

Spring 2016

The American Space Exploration Narrative: Evolution of Space Exploration in the United States from the Cold War to Today

Dora Holland

University of Colorado, Boulder, doho0735@colorado.edu

Follow this and additional works at: https://scholar.colorado.edu/honr_theses



Part of the [Other Political Science Commons](#)

Recommended Citation

Holland, Dora, "The American Space Exploration Narrative: Evolution of Space Exploration in the United States from the Cold War to Today" (2016). *Undergraduate Honors Theses*. 1127.
https://scholar.colorado.edu/honr_theses/1127

This Thesis is brought to you for free and open access by Honors Program at CU Scholar. It has been accepted for inclusion in Undergraduate Honors Theses by an authorized administrator of CU Scholar. For more information, please contact cuscholaradmin@colorado.edu.

The American Space Exploration Narrative: Evolution of Space Exploration in the United States from the Cold War to Today

Dora Holland

International Affairs Departmental Honors Thesis

University of Colorado at Boulder

March 31, 2016

Examining Committee

Dr. Victoria Hunter | International Affairs

Dr. Lisa Dilling | Environmental Studies

Dr. Jack Burns | Astrophysical & Planetary Sciences

TABLE OF CONTENTS

ABSTRACT	2
PREFACE	3
ACKNOWLEDGEMENTS	5
INTRODUCTION	6
RESEARCH APPROACH.....	7
PART I: HISTORICAL NARRATIVE	9
SPACE EXPLORATION DURING THE COLD WAR (1955-1991)	9
EISENHOWER AND THE SPUTNIK CRISIS.....	10
KENNEDY AND THE RACE FOR PRESTIGE	13
NIXON AND THE NORMALIZATION OF SPACE	16
REAGAN AND THE COMMERCIALIZATION OF SPACE.....	19
SPACE EXPLORATION IN THE POST-COLD WAR ERA (1991-TODAY).....	22
GEORGE H. W. BUSH AND THE SPACE EXPLORATION INITIATIVE	22
CLINTON AND THE INTERNATIONAL SPACE STATION.....	24
GEORGE W. BUSH AND THE VISION FOR SPACE EXPLORATION	25
OBAMA AND THE MOVING FRONTIER	27
THE NEW PARADIGM OF SPACE EXPLORATION	29
THE ROLE OF PRIVATE INDUSTRY IN AMERICAN SPACE LEADERSHIP	29
THE POLITICS OF THE INTERNATIONAL SPACE STATION: A CHINESE PERSPECTIVE	32
LOOKING AHEAD: MARS AND THE FUTURE OF THE AMERICAN SPACE PROGRAM	34
PART II: CONTENT ANALYSIS	36
CONTENT ANALYSIS METHODOLOGY.....	36
RESULTS AND ANALYSIS	40
RESULTS	40
ANALYSIS.....	43
DISCUSSION	49
CHALLENGE 1: DISCONNECT BETWEEN POLICY AND IMPLEMENTATION	50
CHALLENGE 2: STRUGGLE BETWEEN LEADERSHIP AND COLLABORATION	51
CHALLENGE 3: EMBRACING THE NEW PARADIGM	54
CONCLUSION.....	57
BIBLIOGRAPHY	60
CONTENT ANALYSIS BIBLIOGRAPHY	63
APPENDIX.....	66

ABSTRACT

This paper documents how the narrative of space exploration in the United States (U.S.) has changed from the Cold War to today. It examines the policy and rhetoric of eight U.S. presidential administrations in regards to space exploration: Eisenhower, Kennedy, Nixon, Reagan, George H. W. Bush, Clinton, George W. Bush, and Obama. The paper also discusses how the overall field of space exploration has changed over time. To investigate this narrative, the paper first examines the history of U.S. space exploration from the Cold War to today, and also examines three current conditions of the field of space exploration, including: 1) the increasing role of the private sector, 2) the influence of global politics and specifically the emergence of China as a global space power, and 3) the current focus on a manned mission to Mars. The Cold War was a period in which the direct competition between the United States and the Soviet Union played out within the field of space exploration. This meant that space initiatives in the U.S. were predominantly centered and motivated around themes of national prestige and pride. However, after the end of the Cold War, there is a shift in U.S. space goals, toward increased interest in the benefits of international collaboration and cooperation. The shift demonstrates the effect of modern globalization, as well as the realities of a space exploration field that increasingly encompasses many different players beyond just the United States and the Soviet Union. In order to further understand the narrative of U.S. space exploration, the paper compiles a list of five rhetorical themes: competition, prestige, collaboration, leadership, and a new paradigm. These themes are then utilized to analyze the content of forty documents over the course of space exploration history in the U.S. from the aforementioned eight U.S. presidential administrations. The historical narrative and content analysis together suggest that space exploration has developed from a straightforward, bipolar arena between the United States and the Soviet Union, into a complicated field that encompasses many new players in the national to the industrial realms. The results also suggest that the United States is currently at a crossroads in which the U.S. must quickly make a decision on how it wants to participate in this changing field of space exploration. This paper identifies three challenges regarding U.S. space policy in the current era. These three challenges are: 1) there is a disconnect between stated policy goals in American space exploration efforts and the implementation of those goals, 2) the United States communicates mixed messages regarding its intent to be both the dominant leader in the field of space exploration and committed as a participant in international collaboration, and 3) the United States cannot remain a true pioneer of space exploration if it does not embrace the realities of globalization and the changing dynamics within the field of space exploration. After discussing the above three challenges, the paper recommends that: 1) U.S. government and NASA should critically examine space exploration priorities and commit to implementing a program that will further realistic and robust stated policy and goals, 2) the U.S. should reexamine its intention to play a dominant leadership role in space exploration, and consider emphasizing a commitment toward active participation in international collaboration in space, and 3) the United States should fully embrace the new paradigm of space exploration by - lowering barriers like ITAR that hinder the competitiveness of the American space industry, committing to collaborative endeavors with rising space-faring nations such as China and abandoning Cold War era thinking, and paving the way to Mars by encouraging the participation of many nations and space agencies on future manned missions.

PREFACE

When I was a child, if I happened to be alone for the afternoon while my mother was at work, I would rearrange our living room into a makeshift spaceship, constructed from dining room chairs and couch pillows. At the head of the fabricated ship was a large cardboard book that detailed facts of each of the planets of our Solar System, which I used as a map to guide my imagination into outer space. As I ran my finger down the list of Jupiter's moons and called out to my first mate - a small teddy bear - to set course for Europa, I etched into my fantasies images of a starlit horizon that melted into the inky blackness of space. These images would remain in my imagination for the rest of my life.

The fascination I have for outer space and all of its mysteries is a fascination that many other people share - especially many Americans. Those of us that grew up in the United States after the Cold War have been taught to revere figures like Neil Armstrong and Buzz Aldrin, pioneers who embody the "American" qualities of bravery, curiosity, and determination. When we look to the stars, we think of those who came before us and paved the way beyond the limits of our own planet Earth.

But growing up, I was also always interested the story of space exploration, and especially where we were headed into the future. I knew that American space exploration had a sense of nationalism to it, but I also grew up watching shows like Star Trek. For me, space symbolized the true scientific unknown. I didn't see space as a symbol of the power of any one individual country, but rather, an opportunity for many cultures to unite together as an entire human race, and move forward into the future. I felt that the attitudes of the past, while motivating during the Cold War era, needed to be left in the past in order for humanity to truly make steps toward global progress. And yet what I was seeing was that the United States clung to rhetoric of the past and was unable to let go of ego in order to move into the next era of space exploration.

When I was a second year college student, I came across this quote from the astrophysicist and science communicator, Neil DeGrasse Tyson:

I look up at the night sky, and I know that, yes, we are part of this universe, we are in this universe, but perhaps more important than both of those facts is that the universe is in us. When I reflect on that fact, I look up. Many people feel small, because they're small and the universe is big, but I feel big, because my atoms came from those stars.

Although space is infinite and holds so much unknown, I don't feel small or insignificant.

Instead, space makes me feel important, because when I look up at the stars, I feel as though I share a history and a future with what is beyond this planet. I truly think space is "the final frontier," and I am glad to live in a time in which technology has allowed us to make monumental leaps of knowledge regarding what outer space holds. As an American, I benefit from my country's history in space, and I feel proud of what my Nation has accomplished. However, instead of focusing on that history as a source of egotism, I want to see the U.S. truly make an effort to reach out to other space-faring nations and unite them into a future in which humanity works together as a whole, rather than just as individual nations. My reasoning behind this paper, and why I chose to write on this topic, is because I envision a future where humanity comes together to explore the wonders of space. By examining the past and where we are currently in relation to the past, we can understand what we need to do in order to succeed in the future. The history of space exploration, especially in the United States, is rich and fascinating, but I truly believe that the best of our story is still yet to come.

ACKNOWLEDGEMENTS

First and foremost, I would like to thank my mother for her wisdom, guidance, and words of encouragement. It was with her support that I found the motivation to attempt and complete this project, a task that I sometimes found myself questioning whether or not I could manage. She is the brightest star in my life, and she inspires me everyday to work hard and dream big. It is because of her that I look up, to the vastness of space when I think about my future.

I would also like to thank my wonderful advisors on this project: Vicki Hunter, Lisa Dilling, and Jack Burns. Thank you so much for all of your advice and direction on this paper. I have learned so much from the process of organizing and writing a thesis, and for that I am truly grateful.

Thank you to my friends and family, my network of support in my life, and the people who were willing to listen to me rant about things like “outdated attitudes left over from the Cold War” or “America’s inability to implement policy goals.” I am so lucky to be surrounded with people who encourage my passions and interests, and laugh at my lame Star Trek jokes.

Finally, I would like to thank the women and men who work hard to keep the American space program alive and healthy, and as a mechanism for progress into the future of international science and collaboration. There are so many individuals not only in my country, but all over the world, who share my dreams and want to see the world move forward, together, into the future. I want to thank them for how they will continue to inspire the next generation to dream of space and to reach for the stars, just as how they inspired me.

INTRODUCTION

In the summer of 2015, world-renowned astrophysicist and host of *StarTalk Radio* Neil deGrasse Tyson conducted a podcast interview with the National Aeronautics and Space Administration (NASA) Administrator General Charles Bolden. Tyson spoke of a shift in how the United States conducts itself in the arena of space exploration, explaining, “We have entered a new era...now we’re in a different world, where other countries are rising in their presence on the space frontier. We should be curious what NASA’s plans are in a world where we’re not the only player in town.”¹ Bolden responded, “We [now] teach people, we act as a model for how people of different cultures, different races, different nationalities can in fact work together.”² In discussing NASA’s current emphasis on international collaboration and cooperation as the model for how the United States (U.S.) will explore outer space in the future, the two men also highlight how this emphasis affects the meaning and purpose of space exploration for the Nation as a whole. Bolden and Tyson also reference change, contrasting the past to the present, which reveals that the American space program recognizes it is currently at an important point in the history of space exploration.

The history of space exploration in the United States is often spoken of with a great sense of national pride. It is very evident that the American persona, which values ideals like innovation, curiosity, and determination, is reflected in how the U.S. has interpreted its role in international space exploration in the past, and continues to be an important value in the present. But how has the understanding of that role changed over time? By examining the rhetorical themes within U.S. national space policy, leadership statements, and policy recommendations throughout American history, we see that the way the United States presents its role in international space exploration directly mirrors the Nation’s motivations in foreign policy and national security. Rhetorical themes can be used as a window into the mindset of leaders and policymakers. Therefore, the research question this paper explores is: how has the narrative of

¹ “NASA’s Vision for Space Exploration with Charles Bolden,” Narrated by Neil deGrasse Tyson and Bill Nye, Interview with Charles F. Bolden, Jr. and Michael Shara, *StarTalk, StarTalk Radio Show with Neil deGrasse Tyson*, 2015.

² *Ibid.*

space exploration in the U.S. changed from the birth of the American space program to today? By following the narrative of space exploration in the United States, through the rhetorical themes that can be found, it is possible, through the lens of space policy, to trace the development of national and international goals of the United States. As these goals have changed since the beginning of space exploration in the U.S. in the Cold War, so has the U.S. voice in space exploration. However, due to the struggle to actualize ambitious goals in space, national U.S. space policy goals often remain purely rhetorical. Today, the United States finds itself at a crossroads between the familiar position of geopolitical posturing to maintain national prestige, and showing leadership in promoting the next steps toward a truly global, collective field of space research.

RESEARCH APPROACH

In order to explore the narrative of space exploration in the United States, this paper investigates the policies and rhetoric of U.S. space exploration from the Cold War era to today. To track these changes, the paper's research into how space exploration in the United States has changed over time is conducted in two parts. The first part comprises a historical narrative, which serves as the background context for how the field of space exploration itself has changed over time. In the historical narrative, the state of American space exploration within the Eisenhower, Kennedy, Nixon, Reagan, George H. W. Bush, Clinton, George W. Bush, and Obama administrations is explored. The Johnson administration is also briefly discussed along with Kennedy, as his policies and goals were similar to Kennedy's. Ford and Carter were not included in this historical narrative due to the similarities of space policies during other administrations around the same time. Along with the examination of presidential administrations, the paper also looks at three broader conditions within the field of space exploration, in order to understand their influence on the field overall. These three additional conditions are: 1) globalization and the growing presence of private industry in space exploration, 2) the International Space Station as a representative of international collaboration in space exploration with a specific look at possible Chinese participation, and 3) the framework for future explorative efforts to Mars.

The second part of the paper is a content analysis of U.S. space policy documentation over time. The content analysis together with the historical narrative traces the evolution of space exploration in the United States. Within the content analysis section, the paper examines forty documents that include: space policy and rhetoric releases from the eight aforementioned presidential administrations, statements concerning space exploration from U.S. presidents and other leaders, and policy recommendations made to the U.S. government for advised action in space exploration from experts within the field. The content analysis allows for a clearer understanding of the rhetorical evolution of space exploration, and therefore, in combination with the historical narrative, we can see not only changes over time, but the state in which the United States finds itself today. Understanding the evolution of these themes is essential in evaluating where the Nation needs to take steps to further progress in space exploration.

PART I: HISTORICAL NARRATIVE

SPACE EXPLORATION DURING THE COLD WAR (1955-1991)

Although the inception of the American space program was influenced by the development of the space technologies of the Soviet Union (U.S.S.R.), it was not initially intended to serve as a symbol of national pride or international competition. Under Eisenhower, U.S. space exploration was designed to represent American scientific achievements, not perpetuate political objectives. Though Eisenhower's vision for American space exploration saw space as a scientific arena in which nations could further global progress instead of competition, this vision would fall to the side as the relationship between space and nationalism became stronger in later administrations.

On September 12, 1962, President John F. Kennedy proclaimed before a crowd of 35,000 that the United States had chosen to forge the pathway to the moon "not because it is easy, but because it is hard."³ He called out to the American pioneering spirit, stretching out a vision of success and prestige for the U.S. in the new frontier of outer space. The conquest of space was to become intrinsically tied to what it meant to be American, and with his rallying speech, Kennedy solidified the rhetorical link between U.S. prestige and dominance in space exploration. This set the predominant tone for the Cold War era of U.S. space endeavors. Although interest in aspects like collaboration and cooperation remained, prestige and competition would take precedence.

The political bipolarity of the Cold War, in which world power was split between the two "poles" of the U.S. and the Soviet Union, was so prolific in every facet of society that space, the next step for human exploration, quickly became a proxy for competition. The following section will explore the historical context of space exploration during the Cold War, including what motivated the United States to enter into direct competition with the Soviet Union in space exploration, what attitudes and perspectives drove the development of America's space program, and how the American leaders of the Cold War shaped the history of U.S. space exploration.

³ John F. Kennedy, "Address at Rice University on Nation's Space Effort," Rice University, Houston, Texas, NASA JSC, 1962, 2.

EISENHOWER AND THE SPUTNIK CRISIS

On April 16th, 1955, over two years before the launch of *Sputnik 1*, the Soviet newspaper *Vechernyaya moskva* (Evening Moscow) announced the creation of a new Soviet commission for interplanetary communications. This marked the beginning of official Soviet interest in developing its own space technologies. The article claimed that the primary goal of the new commission was “to organize work concerned with building an automatic laboratory for scientific research in space”⁴ - an ambitious claim that was, in actuality, not true. The Soviet Union had not even begun preparations for the three Sputnik satellites they would launch between 1957 and 1958, let alone an entire space laboratory. But when American print media caught wind of the bold claims made by *Vechernyaya moskva*, the shocking premise of a Soviet laboratory in space led them to publish their own articles in response the following day. The Washington Post ran an article titled, “Interplanetary commission created: Russians planning space laboratory for research beyond Earth’s gravity.”⁵ The *Vechernyaya moskva* article was purely Soviet propaganda, and it achieved its goal - the United States was now aware that the Soviet Union was making preparations for entering into the space arena, and had begun to panic. The U.S., a country that prided itself on its international leadership, prestige, and technological superiority over the “backwards” Soviet Union, suddenly felt immense pressure due to the possibility of falling behind. Had the “Space Race” between the United States and the Soviet Union begun?

In 1954, the International Council of Scientific Unions, a collection of scientists from all over the world, passed a resolution calling for artificial satellites to be launched for the purposes of mapping the Earth’s surface.⁶ These satellites would be launched during what was to be known as the International Geophysical Year (IGY), a period of time from July 1957 to December 1958. Both the Soviet Union and the United States were member states of the council, and made their own plans to launch a satellite during the IGY. The United States began the Vanguard project, and the Soviet Union, the Sputnik project.

⁴ “Komissiya po mezhplanetarykh soobshcheniy,” *Vechernyaya moskva*, April 16, 1955.

⁵ “Interplanetary Commission Created: Russians Planning Space Laboratory for Research Beyond Earth’s Gravity,” *Washington Post*, April 17, 1955.

⁶ “Sputnik and the Dawn of the Space Age,” *NASA History*, 2007, 1.

However, President Eisenhower did not view the IGY as a “race” with the Soviet Union⁷, and instead chose to focus on the scientific promise of developing a satellite, rather than the prestige element of outcompeting a rival. Eisenhower was predominantly a strategist and a planner,⁸ and therefore because “prestige...was not the driving force behind the project,”⁹ the development of Vanguard proceeded at a relatively slow pace.

In contrast, the Soviet Union was very interested in the propaganda value of launching the world’s first satellite. Therefore, it outpaced the U.S. and launched *Sputnik 1* in October 1957, and achieved the ultimate first of the “space firsts.” *Sputnik 1* shattered the assumption that the United States was the default technological world leader,¹⁰ and the success of the Soviet satellite program created a “Sputnik crisis” throughout American society. Within the United States, the launch “sparked a national soul-searching,”¹¹ as *Sputnik* revealed a psychological vulnerability. For citizens that viewed themselves as a part of the Western, “free world,” with its superior technology in comparison to their communist neighbors, the knowledge that the Soviet Union had surpassed the U.S. in an area of science came as a shock. During this crisis of confidence, members of Eisenhower’s administration grew frustrated with the president over his unwillingness to utilize the space program to promote American prestige.

Yet Eisenhower refused to believe that prestige was something the United States needed to “purchase,” and instead continued to promote the scientific value of the U.S. satellite program.¹² He remained unperturbed in the face of the *Sputnik 1* success, much to the exasperation of others. In a press conference two days after *Sputnik 1* began to orbit the Earth, reporters prompted Eisenhower to respond directly to the threat that the satellite had posed to American prestige, asking, “What are we going to do

⁷ Linda T. Krug, *Presidential Perspectives on Space Exploration: Guiding Metaphors from Eisenhower to Bush*, Praeger Publishers, 1991, 23.

⁸ Ibid, 25.

⁹ Giles Alston, “Eisenhower: Leadership in Space Policy,” *Reexamining the Eisenhower Presidency*, Ed. Shirley Anne Warshaw, Greenwood Press, 1993, 106.

¹⁰ Yanek Mieczkowski, *Eisenhower’s Sputnik Moment: The Race for Space and World Prestige*, Cornell University Press, 2013, 17.

¹¹ Walter A. McDougall, “Sputnik, the Space Race, and the Cold War,” *Bulletin of the Atomic Scientists* 41.5, 1985, 22.

¹² Alston, 104.

about it?”¹³ One reporter asked specifically if it was a mistake not to recognize that the United States was in a race with the Soviet Union.¹⁴ To these questions, Eisenhower responded:

Now, quite naturally, you will say, “Well, the Soviets gained a great psychological advantage throughout the world,” and I think in the political sense this 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.¹⁵

About the launching of *Sputnik 1*, Eisenhower remarked:

[The Soviet Union has] proved again and, indeed, this launching of the satellite proves, that they can hurl an object a considerable distance.¹⁶

However, not everyone shared Eisenhower’s indifferent attitude toward the rising Soviet presence in space, and after *Sputnik 1*, there was mounting pressure from Eisenhower’s political opponents for the president to respond to the blow to American credibility.¹⁷ He earned the nickname of the “do-nothing” president as a result of how he responded to *Sputnik 1*.¹⁸ Over time, despite his beliefs, Eisenhower could not escape the political rhetoric of the Cold War era. The National Aeronautics and Space Administration (NASA) was established in 1958, and as NASA developed, one of the primary goals for the new U.S. space program did in fact become prestige. The President’s Science Advisory Committee listed prestige along with other goals of space research in the United States, such as science exploration and defense,¹⁹ and the National Security Council (NSC) reported that, “continued Soviet superiority in space might undermine U.S. prestige and security.”²⁰

¹³ Eisenhower, Dwight D. “Official White House Transcript of President Eisenhower’s Press and Radio Conference #123 (Filmed, Taped, and Shorthand Reported),” *Eisenhower Presidential Archives*, 1957, 4.

¹⁴ *Ibid.*, 7.

¹⁵ *Ibid.*

¹⁶ *Ibid.*, 6.

¹⁷ Alston, 104.

¹⁸ Krug, 25.

¹⁹ McDougall, 22.

²⁰ *Ibid.*

In recent years, Eisenhower's stance on not only the Soviet Union's space program, but also the values behind the founding of NASA, has been the subject of reexamination and reevaluation.²¹ His insistence on looking at the bigger picture might have gotten lost in the Cold War mentality of the 1960s, but it is a perspective that has come to be appreciated today. Giles Alston explains that Eisenhower's refusal to utilize space exploration as a tool in a "race" with the Soviet Union can be regarded in today's era as "a crucial element of stability" that space policy later lacked.²²

It is true that the "race" mentality dominated the direction of space exploration in the United States during the Cold War, and it is a mentality that the United States continues to struggle to leave behind. Although Eisenhower had the foresight to envision a space program that placed science before politics, this view would not be shared by subsequent administrations. Particularly, in the following administration under John F. Kennedy, rhetoric of American prestige would dominate discussions of space exploration in the U.S. with the "race to the moon."

KENNEDY AND THE RACE FOR PRESTIGE

Despite the fact that the Apollo Project and Kennedy's clear policy goal of placing an American on the moon by the end of the 1960s has become one of the identifying aspects of his presidency, Kennedy himself once remarked that he was "not that interested in space."²³ For all intents and purposes, he recognized the political importance of the Space Race, but unlike his predecessor, he did not see things from the perspective of the scientist. Instead, he advocated for space because he believed that America needed to "get ahead" of the Soviet Union.²⁴ On the campaign trail before his presidency, Kennedy often challenged the past mentality of the Eisenhower era, proclaiming that there was a need to "get the country moving again."²⁵

²¹ Alston, 105.

²² Ibid.

²³ "Transcript of White House Meeting with John F. Kennedy and NASA members," *NASA History*, November 21, 1962.

²⁴ Ibid.

²⁵ John M. Logsdon, *John F. Kennedy and the Race to the Moon*, Palgrave Macmillan, 2010, 11.

U.S. space exploration was a political tool for Kennedy, and provided him an opportunity to regain international confidence in America after the Bay of Pigs incident, the failed U.S. paramilitary invasion of Cuba that had damaged the reputation of the United States.²⁶ In order to regain credibility, Kennedy sought for an area in which the United States could become the undisputed leader and surpass the Soviet Union during the Cold War. He instructed Vice President Lyndon B. Johnson to find a program that the U.S. could “pioneer.”²⁷ Space exploration was the avenue that Johnson chose for the United States to demonstrate superiority over the Soviet Union. In order to take preeminence in space exploration, the United States needed to identify a target that held great psychological impact that could be utilized against the U.S.S.R. Thus, the idea of “the race to the moon” was born, and landing an American on the moon became the most important goal for the U.S. space program. This turned space exploration in the United States into a “visible symbol of national vitality.”²⁸

National prestige became the centerpiece of motivations behind U.S. space exploration.²⁹ The Soviet Union also capitalized on its own successes in space. It achieved another “space first” when Yuri Gagarin became the first human to orbit the Earth on April 12, 1961, which the Soviet Union utilized as propaganda against the United States.³⁰ Global space exploration began to take on the characteristics of “a bipolar struggle between the United States and the Soviet Union for global leadership,”³¹ and this led to U.S. space policy becoming yet another area in which the framing of U.S.-Soviet competition emerged. The U.S. space program, a program that was once primarily considered to be a scientific institution first,³² transitioned into a vital instrument of enacting national strategy.

When Kennedy encouraged the American people to join him on a journey to revitalize American prestige, reaching the moon (and subsequently space endeavors in general) immediately became directly tied to the national identity of the United States. This was an extension of overall Cold War posturing, in

²⁶ Krug, 30.

²⁷ John F. Kennedy, “News Conference 9, April 12, 1961,” *John F. Kennedy Presidential Library*, 1961, 1.

²⁸ McDougall, 24.

²⁹ Logsdon, *Kennedy*, 33.

³⁰ *Ibid*, 72.

³¹ *Ibid*, 89.

³² *Ibid*, 117.

which the U.S. advocated for the superiority of American ideology over that of the Soviet Union. Kennedy stated in his “Moon Speech” at Rice Stadium in Houston, Texas, “no nation which expects to be the leader of other nations can expect to stay behind in the race for space.”³³ Referring to U.S. goals in space exploration, he further stated, “we mean to be a part of it - we mean to lead it.”³⁴ Kennedy insisted that the United States would not only make efforts to explore outer space for individual reasons, but that it would do this to demonstrate American greatness to the rest of the world. Again referencing American prestige, Kennedy proclaimed, “the vows of this Nation can only be fulfilled if we in this Nation are first.”³⁵ Under Kennedy, the United States would pioneer ahead into the new frontier of space in an act not necessarily for the sole purpose of discovery, but for international influence and preeminence.

Despite the overruling rhetoric of competition and prestige, Kennedy interspersed in his proclamations of American greatness calls for cooperation with the Soviet Union. Logsdon writes, “it is worth noting that JFK’s initial priority on becoming president was to make space an area for U.S.-Soviet cooperation.”³⁶ Ideas about collaboration can be found even during the height of “moon rhetoric,” but because the moon became a national goal in response to the success of Yuri Gagarin, it wasn’t until the end of his presidency that Kennedy began to lessen his rhetoric of American excellence. Instead, he began to ask whether or not it was possible to go to the moon together with the Soviet Union.³⁷ In almost complete contrast to his earlier rhetoric, Kennedy began to reach out to the U.S.S.R. later in his presidency. In 1962, his administration released a National Security Action Memorandum (NSAM), recommending cooperation with the U.S.S.R. in space exploration.³⁸ Addressing the United Nations General Assembly in September of 1963, Kennedy questioned why the race to the moon couldn’t be a joint effort between the U.S. and the Soviet Union.³⁹ However, due to silence from the Soviet Union on

³³ Kennedy, “Address,” 2.

³⁴ Ibid.

³⁵ Ibid.

³⁶ Logsdon, *Kennedy*, 159.

³⁷ Ibid, 158.

³⁸ National Security Action Memorandum. “U.S.-U.S.S.R. Cooperation in the Exploration of Space (NSAM 129).” *Federation of American Scientists*, 1962, 1.

³⁹ Logsdon, *Kennedy*, 175.

Kennedy's gesture and the president's assassination two months after his United Nations speech,⁴⁰ collaboration between the two great superpowers remained just an idea.

Logsdon explains that after the assassination of Kennedy, the U.S. space program and lunar missions effectively became a memorial to the late president. Johnson, vice president and successor, made virtually no changes to the plans laid out by the former president, in part because he had previously shared the same outlook, but also because these goals served as a memory to a beloved leader. Kennedy left behind a legacy in which the journey to space was inseparable from the concept of the American spirit itself, and the impact of the Apollo missions on not only the U.S. space program but also American society was significant. Kennedy had turned the space program into a "larger than life" character, and a source of national pride.

The space program continued to thrive during the Johnson administration. Johnson was familiar with competitive space rhetoric, as he had been the chair of the Senate space committee under Eisenhower, and a vocal critic of Eisenhower's response to Sputnik 1.⁴¹ However, over the course of the Johnson administration, as the U.S. began to take the lead away from the Soviet Union in space, Johnson's leadership rhetoric began to lose the "stark polarity" between the U.S. and the U.S.S.R.⁴² Like Kennedy, Johnson began to look at the possibilities of collaboration in space. However Johnson had many other issues competing for his attention, like civil rights and the Vietnam War. But as the country became more involved in these pressing issues, Johnson's commitment to space fell to the side. By the end of the 1960s, despite the excitement generated by the upcoming launch of *Apollo 11*, the future of America's space program was somewhat uncertain.

NIXON AND THE NORMALIZATION OF SPACE

When Richard Nixon was sworn in as President of the United States of America on January 20th, 1969 (exactly six months before the launch of *Apollo 11*), he, like Johnson before him, was not a stranger

⁴⁰ Ibid, 187.

⁴¹ Krug, 36.

⁴² Ibid, 37.

to the U.S. space program. Nixon had stood at Eisenhower's side when *Sputnik 1* had rippled waves of panic throughout American society, and in response had warned that it would be a mistake for the United States to simply brush off the Soviet success as a publicity stunt.⁴³ He also was familiar with the old rhetoric of competition and prestige, but when Nixon inherited the space program, the program, and the world itself, was much changed. The ongoing war in Vietnam had deeply affected U.S. society and American attitudes toward the outside world, especially those that suggested the U.S. should expand outward. Nixon himself was highly invested in the success of landing an American on the moon due to the promise of good publicity, but as for what came after that, he was less interested. After *Apollo 11*, when it seemed evident that the United States had taken preeminence in space, Americans no longer felt the same sense of excitement from NASA as they had in the past.⁴⁴ To those that remained interested in space and looked to the future, "after the Moon, Mars," became the motto. However, because space was not a high priority for Nixon and the public had become preoccupied with other societal concerns, there was no sense of urgency to define what came after the Apollo missions.⁴⁵

NASA found itself in a bit of an identity crisis. Unable to rely solely on themes like competition and prestige to gather support, as it had in the past, the program felt lost. When Nixon set out to create a new identity for the space program, he led with a pragmatic outlook on the future of U.S. space exploration.⁴⁶ The cancellation of the *Apollo 18-20* missions, as well as cuts to NASA's budget made it clear that Nixon and other leaders in U.S. Congress intended to take more of a reserved approach to space exploration. The extravagant spending of the Apollo era was over. As space became less of a national priority, the American space program truly was "normalized" under Nixon, and NASA became more like a regular governmental domestic program, and less of an extension of national image. Nixon had come to the conclusion that the Nation and the national budget could not afford ambitious steps toward the future

⁴³ Ibid, 48.

⁴⁴ Ibid.

⁴⁵ John M. Logsdon, *After Apollo?: Richard Nixon and the American Space Program*, Palgrave Macmillan, 2015, 8.

⁴⁶ Krug, 49.

in space exploration,⁴⁷ and instead decided upon a path that would keep U.S. space endeavors confined to low Earth orbit. The American public, he decided, favored other national priorities over space.⁴⁸ The U.S. viewed the Space Race as “won” after *Apollo 11*, and Nixon and the majority of his policy and budget advisors did not believe it was necessary to continue high-cost space missions to generate American prestige and pride.⁴⁹ In this way, Nixon chose to look inward toward home, rather than outward into space.

The decline of space as a national priority reflected many competing priorities both at home and abroad, including an active civil rights movement and the controversial Vietnam War – both of which coincided with a reduced sense of nationalism by many Americans and a broad distrust in national leadership. The separation between space and national prestige also reflected a shifting perspective in American society, which valued international cooperation over competition.⁵⁰ International collaboration in space once again resurfaced as a goal under Nixon, perhaps due to his “global” designs for his presidency and his desire to appeal to the international community as a peacemaker. Speaking before the United Nations General Assembly on September 18th, 1969, Nixon advocated for the internationalizing of space, stating that the United States would take “positive, concrete steps” to bring the joys of space exploration to many other nations.⁵¹

Keeping the focus toward Earth, NASA under the Nixon administration began preparations for developing a space station. However, there was much confusion surrounding the project, and no long-term strategy for use of the shuttle that would transport astronauts to and from the space station.⁵² This wasn’t so much the fault of Nixon himself or his administration, but due to the uncertainty of NASA as it adjusted to this new era of space exploration. In contrast to the Apollo days, there was a lack of a concrete goal, and therefore it was difficult to organize a motivational project reminiscent of the race to the moon.

⁴⁷ Logsdon, *Nixon*, 30.

⁴⁸ *Ibid*, 100.

⁴⁹ *Ibid*, 123.

⁵⁰ *Ibid*, 104.

⁵¹ Richard Nixon, “Address by President Richard Nixon to the UN General Assembly,” *U.S. Department of State*, September 18, 1969, 1.

⁵² Logsdon, *Nixon*, 277.

Under Nixon, space was to be a normal aspect of life,⁵³ and would lose the sense of grandeur it had in the Kennedy period. Nixon explained that the United States space program would not take money away from other Earth-based government programs, and therefore was subject to budget cuts.⁵⁴ The space program floundered and fell on the backburner, and these cuts set the stage for NASA trying to accomplish too much with too little⁵⁵ - a situation that still plagues NASA's current fiscal environment. Pioneering the frontier of space was not part of Nixon's "strategic vision for America,"⁵⁶ and the uncertainty of America's future in space continues to be felt in American space exploration today. Therefore, in many ways the Nixon administration set the stage for how space exploration in the United States occurs today.

REAGAN AND THE COMMERCIALIZATION OF SPACE

After Nixon's "normalization" of U.S. space exploration, in which the administration pulled back on the extravagant rhetoric of earlier decades, the Reagan administration took Nixon's methods one step further, and began the trend of U.S. space activities in which commercial and economic motivations struggled with the past goals of national prestige. With Reagan's idea of outer space as the "new frontier"⁵⁷ of economic development, two driving concepts of NASA took precedence: the commercialization of space, and interest in international collaboration. Commercialization efforts in space would be an area in which the U.S. could demonstrate the superiority of the American character and economically improve the Nation, and international collaboration would be the avenue in which the U.S. was to do just this.⁵⁸

⁵³ Ibid, 279

⁵⁴ Ibid, 278.

⁵⁵ Ibid, 280.

⁵⁶ Ibid, 284.

⁵⁷ Krug, 68.

⁵⁸ Ibid, 78.

When Reagan took office, public opinion toward space exploration in the U.S. was “generally, but not overwhelmingly, positive.”⁵⁹ Initially, following Reagan’s election, NASA officials were excited to once again have a president who seemed to support the space program wholeheartedly, and hoped for a figure reminiscent of Kennedy to lead the program. However, although Reagan did work to revitalize the U.S. space program and stressed the importance of space as a “new frontier,” conflicting messages created internal issues within NASA. Although Kennedy had once stated that the U.S. would get to the moon “no matter the cost,” this rationale was no longer justifiable. Reflecting Reagan’s own perspective on government as a whole, his administration focused on cost effectiveness and reducing government spending in space. However, he still called for expansive leaps into the future in space technology, which created pressure within NASA to produce successes that garnered public support, but with a smaller budget.

Construction on the space shuttle program dominated space activities under Reagan. However, funding for NASA neither “soared nor stopped”⁶⁰ under Reagan, and after Nixon’s budget cuts, this created problems for the expensive program. There was a need to justify work on the shuttle program as a cheap alternative to a larger project such as exploring Mars, and therefore, NASA often oversold the cost effectiveness of the program.⁶¹ Due to the expectation that more could be achieved for less, NASA underestimated what the actual costs of the program would be, thereby ensuring that not only would the program go over budget, but also that it would be underfunded.⁶² The result of the uncertainty and underfunding of the shuttle project was internal conflict among NASA officials, and a “bad culture” in the U.S. space program.

The *Challenger* disaster, which occurred on January 28th, 1986 and involved an explosion of the rocket on initial launch, as well as the death of the astronauts on board, had a profound effect on attitudes

⁵⁹ Lyn Ragsdale, “Politics not Science: The U.S. Space Program in the Reagan and Bush Years,” Ed. Rodger D. Launius, and Howard E. McCurdy, *Presidential Leadership and the Development of the U.S. Space Program, NASA History Office*, 1994, 260.

⁶⁰ *Ibid*, 258.

⁶¹ *Ibid*, 269.

⁶² *Ibid*.

toward space exploration in the United States. A Congressional investigative task group, known as the Rogers Commission, was charged with the task of understanding the causes of the accident. The group reported that although the accident itself was caused by an equipment failure, the larger cause of the disaster was a style of decision-making within NASA, in which officials at the top of the command chain were willing to compromise safety for better overall results. The report concluded:

Pressures within NASA to attempt to evolve from [a research and development] agency into a quasi-competitive business operation caused a realignment of priorities in the direction of productivity at the cost of safety.⁶³

One member of the commission, physicist Richard Feynman, was particularly critical of the decision-making gap between NASA management and NASA engineers. In an appendix to the report, he explained that there was a willingness of the management to ignore safety recommendations made by the engineers on the shuttle.⁶⁴ Instead, NASA officials had a “fantastical faith” in the project that was not only unrealistic, but later resulted in the loss of lives when *Challenger* exploded.⁶⁵

As the justification of space exploration as a means to promote U.S. national prestige and enforce competition with the Soviet Union faded into rhetoric of the past, there was a need for a new rationale. The economic promise of outer space became an important motivator for U.S. space exploration under the Reagan administration, but also created a culture within the U.S. space program that pushed for rapid, quick successes at the expense of safety measures. As NASA took on more of a “business” atmosphere, while also working under conflicting messages from the top, the American space program fell prey to a common theme that is found in big businesses – disasters when there is a disconnect between management and those that enact policy statements. Gone were the days of unified goals and motivations, and instead the U.S. entered into the era of American space exploration in which the future was clouded rather than clear.

⁶³ Report of the Committee on Science and Technology, *Report of the Presidential Commission on the Space Shuttle Challenger Accident*, U.S. Government Printing Office, 1986, 3.

⁶⁴ Richard Feynman, “Personal Observations on the Reliability of the Shuttle,” *U.S. Government Printing Office*, 1986, 1.

⁶⁵ *Ibid.*

SPACE EXPLORATION IN THE POST-COLD WAR ERA (1991-TODAY)

The aftermath of the success of the Apollo missions left the United States as the perceived “winners” of the Space Race, but rather than serving to encourage the American space program to continue making monumental achievements in space, Apollo and the “lavishness” of the Kennedy era became a benchmark to hold up as a comparison to the relative frugality of the modern era. The United States moved into the next stage of American space exploration, in which NASA was stretched to achieve similar accomplishments to the lunar landings, but a lacking budget and decreasing public interest. This mindset of “a lot with little” began in the Nixon and Reagan administrations, and continued to dominate decades to come.

In the post-Cold War era, the United States struggles to decipher its identity as a space-conquering nation. It hesitates to relinquish its status as the preeminent leader, but yet is also unwilling to commit to space on the same level as the Apollo period. What does the United States want from space exploration in the future? This next section explores the modern period of U.S. space exploration, and investigates the current struggles found in the American space program.

GEORGE H. W. BUSH AND THE SPACE EXPLORATION INITIATIVE

As the Cold War came to an end, so did an American space program that centered on goals of competition and prestige. By the end of the Reagan era, NASA found itself in the midst of competing goals that pulled the program in many directions, thereby stagnating progress.

When George H. W. Bush took office, he did attempt his own tactic at moving the American space program forward. In 1989, he announced his Space Exploration Initiative (SEI), which would return America to the Moon by 2000 to establish a lunar base, and, then utilizing the space station program that he had inherited from Reagan, launch a mission to explore Mars by 2010. Bush called the plan a “national priority,” referencing back to the Kennedy era and calling upon the old mentality of American nationalism united behind space progress.⁶⁶ Congress, however, was still deeply rooted in the budget

⁶⁶ Ragsdale, 297.

concerns of the past decade, and reacted negatively to the proposal, completely refusing support. Bush continued to push for funding, but to no avail. Ragsdale explains:

In its support of the Moon-Mars project, the Bush administration appeared to be offering a plan not just about big science, but about biggest science. Yet it did so with little attention to politics. It attempted to bring the space program full circle back to the early 1960s. It was attempting to recreate space policy as primary policy, which would involve a bold, expensive, and consensual priority. Yet in the political climate of the early 1990s, the boldness and expense of the Moon-Mars plan ensured that it would be anything but consensual.⁶⁷

The problem was that although Bush laid out a vision for the future of America's space program, his vision was not entirely concrete and relatively difficult to pin down into one coherent message. Bush administration leaders were simply not as focused as leaders those the Kennedy and Johnson eras, and although Bush went to great lengths to rejuvenate U.S. space exploration, the overall atmosphere had vastly changed. In his initiative, Bush called for Americans to return to the moon, and to explore Mars - the desired successor to the moon. He maintained interest in the development of the new space station program, reasserting America's interest in leading the global space exploration effort. But with these large, expansive goals, Bush's message was filled with conflicting rhetoric of both looking behind to the past, and forward toward the future.⁶⁸

Overall, the SEI had the kind of forward-looking thinking and ambitious perspective that gets people excited about the American space program, but it fell short of an explanation of how America would make the needed progress to achieve its lofty stated goals. Still, Bush retained the usual political rhetoric regarding space exploration in the United States, touting American leadership and excellence. About the SEI, Bush advocated that despite the challenges of the SEI, the American people would rise above those challenges because it was the Nation's "destiny to lead."⁶⁹

⁶⁷ Ibid.

⁶⁸ Ibid.

⁶⁹ Synthesis Group On America's Space Exploration Initiative, "America at the Threshold: America's Space Exploration Initiative," *NASA History*, 1991, 2.

Even if the president demonstrated a desire to revitalize the U.S. space program with ambitious rhetoric that referenced back to the Apollo days, it simply lacked the clarity, as well as the budget, that both the Kennedy and Johnson administrations benefited from. Bush's rallying words alone were not enough to jump start the program into the future, and because of this lack of follow-through within his own administration, the SEI as a framework did not survive to the following administration. Without a concrete plan that fell in line with budget realities and the attitudes of NASA and Congress officials, when the Clinton administration evaluated the state of NASA, it would create its own plan rather than follow that of its predecessor.

CLINTON AND THE INTERNATIONAL SPACE STATION

By the time Bill Clinton arrived in the White House, critics argued that America's space program had lost its direction. Concerns over resource availability and the need to justify cost effectiveness in NASA also continued, along with an overall sense of stagnation. The United States space program was finding it difficult to rally the same amount of support it had in the past. Indeed, even the space station project, originally proposed by Reagan as the Space Station Freedom, came close to being canceled by Congress over budget concerns.⁷⁰ However, after reducing costs and announcing the inclusion of the new, post-Soviet Union Russia, construction finally began under the Clinton administration, and *Freedom* evolved into the International Space Station (ISS).

After the fall of the Soviet Union in 1991, the post-Cold War arena offered the opportunity for increased collaboration between the United States and Russia in space exploration. However, as Logsdon points out, the end of the Cold War didn't necessarily end the desire for global space dominance on the part of the U.S. or Russia.⁷¹ Leadership in space was still an important rhetorical theme throughout the Clinton administration, as it was in past administrations, despite lack of actual follow-up to achieve this goal. However, with the construction of the ISS, the possibility of achieving more concrete space leadership, even in collaboration with Russia, became a realistic outcome. The ISS allowed the United

⁷⁰ David Callahan, "A Fork in the Road to Space," *Technology Review*, 1993, 1.

⁷¹ John M. Logsdon, "Space in the Post-Cold War Environment," *NASA History*, 1992, 90.

States to demonstrate the superiority of the American space program while also reaching out to other space agencies – and as the U.S. was in fact the leader in space, other nations would likely accept U.S. dominance over the ISS project in order to participate. Logsdon explains that the end of the Cold War created a “need for redefinition of the meaning of space leadership” in the United States – whether or not leadership simply meant being better than the Soviet Union in space, or was more complex.⁷²

GEORGE W. BUSH AND THE VISION FOR SPACE EXPLORATION

Like his father before him, George W. Bush announced his own “vision” for American space exploration during his presidency. He announced his Vision for Space Exploration (VSE) in 2004, following the *Columbia* disaster in 2003, in which the shuttle exploded on reentry into the Earth’s atmosphere, killing the astronauts on board. This was in part to encourage enthusiasm for the space program once again in the wake of tragedy, but also to assert his administration’s commitment to American leadership in space.⁷³ However, again much like George H. W. Bush and other former U.S. presidents, George W. Bush’s strategy had little in terms of a coherent strategy for how to implement his goals. Critics argued that the VSE was too similar to other past unfulfilled “vision” statements, and once again provided poor specific direction for NASA. It reiterated Moon-Mars plans, and also called for the completion of the ISS, as well as the retirement of the shuttle program, but was vague on the specifics.⁷⁴ More criticism drew from Bush’s emphasis on Mars, which was scorned by scientists who valued their work in low-Earth orbit. Abbey and Lane, summarize criticism of the VSE, which emphasized larger, more expensive projects into deep space:

President George W. Bush’s NASA Plan, which echoed that of President George H. W. Bush over a decade before, is bold by any measure. It is also incomplete and unrealistic. It is incomplete, in part, because it raises serious questions about the future commitment of the United States to astronomy and to planetary, earth, and space science. It is unrealistic from the perspectives of cost, timetable, and technological capability. It raises expectations that are not matched by the Administration’s commitments. Indeed, pursuit

⁷² Ibid, 100.

⁷³ Joseph N. Tatarewicz, “The ‘Vision for Space Exploration’ of President George W. Bush, Space Science, and U.S. Space Policy,” *Futures*, 2009, 533.

⁷⁴ Ibid.

of the NASA Plan, as formulated, is likely to result in substantial harm to the U.S. space program.⁷⁵

Regardless of the feasibility of the VSE's stated goals, just as in past administrations, NASA attempted to reorganize itself to encompass this new strategy.⁷⁶ However, internal divisions between those that looked outward into space with the intent of sending manned missions, and those that continued the previous administrations' focus on Earth created, once again, a conflicted environment in NASA.

Calls for increased international collaboration in space exploration were made in Bush's Vision statement, which was received with a mixed response from the global space community. However, as the construction of the ISS was completed under George W. Bush, international partners felt more reassured of U.S. commitment to the space station, and were encouraged despite initial reservations shortly following the VSE announcement.⁷⁷ International collaboration was contingent on the future of the ISS, as it was the dominant U.S. space project under Bush, and his VSE offered only vague references to what the role of the United States might be after its completion. One fact of the VSE that particularly troubled NASA officials, is that with the ending of the shuttle program in 2010, the United States would be bound to Russian assistance in order to take American astronauts to the ISS.⁷⁸

Although international collaboration was once again on the forefront of American space exploration plans, this collaboration was intended to be "American-led."⁷⁹ Under George W. Bush, NASA began to face the struggle that it faces today - whether it will push for American leadership in space and miss out on collaborative possibilities, or whether it will embrace the "new paradigm" of space exploration that is found today, and forge ahead with other space-faring nations

⁷⁵ George Abbey, and Neal Lane, "United States Space Policy: Challenges and Opportunities," *American Academy of Arts and Sciences*, 2005, 16.

⁷⁶ *Ibid*, 17.

⁷⁷ Alain Dupas, and John M. Logsdon, "Creating a Productive International Partnership in the Vision for Space Exploration," *Space Policy*, 2007, 25.

⁷⁸ Abbey and Lane, 19.

⁷⁹ *Ibid*.

OBAMA AND THE MOVING FRONTIER

In April of 2010, U.S. President Barack Obama spoke of his vision for NASA in front of an audience of scientists, business leaders, and politicians. As he outlined his ideas for the future of America's space program, he stated:

I'd like to talk about the next chapter in this story. The challenges facing our space program are different, and our imperatives for this program are different, than in decades past. We're no longer racing against an adversary. We're no longer competing to achieve a singular goal like reaching the Moon. In fact, what was once a global competition has long since become a global collaboration.⁸⁰

Here, President Obama highlights some of the key differences between the past, Cold War era of space exploration initiatives, and the current period of space research and development that the world is in today. Following up with this message, Logsdon explains that the space policy of the Obama Administration acknowledges that the number of nations in the space arena has developed and increased, and is continuing to do so, and that if the United States misses out on these critical new relationships, "other poles of space leadership will emerge."⁸¹

The largest difference between space exploration during the Cold War and space exploration today is simply the increase in the number of interested parties in space exploration. Space exploration now encompasses a multitude of participants. This includes the introduction of more nations that have strong space research capabilities, as well as the marrying of government-controlled space initiatives and assistance from private industry. The effects of globalization aren't unique to just the field of space exploration - as our world gradually becomes more and more interconnected, the roles that individual nations play in determining international politics have been changing. Space exploration is unique in that it has been inherently tied to the national security interests of the United States, and we see that changes in space goals of the U.S. have changed along with shifts in how the U.S. operates in a globalizing world.

⁸⁰ Barack Obama, "Remarks by the President on Space Exploration in the 21st Century," John F. Kennedy Space Center, Merritt Island, 2010, 3.

⁸¹ John M. Logsdon, "Change and Continuity in U.S. Space Policy," *Space Policy* 27.1, 2011, 2.

Globalization has gone hand in hand with the struggle for nations to maintain their autonomy and influence. Montluc explains the importance of globalization:

Two overlapping forces shape our world. On the one hand, there is the dynamic of globalization with its well-known driving forces - financial liberalization and the technological revolution - bringing about interdependence and promoting networks. On the other hand geographical or geopolitical realities are reasserting themselves and causing power struggles.⁸²

Globalization in general has had a great effect on how countries conduct all research, including space research. This creates a situation in which space policy must balance the motivations of space exploration between nationalism and economic gain. In the aforementioned speech, President Obama also states that he wants to transform NASA into an agency that can contend in the modern era of space exploration.⁸³ The realities of space exploration are changing rapidly, and now the United States, as well as the other nations of this world, must decide what their goals are and how they will achieve them.

Although the overall arena of space exploration has changed quite a bit and is more muddled, many aspects remain as familiar echoes of the words of past administrations in the United States. Despite messages of international cooperation and collaboration, Obama still retains some of the same rhetoric from the past era of more competitive space exploration, stating his intention to maintain American space leadership.⁸⁴ The particular national pride America has in its leadership role definitely has not diminished. America still continues to insist that it be the country to control peaceful operations in space, and that without it, space is endangered. Furthermore, current policy understands that international collaboration plays an important role, but that the ultimate goal of this collaboration is to have the U.S. maintain and even strengthen its historic leadership role in space exploration. However, these ideals often conflict with each other, which has led to the continuing problem of an American space program without a concrete direction.

⁸² Bertrand De Montluc, "The New International Political and Strategic Context for Space Policies," *Space Policy* 25.1, 2009, 27.

⁸³ Obama, "Remarks," 6.

⁸⁴ *Ibid*, 7.

THE NEW PARADIGM OF SPACE EXPLORATION

The field of space exploration, as it stands today, is markedly different from the past. Space exploration is now truly a global enterprise, and an arena that is no longer primarily dominated by two parties in struggle with each other. In a sense, there is a “new paradigm” - a change in how space exploration is conducted, and naturally, any nation that wishes to take part in the exploration of space must first integrate itself successfully into this changed field. In the following section, this paper explores three evolving conditions of the space exploration field as a whole that help to shape current U.S. space policy. These three conditions are: 1) globalization and the growing presence of private industry in space exploration, 2) the International Space Station as a representative of international collaboration in space exploration with a specific look at possible Chinese participation, and 3) the framework for future explorative efforts to Mars.

THE ROLE OF PRIVATE INDUSTRY IN AMERICAN SPACE LEADERSHIP

When exploring changes in the narrative of space exploration in the United States, the role of private industry cannot be ignored. Motivations behind entering into the space industry can be different between a national government and a corporation. Given that private industry is required to make a profit, this sets these companies apart from government funded programs like NASA. As the prevalence and visibility of private industry and corporations grows in space exploration, what the United States identifies as its goals in space research is affected, and this shift may even force a realignment of U.S. goals in response. By looking at how private industry has influenced the United States, we are able to see the struggle the U.S. is undergoing between protecting national interests and keeping up with the rapidly globalizing field of space science research.

On May 24th, 2012, the commercial company *SpaceX* achieved something that had previously only been accomplished by governments.⁸⁵ The company's *Dragon* capsule became the first commercially built vehicle to deliver cargo to the International Space Station. After that day, *SpaceX* was

⁸⁵ Chad Anderson, “Rethinking Public-Private Space Travel,” *Space Policy*, 2013, 1.

added to the list of entities that have launched a space capsule into orbit and successfully brought it back to Earth, along with United States, Russia, and China.⁸⁶ Consequentially, private industry now is a force in space exploration on par with governmental agencies. The relationship between private industry and U.S. government programs in space exploration has also become closer in recent years. The increasing inclusion of private companies into an area previously controlled by government reflects overarching changes toward globalization in all sectors of society. “International collaboration” now includes many entities, and is not just limited to government-to-government relations. In President Barack Obama’s speech at the Kennedy Center regarding the future of NASA, he addressed this controversial topic and announced his intention to work with private business, stating:

I recognize that some had said it is infeasible or unwise to work with the private sector in this way. I disagree. The truth is, NASA has always relied on private industry to help design and build the vehicles that carry astronauts to space.⁸⁷

The controversy lies within the separation between the motivations of a nation and a company. The overall goals between these two are often different - and range from political to economic. Both political and economic reasons are present in why humans explore space to begin with, but where a nation is often more concerned with its image and prestige, companies tend to focus more on profits and monetary benefits. Whereas corporations ultimately must focus on economic profit, government can instead focus on investing in broader public good. The upside to privatization of space exploration and technology is that while NASA funding is tied to election cycles in U.S. politics, private industry is not. Currently, NASA simply does not have the budget to enact all of its goals. Therefore, Administrator Charles Bolden has stated that the “new business model”⁸⁸ for NASA includes private contractors as a part of the “NASA family.”⁸⁹

⁸⁶ Ibid.

⁸⁷ Obama, “Remarks,” 5.

⁸⁸ “NASA’s Vision.”

⁸⁹ Ibid.

Also, within the United States, there are governmental barriers to a flourishing space research industry. The presence of International Traffic in Arms Regulations (ITAR) is one significant barrier. ITAR was initially enacted in 1976, during the Cold War, in order to implement control over arms exports. However, in recent years, ITAR has meant that it is exceedingly difficult for international collaboration to take place between organizations within the United States and those of other nations, as there are stringent regulations surrounding what types of information can and cannot be shared. Blount gives this explanation of ITAR:

ITAR is a group of export control regulations that were adopted under the Arms Export Control Act. The Act allows the government to control the export of defense items, services, and technical data to other nations, and ITAR is the implementation of these controls. The policy behind ITAR is to further “world peace and security.” The crucial section of ITAR is the United States Munitions List (USML), which designates, in twenty-one categories, articles and data that are considered to be defense items. If an object is found on the USML, it and data about it will require licensing by the Department of State’s Director of Defense Trade Controls before the item can be exported. Of particular interest to practitioners in the space industry are items such as launchers and propellants; however, the inclusion of spacecraft and commercial satellites create the largest problems for the industry.⁹⁰

ITAR means international collaboration in the space industry is a very long process that not only makes it difficult for civil space programs to cooperate with foreign programs,⁹¹ but also poses a threat to American competitiveness in the space industry. Although the regulations are present for compelling reasons, and there have been efforts to lessen the strictness of ITAR in recent years, ITAR also hinders the growth of space industry-related business in the United States. Due to the stringent regulations and difficulty in getting through all of the processes of ITAR, the presence of ITAR “raises the cost of doing business across the board, which often sends investors to other sources for technology, and it can effectively bar small entrepreneurial business from entering into international markets.”⁹² Longstanding companies like Boeing have the ability to navigate through ITAR, but small businesses or firms may not

⁹⁰ P. J. Blount, “The ITAR Treaty and Its Implications for U.S. Space Exploration Policy and the Commercial Space Industry,” *Journal of Air Law and Commerce* 73, 2007, 709.

⁹¹ *Ibid.*, 712.

⁹² *Ibid.*

be able to do so. ITAR not only results in missed opportunities in the realm of international collaboration between government, but also for industry in the U.S.

THE POLITICS OF THE INTERNATIONAL SPACE STATION: A CHINESE PERSPECTIVE

No look into international collaboration in space would be complete without considering the role of the International Space Station (ISS). As the ISS came about at the beginning of the post-Cold War era of space exploration, it serves as a good case study for how politics and national interests determine what enacted policy looks like in real-life examples. Because of the structure of the ISS and how it is utilized by several different space agencies from a variety of nations, the ISS has been considered “a litmus test of international space cooperation.”⁹³ China serves as an interesting lens in this case, as they have recently indicated interest in joining other agencies on the ISS, and were declined by the United States.

Before the first component of the International Space Station was launched into low Earth orbit in 1998, the project was put forth during the Reagan Administration, then known as Space Station Freedom (SSF), and was intended to be an international project headed by the U.S. from the very beginning. The initial international partners sought out by NASA were the European Space Agency (ESA), the Canadian Space Agency (CSA), and the Japan Aerospace Exploration Agency (JAXA). During the beginnings of the ISS project, NASA’s interaction with the involved foreign space agencies centered around NASA dominating the bilateral or multilateral agreements, and maintaining most of the control over the entire project. This strategy meant that the United States intended to keep its leadership status in space exploration,⁹⁴ but international collaboration was still valuable to the priorities of the U.S. when it came to the space missions that the United States wished to implement.⁹⁵ After the fall of the Soviet Union, the Russian Space Agency (RSA) was added to the list of partners and the project became what we know today, the ISS. Just as Russia was added to ISS after several years of established planning and framework,

⁹³ Eligar Sadeh, “Technical, Organizational and Political Dynamics of the International Space Station Program,” *Space Policy* 20.3, 2004, 171.

⁹⁴ Ibid.

⁹⁵ Ibid.

it is possible in the future that there will be more space agencies added to this symbol of international cooperation in space.

Recently, China has indicated its interest in joining other nations on the ISS,⁹⁶ which due to the politics of the day, has been denied by the United States, despite China's rapid technological development in space exploration.⁹⁷ The United States claims it is for reasons of national security that it opposes collaboration with China in space exploration.⁹⁸ In this way, China has come to replace the former Soviet Union in American security calculations and concerns.⁹⁹ Despite reassurances by China that its interest in space is peaceful in nature, the fact that the country's political decision-making is "notoriously opaque," means that other countries have difficulty in deciphering China's true goals.¹⁰⁰ Additionally, missile tests made by China in space, including the anti-satellite weapons (ASAT) test in 2007 in which China launched a ballistic missile at an out-of-operation weather satellite, resulting in a massive amount of space debris, give cause to the international community to question Chinese intentions in space.¹⁰¹

However, some authors have challenged the argument that countries like the U.S. have purely scientific or peaceful intentions behind their interest in space, while China is more nefarious. Security concerns were present in the past when the U.S. opened up to more collaboration with Russia, yet the collaboration led to a number of successes on projects like the ISS. Seedhouse explains that despite the risks, China's motivations for building up its own national space program is an attempt to "reap all the benefits" that the United States achieved during the Apollo era – benefits which include domestic pride, international prestige, and economic development.¹⁰² Hilborne also recommends that for the benefit of both parties, the U.S. and China should overcome their differences. One difference is that Russia joined the ISS at a time when the country was economically vulnerable, which influenced its decision to team up

⁹⁶ Yun Zhao, "Legal Issues of China's Possible Participation in the International Space Station: Comparing to the Russian Experience," *Journal of East Asia & International Law* 6.1, 2013, 156.

⁹⁷ *Ibid.*

⁹⁸ Zhao, 158.

⁹⁹ Mark Hilborne, "China's Rise in Space and U.S. Policy Responses: A Collision Course?" *Space Policy*, 2013, 121.

¹⁰⁰ *Ibid.*, 123.

¹⁰¹ *Ibid.*

¹⁰² Erik Seedhouse, "The New Space Race: China vs. the United States," *Praxis Publishing*, 2010, 5.

with its old rival.¹⁰³ However, China's is currently in a position where its economic capabilities are increasing, including in space endeavors.¹⁰⁴ Where it was once in Russia's best interests to join the ISS, it now may be in the best interests of the rest of the world to invite China to participate on the ISS. The reality is the field of space exploration has changed. The United States is in a position to recognize this, to establish common ground in security concerns, and to encourage broad participation by other nations, which may require establishing a beneficial relationship with China in space.

LOOKING AHEAD: MARS AND THE FUTURE OF THE AMERICAN SPACE PROGRAM

NASA has recently identified Mars as the new "Moon," or the new larger goal for the space program. What will it take to achieve this ambition? It is generally accepted that as the arena of space exploration develops and becomes more complex, involving more participating agencies and interested parties, future space missions will naturally become more reflective of this diverse field, becoming more "international" in nature and scope. It is also expected that space industry will continue to have an invaluable role in future space missions, more so than it has had in the past. As the global space-faring community looks toward the future, it often looks to Mars.

Shaghghi and Antonakopoulos identify the groups or "stakeholders" that have an important role in future missions to Mars. They identified 13 stakeholders, ranging from governments to cultural institutions.¹⁰⁵ This demonstrates how space exploration is currently a complex endeavor, incorporating many different perspectives and backgrounds. The authors also argue that large-scale missions to Mars, like a settlement missions, would only be possible on a worldwide scale in terms of cooperation, and therefore international collaboration is essential to the success of the mission.¹⁰⁶ No one nation singularly

¹⁰³ Zhao, 166.

¹⁰⁴ Ibid.

¹⁰⁵ Azam Shaghghi, and Konstantinos Antonakopoulos, "The Societal Impacts of a Mars Mission in the Future of Space Exploration," *Physics Procedia*, 2012, 179.

¹⁰⁶ Ibid, 182.

has preeminence over the technology needed for a manned mission to Mars, which means that global cooperation is imperative to the future of space exploration.¹⁰⁷

The question is whether NASA recognizes and accepts this imperative. In NASA's statement on its plan for future manned missions to Mars, many references to international collaboration are made, with phrases like "NASA and its partners," occurring frequently. International collaboration is also identified as a strategic principle,¹⁰⁸ demonstrating NASA's recognition of cooperation between nations as essential to successful missions to Mars. Additionally, the crucial use of the ISS as a stepping stone toward Mars acknowledges the importance of the international relationships already established.¹⁰⁹ NASA also identifies the importance of U.S. space industry in efforts to Mars.¹¹⁰ *SpaceX* is mentioned specifically as an instrumental part of launching U.S. spacecrafts into orbit,¹¹¹ demonstrating the importance of private industry in U.S. space efforts.

However, despite a framework that demonstrates interconnectedness and complexity, NASA is still determined to remain the leader in space exploration.¹¹² The word of the day seems to be "pioneer," which makes repeat appearances in NASA's publication of its strategy to Mars. NASA continues to operate under the belief that it can both be a leader and a participant on the global journey to Mars. The struggle between maintaining leadership and encouraging collaboration will be examined in Part II of this paper.

¹⁰⁷ Ibid.

¹⁰⁸ "NASA's Journey to Mars: Pioneering Next Steps in Space Exploration," *NASA*, 2015, 6.

¹⁰⁹ Ibid, 14.

¹¹⁰ Ibid, 15.

¹¹¹ Ibid.

¹¹² Kathleen C. Laurini, and Michele M. Gates, "NASA's Space Exploration Planning: The Asteroid Mission and the Step-Wise Path to Mars," *International Astronautical Federation*, 2014, 1.

PART II: CONTENT ANALYSIS

CONTENT ANALYSIS METHODOLOGY

In order to investigate how the narrative of space exploration has changed over time, this paper looked at the policies and rhetoric concerning U.S. space exploration across eight U.S. presidential administrations, from the Cold War era to today. It specifically examined three areas of space exploration rhetoric: policy releases from various presidential administrations, statements made by those presidents and other prominent voices in space exploration leadership, and policy recommendations made to the U.S. government for advised action in space exploration. By looking at these three areas, this paper was able to examine a broad range of space exploration rhetoric, from official policy to leadership attitudes. Policy releases represent what the current U.S. administration wishes to present as its official goals for space exploration, leadership statements in speeches or interviews reveal more of the biases and attitudes concerning space exploration development, and policy recommendations demonstrate how individuals in the current administration wish to move forward in space exploration endeavors. These three aspects of U.S. rhetoric concerning space exploration added up to a larger picture of overall attitudes and intent regarding space exploration on the part of the United States, which traces the evolution of the overall narrative of space exploration in the U.S.

To more rigorously evaluate how the rhetoric and priorities of space exploration in the United States have changed throughout the course of space history in the United States. The documents used in this paper were subjected to a content analysis using five general themes (Table 1). The method of content analysis was chosen to analyze space policy documentation, because it is a useful tool for identifying how different patterns emerge over time from a larger body of material. Content analysis is used when examining how language embodies intent, attitudes, and biases beyond its literal textual meaning. Wodak writes that the analysis of overarching patterns within the content of text or speech is used to “focus on larger units than isolated words and sentences,”¹¹³ in order to examine the content as a whole to derive

¹¹³ Ruth Wodak, *Qualitative Discourse Analysis in the Social Sciences*, Palgrave Macmillan (2008), 5.

meaning.¹¹⁴ She adds that this method of analysis can “address the causes and consequences of historical change.”¹¹⁵ By focusing on the presence or absence of certain themes within these documents, historical changes emerged that can be interpreted as an evaluation of policy rhetoric surrounding the role of space exploration in the U.S. over the course of time.

The five themes were chosen for coding within the content analysis after an initial read-through of the selected documents. Some themes, such as competition with the Soviet Union and international collaboration, were obvious choices for the study. As an objective technique, however, the content analysis method helps in evaluating whether there was a direct evolution from competition to collaboration, and if there were other factors or themes that were more dominant in U.S. space policy than originally suspected. Another interesting question was if there was a linear evolution that could be traced from one theme to another, or if the evolution of space exploration in the United States was more complicated and complex. Because space exploration is used as a political tool in the United States, some of the changes may not be immediately obvious or straightforward. Therefore, in addition to revealing some obvious trends that either increased or decreased over time, the method might aid in understanding some of the nuances of space exploration history.

Other themes such as prestige, leadership, and the evolution of the space exploration field itself emerged after the initial read-through. Once the five themes were identified, each document was coded for them and tallies taken for how many times each theme occurred within the document. Those numbers then added up to total counts per theme per administration. This provides the data for the results and analysis section of Part II.

¹¹⁴ Ibid.

¹¹⁵ Ibid.

Content Analysis Themes

Theme	Rhetoric/Attitude/Goals
1: Competition with the Soviet Union	<ul style="list-style-type: none"> ● the United States is in direct competition with the Soviet Union, which extends out into the field of space exploration ● the Soviet Union, in developing their own space technologies, influence the decision making of the United States in its respective space endeavors ● the United States needs to “beat” the Soviet Union in space exploration ● successful efforts of the Soviet Union in space exploration have a psychological impact on the rest of the world and increase their own prestige
2: American Prestige	<ul style="list-style-type: none"> ● the actions of the United States in the field of space exploration are directly tied to the American persona ● American nationalism is tied to accomplishments in space exploration ● achievements in space exploration are a source of prestige for the United States ● it is important to achieve successes in space exploration for the psychological benefits, and in order to increase American prestige
3: International Collaboration	<ul style="list-style-type: none"> ● there is collaboration or cooperation with other international space agencies on the part of the United States ● there is a goal of partnering with international collaborators on space-related projects ● international collaboration is important to U.S. interests in space exploration
4: American Leadership	<ul style="list-style-type: none"> ● the U.S. is and/or has been a leader in the space field ● there is a goal of maintaining American leadership in space exploration ● space will be a peaceful arena with American leadership ● the United States will continue paving the way for space exploration globally
5: A New Paradigm	<ul style="list-style-type: none"> ● there is the sense of a new era of space exploration ● the space exploration field is a multi-national arena that encompasses many players, rather than the traditional bipolar relationship between the U.S. and Russia ● space exploration is a changing field that does not resemble the past

Table 1. Five themes were used for the content analysis of U.S. policy releases, leadership statements, and policy recommendations related to space exploration within eight administrations from the Cold War to today.

Theme 1: Competition with the Soviet Union. Because the decision of the United States to develop its own space program was largely influenced by the Soviet Union's own endeavors in space technology, references to direct competition with the U.S.S.R. are important to track. Theme 1 also includes rhetoric that incites a sense of needing to "beat" the Soviet Union in space technology and exploration, or statements made about the space program of the Soviet Union in a competitive context. Mentions of the successes of the Soviet Union in space as having a deep psychological impact on the United States and, in a sense, even scaring the United States also falls under this theme.

Theme 2: American Prestige. American nationalism in space exploration, and rhetorical references to prestige is another important theme that set a precedent for the U.S. space program, and success in space exploration is often used to demonstrate strength or superiority. This theme includes statements that link the American persona and space exploration, encourage psychological dominance over others by the United States as the result of successful space endeavors, and advocate for the pursuit of American beliefs and values through space exploration.

Theme 3: International Collaboration. This theme includes specific calls for international collaboration or cooperation in space exploration and technology between the United States and at least one other space-faring nation or agency. It also includes statements that encourage collaboration and cooperation as beneficial for the United States in its own efforts in space.

Theme 4: American Leadership. Statements about the United States as a stated leader of the development of humanity's efforts in space include the U.S. achieving or preserving a commanding leadership role. Leadership should not be confused with competition, as it is much broader and encompasses the betterment of all.

Theme 5: A New Paradigm. This theme is perhaps the most complicated, and includes mentions of a new paradigm of space exploration. In this context, paradigm means how the Nation and the world view the overall field of space exploration as a whole. Preferences to the changing field of space exploration, or the inclusion of new players in this field, were identified and coded. This theme

acknowledges a change from the past rhetoric of space exploration, to statements of the new goals and intentions for what the United States desires to achieve for the future in space.

For the content analysis, five documents each were selected from eight U.S. presidential administrations (within the years that each president held office). Each document fit into one of three categories: policy release, leadership rhetoric, or policy recommendation. A list of the specific administrations and the documents examined are given in the Appendix.

RESULTS AND ANALYSIS

RESULTS

Using the five themes given in Table 1, a clear picture emerges of how U.S. goals and rhetoric in the field of space exploration and technology have developed and changed since the inception of the American space program. The raw counts of each theme, per each of the eight administrations, from the content analysis are shown in Table 2 and are depicted as a histogram in Figure 1.

Counts of Thematic References in Analyzed Documents for Each Administration

	Theme 1 Competition with the Soviet Union	Theme 2 American Prestige	Theme 3 International Collaboration	Theme 4 American Leadership	Theme 5 A New Paradigm
Eisenhower Administration	21	11	12	1	0
Kennedy Administration	10	4	4	10	0
Nixon Administration	10	7	12	6	0
Reagan Administration	3	6	26	23	6
Bush Sr. Administration	0	11	18	16	17
Clinton Administration	0	3	15	5	3
Bush Jr. Administration	0	4	14	2	5
Obama Administration	0	4	12	16	11

Table 2. Content analysis results depicted as a table of the raw counts for each identified theme, showing the number of references in each of the five themes within the categories of policy documents, policy recommendations, and leadership statements for eight U.S. presidencies.

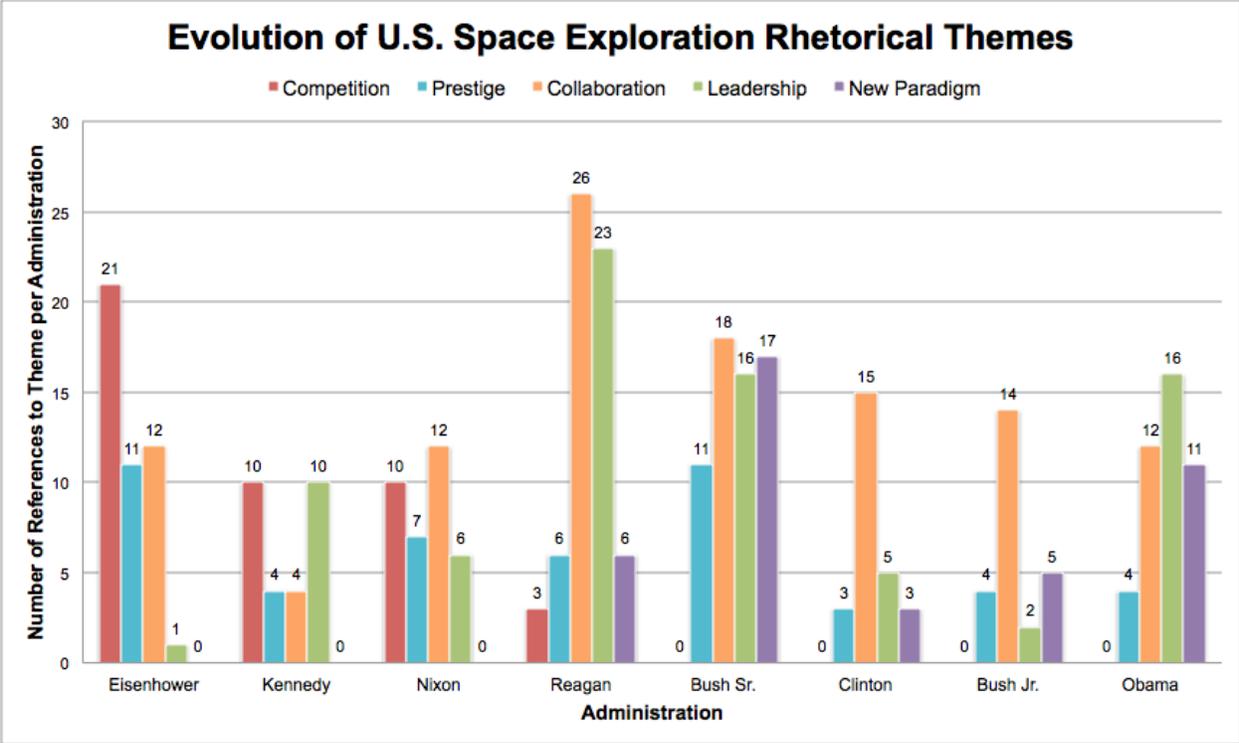


Figure 1. Content analysis results depicted as a histogram, showing the evolution of the identified themes throughout each of the eight administrations. The histogram demonstrates trends for certain themes, such as a decrease in competition over time and an increase in a new paradigm of space exploration. Other themes, such as prestige, collaboration, and leadership, are more complicated and do not show obvious trends.

While some simple trends are apparent in the data, such as the dominance of competition as a theme in early U.S. space program rhetoric and the emergence of the theme of a new paradigm in later years, the results show that space exploration rhetoric is complex and varies greatly from one administration to another. Each of the themes is analyzed in detail in the following section.

ANALYSIS

The rhetoric of space exploration is complicated and varies greatly from administration to administration. Each new U.S. president sets out their own goals for space exploration, and there is variation and, in some cases, conflicting messages. Some administrations may desire to increase American prestige and leadership in space exploration, while others seek to reach other to other space-faring nations and develop collaborative ties. The analysis of these themes reveals how space exploration is an arena where many different, sometimes mutually exclusive, ideals and values interact and conflict with each other. Understanding the development of these themes is important to understanding the development of the symbol of space exploration in the United States as a whole.

Theme 1: Competition with the Soviet Union

Competition is more prevalent in earlier administrations, and gradually decreases over time before it disappears completely during the Post Cold-War period. It begins at its peak of twenty-one counts during the Eisenhower administration, decreasing to ten counts in both the Kennedy and Nixon administration, then to three counts in the Reagan administration, and then disappears as a rhetorical theme from the Bush Sr. administration to the present. It is the dominant theme in the Eisenhower administration, is tied for most references with Theme 4 (leadership) in the Kennedy administration, maintains the same count but comes after Theme 3 (collaboration) in the Nixon administration, and falls to last place in the Reagan administration.

The space exploration narrative begins with a strong presence of Theme 1 in the Eisenhower, Kennedy, and Nixon administrations. The psychological impact of the Soviet Union's launch of *Sputnik 1* is evident in the Eisenhower era, and despite President Eisenhower's dismissal of the Sputnik successes as anything prolific, competition with the Soviet Union dominates early American efforts in space exploration. Well before the launch of the world's first space satellite, the National Security Council brought recent Soviet activities in developing space technology to Eisenhower's attention and explained that future explorations into space would be a race against the Soviet Union that the United States could

not afford to lose.¹¹⁶ After Eisenhower, the Kennedy administration fully embraced the Space Race, and set out to specifically match or exceed the Soviets' space program.¹¹⁷ And in the Nixon era, Congress requested an entire study titled, "United States and Soviet Rivalry in Space: Who Is Ahead, and How Do the Contenders Compare" in order to determine who had the upper hand in space exploration.

In the earlier days of U.S. space efforts, space exploration served as a competitive proxy between the United States and the Soviet Union, symbolizing the general competitiveness that was the Cold War. The presidents and policymakers of these eras were unable to escape the overall atmosphere of "beat the Soviets," and even if the Soviet Union was not explicitly mentioned when space exploration goals were stated, the Cold War and competition with the Soviet Union was heavily embedded in the American psyche.

Theme 2: American Prestige

American prestige stays consistent throughout all administrations as a relevant theme, but slightly decreases over time. It starts off in the Eisenhower administration with eleven counts, and drops a little bit to between four to seven counts for the following three administrations. It gains momentum in the George H. W. Bush administration with eleven counts again, but drops back down again to low numbers for the following three administrations. It is never the most prominent theme in any administration, and is always in 3rd or 4th place.

The consistent presence of Theme 2 in space exploration rhetoric directly demonstrates how space exploration serves a metaphorical purpose in the United States. Space exploration successes are often used as a symbol of the strength of American ideals and values, and those successes bring prestige to the American persona. As a theme it peaks during the Eisenhower and Bush Sr. administrations. During the Eisenhower era, the United States was predominantly reacting to recent Soviet Union advances in space technology - specifically the launch of *Sputnik 1*. While Eisenhower himself gave little

¹¹⁶ National Security Council, "Statement of Policy on U.S. Scientific Satellite Program (NSC 5520)," (1955), 11.

¹¹⁷ The Brookings Institution, "Proposed Studies on Implications of Peaceful Space Activities for Human Affairs," (1961), 190.

attention to this event, his administration was well aware of the psychological benefits of being the first nation to launch a satellite, and related this back to the need of the U.S. to improve its own international image with successes in space. Before the launch of Sputnik 1, as both the United States and the Soviet Union were making preparations for launching satellites during the International Geophysical Year, the National Security Council found that “considerable prestige and psychological benefits will accrue to the nation which first is successful in launching a satellite.”¹¹⁸ After the Soviet Union achieved those psychological benefits, the Council acknowledged that the Soviet Union had surpassed the United States in terms of prestige¹¹⁹ and advised that the United States should work to improve its own image as a successful space-faring nation.¹²⁰

After a handful of presidential administrations and impressive U.S. space missions like Apollo, the George H. W. Bush administration had the ability to look back on 30 years of history in space exploration in the United States with praise. He was fully aware that space exploration served as a symbol of American prestige and was proud of America’s space exploration program, which he acknowledged in his speeches on the 20th anniversary of the Apollo 11 moon landing.¹²¹¹²² However, at this point in time, the United States was beginning to look to the future in order to plan ahead, but maintaining American prestige in space was revealed to be an important goal during the George H. W. Bush administration.

Theme 3: International Collaboration

International collaboration is an important theme throughout all administrations, and, as a theme, becomes slightly more prevalent over time. This theme reaches its peak in the Reagan administration at twenty-six counts, and is at its lowest in the Kennedy administration at four counts. Within the Kennedy administration, it is tied for lowest along with prestige. As a general trend it becomes more of a

¹¹⁸ National Security Council, “Statement of Policy on U.S. Scientific Satellite Program (NSC 5520),” (1955), 3.

¹¹⁹ National Security Council, “U.S. Policy on Outer Space (NSC 5918),” (1959), 3.

¹²⁰ Ibid, 10.

¹²¹ George H.W. Bush, “Remarks on the 20th Anniversary of the Apollo 11 Moon Landing,” (1989).

¹²² George H.W. Bush, “Proclamation 5999 - Space Exploration Day,” (1989).

dominating theme in later administrations, where it is the most frequently occurring theme from the Nixon to the George W. Bush administrations.

Surprisingly, international collaboration as a theme is not only always present in U.S. space policy, even during the earlier days of competition with the Soviet Union, but also dominates rhetoric during the Cold War era administrations of Nixon and Reagan. The earlier rhetoric of international collaboration is generally limited to calls for collaboration with “friendly” countries to the United States. However occasional bones were tossed out to the Soviet Union for exchange of some minimal technical data¹²³ within the Kennedy administration. Eisenhower instead focused on the scientific community as the arena for collaboration,¹²⁴ rather than space agency to space agency.

Under Nixon and Reagan, Theme 3 becomes the key theme in space exploration rhetoric. As the Cold War reaches its height, America looks to its allies to maintain momentum against the Soviet Union in space endeavors. Nixon himself stated he believed that the successes of space exploration “should be shared by all peoples,”¹²⁵ and Reagan reiterated this sentiment during his 1984 State of the Union Address when he stated, “NASA will invite other countries to participate so we can strengthen peace, build prosperity, and expand freedom for all who share our goals.”¹²⁶ The most important American goal during this period of history is without a doubt, to achieve advantage over the Soviet Union.

However once the Soviet Union falls and begins to look less like an enemy and more like a possible partner, Russia is included in this list of possible partnerships for milestone space exploration endeavors like the Space Station Freedom (or as it is later to be known, the International Space Station). Theme 3 maintains its importance over time as globalization and the increasing number of space-faring nations necessitates international collaboration. This theme dominates rhetoric by a wide margin during the Clinton and George W. Bush administrations, where the construction and assembly of the

¹²³ National Security Action Memorandum, “U.S.-U.S.S.R. Cooperation in the Exploration of Space (NSAM 129),” (1962).

¹²⁴ Dwight D. Eisenhower, “State of the Union Address,” (1958), 11.

¹²⁵ Richard Nixon, “Statement About the Future of the United States Space Program,” (1970), 4.

¹²⁶ Ronald Reagan, “1984 State of the Union Address,” (1984), 6.

International Space Station is paramount. By the modern period, the emphasis has shifted away from projects that will gain America prestige, toward projects that will benefit the international community.

Theme 4: American Leadership

American leadership is a present theme throughout all administrations, and also becomes slightly more prevalent over time. It is at its lowest with one count in the Eisenhower administration, and peaks in the Reagan administration at twenty-three counts. It is quite variable as a theme and it is more important within the Kennedy, Reagan, George H. W. Bush, and Obama administrations, than in the Eisenhower, Nixon, Clinton, and George W. Bush administrations.

Theme 4 is closely tied to Theme 2, so like the theme of prestige, leadership is a theme that is constantly present in space exploration rhetoric. In the Kennedy administration, Theme 4 ties with Theme 1 in terms of relevance, demonstrating that not only does the U.S. view space exploration as a competition with the Soviet Union, but that there is also the goal of becoming the leader of the field. Retrospectively, this makes sense, as space exploration was a bipolar arena between the U.S. and the U.S.S.R. As the number of space-faring nations increases, we might expect Theme 4 to decrease. However, this proves not to be the case, and Theme 4 actually increases over time after the Nixon administration. Its peaks in the Reagan and George H. W. Bush administrations are due to the fact that the United States is enjoying its established leadership role in space exploration, and seeks to maintain this role and exert dominance over the Soviet Union. Reagan remarks that “being a leader in space is a very wonderful accomplishment,”¹²⁷ and the National Space Council under the Bush Sr. administration advocates that the “fundamental objective” of U.S. efforts in space exploration is leadership.¹²⁸

Theme 5: A New Paradigm

A “new paradigm,” as a theme, is absent during the Cold War period, and only appears during the post-Cold War period. It first appears during the Reagan administration with the begin of the fall of the

¹²⁷ Ronald Reagan, “Remarks at the 25th Anniversary Celebration of the National Aeronautics and Space Administration,” (1983), 4.

¹²⁸ National Space Council, “National Space Policy Directives and Executive Charter (NSPD-1),” (1989), 1.

Soviet Union, reaching its peak in the following George H. W. Bush administration and staying present within the next three administrations as well. It is less of a pressing theme in the Clinton and George W. Bush administrations, but rises during the Obama administration.

Theme 5 is entirely absent during the Cold War era, as not only is this a period in which the status quo is competition between the U.S. and the U.S.S.R., but the United States does not yet have the history to draw comparison between the past and the present. It first appears as a theme during the Reagan administration, at the tail end of the Cold War, when the National Commission on Space explained that power in space was rapidly proliferating as more and more nations made significant advances in space exploration with their own space capabilities.¹²⁹ Theme 5 reaches its peak under the George H. W. Bush administration, directly after the fall of the Soviet Union and when the world is in the post-Cold War shock. As the United States grapples for where it needs to head in the future in order to achieve its designated space exploration goals, it acknowledges that this is no longer as simple as beating out one identified rival. Additionally, the increasing importance of private industry in space exploration adds to the complexity of space exploration as a field. Globalization not only complicates the arena with the inclusion of more players, but also competing interests in the industrial side.

Under the Obama administration, the president fully acknowledges the multipolar nature of modern space exploration, as well as the significant role of private industry in this field. There is a direct comparison to the past in our current era, where our challenges are now different,¹³⁰ and 50 years after the establishment of NASA, the space exploration narrative has evolved significantly.¹³¹

¹²⁹ National Commission on Space, "Pioneering the Space Frontier," (1986), 158.

¹³⁰ Barack Obama, "Remarks," 3.

¹³¹ *2010 NASA Authorization Act*, (2010), 3.

DISCUSSION

When looking at the patterns that emerge from the five themes of the content analysis, it is important to consider how these themes interact with each other. Understanding this relationship allows us to develop a larger picture of the evolution of space exploration as a whole, with these different moving parts representing shifts in the interests and goals of the U.S. over time. By looking at what the United States currently desires to achieve in space exploration in contrast to its stated goals in the past, we can understand and make recommendations for how the country should move forward in the future.

Competition becomes less present in U.S. space exploration rhetoric, other themes, like international collaboration, American leadership, and a new paradigm become more prevalent. It is plausible that the fall of the Soviet Union and American interest in partnering with the new Russia contributed to this shift in U.S. goals for space exploration, and later on, this interaction between competition and other themes could be the result of the field of space exploration becoming more complex and diverse.

Another theme that fades over time is the theme of prestige, which is an important tool used by earlier leaders to gain the support of the American public by promoting American values through space exploration. Although the United States wishes to remain a leader in space exploration as time goes on, prestige as a theme falls to the wayside in favor of international collaboration. The rhetoric shifts from simply flaunting the national image to enthusiasm for Americans as helping others grow their own space capabilities. This transition is also related to the theme of a new paradigm. As many more interested parties enter into the space exploration arena, the United States makes the decision to let nationalism drop in favor of improving international relations and promoting leadership qualities.

As competition and prestige disappear as relevant space exploration themes, and international collaboration and a new paradigm rise, one might expect that references to American leadership decreases as well. This makes logical sense if leadership is seen as taking a commanding role in conflict with collaboration. The relationship between leadership and collaboration themes is discussed further under Challenge 2 of this section. Curiously, under the Obama administration the theme of leadership spikes up

once again. This may reflect an administration trying to navigate an increasingly complex arena of space exploration, or may be indicative of Obama's values and goals for his legacy. Whatever the cause, Obama's 2010 National Space Policy mentions leadership as a goal six times, communicating intention to maintain U.S. dominance as the field of space exploration develops into the future.

The analysis and interactions among themes point to three challenges regarding U.S. space policy in the current era. These three challenges are: 1) there is a disconnect between stated policy goals in American space exploration efforts and the implementation of those goals, 2) the United States communicates mixed messages regarding its intent to be both the dominant leader in the field of space exploration and committed as a participant in international collaboration, and 3) the United States cannot remain a true pioneer of space exploration if it does not embrace the realities of globalization and the changing dynamics within the field of space exploration. The remainder of this section focuses on each of these challenges in turn, and offers recommendations based on the discussion.

CHALLENGE 1: DISCONNECT BETWEEN POLICY AND IMPLEMENTATION

As examined in the background section of this paper, after the successes of the Apollo era, the United States has had difficulty in clearly defining its goals in space exploration. As space policy has become less of a priority, commitment and follow-through with stated policy goals is often not as consistent as the U.S. government or NASA would like. Whereas in the past space was more of a national priority, today governmental politics dictate stated space policy and subsequent funding for the American space program. Because of this, the United States needs to make some choices concerning how it goes about space exploration, in order to close the gap between ambitious policy statements and the reality of the capabilities of NASA.

The U.S. needs to decide how much influence it wishes to have on global space exploration. Throughout recent policy statements, the U.S. has reiterated its desire to maintain a leadership status in space. Yet realities like NASA's current budget, as well as the general vagueness about the direction the U.S. space program is headed, contradict this goal. Rhetorical posturing is not a substitute for real vision

and commitment. Space doesn't necessarily have to be a top priority in national policy, but if current U.S. administrations continue to make statements about U.S. leadership in space that are reminiscent of the Apollo days, the American public and the rest of the world either expect the U.S. to live up to its proclamations or turn away because they recognize empty promises. Increases to NASA's budget and/or efforts to lay out clearly defined, effective goals for space missions would set an example to the rest of the world that the U.S. is serious about maintaining a leadership status in space.

Additionally, the mentality of "bigger and better for less" that has dominated the space program since the end of the Apollo era is harmful in the long run. While many people argue that the Apollo program was unrestricted in its spending and too lavish, attempting to run more ambitious missions that are on the same grandiose scale as cheaply as possible could be detrimental not only to the quality of the American space program, but also to its reputation. If the United States is not willing to invest what is necessary into projects like a manned mission to Mars, then the country needs to reevaluate its goals. Currently, it is expected that projects will run over the budgets that were originally proposed to Congress, because the ambitious goals that the United States sets out to complete are not realistic for NASA's current budget. One option is for the U.S. to work within its parameters and settle on less expensive, less extravagant projects. The U.S. could also concede unilateral control on projects with other nations in exchange for lower overall costs. However, if the United States desires to be a leader in space, and a pioneer in big, expensive projects, then the country's space program needs to be aligned with that. Either way, the program needs to be reevaluated for realistic and achievable goals.

Recommendation 1: The U.S. government and NASA should critically examine space exploration priorities and commit to implementing a program that will further realistic and robust stated policy and goals.

CHALLENGE 2: STRUGGLE BETWEEN LEADERSHIP AND COLLABORATION

Both the themes of international collaboration in space and American leadership in space have meant different things to different people over the course of the development of space exploration in the

United States. They are consistently prevalent themes, but this is perhaps due to their multifaceted nature and ambiguity. International collaboration and leadership come into direct conflict in the modern era of space exploration. The end of the Cold War may have opened up the global space arena for direction international cooperation, but the post-Cold War era did not completely shift U.S. goals away from nationalism.¹³² As the field developed and more nations became interested in participation, the United States struggled and continues to struggle to balance a desire to participate in the evolving field, but also retain a certain amount of preeminence and control.

Although leadership surpassed competition as the new overarching goal for U.S. space exploration, and leading through collaboration with other nations became a consistent goal of the U.S. space program, it is difficult to reconcile being a participant rather than a leader. Blamont explains NASA's struggle between leadership and collaboration:

For NASA "international cooperation" has generally been conceived as the acceptance by other partners of a programme conceived, planned and directed by NASA. As a matter of principle the USA does not want to relinquish responsibility for a critical element in a mission or program to an outside partner.¹³³

Blamont adds:

Often we hear American analyses of world problems accompanied by the proposal of "American leadership" as a solution. This cliché frequently serves as a euphemism for "command."¹³⁴

In the past, international collaboration in space has meant that the United States is interested in simple data sharing with other friendly, allied countries. The individual goals of the United States dominated these "collaborative" efforts, and the U.S. maintained unilateral control, but yet this can still be considered some measure of international cooperation. Earlier administrations viewed collaboration as an avenue in which the U.S. could solidify other valued goals like prestige and leadership, or further political interests as the atmosphere warmed between the U.S. and the U.S.S.R. Collaboration was not seen as a

¹³² Logsdon, "Space," 99.

¹³³ Jacques Blamont, "International Space Exploration: Cooperative or Competitive?" *Space Policy*, 2005, 213.

¹³⁴ *Ibid.*

benefit to scientific development and the opportunity to share scientific achievement between many nations for the sake of the entire world – a more modern interpretation that resonates today.

Leadership as well has taken on many meanings over time. In the past, the United States argued for leadership in space for the sake of furthering political goals and American prestige. Now, as those specific goals are no longer relevant, NASA argues that it will “lead through cooperation.” However, this sentiment is somewhat of an oxymoron. Whether or not the U.S. can successfully participate in international collaboration in space and still act as a leader in the field is entirely contingent on its definition of what leadership is. If leadership means that the United States must preeminently dominate the arena and maintain the upper hand in international agreements, the country will not find the true benefits to collaboration and as a result, relationships with other space-faring nations will suffer. But if the country can instead find leadership to mean something more along the lines of a country that acts as a “leading participant,” rather than the loudest and most important voice in the room, it will find that other nations are more willing to partner with it.

Indeed, the U.S. cannot ignore the realities of the space exploration field today, which is international and only becoming more so. To push away potential partnerships in favor of egotism would be a huge detriment to not only NASA itself, but also to world progress in space. It is important to find that balance between leader and participant. It is also important to remain open to other perspectives, and allow for other nations to take the critical path on missions. True leadership, after all, is not complete domination over other parties, but rather someone who initially provides the opportunity for others to participate and ensures that all voices are heard.

Recommendation 2: The U.S. should reexamine its intention to play a dominant leadership role in space exploration, and consider emphasizing a commitment toward active participation in international collaboration in space.

CHALLENGE 3: EMBRACING THE NEW PARADIGM

The new paradigm of space exploration is one in which there are many international players, and in which private industry has an increasingly strong foothold. The relative role of U.S. leadership, the participation and role of other countries with interests in entering the space arena, along with privatization of space will all affect the kind of space science the U.S. conducts and in what particular aspects the U.S. will make trade-offs. Too much government control will limit competition, yet too much influence from private corporations will limit space science research only to what is commercially viable. However, it is clear that in order to be at the forefront of space exploration, the United States needs not only to participate with prominent space-faring nations, but also reduce barriers to participation in the space industry. To embrace the new paradigm of space exploration and abandon Cold War era thinking is key.

One area where Cold War rhetoric still dominates is in America's relationship with China in space. In this new era, China is often presented as the successor to the U.S.S.R.'s role as America's "rival" in a space race.¹³⁵ China and Russia share similarities in many ways, especially in terms of looking at how international cooperation functions in ISS-related situations.¹³⁶ Examining the historical context of Russia's inclusion on the ISS and initial U.S. reservations can aid in demonstrating how the United States could possibly extend an invitation to China,¹³⁷ as well as serve to evaluate whether or not the U.S. lives up to its stated goals of international collaboration. While comparing the current situation with China to the past situation of the Soviet Union can be useful in understanding how national interests have shifted over time, it becomes clear that concessions likely will need to be made on part of the United States if it is to truly move forward in this era of globalization. Competition and rivalry in space pose a barrier to international collaboration and progress in space. With the state of current economic interdependence and a globalized world, China cannot be thought of in a simplistic, Cold War mentality.¹³⁸ In his

¹³⁵ Zhao, 161.

¹³⁶ Ibid, 157.

¹³⁷ Ibid.

¹³⁸ Hilborne, 126.

recommendation for the U.S. and China to overcome their differences for the benefit of both parties,

Hilborne states:

In an age of interdependence and globalization, establishing a clear framework for space security is a logical step. In such an era, and in an environment that is inherently cooperative, competition is increasingly fruitless and impractical. Urgency is also a factor. If space is permitted to lapse into a competitive, possibly weaponized environment, it will be very difficult to reverse. To avoid this, China and the USA will need to manage their strategic interests.¹³⁹

Another area in which the U.S. needs to embrace the new paradigm is in reconsidering and possibly restructuring regulations like ITAR. If international collaboration is to be the model moving forward for the United States, the presence of ITAR and similar regulations greatly hinders future successes in space exploration. Blamont explains that ITAR negatively affects collaboration by straining “daily working conditions” due to the “suspicious atmosphere” that the regulations cause.¹⁴⁰ Blamont also hints at America’s suspicious nature when it comes to collaboration in space exploration, a carry over of Cold War era mentality. That mentality is not keeping up with post-Cold War realities, which impedes American progress in developing positive relationships with other countries in space endeavors. Blamont continues, stating that, many Europeans involved in space exploration believe that it is not a good idea to place “long-term strategic trust” in the United States, as the U.S. is a country that continues to put itself and its national image before scientific successes.”¹⁴¹ This is not the message we want to be conveying to the rest of the world.

While ITAR regulations are in place to protect U.S. national security and national interests, some amount of deregulation does not mean dropping ITAR completely, which would render the U.S. extremely vulnerable. Modern security concerns necessitate the need for regulations over data sharing in order ensure the safety of American intelligence and information. However, if the United States were to critically examine what particular regulations need to be in place and focus overall on improving outreach

¹³⁹ Ibid, 126.

¹⁴⁰ Blamont, 91.

¹⁴¹ Ibid.

possibilities to other space-faring nations, this would demonstrate the U.S. government's actual intentions to cooperate internationally in space exploration. The reasonable way forward is to open up opportunities for collaboration between the United States and other interested parties, be it nations or private corporations, in order to truly capitalize on the successes yet to be had in space. Taking an active role in the private space industry and seeking out collaborative roles is essential if the U.S. space program wishes to flourish in the new paradigm.

The third arena in which it is imperative for the U.S. to fully embrace the new paradigm for space exploration is within the context of missions to Mars. If NASA is truly set on taking American astronauts to Mars, the Nation should be asking realistic question about how to achieve such an ambitious collective goal. The path to Mars is undoubtedly one on which many nations must join together, simply due to the size and scope a manned mission to Mars would entail. Whether the U.S. approaches missions to Mars with an international collaborative model in mid, or more like the old missions to the Moon that gave the United States a great sense of national pride, will be a true litmus test of the role the U.S. will take in these new endeavors. By looking at the framework for stated future U.S. missions to Mars, as well as what experts are recommending as courses of actions to Mars, we can see exactly how the “new paradigm” of space exploration plays out.

Recommendation 3: The United States should fully embrace the new paradigm of space exploration by - lowering barriers like ITAR that hinder the competitiveness of the American space industry, committing to collaborative endeavors with rising space-faring nations such as China and abandoning Cold War era thinking, and paving the way to Mars by encouraging the participation of many nations and space agencies on future manned missions.

CONCLUSION

The examination of the changing narrative of space exploration in the United States is also an examination of the changing self-perception of the country in relation to the rest of the world. Space, by the nature of the word, means thinking outside of the boundaries of our own border, be it country or global borders. Because national interests have dictated U.S. direction in space exploration, this has meant that as the country finds itself at the crux of where it stands on the global stage politically, it also does so in space endeavors.

This paper's historical narrative and content analysis were useful in bringing out some trends within the analyzed themes.

- Competition as a driver kicked off the space program, but is no longer relevant with regard to Russia – and probably isn't useful with regard to other countries going forward.
- American prestige has been a consistent but never dominant theme in space exploration rhetoric.
- International collaboration has been an important theme in all administrations, but it hasn't always had the same meaning or connotation throughout each administration.
- American leadership, while present in all administrations, gains momentum post-Cold War, as competition as a theme fades and the field of space exploration develops.
- A new paradigm of space exploration emerges post-Cold War as an acknowledgement of changing times and more complex national and international interests.

Further study of the trends would yield additional insight. One aspect that this paper could investigate further is how the meaning of the five analyzed themes has changed over time. Themes like competition, prestige, collaboration, leadership, and a changing world order rarely mean exactly the same thing over the course of history. It is also often found that individual, leadership-based interpretations of the themes dictate how they are used and the value attributed to them in any given administration. As time goes on, other themes may take precedence, and the approach used here could be repeated with new or additional themes in the future. Additionally, it would be interesting to utilize this same method of

historical narrative and content analysis to evaluate international science collaboration in other arenas, such as global climate change or sustainability in the Arctic. Other areas may also yield similar situations in which the United States has transitioned from a sense of competition toward more interest in international collaboration, and scientific collaboration could be used as a tool for diplomacy.

From the historical narrative and the content analysis, this paper uncovered three challenges to current U.S. efforts in space exploration. These challenges are: 1) there is a disconnect between stated policy goals in American space exploration efforts and the implementation of those goals, 2) the United States communicates mixed messages regarding its intent to be both the dominant leader in the field of space exploration and committed as a participant in international collaboration, and 3) the United States cannot remain a true pioneer of space exploration if it does not embrace the realities of globalization and the changing dynamics within the field of space exploration.

The unknown is complicated, and space is the unknown. The United States, a country that has been at the forefront of exploration into space for much of history, currently has the opportunity to look back upon the past and critically analyze history, while also analyzing the present situation, in order to determine how it should move forward into the future. This paper offers three recommendations: 1) U.S. government and NASA should critically examine space exploration priorities and commit to implementing a program that will further realistic and robust stated policy and goals, 2) the U.S. should reexamine its intention to play a dominant leadership role in space exploration, and consider emphasizing a commitment toward active participation in international collaboration in space, and 3) the United States should fully embrace the new paradigm of space exploration by - lowering barriers like ITAR that hinder the competitiveness of the American space industry, committing to collaborative endeavors with rising space-faring nations such as China and abandoning Cold War era thinking, and paving the way to Mars by encouraging the participation of many nations and space agencies on future manned missions.

The 1960s TV series *Star Trek* perhaps set out to suggest an idealistic future, in which individuals of many different cultural backgrounds stood side-by-side in the name of exploration. Idealistic though it may be, it is an idea that continues to present itself in the psyche of the human race as it into the “moving

frontier” of space, we are not only reminded of the recent past - a period of more direct competition and nationalistic impulses - but also that that particular past isn’t so far behind us as we might think. In today’s age of space exploration that is more complex and intricate than ever before, countries that wish to participate in this exciting field of discovery must decide what it is they hope to achieve, and in doing this, their interests will shape how they go about interacting with the rest of the world in the field of space industry. Is it too ambitious to envision a future in which the nations of this world set aside national interests to come together in the name of progress of the human race? Boldly going where no one has gone before, not solely for the sake of a singular nation, but instead exploring the cosmos in a collective pursuit of knowledge to find solutions to our greatest global challenges.

BIBLIOGRAPHY

- Abbey, George, and Neal Lane. "United States Space Policy: Challenges and Opportunities." *American Academy of Arts and Sciences* (2005): 1-32.
<https://www.amacad.org/publications/spacePolicy.pdf>
- Alston, Giles. "Eisenhower: Leadership in Space Policy." *Reexamining the Eisenhower Presidency*, Ed. Shirley Anne Warshaw. *Greenwood Press* (1993). Print.
- Anderson, Chad. "Rethinking Public-Private Space Travel." *Space Policy* (2013): 266-271.
10.1016/j.spacepol.2013.08.002
- Blamont, Jacques. "International Space Exploration: Cooperative or Competitive?" *Space Policy* (2005): 89-92. 10.1016/j.spacepol.2005.03.003
- Blount, P. J. "The ITAR Treaty and Its Implications for U.S. Space Exploration Policy and the Commercial Space Industry." *Journal of Air Law and Commerce* 73 (2007): 705-722.
http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2401261
- Callahan, David. "A Fork in the Road to Space." *Technology Review* (1993). Print.
- Dupas, Alain, and John M. Logsdon. "Creating a Productive International Partnership in the Vision for Space Exploration." *Space Policy* (2007): 24-28. 10.1016/j.spacepol.2006.11.003
- Eisenhower, Dwight D. "Official White House Transcript of President Eisenhower's Press and Radio Conference #123 (Filmed, Taped, and Shorthand Reported)." *Eisenhower Presidential Archives* (1957): 1-9.
https://www.eisenhower.archives.gov/research/online_documents/sputnik/10_9_57.pdf
- Feynman, Richard. "Personal Observations on the Reliability of the Shuttle." *U.S. Government Printing Office* (1986): 1-10. <http://science.ksc.nasa.gov/shuttle/missions/51-l/docs/rogers-commission/Appendix-F.txt>
- Hilborne, Mark. "China's Rise in Space and U.S. Policy Responses: A Collision Course?" *Space Policy* (2013): 121-127. 10.1016/j.spacepol.2013.03.005
- "Interplanetary Commission Created: Russians Planning Space Laboratory for Research Beyond Earth's Gravity." *Washington Post* (1955).
- Kennedy, John F. "Address at Rice University on Nation's Space Effort." Rice University, Houston, Texas. *NASA JSC* (1962): 1-4. <http://er.jsc.nasa.gov/seh/ricetalk.htm>
- Kennedy, John F. "News Conference 9, April 12, 1961." *John F. Kennedy Presidential Library* (1961).
<http://www.jfklibrary.org/Research/Research-Aids/Ready-Reference/Press-Conferences/News-Conference-9.aspx>
- "Komissiya po mezplanetnykh soobshcheniy." *Vechernyaya moskva* (1955).
- Krug, Linda T. *Presidential Perspectives on Space Exploration: Guiding Metaphors from Eisenhower to Bush*. *Praeger Publishers* (1991). Print.

- Laurini, Kathleen C. and Michele M. Gates. "NASA's Space Exploration Planning: The Asteroid Mission and the Step-Wise Path to Mars." *International Astronautical Federation* (2014): 1-7. https://www.nasa.gov/sites/default/files/files/IAC-14-E3_2-Laurini.pdf
- Logsdon, John M. *After Apollo?: Richard Nixon and the American Space Program*. Palgrave Macmillan (2015). Print.
- Logsdon, John M. "Change and Continuity in U.S. Space Policy." *Space Policy* 27.1 (2011): 1-2. 10.1016/j.spacepol.2010.12.005
- Logsdon, John M. *John F. Kennedy and the Race to the Moon*. Palgrave Macmillan (2010). Print.
- Logsdon, John M. "Space in the Post-Cold War Environment," *NASA History* (1992): 89-102. <http://history.nasa.gov/sp4801-chapter6.pdf>
- McDougall, Walter A. "Sputnik, the Space Race, and the Cold War." *Bulletin of the Atomic Scientists* 41.5 (1985). 10.1080/00963402.1985.11455962
- Mieczkowski, Yanek. *Eisenhower's Sputnik Moment: The Race for Space and World Prestige*. Cornell University Press (2013). Print.
- Montluc, Bertrand De. "The New International Political and Strategic Context for Space Policies." *Space Policy* 25.1 (2009): 20-28. 10.1016/j.spacepol.2008.12.001
- "NASA's Journey to Mars: Pioneering Next Steps in Space Exploration." *NASA* (2015): 1-36. http://www.nasa.gov/sites/default/files/atoms/files/journey-to-mars-next-steps-20151008_508.pdf
- "NASA's Vision for Space Exploration with Charles Bolden." Narrated by Neil deGrasse Tyson and Bill Nye. Interview with Charles F. Bolden, Jr. and Michael Shara. *StarTalk Radio Show with Neil deGrasse Tyson* (2015). <http://www.startalkradio.net/show/nasas-vision-for-space-with-charles-bolden/>
- National Security Action Memorandum, "U.S.-U.S.S.R. Cooperation in the Exploration of Space (NSAM 129)." *Federation of American Scientists* (1962): 1. <http://fas.org/irp/offdocs/nsam-jfk/nsam-129.htm>
- Nixon, Richard. "Address by President Richard Nixon to the UN General Assembly." *U.S. Department of State* (1969). <http://www.state.gov/p/io/potusunga/207305.htm>
- Obama, Barack. "Remarks by the President on Space Exploration in the 21st Century." John F. Kennedy Space Center, Merritt Island. *Whitehouse.gov*. (2010): 1-6. <https://www.whitehouse.gov/the-press-office/remarks-president-space-exploration-21st-century>
- Ragsdale, Lyn. "Politics not Science: The U.S. Space Program in the Reagan and Bush Years." Ed. Rodger D. Launius, and Howard E. McCurdy. *Presidential Leadership and the Development of the U.S. Space Program*. *NASA History Office* (1994). Print.
- Report of the Committee on Science and Technology. *Report of the Presidential Commission on the Space Shuttle Challenger Accident*. *U.S. Government Printing Office* (1986) 1-225. <http://science.ksc.nasa.gov/shuttle/missions/51-l/docs/rogers-commission/table-of-contents.html>

- Sadeh, Eligar. "Technical, Organizational and Political Dynamics of the International Space Station Program." *Space Policy* 20.3 (2004): 171-188. 10.1016/j.spacepol.2004.06.007
- Seedhouse, Erik. "The New Space Race: China vs. the United States." *Praxis Publishing* (2010). Print.
- Shaghghi, Azam, and Konstantinos Antonakopoulos. "The Societal Impacts of a Mars Mission in the Future of Space Exploration." *Physics Procedia* (2012) 177-185. 10.1016/j.phpro.2012.08.021
- "Sputnik and the Dawn of the Space Age." *NASA History* (2007). <http://history.nasa.gov/sputnik/>
- Synthesis Group On America's Space Exploration Initiative. "America at the Threshold: America's Space Exploration Initiative." *NASA History* (1991): 1-190. http://history.nasa.gov/staffordrep/main_toc.PDF
- Tatarewicz, Joseph N. "The 'Vision for Space Exploration' of President George W. Bush, Space Science, and U.S. Space Policy." *Futures* (2009): 531-540. 10.1016/j.futures.2009.04.019
- "Transcript of White House Meeting with John F. Kennedy and NASA members." *NASA History*. (1962). <http://history.nasa.gov/JFK-Webbconv/pages/backgnd.html>.
- Wodak, Ruth. *Qualitative Discourse Analysis in the Social Sciences*. Palgrave Macmillan (2008). Print.
- Zhao, Yun. "Legal Issues of China's Possible Participation in the International Space Station: Comparing to the Russian Experience." *Journal of East Asia & International Law* 6.1 (2013): 155-174. <http://web.b.ebscohost.com/ehost/pdfviewer/pdfviewer?sid=5f4c9d62-7d4e-4284-9fb6-870f73c49a78%40sessionmgr111&vid=0&hid=124>

CONTENT ANALYSIS BIBLIOGRAPHY

- 85th United States Congress. "National Aeronautics and Space Act of 1958." *NASA History* (1958): 1-12.
<http://www.hq.nasa.gov/office/pao/History/spaceact.html>
- 106th United States Congress. "National Aeronautics and Space Administration Authorization Act of 2000." *United States Government Publishing Office* (2000): 1-25.
<https://www.gpo.gov/fdsys/pkg/BILLS-106hr1654enr/pdf/BILLS-106hr1654enr.pdf>
- 111th United States Congress. "National Aeronautics and Space Administration Authorization Act of 2010." *NASA History* (2010): 1-42. http://www.nasa.gov/pdf/649377main_PL_111-267.pdf
- Bolden, Charles Jr. "State of NASA." *NASA.gov* (2015): 1-21.
http://www.nasa.gov/sites/default/files/15_0202_bolden_state_of_nasa.pdf
- Brookings Institute, The. "Proposed Studies on the Implications of Peaceful Space Activities for Human Affairs." *ProQuest Congressional* (1961): 1-284.
<http://congressional.proquest.com/congressional/docview/t21.d22.cmp-1961-sah-0002?accountid=14503>
- Bush, George H. W. "Remarks on the 20th Anniversary of the Apollo 11 Moon Landing." *The American Presidency Project* (1989): 1-4. <http://www.presidency.ucsb.edu/ws/?pid=17321>
- Bush, George H. W. "Proclamation 5999 - Space Exploration Day." *The American Presidency Project* (1989): 1-2. <http://www.presidency.ucsb.edu/ws/index.php?pid=1718>
- Bush, George W. "Remarks on U.S. Space Policy." *NASA History* (2004): 1-7.
<http://history.nasa.gov/Bush%20SEP.htm>
- Bush, George W. "U.S. National Space Policy," *NASA History* (2006): 1-10.
<https://fas.org/irp/offdocs/nspd/space.pdf>
- Clinton, William J. "Proclamation 6707 – National Apollo Anniversary Observance." *The American Presidency Project* (1994): 1-2. <http://www.presidency.ucsb.edu/ws/index.php?pid=50515>
- Clinton, William J. "Statement on the Space Station Program." *The American Presidency Project* (1993): 1-2. <http://www.presidency.ucsb.edu/ws/index.php?pid=46709>
- Eisenhower, Dwight D. "Official White House Transcript of President Eisenhower's Press and Radio Conference #123 (Filmed, Taped, and Shorthand Reported)." *Eisenhower Presidential Archives* (1957): 1-9.
https://www.eisenhower.archives.gov/research/online_documents/sputnik/10_9_57.pdf
- Eisenhower, Dwight D. "State of the Union Address, 1958." *Eisenhower Presidential Archives* (1958): 1-16. https://www.eisenhower.archives.gov/all_about_ike/speeches/1958_state_of_the_union.pdf
- Johnson, Lyndon B. "The Vice President Answers." *NASA History* (1961): 1-4.
http://www.au.af.mil/au/awc/awcgate/key_docu.htm
- Kennedy, John F. "Address at Rice University on Nation's Space Effort." *NASA JSC* (1962): 1-4.
<http://er.jsc.nasa.gov/seh/ricetalk.htm>

- Kennedy, John F. "Special Message to the Congress on Urgent National Needs." *The American Presidency Project* (1961): 1-12. <http://www.presidency.ucsb.edu/ws/?pid=8151>
- National Aeronautics and Space Administration, "The Vision for Space Exploration," *NASA History* (2004): 1-32. https://www.nasa.gov/pdf/55583main_vision_space_exploration2.pdf
- National Commission on Space. "Pioneering the Space Frontier: An Exciting Vision of Our Next Fifty Years in Space." *NASA History* (1986): 1-225. https://www.nasa.gov/pdf/383341main_60%20-%2020090814.5.The%20Report%20of%20the%20National%20Commission%20on%20Space.pdf
- National Security Action Memorandum. "U.S.-U.S.S.R. Cooperation in the Exploration of Space (NSAM 129)." *Federation of American Scientists* (1962): 1. <http://fas.org/irp/offdocs/nsam-jfk/nsam-129.htm>
- National Security Decision Memorandum. "Exchange of Technical Data between the United States and the International Space Community (NDSM 72)." *Nixon Library* (1970): 1. https://www.nixonlibrary.gov/virtuallibrary/documents/nsdm/nsdm_072.pdf
- National Security Council. "Implications of the Soviet Earth Satellite for U.S. Security (NSC 5520)." *George C. Marshall Institute* (1955): 1-20. <http://marshall.wpengine.com/wp-content/uploads/2013/09/NSC-5520-Statement-of-Policy-on-U.S.-Scientific-Satellite-Program-20-May-1955.pdf>
- National Security Council. "U.S. Policy on Outer Space (NSC 5918)." *George C. Marshall Institute* (1959): 1-26. <http://marshall.wpengine.com/wp-content/uploads/2013/09/NSC-5918-1-U.S.-Policy-on-Outer-Space-26-Jan-1960.pdf>
- National Space Council. "National Space Policy Directives and Executive Charter (NSPD-1)." *NASA History* (1989): 1-14. <http://fas.org/spp/military/docops/national/nspd1.htm>
- Nixon, Richard. "Announcement on the Space Shuttle." *NASA History* (1972): 1-4. <http://history.nasa.gov/stsnixon.htm>
- Nixon, Richard. "Statement About the Future of the United States Space Program," *The American Presidency Project* (1970): 1-4. <http://www.presidency.ucsb.edu/ws/?pid=2903>
- Obama, Barack. "Remarks by the President on Space Exploration in the 21st Century." John F. Kennedy Space Center, Merritt Island. *Whitehouse.gov*. (2010): 1-6. <https://www.whitehouse.gov/the-press-office/remarks-president-space-exploration-21st-century>
- Obama, Barack. "U.S. National Space Policy." *Whitehouse.gov* (2010): 1-18. https://www.whitehouse.gov/sites/default/files/national_space_policy_6-28-10.pdf
- President's Commission on Implementation of United States Space Exploration Policy. "A Journey to Inspire, Innovate, and Discover." *NASA History* (2004): 1-64. https://www.nasa.gov/pdf/60736main_M2M_report_small.pdf
- Radzanowski, David P. and Marcia S. Smith. "Clinton and Bush Administration National Space Policies: A Comparative Analysis." *Proquest Congressional* (1997): 1-48.

- <http://congressional.proquest.com/congressional/docview/t21.d22.crs-1997-epw-0075?accountid=14503>
- Reagan, Ronald, "1984 State of the Union Address." *The American Presidency Project* (1984): 1-11. <http://www.presidency.ucsb.edu/ws/index.php?pid=40205>
- Reagan, Ronald. "Presidential Directive on National Space Policy." *NASA History* (1988): 1-12. <http://www.hq.nasa.gov/office/pao/History/policy88.html>
- Reagan, Ronald. "Remarks at the 25th Anniversary Celebration of the National Aeronautics and Space Administration." *The American Presidency Project* (1983): 1-5. <http://www.presidency.ucsb.edu/ws/index.php?pid=40662>
- Ride, Sally K. "Leadership and America's Future in Space." *NASA History* (1987): 1-53. <http://history.nasa.gov/riderep/main.PDF>
- Sheldon, Charles S. II. "United States and Soviet Rivalry in Space: Who Is Ahead, and How Do the Contenders Compare." *Congressional Research Service Reports* (1969): 1-54. <http://congressional.proquest.com/congressional/docview/t21.d22.crs-1969-spx-0004?accountid=14503>
- Space Task Group, The. "Report of the Space Task Group." *NASA Historical Reference Collection* (1969): 1-21. <http://www.hq.nasa.gov/office/pao/History/taskgrp.html>
- Stine, Deborah D. "U.S. Civilian Space Policy Priorities: Reflections 50 Years After Sputnik." *Foreign Press Centers* (2007): 1-30. <http://fpc.state.gov/documents/organization/108077.pdf>
- U.S. Congress Office of Technology. "Exploring the Moon and Mars: Choices for the Nation." *NASA History* (1991): 1-112. <http://history.nasa.gov/32992.pdf>
- U.S. Human Spaceflight Plans Committee. "Seeking a Human Spaceflight Program Worthy of a Great Nation." *NASA History* (2009): 1-157. https://www.nasa.gov/pdf/396093main_HSF_Cmte_FinalReport.pdf
- Vice President's Space Policy Advisory Board. "A Post Cold War Assessment of U.S. Space Policy." *NASA History* (1992): 1-80. <http://history.nasa.gov/33080.pt1.pdf>
- White House National Science and Technology Council, The. "Fact Sheet: National Space Policy." *NASA History* (1996): 1-10. <http://history.nasa.gov/appf2.pdf>

APPENDIX

Documents Analyzed in Content Analysis

Administration	Author	Title	Year	Document Category
Eisenhower	National Security Council	Implications of the Soviet Earth Satellite for U.S. Security (NSC 5520)	1955	Policy Recommendation
Eisenhower	Dwight D. Eisenhower	Official White House Transcript of President Eisenhower's Press and Radio Conference #123	1957	Leadership Statement
Eisenhower	Dwight D. Eisenhower	1958 State of the Union Address	1958	Leadership Statement
Eisenhower	85th United States Congress	National Aeronautics and Space Act of 1958	1958	Policy
Eisenhower	National Security Council	U.S. Policy on Outer Space (NSC 5918)	1959	Policy
Kennedy	The Brookings Institute	Proposed Studies on Implications of Peaceful Space Activities for Human Affairs	1961	Policy Recommendation
Kennedy	Lyndon B. Johnson	Policy Recommendation to President Kennedy	1961	Policy Recommendation
Kennedy	John F. Kennedy	Special Message to the Congress on Urgent National Needs	1961	Leadership Statement
Kennedy	National Security Action Memorandum	U.S.-U.S.S.R. Cooperation in the Exploration of Space (NSAM 129)	1962	Policy
Kennedy	John F. Kennedy	Address at Rice University on Nation's Space Effort	1962	Leadership Statement
Nixon	Charles S. Sheldon II	United States and Soviet Rivalry in Space: Who Is Ahead, and How Do the Contenders Compare	1969	Policy Recommendation
Nixon	Space Task Group	Report of the Space Task Group	1969	Policy Recommendation
Nixon	Richard Nixon	Statement About the Future of the United States Space Program	1970	Leadership Statement
Nixon	National Security Decision Memorandum	Exchange of Technical Data between the United States and the International Space Community (NDSM 72)	1970	Policy
Nixon	Richard Nixon	Announcement on the Space Shuttle	1972	Leadership Statement
Reagan	Ronald Reagan	Remarks at the 25th Anniversary Celebration of the National Aeronautics and Space Administration	1983	Leadership Statement

Reagan	Ronald Reagan	1984 State of the Union Address	1984	Leadership Statement
Reagan	National Commission on Space	Pioneering the Space Frontier	1986	Policy Recommendation
Reagan	Sally K. Ride	Leadership and America's Future in Space	1987	Policy Recommendation
Reagan	Ronald Reagan	Presidential Directive on National Space Policy	1988	Policy
Bush Sr.	George H. W. Bush	Remarks on the 20th Anniversary of the Apollo 11 Moon Landing	1989	Leadership Statement
Bush Sr.	George H. W. Bush	Proclamation 5999 - Space Exploration Day	1989	Leadership Statement
Bush Sr.	National Space Council	National Space Policy Directives and Executive Charter (NSPD-1)	1989	Policy
Bush Sr.	U.S. Congress Office of Technology	Exploring the Moon and Mars: Choices for the Nation	1991	Policy Recommendation
Bush Sr.	Vice President's Space Policy Advisory Board	A Post Cold War Assessment of U.S. Space Policy	1992	Policy Recommendation
Clinton	Bill Clinton	Statement on the Space Station Program	1993	Leadership Statement
Clinton	Bill Clinton	Proclamation 6707 - National Apollo Anniversary Observance	1994	Leadership Statement
Clinton	The White House National Science and Technology Council	Fact Sheet: National Space Policy	1996	Policy
Clinton	David P. Radzanowski and Marcia S. Smith	Clinton and Bush Administration National Space Policies: A Comparative Analysis	1997	Policy Recommendation
Clinton	106th U.S. Congress	2000 NASA Authorization Act	2000	Policy
Bush Jr.	George W. Bush	Remarks on U.S. Space Policy	2004	Leadership Statement
Bush Jr.	President's Commission on Implementation of United States Space Exploration Policy	A Journey to Inspire, Innovate, and Discover	2004	Policy Recommendation
Bush Jr.	National Aeronautics and Space Administration	The Vision for Space Exploration	2004	Policy
Bush Jr.	George W. Bush	U.S. National Space Policy	2006	Policy

Bush Jr.	Deborah D. Stine	U.S. Civilian Space Policy Priorities: Reflections 50 Years After Sputnik	2007	Policy Recommendation
Obama	U.S. Human Spaceflight Plans Committee	Seeking a Human Spaceflight Program Worthy of a Great Nation	2009	Policy Recommendation
Obama	Barack Obama	Remarks By the President on Space Exploration in the 21st Century	2010	Leadership Statement
Obama	Barack Obama	U.S. National Space Policy	2010	Policy
Obama	111th Congress	NASA Authorization Act	2010	Policy
Obama	Charles Bolden	State of NASA	2015	Leadership Statement