

THE COLD WAR PROPAGANDA OF PROJECT APOLLO

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“That’s one small step for man; one giant leap for mankind.”¹ These famous words, spoken by Neil Armstrong upon first walking on the moon, marked the achievement of Project Apollo, NASA’s manned lunar excursion program. Beginning in 1961, Americans rallied together around Project Apollo, turning it into a point of national unity during a time of major domestic conflict. Apollo appeared to serve another purpose as well. The federal government widely represented the space race and, more specifically, Project Apollo, as a way to elevate the United States’ scientific and technological prestige, and thus surpass the Soviet Union, its Cold War rival. However, this emphasis on idealistic reasons for racing to the moon overshadowed other equally significant motivations.

In the 1950s, national media outlets suggested that the Soviets’ lead in the Space Race could translate into military superiority.² By the 1960s, however, public discourse all but eliminated the military and defense as goals for outer space. Instead, the public viewed space exploration as a great scientific endeavor, with motivations based on exploration, curiosity, and the challenge of technological development. This transition in emphasis indicates a significant and ironic shift because the military objectives had not really disappeared; they had just ceased to be presented in public dialogue on the Space Race.

Although historians have done research in the past to prove that the Space Race had an intimate connection to the Arms Race, questions still remain.³ Who benefitted

from the connection? How were the billions of budgeted dollars spent? Why was national defense within NASA not out in the open? Public media emphasized the expansion of scientific knowledge during a time of highly charged tensions between the United States and the Soviet Union. The 1960s also represented a time of domestic conflict over widespread issues such as civil rights, women's rights, and the Vietnam War. However, Project Apollo united US citizens during this period of disunity, making it an anomaly.⁴

Public rhetoric by the federal government portrayed Project Apollo as an idealistic civilian effort to increase national unity and prestige. However, this discourse obscured an important defense dimension to the project and its ties to the Arms Race. President John F. Kennedy hailed Project Apollo as "the most hazardous and dangerous and greatest adventure on which man has ever embarked."⁵ Government use of military contractors and tensions with the USSR show that the Space Race contained military aspects; it was not simply an idealistic scientific adventure. This article will demonstrate how NASA quietly utilized its resources for military objectives throughout the development of Project Apollo.

The Cold War began shortly after WWII as a result of suspicion between two major superpowers of the world, the United States and the USSR.⁶ The two WWII allies faced cooperation problems as distrust mounted from ideological differences and mutual fears of global domination.⁷ The USSR developed its first atomic weapons by 1950, which heightened tensions and increased hostility.⁸ This tension quickly burst into a nuclear race. The United States did not have the upper hand at the bargaining table and the two countries competed to obtain the most nuclear weapons.⁹ Negotiation and diplomacy failed to stop the two nations from developing large numbers of nuclear weapons, and

both countries continued to create newer and more destructive weapons.¹⁰

The race for nuclear supremacy manifested itself in several ways, including the race for superiority in space. In 1958 Congress passed the Space Act, which created the National Aeronautics and Space Administration (NASA).¹¹ The Saturn Program, the predecessor of Apollo, created a launch vehicle that would make launching a manned lunar mission possible.¹² Project Apollo, also known as the Apollo Program, was a NASA program that had the basic objective of landing two men on the surface of the moon.¹³ The program succeeded. On 16 July 1969, Apollo Mission 11 was launched; on July 20, the first man walked on the surface of the moon, and on July 24, he returned safely to Earth.¹⁴

From Apollo's introduction to the public by President Kennedy in 1961 on through Apollo 11 in 1969, the media showed uncontrolled excitement. Professionals, businessmen, and government officials excitedly discussed the project at length. Extensive public discussion on the subject took every form imaginable, from scholarly essays to editorials to poetry. The government seemed to put as much emphasis on its space programs as possible in order to stress that the program united the nation.

President Dwight D. Eisenhower set the initial tone of the public conversation by tying the space race directly to the Cold War. In 1954, the Eisenhower Administration created the Technological Capabilities Panel to assess the Soviet threat to US national security.¹⁵ Historian Von Hardesty explains that this panel feared that the USSR would use satellites for military purposes in order to gain intelligence.¹⁶ Eisenhower clearly viewed the USSR as a military threat. As he outspokenly stated in his farewell address, "we face a hostile ideology - global in scope, atheistic in character, ruthless in purpose, and insidious in method... Our arms must be mighty, ready for instant

action, so that no potential aggressor may be tempted to risk his own destruction.”¹⁷ Eisenhower believed that the USSR posed a military threat to the United States – a threat that had spread to space.

John F. Kennedy, in contrast, turned the Apollo program into a symbol of idealism. He inspired audiences through his rhetoric, using words that made the Apollo Project seem like the most glorious and pressing issue of the time: “These are extraordinary times. And we face an extraordinary challenge. Our strength as well as our convictions have imposed upon this nation the role of leader in freedom's cause.”¹⁸ His use of words such as “freedom,” “extraordinary,” and “leader” in this speech exemplify how he rallied Americans using words that made them feel prestigious as a world power.

Kennedy publicly emphasized that the Apollo Program would bring the United States national and international prestige. “I am delighted,” he exclaimed in a 1962 speech at Rice University, “that this university is playing a part in putting a man on the moon as part of a great national effort of the United States of America.”¹⁹ This national effort was not just for domestic consumption; the Cold War meant that it was also being played out on a global stage. Kennedy used Apollo to demonstrate US superiority in technology and science against the Soviets, highlighting the fact that winning against them would symbolize a major morale blow. An interview between Kennedy and James Webb, the Administrator of NASA, illustrates just how central the sense of competition was:

PRESIDENT KENNEDY: Everything that we do ought to really be tied in to getting onto the moon ahead of the Russians.

WEBB: Why can't it be tied to preeminence in space, which are your own words...

*PRESIDENT KENNEDY: Because, by God, we've been telling everyone we're preeminent in space for five years and nobody believes it because they have the booster and the satellite.*²⁰

As this exchange shows, Kennedy strongly felt that a lunar landing would assure the country's national standing over the Soviet Union.

Extensive newspaper and popular magazine coverage of Project Apollo in the 1960s reinforced Kennedy's message that space technology would enhance national prestige. *Time* magazine, for example, gave widespread coverage to the space race and Project Apollo. The articles usually presented a positive view of the program, celebrating the possibility of manned exploration of space and the moon, and predicting many future benefits. The *New York Times*, one of the most widely read newspapers, also supported Project Apollo. James Webb, in one of the paper's articles, explained, "For the sake of this country's prestige, it is essential that other nations believe that we have the capability and determination to carry out whatever we declare seriously that we intend to do. Space achievements have become today's symbols of tomorrow's scientific and technical supremacy in the minds of millions of the world's people."²¹ This positive outlook venerated scientists as national heroes who pursued their work with creativity and resourcefulness. Webb's statement not only reinforced the prestige that space exploration would bring, but reminded the reader that the nation's reputation rested upon finishing what had begun. The United States could not give up.

NASA's biannual reports regarding Project Apollo similarly underscored technological advancement rather than the Cold War military goals. The Apollo Objectives, as stated in the Eleventh Semiannual Report to Congress in

1964, were “to achieve U.S. preeminence in space during this decade through the creation of the broad range of capabilities required to accomplish manned lunar exploration....All [the objectives] will open the door to further exploration and exploitation of space as required by the national interest.”²² Here again, the message of US prestige as a major goal of Project Apollo stood front and center.

Subsequent annual reports continued the trend of emphasizing technological progress. In the Twelfth Semiannual Report to Congress, NASA identified significant progress in the development of the spacecraft and other services needed for the launch of the craft.²³ This report stated in its “Objectives” section that “once developed, these new capabilities can be employed for scientific investigations, for space exploration, and for new technological applications.”²⁴ Progress in technology, and technology only, was the focus of the reports.

The NASA budget demonstrated Project Apollo’s significance in the mind of the government. The Space Act created NASA as a government agency in 1958.²⁵ Its budget, as appropriated by Congress, stood alone from any other agency’s budget; no other agency was affiliated with or directed NASA. In 1962, the outlay to NASA was \$1.257 billion.²⁶ This is a significant amount of money for a new agency and demonstrated its importance to the Kennedy administration. NASA then separated its budget into different research areas. That same year, \$234 million went to Project Apollo. Just two years later, that amount had increased to almost \$3 billion.²⁷ As NASA realized the potential for lunar exploration, it allotted more money to that segment of the department to speed up progress. Apollo had become one of NASA’s, and the nation’s, most important projects.

Criticism of Apollo did at times appear, primarily based on economic concerns. Opponents feared that the

cost and the rapid pace of the project's development was financially reckless. The *Wall Street Journal*, the newspaper of the financial and business sector, published many of these critiques. In one issue, a professor from Stanford University exclaimed, "I'm in favor of putting a man on the moon. But I think it's dubious whether we should cram the program into this decade and spend 20 or 40 billion [dollars] on it."²⁸ Another analyst similarly wrote, "What is unarguable is the cost of the rapid pace of the space program....What Washington needs in a great hurry are some clear priorities."²⁹ Both writers criticized the "race" aspect of the Apollo Program, which seemed to many a waste of taxpayer money. Reporters described it as a "crash" program - pouring money into a program to get it done faster, instead of using less money and developing it slower.

Other criticism revolved around the fact that no one at any given point could "win" the space race, or even the race to the moon. As one *Wall Street Journal* editorial opined, "It's impossible to say we or the Soviets are 'winning' in either civilian or military space at any given time, because of a particular feat.... That measuring game...is the real idiot's delight."³⁰ Another author wrote, "The 'space race' is a rather meaningless and tiresome fiction."³¹ Because the race seemed unwinnable, many wondered whether or not the program merited such effort and financial expense.

Professional businessmen were not the only critics of Apollo. Many "average" Americans also found fault in the lunar program. In a *Wall Street Journal* article from 1963, a reporter interviewed several average Americans about their thoughts on the space race. Stanley Moore, "an unemployed Negro laborer," said, "I suppose we'll hear plenty about it if the Russians get there first, but I'm worrying about number one and going to the moon isn't going to help me any." Later in the same article, a vice

president of a bank criticized the program: ““A group of brilliant engineers have found a glamorous toy and want to play with it.””³² These public critiques tended to cast Apollo as an optional government endeavor rather than a critical national project. The project’s military goals and the sense of urgency that such goals would normally have generated had clearly disappeared from public view. This demonstrated the tendency of public rhetoric to describe Apollo as an effort for civilian national interest.

Project Apollo was a unique government action in that the federal government touted it publicly as a prestige-based action. This was, however, a foreign concept for the US government. Prior to Apollo, no US president had acted solely for the purpose of national prestige. In fact, before WWII, the idea of a government-funded scientific endeavor for such purposes simply did not exist. After WWII, however, the idea of “Big Science” started to gain steam. Large-scale research teams, funded by the government, came to dominate over smaller-scale individual research.³³ Some projects comparable to Apollo that also fell under the category of “Big Science” included the atomic bomb and the hydrogen bomb, both of which had direct military goals and neither of which were based on prestige. No precedent for a prestige-based project such as Apollo, which cost the United States billions of dollars, in fact existed. In the Cold War era, “Big Science” and military objectives seemed inextricably linked.

The 1960s began with no major change in the Cold War climate. The United States still considered the Soviets a military threat, President Eisenhower had placed military bases all over the globe in order to assure national defense and bolster anti-communist governments wherever needed, and presidents Kennedy and Johnson continued these policies as they worked to strengthen US spheres of influence across the globe.³⁴

The USSR's successful Sputnik program, which put satellites into Earth's orbit and even put a man into space in 1961, also frightened the United States.³⁵ NASA and its space programs could not allow the Soviets to surpass them in space technology, the ultimate "sphere" that both the Soviets and Americans vied for.³⁶ The United States needed the Apollo program in order to counter Soviet progress in space technology.

NASA's business relations gave evidence to the military dimensions of the Apollo program. After WWII, the dependence of military contractors on government contracts grew sharply, and, with the advent of "Big Science," the dependence of government agencies on large contractors grew as well. Not surprisingly, NASA tended to hire those contractors who had longstanding government and military relationships. Federal budgets for defense were kept separate from the budget of NASA, yet the contractors worked for both departments. Because of this, contractors publicly developed civilian technology, but quietly used their defense capabilities within NASA.

President Eisenhower perceived new kinds of relationships between the federal government and military contractors as a threat to Americans. In Eisenhower's famous farewell speech, he warned of the dawn of a new age of militarism in the United States.

*The total influence - economic, political, even spiritual - is felt in every city, every State house, every office of the Federal government. ... [W]e must guard against the acquisition of unwarranted influence, whether sought or unsought, by the military-industrial complex. The potential for the disastrous rise of misplaced power exists and will persist.*³⁷

The phrase "military-industrial complex" in this instance refers to the permanent and near-complete support of large military contracting corporations by the national

government.³⁸ In 1961, when he gave this speech, Eisenhower clearly believed that large military contractors threatened the American people. In relying on big corporations for national defense, the federal government might begin to answer to the needs of the corporations instead of the needs of the American people. Eisenhower warned against a growing military presence in all areas of government.

An example of how the military-industrial complex took hold in the United States was the Grumman Corporation. Grumman began as a small company with a staff of only twenty-one in 1930.³⁹ Roy Grumman ran his company with a very personal touch – even as the company grew into thousands of staff, he knew everyone’s first names.⁴⁰ Things changed when hostilities began to rise in the late 1930s among European nations and Congress passed the Emergency Plant Facilities Act, which created a mechanism for the government to pay for facilities for the production of war materials.⁴¹ In this new environment, Grumman began to focus its work almost exclusively on products for the military, and the corporation grew significantly in size.⁴² As with other industrial corporations of the time, Grumman transformed itself from a small company to a large, almost entirely government-funded, contracting factory.

By the early 1960s, when the Apollo Program took shape, contractors such as Grumman, joined by Boeing and Lockheed, had developed longstanding relationships with the military, relationships rooted in the dramatic growth of the defense industry during and after WWII.⁴³ NASA used these same contractors, who were still under contract with the military, for the development of the Apollo Program.⁴⁴ Their associations with the federal government through their defense contracts gave them the upper hand at the bargaining table, and they easily obtained NASA contracts

over companies who did not have the same history of working with the Department of Defense.⁴⁵

A close examination of NASA's budget reveals similar military connections. In 1963, NASA's budget was about \$2.5 billion.⁴⁶ The Department of Defense's budget that same year was about \$51 billion.⁴⁷ However, the two departments were intimately connected, although Congress separated their budgets. The Department of Defense had some agencies within NASA and even funded some of its research.⁴⁸ Specific programs that overlapped between space research and defense connected the two.

While publicly developing space technology for NASA, many military contractors doubly benefitted from the US arms race against the Soviets by quietly utilizing those same capabilities to achieve military space objectives under NASA's budget. These companies took the contracts, understanding that a major public goal of the program was national prestige, but also recognizing that it had military aims.⁴⁹ President Kennedy reinforced the urgency of the situation in 1962, saying "the space program cannot 'afford undue work stoppages, inflated costs of material or talent, wasteful interagency rivalries or a high turnover of key personnel.'"⁵⁰ NASA contractors worked for both progress and technology through Apollo, but the military never overlooked the future uses of space for defense.

These examples demonstrate the defense dimension of the space race and Project Apollo. However, the federal government and the media obscured this dimension from public rhetoric and discourse. Instead, they focused on national prestige as the reason behind the development of this space technology and exploration. But national defense was clearly one of the hidden reasons for the push for rapid development of space technology against the Soviets.

It is probable that the government obscured the defense dimension from public discussion in order to

maintain the project's idealistic appearance. The turbulence of the 1960s in both domestic and foreign relations meant that the military was subject to public criticism. As the decade progressed, the public criticized many military ventures, from nuclear weapons testing to the Vietnam War. NASA likely did not want to associate itself with such national defense or military ventures in order to avoid conflict. The defense dimension of Apollo, therefore, had to maintain the appearance of an idealistic scientific venture designed to unite Americans with the government. It certainly did not want to become a target of social protest.

One look at the nation's nuclear weapons policies of the early 1960s suggests the dangers of becoming a point of protest. It began in the 1940s and picked up steam in the 1950s, resulting in the first organized protest against the testing in Nevada in 1957.⁵¹ Historian Marian Mollin described the rapid increase in support of anti-nuclear testing groups such as the National Committee for a SANE Nuclear Policy (SANE) and the Committee for Non-Violent Action (CNVA), explaining that during 1959 as many as 50,000 alarmed Americans joined in the protests.⁵² In 1963, the protesters succeeded in forcing the passage of the Atmospheric Nuclear Test Ban, which prohibited any explosions of nuclear weapons in the atmosphere, under water, or anywhere else that could lead to public exposure to nuclear material.⁵³ Although the movement did not eliminate nuclear testing, gaining the government's attention and forcing it to respond to the public's anxieties on this issue was crucial.

The example of the anti-nuclear testing movement made it clear that, even in the early 1960s, the federal government could not afford for the public to see Project Apollo as a threatening military endeavor; otherwise, it could have met the same end. Obscuring the program's military dimension was thus highly beneficial.

Even after 1965, as Project Apollo picked up steam and closed in on its first lunar landing, the government continued to worry about anti-military opposition. This was the year in which major bombing campaigns began in Vietnam, a key change from earlier tactics of sending military advisors and training Vietnamese Armies.⁵⁴ Historian Alexander Bloom writes that this policy shift resulted in a more involved US presence in Southeast Asia, thought of as an unnecessary military action by many Americans. Activists organized teach-ins at colleges, where professors and students discussed the morality of the Vietnam War and the US presence in Southeast Asia.⁵⁵ The anti-war movement strengthened throughout the later 1960s, making public officials anxious.

According to Bloom, as the anti-war movement increased, public support for the war decreased, which “agonized” the federal government.⁵⁶ Officials began to take extreme steps to contain it, using force in some cases and illegal surveillance intelligence in others, which later became a part of Watergate.⁵⁷ Government officials, including the president and his national security advisor, Henry Kissinger, limited their public appearances due to the protests.⁵⁸ The government likely feared that public protests against its military actions in Vietnam could translate to other government programs as well.

This “agony” gave the US government a sense of caution when it came to other military endeavors. Obscuring the military aspect of the Apollo Program could have given the government freedom to continue moving forward, as opposed to answering the questions of the public. As a result, indecision and dallying characterized the latter end of the Vietnam War. NASA on the other hand leaned on the civilian aspects of Project Apollo to quiet the military connections and to continue its development.

Project Apollo was a landmark in US history. Americans were the first to walk on the moon, but, more importantly, the first to achieve the technology that gave them the ability to do so. The news media widely covered the Apollo program in the years between its inception in 1961 and its completion in 1969. Public discourse on the project emphasized its value as a vehicle for national prestige and celebrated its ability to promote national unity, but only a narrow view of history would accept these reasons alone as a basis for such a major project.

National unity and prestige certainly impacted the nation during the 1960s. These were critical concerns of the federal government, especially as the nation splintered over controversies like the Vietnam War, nuclear weapons testing, and civil rights. Project Apollo's self-representation as a symbol of national unity and progress likely proved critical to its success. However, that is not to say that other factors, such as military interest in space, were unimportant influences in the program.

The project certainly resulted in increased national prestige, but additional hidden factors, particularly those related to national defense, paved the way for this project. After the Soviets began developing nuclear arms following WWII and then surpassed the United States in the space race in the late 1950s, Americans increasingly viewed the USSR as a military threat. The military motives of Apollo not only included the use of satellites for intelligence, but also the use of military technology to take advantage of the United States' desired capability to send a man to the moon and return him safely. The realization of these goals was made possible by funding from NASA and the Department of Defense, as well as NASA's utilization of military contractors with established relationships with the Department of Defense. The Apollo Project, although seemingly based on prestige according to public rhetoric and discourse, had a significant military dimension as well

as the backing and aid of the Department of Defense. US national security and outer space always have been inseparably bound, and Project Apollo was no exception to this rule.

The triumph of the Apollo Project was manifold. America, already solidified as one of, if not the, greatest military power of the world, became a scientific and technological superpower. Worldwide, nations recognized the unlimited potential for power of a country with Apollo-level technology. The possibilities for military and civilian use of space technology were and are endless. After putting a man on the moon, the United States built on this technology to create amazing tools, like permanent space stations and extremely accurate navigation systems – both also used by the US military. Exploratory missions and even occupations by humans in other planets are well within NASA's reach and will make humans unprecedented masters of their solar system. American government and military, as the first and one of the few possessors of this technology, will determine the direction of how space will be used by humans in the near future.

¹ "Apollo 11 Lunar Surface Journal," *National Aeronautics and Space Administration*, Corrected Transcript and Commentary by Eric M. Jones, 1995.

² Von Hardesty and Gene Eisman, *Epic Rivalry: The Inside Story of the Soviet and American Space Race* (Washington, DC: National Geographic, 2007): 41.

³ Hardesty and Eisman, 243.

⁴ Alexander Bloom, *Long Time Gone* (New York: Oxford University Press, 2001). The essays in Bloom's work demonstrate varied movements and challenges throughout the sixties such as women's rights, anti-war protests, and civil rights for black Americans.

⁵ John F. Kennedy, "Address at Rice University on the Nation's Space Effort," 12

September 1962, in John F. Kennedy Library and Museum, <http://www.jfklibrary.org/>.

⁶ Norman L. Rosenberg and Emily S. Rosenberg, *In Our Times* (Upper Saddle River, NJ: Prentice Hall, Inc, 1999,) 6.

⁷ *Ibid.*, 7.

⁸ *Ibid.*, 13.

⁹ Rosenberg, 13.

¹⁰ *Ibid.*, 13.

¹¹ Richard M. Nixon and Sam Rayburn, National Aeronautic and Space Act of 1958 (Unamended). 2004.

<<http://history.nasa.gov/spaceact.html>>.

¹² "Apollo Program Summary Report," 2-1.

¹³ "Apollo Program Summary Report," *National Aeronautics and Space Administration*, Document # JSC-09423, April 1975, 2-36.

¹⁴ Roger D. Launius, "The Legacy of Project Apollo," *NASA History Office*, 1999.

¹⁵ Hardesty and Eisman, 45.

¹⁶ *Ibid.*, 47.

¹⁷ Dwight D. Eisenhower, "Farewell Address," 17 January 1961. Presidential Speech Archive, Miller Center of Public Affairs, University of Virginia, <http://millercenter.org/scripps/archive/speeches>.

¹⁸ John F. Kennedy, "The Goal of Sending a Man to the Moon," 25 May 1961. Presidential Speech Archive, Miller Center of Public Affairs, University of Virginia, <http://millercenter.org/scripps/archive/speeches>.

¹⁹ John F. Kennedy, "Address at Rice University on the Nation's Space Effort," 12 September 1962. Presidential Speech Archive, Miller Center of Public Affairs, University of Virginia, <http://millercenter.org/scripps/archive/speeches>.

²⁰ John F. Kennedy and James Webb, "JFK Exchange with NASA on Priority of Moon Landing," John F. Kennedy Presidential Library and Museum, Excerpt of 21 November 1962 White House meeting on space program- White House Tape #63. <http://www.jfklibrary.org/>.

²¹ James E. Webb, "America's Role in Space Today: Head of United States Space Agency Gives Five Reasons Why This Country Must Move to Master Space Flight," *New York Times*, 8 October 1961, M1.

²² NASA Eleventh Semiannual Report to Congress, CIS U.S. Serial Set, Annual Reports of Administrations and Boards, 89th Congress 1st Session, 32.

²³ NASA Twelfth Semiannual Report to Congress, 26.

²⁴ NASA Twelfth Semiannual Report to Congress, CIS U.S. Serial Set, Annual Reports of Administrations and Boards, 89th Congress 1st Session, 28.

²⁵ Linda N. Ezell, *NASA Historical Data Book: Programs and Projects 1958-1968*,

(Washington, DC: The NASA Historical Series, 1988), iii.

²⁶ *Historical Tables: Fiscal Year 2010*, Office of Management and Budget, www.budget.gov, 74.

²⁷ *Historical Tables: Fiscal Year 2010*, 122.

²⁸ "Many Americans Doubt Manned Lunar Flight Is Worth the Huge Cost," *Wall Street Journal*, 19 September 1963, 18.

²⁹ "The Great Hurry," *Wall Street Journal*, 9 August 1962, 10.

³⁰ "Idiot's Delight," *Wall Street Journal*, 27 April 1962, 14.

³¹ "NASA Laments Notion of 'Race' with Reds, But Capitalizes on Its Moon-Struck Rooters," *Wall Street Journal*, 23 August 1962, 8.

³² "Many Americans Doubt Manned Lunar Flight Is Worth the Huge Cost," *Wall Street Journal*, 1963, 18.

³³ Peter Galison and Bruce William Hevly, *Big Science: the Growth of Large-scale Research*, (Stanford: Stanford University Press, 1992), 2.

³⁴ Rosenberg, 108.

³⁵ Yuri Gagarin, *Soviet Man in Space* (Honolulu: University Press of the Pacific, 2001), 9.

³⁶ Rosenberg, 13.

³⁷ Eisenhower, "Farewell Address," 17 January 1961.

³⁸ Rosenberg, 193.

³⁹ Richard Thruelsen, *The Grumman Story* (New York: Praeger Publishers, 1976), 1.

⁴⁰ Thruelsen, 20.

⁴¹ Bill Gunston, *Grumman: Sixty Years of Excellence* (New York: Orion Books, 1988), 33.

⁴² Gunston, 33.

⁴³ Barnes W. McCormick, Conrad F. Newberry, Eric Jumper, and American Institute of Aeronautics and Astronautics, *Aerospace Engineering Education During the First Century of Flight* (Reston, VA: American Institute of Aeronautics and Astronautics, Inc, 2004), 158.

⁴⁴ "Biggest Contract is Signed by NASA," *New York Times* (1923-Current file), Aug 17, 1963, ProQuest Historical Newspapers The New York Times (1851 - 2007), 25.

⁴⁵ "Biggest Contract is Signed by NASA," 25.

⁴⁶ *Historical Tables: Fiscal Year 2010*, 74.

⁴⁷ *Historical Tables: Fiscal Year 2010*, 74.

⁴⁸ Ezell, 1, 17.

⁴⁹ Hardesty, 47.

⁵⁰ "Kennedy Asks Added \$7 Billion to \$9 Billion For Space Program Over Next 5 Years," *Wall Street Journal*, 26 May 1961, 3.

⁵¹ Marian Mollin, "The Struggle Against McCarthyism and the Bomb," in *The Encyclopedia of American Social Movements*, Immanuel Ness, ed. (Armonk, NY: M.E. Sharpe, 2004), 6.

⁵² *Ibid.*, 7.

⁵³ Mollin, 7; John F. Kennedy and Dean Rusk, "Treaty Banning Nuclear Weapon Tests in the Atmosphere, in Outer Space and Under Water," Article 1, 10 October 1963.

⁵⁴ Rosenberg, 147.

⁵⁵ Bloom, 76.

⁵⁶ Bloom, 78-79.

⁵⁷ Bloom, 81-2.

⁵⁸ Bloom, 82.