facing the United States and the sacrifices necessary in order to overcome them. In his first State of the Union Address, Kennedy painted a grim picture:

Each day the crises multiply. Each day their solution grows more difficult. Each day we draw nearer the hour of maximum danger, and weapons spread and hostile forces grow stronger. I feel I must inform the Congress that our analyses over the last ten days make I clear that—in each of the principal areas of crisis—the tide of events has been running out and time has not been our friend.⁴³

Expressing a sense of urgency, Kennedy echoed the Wiesner Report and called for a complete re-assessment of the nation’s priorities and a re-examination of “our whole arsenal of tools: military economic, and political.”⁴⁴ He continued to identify American shortcomings, but also offered the possibility of cooperation: “civility is not a sign of weakness, and sincerity is always subject to proof. Let us never negotiate out of fear. But let us never fear to negotiate.”⁴⁵ With Kennedy, there is a distinct shift towards the future, but with a more humble, stark, even ominous tone. He closed his address in 1961 by stating that “Life in 1961 will not be easy. Wishing it, predicting it, even asking for it will not make it so. There will be further setbacks before the tide is turned. But turn it we must.”⁴⁶ However, as Walter McDougall points out, for all the “space gap” talk, the Kennedy team had little notion of what to do with the space program

⁴² Wiesner Committee, “Report to the President-Elect of the Ad Hoc Committee on Space.”

⁴³ John F. Kennedy, “Annual Message to Congress on the State of the Union,” transcript of remarks delivered in Washington D.C., January 30, 1961, *The American Presidency Project*, <https://www.presidency.ucsb.edu/documents/annual-message-the-congress-the-state-the-union-5>.

⁴⁴ John F. Kennedy, “Annual Message to Congress on the State of the Union,” January 30, 1961.

⁴⁵ Kennedy, “Inaugural Address.”

⁴⁶ John F. Kennedy, “Annual Message to Congress on the State of the Union,” January 30, 1961.

after election day.⁴⁷ Despite all the lofty talk about the future and the New Frontier, it would take another crisis for Kennedy to set his sights once again on competition.

While Kennedy was promising a turn of the tide, the Soviet Union achieved its biggest propaganda victory since *Sputnik*. Following the launches of multiple small satellites, both the United States and the Soviet Union were looking to take the next step and put a human into space. On April 12, 1961 a R7 Semyorka successfully lifted off from Baikonur Cosmodrome carrying test pilot Yuri Gagarin into space. He spent 108 minutes orbiting the earth before successfully returning to earth. Upon his return, Gagarin became a national hero of the Soviet Union and communism worldwide. As newspapers around the world published his life story, he was given a full ticker-tape parade through Moscow to the Kremlin before being honoured as a Hero of the Soviet Union by Khrushchev. More people assembled in Red Square to celebrate his achievement than had been present at the same location at the end of World War II in 1945.⁴⁸ In turn, Kennedy barred Gagarin from visiting the United States. To many, it seemed like the United States would forever be playing catch up. In an April 15th letter to Vice President Johnson, Representative David King commented that

we have fired dozens of space probes with the obvious hope that our numerical showing would partially offset the impact on global opinion of the spectacular Russian achievements. But it had also given our people a sense of false security, the feeling that this country is keeping pace. We are not now keeping pace.⁴⁹

Seeking to take a stand and turn the tide against communism, Kennedy launched his biggest gamble yet just five days after Gagarin's flight by sending roughly 1,500 Cuban exiles to invade Cuba. The failure of the Bay of Pigs Invasion was a massive public setback for Kennedy, who

⁴⁷ McDougall, ... *The Heavens and the Earth*, 308.

⁴⁸ Asif Siddiqi, *The Rockets' Red Glare: Spaceflight and the Soviet Imagination, 1857-1957* (Cambridge: Cambridge University Press, 2010), 1.

⁴⁹ David S. King to Lyndon Johnson, April 15, 1961, United States Capitol Visitor Centre, Exploration, The Space Race, <https://www.visitthecapitol.gov/exhibitions/artifact/letter-representative-david-s-king-vice-president-lyndon-b-johnson-april-15>.

was deeply depressed and angered by the fiasco. Castro cozied up to the Soviet Union and became even more hostile towards the United States. After Gagarin, and especially after the Bay of Pigs, Kennedy set cooperation aside and embraced competition. To repair some of the damage done to American prestige, he needed a man in space, and fast.

Just under a month later, Alan Shephard completed a sub-orbital flight on May 5. While it could be argued that *Sputnik* had a bigger impact on American strategy, manned spaceflight arguably galvanized popular support for the American Space Program. This mood was still tempered by the president's strategy. For Eisenhower, success in space was a prestige object that would be nice to have but the United States and the American people should be content with the status quo, and content with the current state of progress and innovation. Kennedy took an entirely different view. Kennedy from the outset had no clear space strategy, and it would not be until after the Gagarin flight that he developed any noticeable interest in space and competition with the Soviets (perhaps not too dissimilar to Eisenhower before *Sputnik*). In a 1964 interview, Dr. Edward C. Welsh, the Executive Secretary of the National Aeronautics and Space Council recounted the need for management:

We had a pretty strong feeling that, in addition to recognizing that we're in a race with the Soviets, we needed to win that race, and, therefore, we needed to choose various objectives where we had a chance of winning or getting ahead. It was also necessary to set up some clear-cut goals and schedule these goals in order to have a good orderly program. In order to develop real confidence, overall confidence, you needed an orderly program. An orderly program calls for goals; it calls for objectives; it calls for schedules. You ought to have flexibility in them, but it calls for these things to get people to have something that they're working for, something that gives them a clear-cut objective, a target if you will.⁵⁰

In other words, the United States needed to sort out its means and ends: what should the goal be, and how are we to achieve it? This was never straightforward, and there is no clear line that can be drawn from Kennedy's inaugural address in January of 1961 to his famous speech at Rice in

⁵⁰ Edward C. Welsh, transcript of an oral history conducted May 16, 1964 by Walter D. Sohler, Addison M. Rothrock, and Eugene M. Emme, John F. Kennedy Presidential Library, 15.

September 1962. Nor is there a clear line between Kennedy's address at Rice and the moon landing in 1969. According to Sorensen, Kennedy had three objectives regarding space: demilitarization, open access, and the promotion of American scientific prestige. Critically Sorensen also points out that while all three goals could be attained by competing with and subsequently beating the Soviets, they could also be attained through cooperation.⁵¹ The problem for Kennedy was that in 1961 the Americans were behind the Soviets in space and consequently had little to offer. An astute politician and strategist, Kennedy sought flexibility so as not to show weakness or limit his options.

The spring of 1961 was a time of uncertainty and insecurity in America, particularly for Kennedy. At the time, few would have predicted that the United States would not only catch up to the Soviet Union in space but surpass them on the way to the moon. Kennedy played a large role in this. Out of this crisis he saw an opportunity, and the identification of a moonshot was a product of such study. He was also not alone in its formulation. In contrast to Eisenhower's preference for hierarchies, Kennedy preferred the organizational structure of a wheel with all the spokes leading to the president. At the centre of the wheel, Kennedy needed competent spokes-action intellectuals—to support him. Popularized by Theodore H. White in a frequently cited piece in *Life* magazine in June 1967, the moniker "action intellectual" denoted a recognizable identity that contributed enormously both to the substance and to the mystique of the Kennedy presidency. According to White, these people were "intelligent and academic but unpompous; muscularly masculine in outlook; anticommunist in foreign policy; combative; and liberally inclined in domestic policy."⁵² While the term refers to time spent in academia, the moniker

⁵¹ Sorensen, *Counselor*, 333-336.

⁵² John Dumbrell, "The Action Intellectuals," in *A Companion to John F. Kennedy*, ed. Marc Selverstone (New York: John Wiley & Sons, 2014), 133.

came to denote a certain mindset and worldview that favoured nuance on the one hand and the pursuit of world-beating change on the other. With Kennedy at the center, there were numerous “spokes” who radiated out from the center and played a key role in shaping policy. Defense Secretary Robert McNamara, Secretary of State Dean Rusk, National Security Advisor McGeorge Bundy, as well as speechwriters and advisors Ted Sorensen and Arthur Schlesinger Jr. all fit the profile as smart, shrewd, and self-assured bureaucrats. All of these men played key roles in Kennedy’s strategic synthesis but had relatively little input on space policy. The men Kennedy turned to on matters of space were Vice President Lyndon Johnson, NASA Administrator James Webb, Executive Secretary of the National Aeronautics and Space Council Edward Welsh, rocket scientist and NASA engineer Wernher von Braun, and Chairman of the President’s Science Advisory Committee Jerome Wiesner.

All five were part of the Kennedy generation, with Webb being the oldest and Kennedy himself the youngest. Placed in charge of the President’s Space Council, Johnson was given a major role in overseeing the administration’s space policy with Kennedy often using him as a liaison with NASA and the scientific community. After his appointment by Kennedy, Johnson immediately spearheaded the effort that recommended a moonshot as the best way to beat the Soviets in space. While he lacked the technical expertise, Johnson played a significant role in identifying competent individuals to serve in important space-related roles.⁵³ One of those individuals was James Webb, who, according to historian Douglas Brinkley profoundly understood the deep political and cultural implications of space achievement.⁵⁴ Webb played a major role not only in the fulfillment of Kennedy’s moonshot pledge, but also in the

⁵³ Douglas Brinkley, *American Moonshot: John F. Kennedy and the Great Space Race* (New York: Harper Collins, 2019), 214-215.

⁵⁴ Brinkley, *American Moonshot*, 220.

reorganization and consolidation of NASA. During Webb's administration, NASA developed from a loose collection of research centers to a coordinated organization, with establishment of the Manned Spacecraft Centre (later the Johnson Space Centre) in Houston as his crowning achievement. Meanwhile, after coming to the United States as a part of Operation Paperclip in 1945, Wernher von Braun was an optimistic and creative thinker and became one of the chief rocket engineers at NASA. As a representative of the scientific community von Braun worked hard to popularize and promote the idea of human space flight.⁵⁵ Prior to his appointment, Edward Welsh served as an advisor to Kennedy's Democratic rival for the presidential nomination Senator Stuart Symington on space-related issues. As the president's top space administrator, Welsh remained in the background yet played a key role in promulgating the "space gap" rhetoric, such as the 1960 article in *Missiles and Rockets*. While Kennedy and Johnson put people in place who were supportive of their goals, Jerome Wiesner served a check on Kennedy's space dreams. Not as concerned with the political aspects of the space race, he remained skeptical of both the feasibility and desirability of manned spaceflight, often forcing NASA to defend its decisions, budgets, programs, and projects.⁵⁶

Schlesinger Jr. commented that as a result of this "invasion of bright young men," Washington seemed "engaged in a collective effort to make itself brighter, gayer, more intellectual, more resolute;" it was a "golden interlude."⁵⁷ Kennedy's inner circle played a key role in identifying problems, offering solutions, and working out the President's strategy. What made this network function was that, for the most part, Kennedy was flexible, open to suggestions, and often relied on these individuals to not only implement policy but to serve as

⁵⁵ Wayne Biddle, *Dark Side of the Moon: Wernher von Braun, the Third Reich and the Space Race* (New York: W.W. Norton, 2012), 165.

⁵⁶ McDougall, ...*The Heavens and the Earth*, 378.

⁵⁷ Schlesinger Jr. *A Thousand Days*, 206.

active participants in the brainstorming. Despite their disagreements on means, ways, and ends, they all wanted what was best for the country. No one was content a world in which the United States played second fiddle to the Soviet Union in space, whether it be for political, scientific, or technological reasons. Furthermore, they all agreed that the United States could and should learn from its past mistakes so as to develop a stronger and more competent space strategy.

As Kennedy began to sort out his priorities in early 1961, the prestige factor associated with space achievement was well understood. The idea of a moonshot had been circulating in Washington, but no serious inquiry into its feasibility had been made. Keen on identifying an achievement to tilt the balance of soft power back in the favour of the United States, Kennedy put out some feelers. Convinced by the need for an achievement which would decisively demonstrate American space superiority, leapfrog the Soviet Union, and rescue American prestige in the wake of Gagarin and the Bay of Pigs, Kennedy tasked Johnson with overseeing the space program. In an April 20th letter to his vice president, Kennedy posed five questions: Is there a program or a project that we can beat the Soviets to? How much would something like this cost? How much time is currently being devoted to such a program? If we are focusing on large boosters, what propulsion system should we use? Are we doing all we can, and are we seeing the required results?⁵⁸ Johnson, with the input of Edward Welsh, wrote back to Kennedy on April 28. The report identified a lunar landing by 1966 or 1967 as the first dramatic space project in which the United States could beat the Soviet Union. The vice president also identified leadership as the appropriate goal of American efforts in space. He argued that

this country should be realistic and recognize that other nations, regardless of their appreciation of our idealistic values, will tend to align themselves with the country which they believe will be the world leader-

⁵⁸ John F. Kennedy, "Memorandum for Vice President," April 20, 1961, United States Capitol Visitor Centre, Exploration, The Space Race, <https://www.visitthecapitol.gov/exhibitions/artifact/memo-president-john-f-kennedy-vice-president-lyndon-johnson-april-20-1961>.

the winner in the long run. Dramatic accomplishments in space are being increasingly identified as a major indicator of world leadership.⁵⁹

Answering Kennedy's questions, Johnson concluded that "we are neither making maximum effort nor achieving results necessary if this country is to reach a position of leadership."⁶⁰ In consultation with Johnson, NASA scientist Wernher von Braun also wrote to the Vice President a day later. He claimed that the United States had an "excellent chance"⁶¹ of beating the Soviets to the first landing of a crew on the moon. However, he called for clarity in objectives and an increase in funding: "we can[not] win this race unless we take at least some measures which thus far have been considered acceptable only in times of a national emergency."⁶² Aligning means and ends to pull off a moonshot would require a massive mobilization of people, resources, and energy, as much of the infrastructure would have to be built for such a project.

On May 8, seventeen days before Kennedy addressed Congress on "urgent national needs," Webb and McNamara drafted a formal report that served as the culmination of much of the internal discussion and debate surrounding the American space program. Although there were still many questions that needed answers, the report prepared for the president outlined their joint recommendations for the national space program. While the memorandum focused mainly on technical and budgetary requirements, it also stressed the political and strategic significance of the program. It stated that

this nation needs to make a positive decision to pursue space projects aimed at enhancing national prestige. Our attainments are a major element in the international competition between the Soviet system and our own. The non-military, non-commercial, non-scientific but "civilian" projects such as lunar planetary exploration are, in this sense, part of the battle along the fluid front of the cold war. Such undertakings may

⁵⁹ Lyndon Johnson, "Evaluation of Space Program," April 28, 1961, in *Exploring the Unknown: Selected Documents in the History of the U.S. Civil Space Program, Volume VII: Human Spaceflight: Projects Mercury, Gemini, and Apollo*, ed. John Logsdon (Washington D.C.: CreateSpace Independent Publishing, 2014), 427.

⁶⁰ Johnson, "Evaluation of Space Program," April 28, 1961, in *Exploring the Unknown*, 429.

⁶¹ Wernher von Braun to the Vice President of the United States, April 29, 1961, in *Exploring the Unknown: Selected Documents in the History of the U.S. Civil Space Program, Volume VII: Human Spaceflight: Projects Mercury, Gemini, and Apollo*, ed. John Logsdon (Washington D.C.: CreateSpace Independent Publishing, 2014), 430.

⁶² von Braun to the Vice President, April 29, 1961, in *Exploring the Unknown*, 433.

affect our military strength only indirectly if at all, but they have an increasing effect upon our national posture.⁶³

Webb and McNamara go on to conclude that “[o]f all programs planned, perhaps the greatest unsurpassed prestige will accrue to the nation which first sends man to the moon and returns him to earth.”⁶⁴ The decision to go to the moon was neither spontaneous nor impulsive. In the end it was the result of a continuous back and forth between Kennedy, his spokes, the Department of Defense, NASA, and the scientific community. Despite the presence of detractors, the broad consensus that emerged was that something needed to be done to regain the initiative on behalf of the United States. It was clear that incrementally matching Soviet achievements was insufficient to generate the soft power required to demonstrate American scientific and technological primacy to the world going forward.

When Kennedy took the podium to address Congress on the nation’s space effort on May 25, 1961, NASA had yet to put an American into orbit. Kennedy was aware that the United States had accumulated only 15 minutes and 22 seconds of manned flight time in outer space. The address marked the first time Kennedy addressed the public at length on the American space effort. It was one thing to identify the moon as a goal, but another thing entirely to sell such a project to the American people. In order to secure American democracy and recover from crisis and setback, pushing the boundaries was necessary. The current pace was simply not enough. In his May 25 address to Congress, Kennedy suggested that “it is time to take longer strides - time for a great new American enterprise - time for this nation to take a clearly leading role in space achievement, which in many ways may hold the key to our future on earth.”⁶⁵ After lamenting

⁶³ James Webb and Robert McNamara, “Recommendations for our National Space Program: Changes, Policies, Goals,” May 8, 1961, *John F. Kennedy Presidential Library*, Space Activities: General, vol. I-III, 1961: April-June, 8.

⁶⁴ Webb and McNamara, “Recommendations for our National Space Program,” 25.

⁶⁵ Kennedy, “Special Message to the Congress on Urgent National Needs.”

previous shortcomings, he declared that “this nation should commit itself to achieving the goal, before this decade is out, of landing a man on the moon and returning him safely to earth.”⁶⁶

While his speech just over a year later at Rice is often remembered as the most important moon- or space-related speech, Kennedy’s address to Congress in May of 1961 also sheds significant light on American means, ways, and ends. This is where Kennedy took a stand and laid it out. He stated that “no single space project in this period will be more exciting, or more impressive, or more important for the long-range exploration of space.”⁶⁷ Such a project was not without its costs, with Kennedy continuing: “none will be so difficult or expensive to accomplish.” However, he sought to capture the sentiment of the nation, where “in a very real sense, it will not be one man going to the moon,... it will be an entire nation. For all of us must work to put him there.”⁶⁸ This was Kennedy’s vision and strategy in a nutshell. In a rhetorical sense, the Americans sought to regain the initiative: “for while we cannot guarantee that we shall one day be first, we can guarantee that any failure to make this effort will make us last.”⁶⁹ While Kennedy made his declaration, he never openly challenged the Soviets to any sort of race or competition. The door was still open for alternative courses of action, and despite the now clearly defined end, Kennedy was careful not to lock himself into a single course of action. He made this clear to the American people:

I believe we should go to the moon. But I think every citizen of this country as well as the Members of the Congress should consider the matter carefully in making their judgement, to which we have given attention over many weeks and months, because it is a heavy burden, and there is no sense in agreeing or desiring that the United States take an affirmative position in outer space, unless we are prepared to do the work and bear the burden to make it successful.⁷⁰

⁶⁶ John F. Kennedy, “Special Message to the Congress on Urgent National Needs,” transcript of remarks delivered in Washington D.C., May 25, 1961, *The American Presidency Project*, <https://www.presidency.ucsb.edu/documents/special-message-the-congress-urgent-national-needs>.

⁶⁷ Kennedy, “Special Message to the Congress on Urgent National Needs.”

⁶⁸ Kennedy, “Special Message to the Congress on Urgent National Needs.”

⁶⁹ Kennedy, “Special Message to the Congress on Urgent National Needs.”

⁷⁰ Kennedy, “Special Message to the Congress on Urgent National Needs.”

Once again, there was seen agility and flexibility in Kennedy's space strategy. He makes his ends clear, but keeps his options open so as to not tie himself to a specific course of action. This allowed him to adjust the ways and means as needed.

In June 1961, Kennedy went to Vienna to meet with Nikita Khrushchev to discuss arms control and the sensitive topic of Berlin. Despite this focus, Kennedy's speech assured the world that the American commitment to space was second to none. Publicly the Soviets feigned good wishes to the United States in its quest to the moon, and some were even secretly delighted by it. According to Brinkley, these scientists and bureaucrats theorized that a single-minded focus on the moon would distract American focus, funding, and brainpower from more practical military projects.⁷¹ At the summit, Kennedy made the error of admitting that the United States would not oppose the building of a barrier between East and West Berlin. In an interview with the *New York Times*, Kennedy admitted after the Summit a feeling of miscalculation and failure.⁷² Kennedy had been bullied by Khrushchev, and both men knew it. Speaking to Soviet officials in the aftermath of the crisis, Khrushchev asserted, "I know for certain that Kennedy doesn't have a strong background, nor, generally speaking, does he have the courage to stand up to a serious challenge."⁷³ Despite Kennedy's embarrassment in Vienna and the deteriorating situation in Berlin, the United States was by no means on the back foot. It turned out, however improbably, that Kennedy's moonshot pledge had given the United States the upper hand over the Soviet Union. If the Americans were playing defense in Berlin, they were, by contrast on the offensive in the fields of manned space reconnaissance aviation, satellites, ICBMs, and moonshots.

⁷¹ Brinkley, *American Moonshot*, 277.

⁷² Kempe, *Berlin 1961*, 256-258.

⁷³ Kempe, *Berlin 1961*, 491.

After Shephard's sub-orbital flight on May 5, it would take another ten months for NASA to orbit John Glenn, who completed three orbits on February 20, 1962 before splashing down off the coast of Florida. As the first American to orbit the earth, Glenn received a similar welcome as Gagarin had. He became so valuable to the nation as an iconic figure that Kennedy would not risk putting him back in space again. Space exploration and American success in space were now front and centre in the minds of Americans. Kennedy had a significant achievement he could point to, one that tied in with his vision of national renewal.⁷⁴ The United States was once again at a position of relative parity with Soviet Union in the realm of space achievements. As a young leader Kennedy that felt he needed to prove himself; to demonstrate that he had the necessary experience to make tough decisions. After Glenn's successful orbit, Kennedy set competition aside and revived the idea of cooperation.

On a fundamental level, the Space Race was not about technological achievement. It was about prestige, and Kennedy knew it. Cold War competition was no longer only characterized by which superpower could build the largest bomb or the most powerful rocket, but rather which power could successfully weaponize national morale and power with such potency as to wipe away all attitudes of inferiority. It was about demonstrating the vitality and virility of institutions and the ability of a state to mobilize its resources to do so. This frenetic determination paired with the charisma of Kennedy would put the United States at the forefront of scientific development and progress into the 1960s and beyond. As discussed in the next section, it was not just about catching up with the Soviets or maintaining a steady course. Maintaining and managing had led to crisis, panic, and humiliation. Learning from past failures, the United States needed something big.

⁷⁴ Jeff Shesol, *Mercury Rising: John Glenn, John Kennedy, and the New Battleground of the Cold War* (New York: W.W. Norton & Co., 2021), 320-321.

Conquering the Final Frontier

Although important before Kennedy, image and image management became a key issue during his campaign and presidency. According to historian Thomas Paterson, Kennedy's upbeat public symbols improved his chances of persuasion, permitted him to lead more effectively, and gave him power.⁷⁵ As such, Kennedy and his advisors used televised press conferences and well-crafted speeches to enhance his image and created myths to promote the man, his record, and his vision. As part of the 1960 presidential campaign, Kennedy and Nixon participated in the first televised presidential debates in American history. During these programs, Nixon had an injured leg, five o'clock shadow, and was perspiring heavily making him look tense and uncomfortable. Conversely, Kennedy wore makeup and appeared relaxed, which helped the large television audience to view him as the winner. Nearly 70 million Americans, two-thirds of the population at the time watched the first debate, the largest audience for any political event in history.⁷⁶ During his time in office Kennedy was particularly media savvy. He liked to be seen doing things, presenting himself as the face of a new era.

While it was Eisenhower who oversaw the creation of NASA in 1958, it was Kennedy who made a concerted effort to maintain strong relationship with both the organization and the prominent individuals working on projects. On September 5, 1962 the White House announced that the president would visit space facilities in Alabama, Florida, Texas, and Missouri. In Huntsville, Alabama, Kennedy inspected the development of the *Saturn* rocket. Visiting both the Marshall Space Flight Centre and Ballistic Missile Agency base, Kennedy was hosted by von

⁷⁵ Thomas G. Paterson, "Introduction: JFK's Quest for Victory and Global Crisis," in *Kennedy's Quest for Victory: American Foreign Policy, 1961-1963*, ed. Thomas G. Paterson (New York: Oxford University Press, 1989), 4.

⁷⁶ Gary Donaldson, *The First Modern Campaign: Kennedy, Nixon, and the Election of 1960* (Lanham: Rowman & Littlefield, 2007), 110-111.

Braun. When posing for photos together, Brinkley comments that the two “looked like doppelgängers cut from the same cloth.” As von Braun used models to brief Kennedy, the president made a conscious effort to position himself at the best angle to allow photographers to capture both him and the giant rocket behind him.⁷⁷ After meeting with Mercury astronauts Gordon Cooper and Gus Grissom at Cape Canaveral, Kennedy left for Houston to view the new Manned Spacecraft Centre. He was escorted by Mercury astronauts Scott Carpenter and John Glenn, and shown models of the Gemini and Apollo spacecraft. Kennedy also viewed *Friendship 7*, the Mercury spacecraft in which Glenn had made America’s first orbital flight. For Kennedy, and indeed for the public at home, American achievement in space was all becoming tangible: the various rockets, re-entry vehicles, laboratories, research centers, command centers, and institutions that were appearing around the country were physical manifestations of American progress. All of this served to support the president’s promises about American pre-eminence in science, technology, space.

The next day, on September 12, Kennedy headed to Rice University to deliver his now famous address ‘On the Nation’s Space Effort.’ The speech was drafted primarily by Sorensen, with important contributions from various NASA advisors. At Rice Kennedy would tie his patriotic belief in American exceptionalism directly to his prioritization of the manned space effort:

Surely the opening vistas of space promise high costs and hardships, as well as high reward So it’s not surprising that some would have us stay where we are a little longer to rest, to wait. But this city of Houston, this state of Texas, this country of the United States, were not built by those who waited and rested and wished to look behind them. This country was conquered by those who moved forward—and so will space.⁷⁸

⁷⁷ Brinkley, *American Moonshot*, 353.

⁷⁸ John F. Kennedy, “Address at Rice University in Houston on the Nation’s Space Effort,” transcript of remarks delivered in Houston, September 12, 1962, *The American Presidency Project*, <https://www.presidency.ucsb.edu/documents/address-rice-university-houston-the-nations-space-effort>.

He openly acknowledged previous shortcomings, stating that “we have had our failures, but so have others, even if they do not admit them.”⁷⁹ Referring to the gap between the United States and the Soviet Union, Kennedy admitted that “we are behind, and will be behind for some time in manned flight.” As with all of his speeches, there was still a sense of hope and optimism: “but we do not intend to stay behind, and in this decade we shall make up and move ahead.”⁸⁰ He infused the speech with a sense of urgency and destiny, and emphasized the freedom enjoyed by Americans to choose their destiny rather than have it chosen for them. At Rice, he laid out a clear goal:

Those who came before us made certain that this country rode the first waves of the industrial revolutions, the first waves of modern invention, and the first wave of nuclear power, and this generation does not intend to founder in the backwash of the coming age of space. We mean to be a part of it—we mean to lead it. For the eyes of the world no look into space, to the moon and to the planets beyond, and we have vowed that we shall not see it governed by a hostile flag of conquest, but by a banner of freedom and peace.⁸¹

Knowing that his May 25th address to Congress the year before had been very buttoned down, Kennedy went all in with his speech at Rice, filling it with the same soaring rhetoric that characterized his inaugural address.

According to political scientist John Jordan, Kennedy’s speech used three strategies: a characterization of space as a beckoning frontier; an articulation of time that locates the endeavor within a historical moment of urgency and plausibility; and a final, cumulative strategy that invites audience members to live up to their pioneering heritage by going to the Moon.⁸² A key component of Kennedy’s strategy was to make an American moonshot, and by extension reversing the trend of Soviet firsts, tangible to the widest possible audience. In order to do this, Kennedy expanded his New Frontier rhetoric to establish space as a reachable and fruitful

⁷⁹ Kennedy, “Address at Rice University.”

⁸⁰ Kennedy, “Address at Rice University.”

⁸¹ Kennedy, “Address at Rice University.”

⁸² John W. Jordan, “Kennedy’s Romantic Moon and Its Rhetorical Legacy for Space Exploration” *Rhetoric and Public Affairs* 6, vol. 2 (Summer 2003), 214.

destination. His rhetoric evoked the same spirit as Frederick Jackson Turner's 1893 Frontier Thesis. Turner argued that in order to erode old and dysfunctional customs, the United States the United States needed to conquer new frontiers. His thesis was paired with a Social Darwinist framework that suggested the best societies must compete in order to come out on top, and that the United States had a mission ordained by God to push the boundaries.⁸³ The heart and soul of the Rice speech connected NASA to both America's frontier tradition and the concept of American exceptionalism. Pride, prestige, and national defense were major factors, and beating the Soviets was a geopolitical imperative, but according to Kennedy, the United States could not and should not be defined by its adversary. Instead, going to the moon presented the grand historic challenge of an unexplored frontier, and it was the noblest illustration of the American pioneer spirit in the twentieth century. Addressing the criticism that still lingered around the moonshot proposal, Kennedy delivered one of his most timeless lines:

But why, some say, the moon? Why choose this as our goal? And they may well as why climb the highest mountain. Why 35 years ago, fly the Atlantic? Why does Rice play Texas? We choose to go to the moon. We choose to go to the moon in this decade and do the other things, not because they are easy, but because they are hard. Because that goal will serve to organize and measure the best of our energies and skills, because that challenge is one that we are willing to accept, one we are unwilling to postpone, and one which we intent to win.⁸⁴

At its core, antifragility involves using and transcending crises, setbacks, and hardship to become stronger. By committing to such a massive project, the United States would not only send a message to its adversaries, but would also get stronger internally. The immense power conversion required would transform the country and establish the United States at the forefront of scientific and technological achievement.

Just as space momentum was accelerating, Kennedy was about to face the biggest test of his administration. As early as August 1962, the US suspected the Soviets of building missile

⁸³ Herring, *From Colony to Superpower*, 301.

⁸⁴ Kennedy, "Address at Rice University."

facilities in Cuba. A U-2 flight on October 14 provided the first photographic evidence of the missiles. The next morning, Bundy met with Kennedy and briefed him on the CIA's analysis of the images. Kennedy and his action intellectuals now had to make a decision as to how to respond. Shortly before he addressed the nation, Kennedy conferred with Eisenhower. The two anticipated that Khrushchev would respond to the West in a similar manner to his response during the Suez Crisis, and would possibly end up making concessions in Europe. On October 22 Kennedy delivered a nationwide televised address on all the major networks announcing the discovery of the missiles. He faced a dilemma: if the United States took steps to remove the missiles, they could risk war. If he did nothing, Kennedy would appear weak. Throughout the crisis Kennedy stood firm, yet in the end showed flexibility and agility. He would not be bullied as he had been in Vienna. The missiles in Cuba were removed, but not without American concessions: the United States publicly pledged not to invade Cuba again and quietly removed American missiles from Turkey. The Cuban Missile Crisis has been well documented⁸⁵ and this paper does not cover all of the nuances. There are still ongoing debates regarding Kennedy's leadership during the Cuban Missile Crisis and what it meant for his presidency. Many historians point to the October crisis as Kennedy's finest hour, while others fault the Kennedy administration for precipitating the crisis with its efforts to remove Castro.⁸⁶ Overall, the Cuban Missile Crisis demonstrated not only Kennedy's agility, but also his ability to learn. Kennedy acquiesced in Berlin, and because it showed American weakness, he is more keen to stand firm with Cuba. According to Richard Reeves, the crisis improved the image of American willpower

⁸⁵ See Aleksandr Fursenko and Timothy Naftali, *"One Hell of a Gamble": The Secret History of the Cuban Missile Crisis* (1998), Michael Dobbs, *One Minute to Midnight: Kennedy, Khrushchev, and Castro on the Brink of Nuclear War* (2008), Theodore Voorhees, *The Silent Guns of Two Octobers: Kennedy and Khrushchev Play the Double Game* (2020), and Sheldon Stern, *The Week the World Stood Still: Inside the Secret Cuban Missile Crisis* (2005)

⁸⁶ Herring, *From Colony to Superpower*, 722-723.

and the president's credibility. Kennedy's approval rating increased from 66% to 77% in the wake of the crisis.⁸⁷ Kennedy emerged from the crisis triumphant, yet humbled. Aware of the potential for events to spiral out of control, Kennedy demonstrated that he was pragmatic with a quick mind.

Perhaps the clearest insight into Kennedy's moon strategy can be found in a recorded meeting at the White House on November 21, 1962. The main participants were Kennedy and Webb. At issue was the purpose of NASA and the Apollo program, with Kennedy asking Webb at the outset if he thought that the moon program was the top priority of the agency. In hindsight, Webb's answer was surprising:

No sir, I do not. I think it is one of the top priority programs, but I think it is very important to recognize here, that as you have found out what you could do with a rocket, as you find out how you could get beyond the Earth's atmosphere and into space to make measurements, several scientific disciplines that are very powerful have [begun] to converge on this area.⁸⁸

Kennedy responds by stating that Apollo should be the top priority: "This is important for political reasons, for international political reasons." He told Webb he did not want to finish second to the Soviet Union in the race to the moon. Later in the conversation, Webb mentioned that scientists had doubts about the importance and viability of the moon project. These people that were "going to furnish the brain work," as Webb called them, thought the highest priority was to "understand the environment and the areas of the laws of nature that operate out there." In other words, the scientists wanted to do science. Kennedy had other priorities. Science was nice, but only when it applied directly to the Apollo program. Webb argued further, suggesting that the overall goal of the program should be tied to pre-eminence in space, including space science. Kennedy dismissed him, stating that "you can't because by God we keep—we've been telling

⁸⁷ Reeves, *President Kennedy*, 178.

⁸⁸ James Webb, "Supplemental Appropriations for the National Aeronautics and Space Administration (NASA)," transcript of Presidential Meeting in the Cabinet Room of the White House, November 21, 1962. <https://history.nasa.gov/JFK-Webbconv/pages/transcript.pdf>.

everybody we're preeminent in space for five years and nobody believes us because [the Soviets] have the booster and the satellite.”⁸⁹ Kennedy knew that the success of the Apollo program was linked directly to the national interests of the country, and he made sure that everyone knew that. The best way to come from behind was not just to catch up, but to overtake.

As the new year began, space faded into the background temporarily as Kennedy shifted his focus to other foreign and domestic issues in late 1962 and early 1963. Following the events of the previous October, Kennedy believed that a reduction in superpower tensions was necessary. The events surrounding Cuba had almost led to nuclear war, and by the spring of 1963, Kennedy returned to cooperation. He believed that there was a possibility for some kind of new movement in American-Soviet relations; one that was based on the pursuit of mutual interests. In his commencement address at American University on June 10, 1963, the president called on the Soviet Union to work with the United States to achieve a nuclear test ban treaty and help reduce tensions. He announced a new round of high-level arms negotiations with the Soviets, and boldly called for an end to the Cold War.⁹⁰ A Washington-Moscow ‘hotline’ was established ten days later to facilitate this discourse and serve as a direct connection in times of crisis. On August 5, 1963 the United States and the Soviet Union signed the Limited Test Ban Treaty which banned nuclear tests in the atmosphere, under water, and in outer space. To cap off the summer, Kennedy addressed the United Nations on September 20, 1963. Citing the success of his nuclear agenda, Kennedy famously proposed joint Soviet-American moon exploration:

In a field where the United States and the Soviet Union have a special capacity in the field of space, there is room for new cooperation, for further joint efforts in the regulation and exploration of space. I include among these possibilities a joint expedition to the moon. ... Why should man's first flight to the moon be a

⁸⁹ John F. Kennedy, “Supplemental Appropriations for the National Aeronautics and Space Administration (NASA),” transcript of Presidential Meeting in the Cabinet Room of the White House, November 21, 1962. <https://history.nasa.gov/JFK-Webbconv/pages/transcript.pdf>.

⁹⁰ John F. Kennedy, “Commencement Address at American University in Washington,” transcript of speech delivered in Washington D.C., June 10, 1963, *The American Presidency Project*, <https://www.presidency.ucsb.edu/documents/commencement-address-american-university-washington>.

matter of national competition? Why should the United States and the Soviet Union, in preparing for such expedition, become involved in immense duplications of research, construction and expenditure? Surely we should explore whether the scientists and astronauts of our two countries—indeed of all the world—cannot work together in the conquest of space, sending some day in this decade to the moon not the representatives of a single nation, but the representatives of all our countries.⁹¹

Kennedy's bold proposal reflected the sentiment expressed in his speech at American University just three months prior where he indicated that a reduction in superpower tensions was feasible. The steps taken by Kennedy, the United States, and the Soviet Union in the spring and summer of 1963 never intended to end the Cold War, yet they are indicative of a shift in the balance of power. The fact that Kennedy proposed such an endeavour serves a testament to how far the United States had come since *Sputnik*. At the UN pulpit Kennedy spoke from a position of strength and vitality, and Khrushchev's pithy rejection of the proposal, to a certain degree, indicated just how far the balance of power had shifted.

By the time Kennedy went to Dallas in November 1963, the United States was beginning to settle into the Space Race. Following the success of the Mercury Program, Project Gemini sent sixteen astronauts into orbit over ten missions to test endurance and space travel techniques in preparation for the moon landing. The Apollo program was underway, however progress did not result in an immediate overtaking of the Soviets, and the Russians would continue to achieve significant firsts well into the 1960s: Valentina Tereshkova became the first woman in space on June 16, 1963 and Alexei Leonov completed the first Spacewalk on March 18, 1965. While propaganda victories, nonetheless, they no longer had the same resonance on American strategy and policy as *Sputnik* or Yuri Gagarin. As president, Kennedy sought to drive forward, push the boundaries, do bold new things at a confluence of time and opportunity, and to immanentize the return of American strategic initiative in space. Moving forward undeterred was the key. There

⁹¹ John F. Kennedy, "Address at the 18th U.N. General Assembly," transcript of remarks delivered in New York City, September 20, 1963, *John F. Kennedy Presidential Library*, <https://www.jfklibrary.org/asset-viewer/archives/JFKPOF/046/JFKPOF-046-041>, 20-22.

would be no more *Sputnik* shocks, or if there were, they would no longer result in mass hysterics and frenetic naval gazing. Kennedy set the United States on a firm trajectory, and for better or worse, the moonshot was now the United States' to make, especially in the months and years following the president's assassination in Dallas. For Kennedy and his action intellectuals the time was now to take longer strides. Crisis was not the time to retreat, but a time to learn, transcend, and push to become stronger. In his final State of the Union Address Kennedy stated that

in short, both at home and abroad, there may now be a temptation to relax. For the road has been long, the burden heavy, and the pace consistently urgent. But we cannot be satisfied to rest here. This is the side of the hill, not the top. The mere absence of war is not peace. The mere absence of recession is not growth. We have made a beginning—but we have only begun. Now the time has come to make the most of our gains—to translate the renewal of our national strength into the achievement of our national purpose.⁹²

The only way was up—literally and figuratively. Kennedy set the mood not only for the rest of the decade, but indeed the rest of the Cold War. The United States would continue to transcend crises in the name of achievement and excellence, both throughout the Cold War and beyond.

Conclusions – The Antifragility of Apollo

It is easy to attribute the renewal of American vitality to the personal brilliance of Kennedy. Certainly, numerous writers have, especially those who worked closely with him. Likewise, it is easy to criticize a man and amplify his personal shortcomings. What matters here is not the innate brilliance of one person but how each of these actors perceived and responded to structural forces. Despite the differences between Eisenhower and his young successor, there was much more continuity between the two than their respective supporters would like to admit. Kennedy certainly had doubts about the clichés of the Cold War, but as Thomas Paterson points

⁹² John F. Kennedy, “Annual Message to Congress on the State of the Union,” transcript of speech delivered in Washington D.C., January 14, 1963, *The American Presidency Project*, <https://www.presidency.ucsb.edu/documents/annual-message-the-congress-the-state-the-union-3>.

out, he never really shed them.⁹³ Despite the rhetoric of bold new thinking and the upending of the old, Kennedy and his advisors never fundamentally reassessed the ends of American Cold War strategy. Rather than tear down and build anew his administration built on and refined the systems and institutions created by his predecessor. In the end, he was able to foster and exercise the three traits of an antifragile state in the pursuit of American space primacy.

Constantly revising his options, Kennedy was agile. Throughout his administration, Kennedy went back and forth between cooperation and competition in space. In periods of relative parity or American advantage, Kennedy toned down the harsh rhetoric of competition in favour of peaceful coexistence. This can be seen in the period following the John Glenn flight as well as in the aftermath of the Cuban Missile Crisis, and especially throughout much of 1963 when he proposed international treaties and joint ventures. However, when the United States was on the back foot, Cold War competition was the order of the day. This is most evident following the harsh week in April 1961 that included the failed Bay of Pigs Invasion paired with Gagarin's flight. Looking to renew himself and his country in the wake of crisis, Kennedy planned big projects with the goal of pushing the bounds and catching up. At the core of state agility is the ability to think, understand, and maneuver quickly with ease. Kennedy's space policy certainly reflected this, as he never tied himself to a specific course of action thus reducing the potential for derailment.

The overall progression and refinement of the American space program between 1960 and 1969 is best understood through effective power conversion. As mentioned above, this involves both hard and soft power. The Space Race created a vast network of research and development facilities across the country, with technological and scientific achievements

⁹³ Paterson, "Introduction," in *Kennedy's Quest for Victory*, 22.

following suit. Apart from the space-specific facilities, an entire infrastructure was built to support it, staffed by hundreds of thousands of individuals. At the height of the Apollo program, there were 375,000 people working on it. The range of skills required was much broader than any single company could provide, and the chance of success was be maximized by bringing together the very best minds from the top companies in the country. Instead of dispensing the entire Apollo project to a single contractor, the administration spread the financial allocations among hundreds of companies. According to Brinkley, encouraging diversity among contractors made it possible for NASA to acquire billion worth of exotic new hardware and specialized features without overrunning the initial cost estimates and without even the slightest hint of any procurement scandal in that vast empire.⁹⁴

The achievements made under Kennedy and his successors also required a significant investment in soft power. As a man who spent a lot of time curating his image, Kennedy invested countless resources curating the image of his country. He wanted the United States to serve as a symbol of achievement and inspiration to those around the world. Keen on winning the hearts and minds of those in new nations, American pre-eminence and success in space was linked directly to the endurance of American ideals and values around the world. Through the successful mobilization of men and material, the Kennedy administration generated significant increases in soft and hard power, thus demonstrating the ability to convert resources and power into tangible action.

Before his time in office and indeed throughout his presidency Kennedy was constantly learning. Even before he was elected president in 1960, Kennedy was able to shape public opinion and identify not only where the United States was lagging behind the Soviet Union, but

⁹⁴ Brinkley, *American Moonshot*, 336.

also how the country could and should move forward. After the failure of the Bay of Pigs Invasion, Gagarin's flight, and his lackluster performance at the Vienna Summit, Kennedy believed that another failure on the part of the United States to gain control of the strategic initiative would fatally damage both his and indeed America's credibility. He was thus determined to draw a line in the sand and prevent further communist gains. Perhaps the most critical aspect of antifragility is that the ability to learn is closely tied in with agility and power conversion. In order to learn in the wake of crisis or defeat, leaders have to be able to adapt and overcome. This requires skills to shift national means, ways, and/or ends in order to effectively use human and material resources to pursue this change. In certain respects, Eisenhower held the line and ensured that the United States did not lose any more ground. But Kennedy's contribution—the desire to pursue a moonshot—was transformative. In order to regain the initiative from the Soviet Union Kennedy and his action intellectuals came to the conclusion that it was necessary to do something big. Incremental achievements were nice, but they did little to win the prestige necessary to counter Soviet firsts. Previous crises not only highlighted holes in American strategy, but also served to strengthen American resolve. The Soviet Union would continue to achieve firsts in space, but having set course for the moon, there would be no more frenzy or anxiety over the lack of American inferiority. The president and his action intellectuals successfully achieved antifragility.

Conclusions

State Antifragility in Perspective

On November 22, 1963 Kennedy's term in office was cut short. A week later, the existing Launch Operations Centre on Merritt Island, Florida was renamed the Kennedy Space Center by President Lyndon B. Johnson on November 29, 1963. The system Kennedy refined to put a man on the moon carried on under the leadership of Johnson. Under Johnson, the Gemini program continued. Gemini's objective was the development of space travel techniques to support the Apollo program. Success with Gemini allowed the United States to catch up and take the lead in human spaceflight capability that the Soviet Union had obtained in the early years of the Space Race. Gemini demonstrated mission endurance up to just under fourteen days (longer than the eight days required for a round trip to the moon), methods of performing extra-vehicular activity without tiring, and the orbital maneuvers necessary to achieve rendezvous and docking with another space craft. This left Apollo free to pursue its prime mission without spending time developing these techniques. Although it began in 1961, the first Apollo crewed flight would not happen until 1968. In a twist of fate, it would be under the leadership of Kennedy's 1960 electoral opponent Richard Nixon that Apollo 11 would take Americans to the surface of the moon in the summer of 1969. Apart from two failures (Apollo 1 and 13), the program took 24 American astronauts on the moon between 1969 and 1972. After the Apollo program, détente between the United States and the Soviet Union led to a 1972 agreement on a cooperative Apollo-Soyuz Test Project, which culminated in a 1975 rendezvous in orbit between American astronauts and Soviet cosmonauts. The Space Race was over as a competition and would be replaced by cooperation throughout the 1980s and beyond. The collapse of the Soviet Union

eventually allowed the United States and Russia to agree on the Shuttle-*Mir* and the International Space Station Programs in the early 1990s.

Considering these developments, what then do we make of the twelve-year period of competition between *Sputnik* and the Moon Landing? In late 1963, John F. Kennedy stood at the helm of the greatest power the world had ever seen; a booming American nation that he had steered through some of the most perilous diplomatic standoffs of the Cold War. While significant progress was made under the Johnson and Nixon administrations, it was Eisenhower who laid the framework and Kennedy who set it in motion. The former General was elected in 1952 as an experienced national security godfather who was going to come in and stabilize the Cold War. However, his hierarchic leadership was challenged with *Sputnik*, to such an extent that he was no longer able to sustain the vision he promised. Between *Sputnik* in 1957 and Kennedy's inauguration in 1961, the United States failed to gain the strategic initiative in space. That is not to say that Eisenhower did nothing. Before *Sputnik*, he sought to prevent more crises from happening rather than building a system that could withstand them. In the aftermath, Eisenhower and his administration learned from the crisis, quickly moving to found NASA, ARPA, and pass the NDEA. These moves were not designed to solve the problem immediately, but instead to serve as long-term corrections that would enhance the American ability to compete in science and technology long-term. While Eisenhower took these important steps to bring the United States up to speed, he was limited by his personal perspectives on the relationship between the state, the economy, and the defense industry. It took a young senator from Massachusetts to carry on building antifragility. Kennedy had an affirmative vision for the future of the country: a vision of what we can be tomorrow. He was not one of those Cold Warriors fighting World War II talking about how great things used to be. The Kennedy administration

introduced a new vigour to the Space Race and indeed the presidency maintaining agility and flexibility in his security and space policy. Through his charisma, rhetoric, and conviction, Kennedy set in motion the mobilization of American science and society to enhance the country's soft power. Overall, both presidents did not let crisis fundamentally derail American strategy, and instead used setbacks, stressors, and shortcomings to improve the United States' ability to deal with Cold War competition at an institutional and systems level.

So what does this saga reveal about antifragility and strategy? First, it is clear that agility and flexibility are key when it comes to policy making and strategic synthesis. With a rigid, fixed, or single-minded strategy, crisis tends to cripple and immobilize rather than stimulate and galvanize. Consider Germany's strategy in World War I. German planners were convinced that the war would be a quick victory, committing large numbers of troops to the Schlieffen Plan in July 1914. The plan was to quickly knock out France, and then transfer troops across the country to deal with Russia. The offensive in France stalled and subsequently trapped Germany in a protracted war. Years of trench warfare saw Germany suffer enormous losses in both men and material, not to mention the severe damage done to the country's image and reputation. Unable to recognize or match the change in Allied strategy as the war went on, the offensive war turned into a defensive war. By November 1918, Germany sued for a humiliating peace in order to avoid being invaded. Had Germany policy makers employed more flexibility and agility in their strategy, they might have been able to recognize a quick victory was not possible and shift tactics, operations, and strategy accordingly. Sticking to their assumptions, Germany policy makers hindered their country's ability to effectively convert the state's resources into tangible action during a time of crisis. Going back to Taleb and Treverton's signs of fragility, Germany on the eve of war had a centralized political and military decision-making system, no political

variability, and a single-factor economy based almost entirely around the military. Four years of war only served to exacerbate these factors and lead to internal instability throughout the 1920s. To avoid this, On the one hand, leaders must have the ability to pursue a variety of options in response to any particular situation. On the other, the system must be open to critique, change, and alteration in order for new and better means, ways, and ends to shape strategy. Taken together, both of these factors allow a state to respond quickly to crisis without experiencing significant internal fragmentation or disintegration.

Power conversion remains a key aspect of a state's strategy. This concerns a state's ability to use its resources to do stuff, in this case surrounding a crisis. What this looks like depends on both the nature and magnitude of the event. At an individual level, leadership is very idiosyncratic. What might work for one leader might not work for another; and different leadership styles produce different results, even if they are pursuing similar ends. Power conversion is predicated on accurate perception, both of one's means and of one's ends. With so much information out there, especially in the age of the internet, making sense of the world is getting harder than ever. The media and public often play a key role in this process, whether it be downplaying significance or egging on a moral panic. During times of uncertainty and crisis, it is the leader's responsibility to not only set policy, but to maintain control of the narrative. We can see this with the Space Race and the mobilization of science and society. We can also see this with ongoing crises such as COVID-19. Over the last two years, the pandemic has revealed the importance of prudent decision making and power conversion. Whether it be in the implementation of lockdowns, the creation of a viable vaccine in record time, or the control of misinformation, the ability of a leader to effectively utilize resources at hand to produce tangible action is key to weathering and withstanding crisis. With science and technology, this tangible

action is not always felt immediately. Often this involves investment, both in terms of manpower and money in the present to produce results in the future. In order to mitigate and/or survive the potentially catastrophic effects of climate change, investment in infrastructure must be made now. A society grows great when old men plant trees in whose shade they will never sit. While not every nation can match the level of power achieved by the United States during the twentieth century, the principle holds. A state that cannot effectively use its resources to produce relative power, whether hard, soft, or sharp will lose its ability to maintain a competitive edge, and thus fail to achieve both long-term strategic viability and antifragility.

The story of the Space Race also demonstrates the impact a significant crisis can have on a seemingly stagnant system. Technology and the desire compete with technology continues to be a key aspect of international relations, whether in relation to the peaceful progression of science and technology or the not-so-peaceful development of new weapons. In order to survive crisis, a state, or at the very least the civil servants, bureaucrats, and politicians that serve it must “learn.” While learning from past crises is a key feature of antifragility, the maintenance of an antifragile system involves much more agency when it comes to preparing for future shocks, stressors, and crises. This process involves active study of the past, acute awareness of the present, and ardent anticipation of the future. Active study of the past provides information, whether it be on crisis management or leadership strategies. Within an antifragile system, the past (recent or otherwise) will feature in a leader’s policy. History demonstrates that invading Russia in the winter is not a very effective strategy, and this history should be taken into consideration by any agent or actor considering such a move. Awareness of the present means awareness of the context in which strategy is made both with respect to state in question and the world around them. Since the collapse of the Soviet Union, the United States has enjoyed a

significant advantage in the realm of military technology, and to a certain extent, continues to do so. That being said, American competitors, especially China have been catching up fast. Consider China's surprise launch of a hypersonic ICBM on October 18, 2021. The way the United States should compete with the Chinese is not by building more than them, but by out-innovating them and taking the initiative. Anticipation of the future is key for the maintenance of antifragility. The further a state can reach out towards the future and be on the cutting edge of technology, the more likely they will be able to meet the challenges that remain unseen. ARPA, now rebranded as DARPA, continues to serve this purpose. As demonstrated in the Space Race, gaining the initiative allows one to set the pace in the realm of technological and institutional development.

What then, can we say about the usefulness of antifragility as a concept in the social sciences? First, it is clear that more work needs to be done in identifying antifragility's role in political systems. Further application of the concept is necessary to determine its long-term usefulness as a necessary or viable factor of analysis. Second, the definition of antifragility as it pertains to political and social systems needs more clarification. Is learning the only variable that separates the resilient from the antifragile, or is there more? There is not enough space in this thesis to answer this question, but in order to delineate antifragility as a concept, further inquiry is required. The goal of this study has been to simply demonstrate that antifragility exists and can be studied through the social sciences. Until more is done do transfer the concept across time and space within the social sciences, identifying how such a system can be built and maintained is an important step.

When people look back on the past, they tend to compress time because they skip between major events, often forgetting the months and days in between. Almost twelve years

passed between *Sputnik* and the moon landing. In its entirety, the Space Race lasted eighteen years between *Sputnik* and the Apollo-Soyuz Test Project. At the institutional level, it was the American combination of science and technology with democratic ideals that produces an antifragile system. That system is once again being put to the test as a new chapter of space exploration begins. The narrative continues, with both familiar and new faces. The United States and its allies continue to lead the way, both in the public and now private sector. Elon Musk's SpaceX is leading the way with Jeff Bezos' *Blue Horizon* and Richard Branson's *Virgin Galactic* commercial spaceflight projects following close behind. China has successfully launched dozens of satellites, made three successful moon landings, and began construction on its own Tiangong space station. To a lesser extent, Russia remains a key player in space along with other European and Asian countries. Will another Space Race emerge, in which the pride and prestige of nations is linked to their achievements in space? Or will private companies take up the torch and lead the way? While it is uncertain what the future may hold for the latest generation of astronauts, scientists, and engineers working on these projects, the state and those who lead it will continue to play a key role. The longevity of this connection in the United States is a testament to the foundation built by the Eisenhower and Kennedy administrations. As masters of controlled chaos, they successfully built an antifragile space strategy paving the way for generations of American success.

Bibliography

“A Report to the National Security Council by the Executive Secretary on Basic National Security Policy.” October 30, 1953. *Foreign Relations of the United States (FRUS), 1952-1954, National Security Affairs, Volume II, Part I*.

https://history.state.gov/historicaldocuments/frus1952-54v02p1/pg_578.

“About DARPA.” *Defense Advanced Research Projects Agency*, Accessed February 15, 2022.

<https://www.darpa.mil/about-us/about-darpa>.

Adams, Douglas. *The Salmon of Doubt: Hitchhiking the Galaxy One Last Time*. New York: Pocket Books, 2002.

“An Open Letter to Richard Nixon and John Kennedy,” *Missiles and Rockets*, VII (Oct. 3, 1960), 10-11; John F. Kennedy, “If the Soviets Control Space They Can Control Earth,” *Missiles and Rockets*, VII (Oct. 10, 1960), 12-13. Cf. a similar set of questions and answers in *Western Aviation, Missile and Space Industries* (Nov. 1960). See also Edward C. Welsh, interview, Washington, Sept. 1, 1965.

Biddle, Wayne. *Dark Side of the Moon: Wernher von Braun, the Third Reich and the Space Race*. New York: W.W. Norton, 2012.

Brands, H.W. “The Age of Vulnerability: Eisenhower and the National Insecurity State.” *American Historical Review* vol. 94, no. 4 (1989), 963-989.

Brinkley, Douglas. *American Moonshot: John F. Kennedy and the Great Space Race*. New York: Harper Collins, 2019.

Cadbury, Deborah. *Space Race: The Epic Battle Between America and the Soviet Union for Dominance in Space*. New York: Harper Collins, 2006.

Central Intelligence Agency. “NSC Briefing: Soviet Earth Satellite Capabilities,” January 24, 1956. *Intelligence Warning of the 1957 Launch of Sputnik*. Central Intelligence Agency.

<https://www.cia.gov/library/readingroom/document/0003192764>

Cox, Lori and Diane J. Heith. *In the Public Domain: Presidents and the Challenges of Public Leadership*. New York: State University of New York Press, 2005.

Craig, Campbell, and Fredrik Logevall. *America’s Cold War: The Politics of Insecurity*. Cambridge, Mass.: Belknap Press of Harvard University Press, 2009.

“Deterrence and Survival in the Nuclear Age.” Washington D.C.: Government Printing Office, November 7, 1957.

Diamond, Jared. *Guns, Germs, and Steel: The Fates of Human Societies*. New York: W.W. Norton, 1997.

Director of Central Intelligence. “Special National Intelligence Estimate Number 11-10-57.” November 2, 1957, *National Intelligence Council (NIC) Collection*. Central Intelligence Agency. Accessed March 19, 2022. <https://www.cia.gov/readingroom/document/0000267695>.

Divine, Robert A. *The Sputnik Challenge: Eisenhower’s Response to the Soviet Satellite*. New York: Oxford University Press, 1993.

Donaldson, Gary. *The First Modern Campaign: Kennedy, Nixon, and the Election of 1960*. Lanham: Rowman & Littlefield, 2007.

Dulles, Allen W. to Charles Wilson. January 29, 1955. *Intelligence Warning of the 1957 Launch of Sputnik*. Central Intelligence Agency. 1. Accessed February 9, 2022. <https://www.cia.gov/library/readingroom/document/0006513734>.

“Dwight D. Eisenhower Public Approval.” April 19, 1956 to August 3, 1956. *The American Presidency Project*. <https://www.presidency.ucsb.edu/statistics/data/dwight-d-eisenhower-public-approval>.

Edwards, George C. *The Strategic President: Persuasion and Opportunity in Presidential Leadership*. Princeton, Princeton University Press, 2009.

Edwards, George C. and Stephen J. Wayne, *Presidential Leadership: Politics and Policy Making*. New York. St. Martin’s Press, 1985.

Eisenhower, David and Julie Nixon Eisenhower. *Going Home to Glory: A Memoir of Life with Dwight D. Eisenhower*. New York: Simon & Schuster, 2011.

Eisenhower, Dwight D. “Address Accepting the Presidential Nomination at the Republican National Convention.” Transcript of speech delivered in Chicago, July 11, 1952. *The American Presidency Project*. <https://www.presidency.ucsb.edu/documents/address-accepting-the-presidential-nomination-the-republican-national-convention-chicago-0>.

Eisenhower, Dwight. D. “Address Delivered Before the American Society of Newspaper Editors.” Transcript of speech delivered in Washington D.C., April 16, 1953. *The American Presidency Project*. <https://www.presidency.ucsb.edu/documents/address-the-chance-for-peace-delivered-before-the-american-society-newspaper-editors>.

Eisenhower, Dwight D. “Annual Message to Congress on the State of the Union,” transcript of remarks delivered in Washington D.C., January 10, 1957. *Dwight D. Eisenhower Presidential Library*. https://www.eisenhowerlibrary.gov/sites/default/files/file/1957_state_of_the_union.pdf.

Eisenhower, Dwight D. “Annual Message to Congress on the State of the Union.” Transcript of speech delivered in Washington D.C., January 9, 1958. *The American Presidency Project*.

<https://www.presidency.ucsb.edu/documents/annual-message-the-congress-the-state-the-union-10>.

Eisenhower, Dwight D. "Farewell Radio and Television Address to the American People." transcript of speech delivered in Washington D.C., January 17, 1961. *The American Presidency Project*. <https://www.presidency.ucsb.edu/documents/farewell-radio-and-television-address-the-american-people>.

Eisenhower, Dwight D. "Inaugural Address." Transcript of speech delivered in Washington D.C., January 20, 1953. *The American Presidency Project*. <https://www.presidency.ucsb.edu/documents/inaugural-address-3>.

Eisenhower, Dwight D. "Statement by the President Upon Signing the National Defense Education Act." Transcript of remarks delivered in Newport R.I, September 2, 1958. *The American Presidency Project*. <https://www.presidency.ucsb.edu/documents/statement-the-president-upon-signing-the-national-defense-education-act>.

Eisenhower, Dwight D. "The President's News Conference." transcript of remarks delivered in Washington D.C., October 9, 1957. *The American Presidency Project*. <https://www.presidency.ucsb.edu/documents/the-presidents-news-conference-308>.
Erickson, Mark. *Into the Unknown Together: The DOD, NASA, and Early Spaceflight*. Maxwell: Air University Press, 2005.

Farnsworth, Stephen J. *Spinner in Chief: How Presidents Sell their Policies and Themselves*. New York, Routledge, 2015.

Frank, Jeffrey. *Ike and Dick: Portrait of a Strange Political Marriage*. New York: Simon & Schuster, 2013.

Gaddis, John Lewis. *Strategies of Containment: A Critical Appraisal of Postwar American National Security Policy, Revised and Expanded Edition*. New York: Oxford University Press, 2005.

Gallup, George. "Kennedy In Same Spot as Previous Candidates." *The Hartford Daily Courant*, May 27, 1960.

Greenstein, Fred I. *The Presidential Difference* 3rd Edition. Princeton: Princeton University Press, 2009.

Hargrove, Erwin C. *The Effective Presidency: Lessons on Leadership from John F. Kennedy to Barack Obama*. New York: Routledge, 2015.

Hitchcock, William. *The Age of Eisenhower: America and the World in the 1950s* (New York: Simon & Schuster, 2018), 310-311.

Jervis, Robert. *Perceptions and Misperceptions in International Politics*. Princeton: Princeton University Press, 1976.

Jordan, John. W. "Kennedy's Romantic Moon and Its Rhetorical Legacy for Space Exploration." *Rhetoric and Public Affairs* 6, vol. 2 (Summer 2003), 209-231.

Kempe, Frederick. *Berlin 1961: Kennedy, Khrushchev, and the Most Dangerous Place on Earth*. New York: G.P. Putnam's Sons, 2011.

Kennedy, John F. "Acceptance of Democratic Nomination for President." Transcript of speech delivered in Los Angeles, July 15, 1960. *JFK Presidential Library*, <https://www.jfklibrary.org/learn/about-jfk/historic-speeches/acceptance-of-democratic-nomination-for-president>.

Kennedy, John F. "Address at Rice University in Houston on the Nation's Space Effort." Transcript of speech delivered in Houston, September 12, 1962. *The American Presidency Project*. <https://www.presidency.ucsb.edu/documents/address-rice-university-houston-the-nations-space-effort>.

Kennedy, John F. "Address at the 18th U.N. General Assembly." Transcript of remarks delivered in New York City, September 20, 1963. *John F. Kennedy Presidential Library*, <https://www.jfklibrary.org/asset-viewer/archives/JFKPOF/046/JFKPOF-046-041>.

Kennedy, John F. "Annual Message to Congress on the State of the Union." Transcript of speech delivered in Washington D.C., January 30, 1961. *The American Presidency Project*. <https://www.presidency.ucsb.edu/documents/annual-message-the-congress-the-state-the-union-5>.

Kennedy, John F. "Annual Message to Congress on the State of the Union." Transcript of speech delivered in Washington D.C., January 14, 1963. *The American Presidency Project*. <https://www.presidency.ucsb.edu/documents/annual-message-the-congress-the-state-the-union-3>.

Kennedy, John F. "Commencement Address at American University in Washington." Transcript of speech delivered in Washington D.C., June 10, 1963. *The American Presidency Project*. <https://www.presidency.ucsb.edu/documents/commencement-address-american-university-washington>.

Kennedy John F. "Inaugural Address." Transcript of speech delivered in Washington D.C., January 20, 1961. *The American Presidency Project*. <https://www.presidency.ucsb.edu/documents/inaugural-address-2>.

Kennedy, John F. "Memorandum for Vice President." April 20, 1961. United States Capitol Visitor Centre, Exploration, The Space Race. <https://www.visitthecapitol.gov/exhibitions/artifact/memo-president-john-f-kennedy-vice-president-lyndon-johnson-april-20-1961>.

Kennedy, John F. “Special Message to the Congress on Urgent National Needs.” Transcript of remarks delivered in Washington D.C., May 25, 1961. *The American Presidency Project*. <https://www.presidency.ucsb.edu/documents/special-message-the-congress-urgent-national-needs>.

Kennedy, John F. and James Webb. “Supplemental Appropriations for the National Aeronautics and Space Administration (NASA).” Transcript of Presidential Meeting in the Cabinet Room of the White House, November 21, 1962. <https://history.nasa.gov/JFK-Webbconv/pages/transcript.pdf>.

Kennedy, John F. *The Strategy for Peace*. New York: Harper & Brothers, 1960.

King, David S. to Lyndon Johnson, April 15, 1961. United States Capitol Visitor Centre, Exploration, The Space Race. <https://www.visitthecapitol.gov/exhibitions/artifact/letter-representative-david-s-king-vice-president-lyndon-b-johnson-april-15>.

Launius, Roger D. “Sputnik and the Origins of the Space Race.” *NASA*. Accessed March 9, 2022. <https://history.nasa.gov/sputnik/sputorig.html>.

Law, Rebecca Lee. “State Antifragility: An Agent-Based Modelling Approach to Understanding State Behaviour.” PhD diss. Old Dominion University, 2021.

Leffler, Melvyn P. *For the Soul of Mankind: The United States, The Soviet Union and The Cold War*. New York: Hill and Wang, 2007.

Logevall, Fredrik. *JFK: Coming of Age in the American Century, 1917-1956*. New York: Random House, 2020.

Logsdon, John, ed. *Exploring the Unknown: Selected Documents in the History of the U.S. Civil Space Program, Volume VII: Human Spaceflight: Projects Mercury, Gemini, and Apollo*. Washington D.C.: CreateSpace Independent Publishing, 2014.

McClenahan Jr., William M. and William H. Becker. *Eisenhower and the Cold War Economy*. Baltimore: Johns Hopkins University Press, 2011.

McDougall, Walter A. ...*The Heavens and the Earth: A Political History of the Space Age*. Baltimore: Johns Hopkins University Press, 1985.

McMath, Robert R., Lawrence A. Hyland, George B. Kistiakowsky, and Francis H. Clauser to Allen W. Dulles. October 23, 1957. *Intelligence Warning of the 1957 Launch of Sputnik*. Central Intelligence Agency. Accessed February 11, 2022. <https://www.cia.gov/library/readingroom/document/0003030512> .

McDougall, Walter A. ...*the Heavens and the Earth: A Political History of the Space Age*. Baltimore: Johns Hopkins University Press, 1985.

“Memorandum for the President by the Secretaries of State and Defense and the Director for Mutual Security.” January 16, 1953. *Foreign Relations of the United States (FRUS), 1952-1954, National Security Affairs, Volume II, Part I.*

<https://history.state.gov/historicaldocuments/frus1952-54v02p1/d80>.

“Memorandum to the National Security Council by the Executive Secretary.” S/S–NSC file , Lot 66 D 148, “Solarium.” July 22, 1953. *Foreign Relations of the United States, 1952-1954, National Security Affairs, Volume II, Part I.*

<https://history.state.gov/historicaldocuments/frus1952-54v02p1/d80>.

Mitrovich, Gregory. *Undermining the Kremlin: America’s Strategy to Subvert the Soviet Bloc, 1947-1956.* Ithaca: Cornell University Press, 2000.

Nash, Phillip. *The Other Missiles of October: Eisenhower, Kennedy, and the Jupiters, 1957-1963.* Chapel Hill: University of North Carolina Press, 1997.

National Security Council Report 68. “United States Objectives and Programs for National Security” April 14, 1950. General CIA Records, Freedom of Information Act Electronic Reading Room, Central Intelligence Agency. <https://www.cia.gov/library/readingroom/document/cia-rdp91g01141r000200130001-3>.

Nietzsche, Friedrich. *The Gay Science* trans. Thomas Common. New York: MacMillan Company, 1924 (1882).

Norris, Robert, and Hans M. Kristensen. “Global Nuclear Weapons Inventories, 1945-2010.” *Bulletin of the Atomic Scientists* vol. 66, no. 4 (July 2010).

Nye, Jr., Joseph. *Soft Power: The Means to Success in World Politics.* New York: Public Affairs, 2004.

O’Neill, Terry. *The Nuclear Age.* San Diego: Greenhaven, 2002.

Pach, Chester J. *A Companion to Dwight D. Eisenhower.* New York: John Wiley & Sons, 2017.

Paterson, Thomas G., ed. *Kennedy’s Quest for Victory: American Foreign Policy, 1961-1963.* New York: Oxford University Press, 1989.

Perry, Paul. “Gallup Poll Election Survey Experience, 1950 to 1960.” *The Public Opinion Quarterly* 26, no.2 (Summer 1962), 272-279.

Preble, Christopher A. *John F. Kennedy and the Missile Gap.* DeKalb: Northern Illinois University Press, 2004.

RAND. “About the RAND Corporation.” Accessed January 24, 2022.

<https://www.rand.org/about.html>.

RAND. "Preliminary Design of an Experimental World Circling Spaceship." Santa Monica, California. RAND Corporation, 1946.

https://www.rand.org/pubs/special_memoranda/SM11827.html.

Reeves, Richard. *President Kennedy: Profile of Power*. New York: Touchstone, 1993.

Security Resources Panel of the Science Advisory Committee. "Deterrence and Survival in the Nuclear Age." November 7, 1957. *NSA Archives*.

Silverstone, Marc, ed. *A Companion to John F. Kennedy*. New York: John Wiley & Sons, 2014.

Siegel, Michael E. *The President as Leader*. Upper Saddle River, Pearson: 2012.

Spinney, Laura. "Lethal Weapons and the Evolution of Civilisation." *New Scientist* no. 2886 vol 216 (2012): 46-49.

Scheffer, James. *The Race: The Uncensored Story of how America beat Russia to the Moon*. New York: Doubleday, 1999.

Schlesinger Jr. Arthur. *A Thousand Day: John F. Kennedy in the White House*. Boston: Houghton Mifflin Company, 1965.

Siddiqi, Asif. *The Rockets' Red Glare: Spaceflight and the Soviet Imagination, 1857-1957*. Cambridge: Cambridge University Press, 2010.

Shesol, Jeff. *Mercury Rising: John Glenn, John Kennedy, and the New Battleground of the Cold War*. New York: W.W. Norton & Co., 2021.

Skolnikoff, E.B. "Abstract of Possible Projects for International Cooperation." Papers of John F. Kennedy, Presidential Papers, President's Office Files, Departments and Agencies, National Aeronautics and Space Administration, 1961: January-March. *JFK Presidential Library*, <https://www.jfklibrary.org/asset-viewer/archives/JFKPOF/082/JFKPOF-082-007>.

Sorensen, Theodore. Transcript of an oral history conducted March 26, 1964, by Carl Kaysen. John F. Kennedy Presidential Library.

Taleb, Nassim Nicholas. *Antifragile: Things That Gain from Disorder*. New York: Random House, 2014.

Taleb, Nassim Nicholas and Gregory F. Treverton. "The Calm Before the Storm: Why Volatility Signals Stability, and Vice Versa." *Foreign Affairs*, January/February, 2015. Accessed February 4, 2022. https://www.foreignaffairs.com/articles/africa/calm-storm?check_logged_in=1.

Taubman, Philip. *Secret Empire: Eisenhower, the CIA, and the Hidden Story of America's Space Espionage*. New York: Simon & Schuster, 2003.

Taylor, Maxwell D. *The Uncertain Trumpet*. New York: Harper & Collins, 1960.

The President's Science Advisory Committee. "Report of the Ad Hoc Panel on Man-in-Space." December 16, 1960. *NASA Historical Reference Collection, History Office*. NASA Headquarters, Washington D.C. Accessed February 9, 2022.
<https://www.hq.nasa.gov/office/pao/History/report60.html>.

Voorhees Jr., Theodore. *The Silent Guns of Two Octobers: Kennedy and Khrushchev Play the Double Game*. Ann Arbor: University of Michigan Press, 2020.

Webb, James and Robert McNamara. "Recommendations for our National Space Program: Changes, Policies, Goals." May 8, 1961. *John F. Kennedy Presidential Library*. Space Activities: General, vol. I-III, 1961: April-June.

Webb, James. "Presentation by the Administrator of the National Aeronautics and Space Administration to President Kennedy." Kennedy Library, National Security Files, Departments and Agencies Series, NASA, 1961, Box 282.
<https://history.state.gov/historicaldocuments/frus1961-63v25/d359>.

Welsh, Edward C. transcript of an oral history conducted May 16, 1964 by Walter D. Sohler, Addison M. Rothrock, and Eugene M. Emme. John F. Kennedy Presidential Library.

Wiesner Committee. "Report to the President-Elect of the Ad Hoc Committee on Space." January 10, 1961. *NASA History Archives*.
<https://www.hq.nasa.gov/office/pao/History/report61.html>.

Zelizer, Julian. *Arsenal of Democracy: The Politics of National Security from World War II to the War on Terrorism*. New York: Basic Books, 2010.