




Fall 2019

The Pioneering Legacy and Consequence of Wernher von Braun

Ethan S. Wilt
Gettysburg College

Follow this and additional works at: https://cupola.gettysburg.edu/student_scholarship

 Part of the [Aviation and Space Education Commons](#), and the [History of Science, Technology, and Medicine Commons](#)

Share feedback about the accessibility of this item.

Recommended Citation

Wilt, Ethan S., "The Pioneering Legacy and Consequence of Wernher von Braun" (2019). *Student Publications*. 751.

https://cupola.gettysburg.edu/student_scholarship/751

This is the author's version of the work. This publication appears in Gettysburg College's institutional repository by permission of the copyright owner for personal use, not for redistribution. Cupola permanent link: https://cupola.gettysburg.edu/student_scholarship/751

This open access student research paper is brought to you by The Cupola: Scholarship at Gettysburg College. It has been accepted for inclusion by an authorized administrator of The Cupola. For more information, please contact cupola@gettysburg.edu.

The Pioneering Legacy and Consequence of Wernher von Braun

Abstract

The fundamental research question of this paper revolves around the idea of; would it have been possible for the United States to land on the Moon by the close of the decade if it hadn't been for the effort, influence, and work of Wernher von Braun? The secondary question of the paper is what significant accomplishments and work did von Braun contribute to the United States space flight program that consequently led to the success in 1969? Through the effort, work, and influence of Wernher von Braun, it was possible for the United States to land on the Moon in 1969. Overall, had it not been for the initiative and accomplishments of von Braun, the United States would have either made it the Moon far later than 1969 or would have never landed on the Moon at all. To clearly understand how the United States landed a man on the Moon in 1969, it is essential to acknowledge the significant accomplishments and work of Wernher von Braun during the 1950s and 1960s. These accomplishments can be categorized into two structures: decisive advocacy and leadership and critical administrative and scientific endeavors at NASA. As a result of investigating the inner workings of the colossal and herculean character of Wernher von Braun, this inquiry provides an integrative argument as to why von Braun was fundamental for the United States landing on the Moon in 1969.

Keywords

Wernher von Braun, space policy, space race

Disciplines

Aviation and Space Education | History | History of Science, Technology, and Medicine

Comments

Written for FYS 101-4: Visions of Space Exploration.

The Pioneering Legacy and Consequence of Wernher von Braun

Ethan Wilt

Gettysburg College

FYS 101-4

12/4/19

Wernher von Braun was born on March 23, 1912, to Magnus von Braun and Emmy von Quistorp, with the *von* denoting an aristocratic and elite genealogical stock. The young von Braun grew up in nobility and entitlement due to his father's high-level civil service reputation in the Weimar Republic in Germany. On his thirteenth birthday in March of 1925, his parents presented him with a small telescope as a present which proved to be pivotal in establishing his passion for space flight and rocketry. 1925, as a whole, proved to be an essential year for von Braun who, along with being utterly enamored by his new present, gained acceptance to Ettersburg, an elite boarding school near Weimar.¹ After his first term at Ettersburg, von Braun came across a book called *The Rocket into Interplanetary Space* which was coincidentally Hermann Oberth's rejected doctoral thesis paper. Von Braun was dumbfounded by the content and diligently worked to comprehend the material which was very far outside his realm of knowledge.² Von Braun would later meet his inspiration and catalyst and they both became members of the German Rocket Society during the 1930s. Through those profoundly transformative years between 1925 and 1932, von Braun had realized his ultimate passion for space flight and really matured and transformed into an immensely charming, talented, and driven individual.³

Wernher von Braun's initial rocketry career endeavors oddly began when a black sedan rolled up with three high level German military officials offering him a job in the Army creating and testing rockets and missiles.⁴ It wasn't an automatic decision for von Braun who was still debating the best way to gain influence and experience in the field of rocketry. "If advancing

¹ "Page 21." *Von Braun: Dreamer of Space, Engineer of War*, by Michael J. Neufield, A.A. Knopf, 2008.

² "Page 25." *Von Braun: Dreamer of Space, Engineer of War*, by Michael J. Neufield, A.A. Knopf, 2008.

³ "Page 21." *Von Braun: Dreamer of Space, Engineer of War*, by Michael J. Neufield, A.A. Knopf, 2008.

⁴ "Page 17." *Dr. Space: The Life of Wernher von Braun*, by Bob Ward and John Glenn, Naval Institute Press, 2013.

rocketry towards his eventual goal of human space flight meant joining forces with the German military then so be it.” The German military was able to provide the funds and facilities that von Braun and his team desperately needed to continue their quest which made their decision to join very simple.⁵ This inherent logic by von Braun characterizes his whole philosophy on space flight but would later get him in trouble with the party for being dangerously anti-militaristic. After establishing himself as a reliable and highly intelligent engineer within the German Army, von Braun went on to develop the V-2 Rocket which he regarded as his “baby.”⁶ Walter Dornberger, a German Lieutenant General and military and administrative head of the V-2, stated that “Wernher von Braun’s personal contributions to all areas of the development of the V-2 rocket was decisive, guiding, and truly invaluable.” (Baranov 6) Towards the end of World War II with almost certain defeat imminent, von Braun and his fellow scientist made the crucial and conscious choice to surrender voluntarily to the U.S Army instead of the Red Army. This fateful and resolute decision subsequently allowed for the German scientists to be brought over to the U.S to conduct research in rocketry rather than being tried and convicted of their war crimes in Europe.

The fundamental research question of this thesis revolves around the idea of; would it have been possible for the United States to land on the Moon by the close of the decade if it hadn’t been for the effort, influence, and work of Wernher von Braun? The secondary question of the paper is what significant accomplishments and work did von Braun contribute to the United States space flight program that consequently led to the success in 1969? The first question provides the basic framework for the essay while the second question fills out the

⁵ “Page 18.” *Dr. Space: The Life of Wernher von Braun*, by Bob Ward and John Glenn, Naval Institute Press, 2013.

⁶ “Page 46.” *Dr. Space: The Life of Wernher von Braun*, by Bob Ward and John Glenn, Naval Institute Press, 2013.

content and analysis portion for von Braun. Thus, these two questions act as guides and directives to follow while making the argument and introducing the key methods for evidence.

Through the effort, work, and influence of Wernher von Braun, it was possible for the United States to land on the Moon in 1969. Overall, had it not been for the initiative and accomplishments of von Braun, the United States would have either made it the Moon far later than 1969 or would have never landed on the Moon at all. John F. Kennedy famously determined the deadline for men on the Moon in his speech at Rice University in 1961 which he passionately stated: “we choose to go to the Moon in this decade and do the other things, not because they are easy, but because they are hard.” Though Kennedy officially inaugurated this deadline for landing on the Moon, von Braun had already been campaigning and advocating for this level of commitment by the U.S. government since the 1950s. To clearly understand how the United States landed a man on the Moon in 1969, it is essential to acknowledge the significant accomplishments and work of Wernher von Braun during the 1950s and 1960s. These accomplishments can be categorized into two structures: decisive advocacy and leadership and critical administrative and scientific endeavors at NASA.

The first category of von Braun’s significant accomplishments revolves around the decisive advocacy and leadership positions he occupied throughout his time at the helm of NASA and as a private citizen looking to explore the greater realms of possibility in space. This area of interest can be further broken down into three distinctive sections: personality and persuasiveness, presence in broadcast and literary media, and his political ambitions. These three distinctions provide an analysis of how von Braun leveraged his identity and actions to transform

the social dynamic around human space exploration which ultimately led to NASA's success in 1969.

One of the many characteristics that separated von Braun from other enthusiasts and fellow rocket scientists was his charming yet driven personality. His ability to use his strengths in charm and charisma was an undoubtedly key factor in how he led the charge for the development of human space flight in the United States. *Chasing the Moon* explicates this ability by saying "von Braun grew up with a sense of entitlement, which, when combined with his innate charisma, effortlessly opened doors." (Stone and Andres 40) These attributes became von Braun's identity which helped him forge on with his space aspirations inside NASA and U.S. government. Specifically, von Braun differentiated himself from other rocket engineers like Willy Ley because he had the expertise in being charismatic to a wide variety of audiences which Ley subsequently lacked with his thick accent.⁷ This was critical since the up and coming space program policy needed a steadfast and understandable figure to effectively relay significant information to the public about their goals and aspirations. *Chasing the Moon*, in addition to highlighting his charisma and charm, showcases his resourcefulness and cleverness by saying "by the early 1950s, von Braun's charm, as well as his considerate political savvy and innate talent to inspire, had worked magic on his former enemies." (Stone and Andres 40) Von Braun possessed all the necessary tools to achieve his internal goals and he expertly and persuasively utilized those tools to actually enact new policy on space exploration.

Wernher von Braun excelled at tailoring his arguments and speeches towards each perspective and particular audience which, in turn, granted him an edge over other influential

⁷ "Page 41." *Chasing the Moon: the People, the Politics, and the Promise That Launched America into the Space Age*, by Robert Stone and Alan Andres, Ballantine Books, an Imprint of Random House, 2019.

government or civil personnel. Von Braun knew that to convince the U.S government, in addition to the general populace, that human space flight was absolutely paramount for the advancement of American society, he was required to express his views to the different agents of change and influence. “He learned how to convince the key decision-makers that his vision would confer to those in power precisely what he had deduced they most desired.” (Stone and Andres 46) For example, for those who were worried about threats from outside countries, von Braun promised security and to those searching for a sense of purpose or meaning, he offered a unique adventure and fulfillment of our natural and eternal human destiny.⁸ In *Engineer’s Dream: Wernher von Braun, Willy Ley, and Astrofuturism in the 1950s*, Kilgore provides a narration of an interaction between von Braun and Adolf K. Thiel that showcases how realistic von Braun was in creating space policy:

After five years in the desert von Braun decided to go public in pressing for space exploration. One day, while walking among the sage brush with his associate Dr. Adolf K. Theil, he suddenly turned to him and said with bluntness and facility in the idiom of his newly polished English, “We can dream about rockets and the Moon until Hell freezes over. Unless the people understand it and the man who pays the bill is behind it, no dice. You worry about your damned calculations, and I’ll talk to the people.” (Kilgore 111)

Von Braun strived to offer the American people and the government every type of vision and dream for space flight in order to increase his leverage and popularize the race to the Moon.

⁸ “Page 46.” *Chasing the Moon: the People, the Politics, and the Promise That Launched America into the Space Age*, by Robert Stone and Alan Andres, Ballantine Books, an Imprint of Random House, 2019.

The first channel von Braun employed to communicate and encapsulate his vision for space exploration was speaking directly to the media and press through television interviews, performances, and speeches. It is extraordinary how von Braun was able to appear on television to discuss his ideas for space flight since television was a relatively new medium for communication and was becoming more accessible to the average American household. “Along with other members of the aerospace community, von Braun began a multi-media crusade that took him far beyond the laboratories, lecture halls, and conferences familiar to ordinary scientists and engineers.” (Kilgore 111) Von Braun appeared on NBC, CBS, and ABC, all within a short amount of time, which allowed for maximum exposure of his ideas of space flight to the American people.⁹ Von Braun transcended at quickly changing the opinions of the masses on space flight either by elaborate speeches to larger audiences or more personal conversations with critics. A fellow pro-space advocate and science writer, Frederick C. Durant III, recalled: “but over and over I’ve watched these opinions change, usually within a few minutes of a first meeting, as von Braun’s personal warmth and engaging manner and obvious honesty are communicated as if by a sixth sense.” (Kilgore 112) Once von Braun was thrust into the limelight of the press, he was exuberant since his American moment had finally arrived after seven long years with little national recognition.¹⁰ Von Braun persuasively used media and press to sway public opinion regarding space flight which greatly impacted its success and progression.

⁹ “Page 53.” *Chasing the Moon: the People, the Politics, and the Promise That Launched America into the Space Age*, by Robert Stone and Alan Andres, Ballantine Books, an Imprint of Random House, 2019.

¹⁰ “Page 53.” *Chasing the Moon: the People, the Politics, and the Promise That Launched America into the Space Age*, by Robert Stone and Alan Andres, Ballantine Books, an Imprint of Random House, 2019.

The second impactful promotion of space flight by von Braun was his participation in Disney's documentary on space flight called "Man in Space." After an unexpected call from Walt Disney himself, von Braun, along with Willy Ley and Heinz Haber, was to feature in the documentary discussing rocketry history, orbital science, and the physical challenges associated with human space flight.¹¹ Von Braun commanded the viewer's attention by looking straight into the camera and confidently asserting that "if we were to start today on an organized and well-supported space program, I believe a practical passenger rocket can be built within ten years." (Stone and Andres 59) Man in Space was viewed by almost forty million American households, about a third of the viewing public. The documentary ultimately proved to be consequential in changing public opinion with nearly forty percent of people believing we would be able to reach the Moon which had doubled just in the last six years.¹² Von Braun's work with Disney allowed for his vision for space flight to improve significantly since the populace, more than ever, was interesting and amazed by the new innovation that was on the horizon.

Lastly, von Braun utilized the raw benefits associated with print and literary media to further his many claims and ideas as to why space flight is necessary and definite for the United States. Von Braun was heavily involved with the expansion and circulation of the Magazine *Collier's*.¹³ This privilege granted him the ability to speak a highly interested audience, albeit small readership that made up of eight to ten percent of the American public, which transformed

¹¹ "Page 58." *Chasing the Moon: the People, the Politics, and the Promise That Launched America into the Space Age*, by Robert Stone and Alan Andres, Ballantine Books, an Imprint of Random House, 2019.

¹² "Page 59." *Chasing the Moon: the People, the Politics, and the Promise That Launched America into the Space Age*, by Robert Stone and Alan Andres, Ballantine Books, an Imprint of Random House, 2019.

¹³ "Page 54." *Chasing the Moon: the People, the Politics, and the Promise That Launched America into the Space Age*, by Robert Stone and Alan Andres, Ballantine Books, an Imprint of Random House, 2019.

him into the most prominent public advocate for space exploration.¹⁴ Von Braun also aspired to write informative and compelling books about space exploration which resulted in him writing *The Mars Project* in 1948 but wasn't published until 1952. "My basic objective during the preparation of *The Mars Project* has been to demonstrate that on the basis of the technologies and the know-how then available (1948), the launching of a large expedition to Mars was a definite technical possibility." (Kilgore 115) Another example includes von Braun writing an endearing article in the *Los Angeles Times* in 1960 and answering the most vital question about conquering space for Americans.¹⁵ Von Braun stimulated the minds of the American people about space flight by saying "we have just opened the door into the limitless reaches of the universe and we can see just far enough ahead to know that man is at the threshold of a momentous area." (von Braun 3) Von Braun intrinsically valued the potentiality of literary media and capitalized on the opportunity which ultimately led to the advancement of his vision for space exploration in the United States.

Von Braun eloquently and profoundly defended his concepts for human space exploration most publicly in Senate committee hearings where he finally had an opportunity to advocate directly to the key decision-makers in the U.S. government. The first hearing von Braun attended was in 1957 which was in reaction to the Soviet Union successfully launching their own satellite, Sputnik. Von Braun intently urged the United States, that is the U.S. government, to increase efforts to conquer space and launch their own system and program to

¹⁴ "Page 55." *Chasing the Moon: the People, the Politics, and the Promise That Launched America into the Space Age*, by Robert Stone and Alan Andres, Ballantine Books, an Imprint of Random House, 2019.

¹⁵ "Page 2." *Wernher von Braun, the Nation's Foremost Missile Expert, Answers the most Vital of all Questions for Americans Today*, by Wernher von Braun, *Los Angeles Times*, 1960.

develop rockets and satellites.¹⁶ During the hearing, von Braun clearly stated: “but given enough money, he said, the United States had enough scientific brains to get a successful space program going.” (*Russ can Hit Anywhere*) Along with testifying becoming a relatively simple task for von Braun, many congressmen welcomed the opportunity to question von Braun, simply because he mesmerized them with his overwhelming knowledge, wisdom, and charm.¹⁷

With von Braun mostly at ease with testifying in front of Senate committees, he was able to embody the necessary confidence and intellect to showcase why the United States required a competent space program. The second influential appearance was in 1963 when NASA’s budget come under scrutiny for being overfunded without significant returns. Von Braun basically pleaded to the Senators that a five to ten percent decrease in the space budget would seriously threaten America’s dream of sending a man to the Moon by 1970.¹⁸ Through giving an energetic and visionary speech to the subcommittee, von Braun was able to gain key allies like future President Lyndon B. Johnson who became an avid proponent of the space program. Von Braun used his opportunities in politics to quickly convince many in Washington to support and understand the importance of space flight.

To gain a clear understanding of how much Wernher von Braun influenced national space policy, it crucial to focus on his relationships and encounters with the U.S. presidency throughout time in America. The two U.S. presidents that are going to be investigated are President Eisenhower and President Kennedy since they offered radically different views on the

¹⁶ “Page 1.” *Russ can Hit Anywhere, Expert Says: von Braun Urges Huge U.S. Effort to Conquer Space*, *Los Angeles Times*, 1957.

¹⁷ “Page 113.” *Engineer’s Dream: Wernher von Braun, Willy Ley, and Astrofuturism in the 1950s*, by De Witt Douglas Kilgore, *Canadian Review of American Studies*, 1997.

¹⁸ “Page 1.” *von Braun Fears Space Budget Cut would Peril Man-on-Moon Project*, by Marvin Miles, *Los Angeles Times*, 1963.

role of NASA and space flight. Firstly, Eisenhower's internal plans for space flight came into direct opposition to von Braun's vision. Eisenhower's type of program rested in a realistic desire to invest limited funds in space systems with military and other applications rather than to engage in what he characterized as space stunts.¹⁹ Instead of providing key information and reliable advice on space policy to the president, Eisenhower viewed von Braun as almost an enemy or idealistic in regards to his vision for human space flight. Although Eisenhower may have disliked von Braun's policies, he recognized that von Braun was a passionate and empowering leader within the field of space and actively campaign for the advancement of the space program.

On the other hand, President Kennedy was the ideal person for von Braun to convince to further develop NASA and the space program. "As a result, he and his chief advisors expressed a strong consensus that science and technology coupled with proper leadership and the inspiration of a great cause, could solve almost any problem of society." (Launius 140) Kennedy's mindset almost perfectly mirrored that of von Braun which led to an increase in the space program at the highest level since it was the first time a U.S. president was ardently behind space flight. Kennedy proved to be consequential in the race to get a man on the Moon by 1970 which nicely coincided with von Braun's vision for space exploration. What Kennedy differed from von Braun in respect to the space race was his ultimate goal for the program, Kennedy affirmed that the U.S. involvement in the space race was mainly due to the highly contested competition with the Russians. In a press conference in early 1961, Kennedy clearly stated that if the United States could get the Moon before the Russians, then we should make it our prerogative to do so.²⁰ And

¹⁹ "Page 129." *Eisenhower, Sputnik, and the Creation of NASA*, by Roger D. Launius, The Journal of the National Archives, 1996.

²⁰ "Page 13." *Apollo's Legacy: The Space Race in Perspective*, by Roger D Launius, Smithsonian Books, 2019.

after Kennedy was assassinated in 1963, his vision of landing on the Moon by the end of the decade became priority number one for NASA to accomplish and memorialize his dream.

The second category of Wernher von Braun's achievements involves his administrative and scientific endeavors while working and advocating for NASA and the U.S. government. This field of study can be separated into distinct sub-sections: his experiences in Huntsville, Alabama, his work in the Redstone project, Explorer I and the Saturn V, and his overall contributions to NASA as a whole. Although von Braun is famously known for his leadership and advocacy, he also was a highly qualified scientist, engineer, and administrator for NASA during the 1950s and 1960s.

After spending his first few years in America in White Sands, New Mexico, von Braun and his fellow German scientists were relocated to the Redstone Arsenal in Huntsville, Alabama. Around 1951 and 1952, Von Braun began spearheading the creation of the Redstone rocket which was a modified and bigger variation of the V-2 rocket.²¹ Von Braun continued to steadily work on the Redstone rocket while also overseeing the top-secret plan to launch the first U.S. satellite into orbit, codenamed Project Orbiter throughout the 1950s.²² After President Eisenhower chose the Navy's Vanguard rocket over his Orbiter Rocket and its subsequent launch failure, von Braun felt ever more empowered to launch his own rocket knowing it would perform without a hitch. So on January 31, 1958, the Redstone rocket was launched which carried the first American satellite of the Earth, Explorer I.²³ This was an extraordinary and encompassing

²¹ "Page 51." *Chasing the Moon: the People, the Politics, and the Promise That Launched America into the Space Age*, by Robert Stone and Alan Andres, Ballantine Books, an Imprint of Random House, 2019.

²² "Page 58." *Chasing the Moon: the People, the Politics, and the Promise That Launched America into the Space Age*, by Robert Stone and Alan Andres, Ballantine Books, an Imprint of Random House, 2019.

²³ "Page 7." *An Anthology of the Distinguished Achievements in Science and Technique*, by M.I. Baranov, Electrical Engineering & Electromechanics, 2019.

achievement and moment for the U.S. in addition to von Braun who had been waiting for this particular opportunity since he was young rocket enthusiast in Germany.

The triumph from the launch of Explorer I, the first U.S. cigar-shaped artificial satellite, marked the beginning of space flights in the United States, as well as basic scientific research of space by scientists in NASA.²⁴ The next great expedition in rocketry for von Braun revolved around the development of a rocket, which had a much more sophisticated and technological design, known as the Saturn V. At the beginning of the development of the Saturn V, many of the German engineer, including von Braun, were dumbfounded by the tremendous size of the rocket with it standing at almost three hundred sixty-five feet. To put that into comparison, the rocket towered six stories taller than the Statue of liberty.²⁵ The Saturn V rocket was ultimately used for human space flight missions, starting with Apollo eight through Apollo thirteen. Thus, the landmark mission of Apollo eleven, in July of 1969, finally achieved Kennedy's and von Braun's inherent dream of reaching the Moon by the end of the decade.

Wernher von Braun was indefinitely a natural-born leader and highly confident advocate for space policy in the United States which can be showcased through his many leadership and administrative positions while working for NASA and the U.S. Army. Von Braun began as the head of U.S. Army design and development service while he was stationed in White Sands, New Mexico.²⁶ After he and his fellow German engineers were relocated to the Redstone Arsenal in Huntsville, Alabama, he was appointed as the chief designer and director of development

²⁴ "Page 7." *An Anthology of the Distinguished Achievements in Science and Technique*, by M.I. Baranov, Electrical Engineering & Electromechanics, 2019.

²⁵ "Page 136." *Dr. Space: The Life of Wernher von Braun*, by Bob Ward and John Glenn, Naval Institute Press, 2013.

²⁶ "Page 6." *An Anthology of the Distinguished Achievements in Science and Technique*, by M.I. Baranov, Electrical Engineering & Electromechanics, 2019.

division.²⁷ When NASA was created and Redstone Arsenal became the Marshall Space Flight Center, von Braun was appointed as the first director and spend much of the rest of his career at the helm in Huntsville.²⁸ The hallmark of his many honors rests upon him receiving the NASA medal for Distinguished Service in 1969 after the success of Apollo eleven.²⁹ Through exploring the many roles and positions von Braun occupied during the 1950s and 1960s, it is imperative to give respect to his tireless and driven character which propelled him to the top of management at NASA.

As a result of investigating the inner workings of the colossal and herculean character of Wernher von Braun, this inquiry provides an integrative argument as to why von Braun was fundamental for the United States landing on the Moon in 1969. The unparalleled influence of von Braun on the development and advancement of the U.S. space program during the 1950s and 1960s in America is unrivaled. Through probing von Braun and constituting his actions in specific categories, it allowed for the greater picture of his accomplishments to be established and honored. Von Braun's decisive leadership and advocacy unequivocally led to the rapid transformation of the social dynamic around the concepts of human space flight. While also being a qualified professional within the field of rocketry and space flight led to him being directly involved with the extraordinary ideas he was advocating to the general populace. *Chasing the Moon* provides a very intriguing detail that encapsulates the overall impact and importance of von Braun's work was in the U.S, "a noted nuclear physicist asked the former

²⁷ "Page 7." *An Anthology of the Distinguished Achievements in Science and Technique*, by M.I. Baranov, Electrical Engineering & Electromechanics, 2019.

²⁸ "Page 8." *An Anthology of the Distinguished Achievements in Science and Technique*, by M.I. Baranov, Electrical Engineering & Electromechanics, 2019.

²⁹ "Page 9." *An Anthology of the Distinguished Achievements in Science and Technique*, by M.I. Baranov, Electrical Engineering & Electromechanics, 2019.

President whether he had anyone in mind when he mentioned the scientific-technological elite. Eisenhower answered without any hesitation.... Wernher von Braun.” (Stone and Andres 82) Therefore, without the work, effort, and influence of Wernher von Braun, the United States would have unquestionably never reached the Moon in 1969.

I have upheld the highest principles of honesty and integrity in my academic work and have not witnessed a violation of the Honor Code.

ESWilt

Bibliography:

Neufeld, Michael J. *Von Braun: Dreamer of Space, Engineer of War*. A.A. Knopf, 2008.

Stone, Robert, and Alan Andres. *Chasing the Moon: the People, the Politics, and the Promise That Launched America into the Space Age*. Ballantine Books, an Imprint of Random House, 2019.

Ward, Bob, and John Glenn. *Dr. Space: the Life of Wernher Von Braun*. Naval Institute Press, 2013.

M. I. Baranov. “AN ANTHOLOGY OF THE DISTINGUISHED ACHIEVEMENTS IN SCIENCE AND TECHNIQUE. PART 50: ROCKET-SPACE TECHNOLOGY DESIGNER WERNHER VON BRAUN AND HIS ACCOMPLISHMENTS IN MISSILE DESIGN.” *Electrical Engineering & Electromechanics* 4 (2019): 3–11. Web.

Kilgore, De Witt Douglas. “Engineers’ Dreams: Wernher von Braun, Willy Ley, and Astrofuturism in the 1950s.” *Canadian Review of American Studies*, vol. 27, no. 2, Mar. 1997, p. 103. *EBSCOhost*, doi:10.3138/CRAS-027-02-05

"Russ can Hit Anywhere, Expert Says: Von Braun Urges Huge U.S. Effort to Conquer Space VON BRAUN VIEWS." *Los Angeles Times (1923-1995)*, Dec 15, 1957, pp. 1. *ProQuest*, <http://ezpro.cc.gettysburg.edu:2048/login?url=https://search.proquest.com/docview/167176031?accountid=2694>.

Miles, Marvin. "Von Braun Fears Space Budget Cut would Peril Man-on-Moon Project: VON BRAUN VIEWS." *Los Angeles Times (1923-1995)*, Mar 19, 1963, pp. 2. *ProQuest*,

<http://ezpro.cc.gettysburg.edu:2048/login?url=https://search.proquest.com/docview/168267464?accountid=2694>.

Wernher, von B. "Wernher Von Braun, the Nation's Foremost Missile Expert, Answers the most Vital of all Questions for Americans Today: Why should America Conquer Space? Outer Space: New Frontier for Young Americans." *Los Angeles Times (1923-1995)*, Mar 20, 1960, pp. 3. *ProQuest*,
<http://ezpro.cc.gettysburg.edu:2048/login?url=https://search.proquest.com/docview/167576467?accountid=2694>.

Launius, Roger D. "Eisenhower, Sputnik, and the creation of NASA." *The Journal of the National Archives*, vol. 2, no. 2, summer 1996, p. 127-143.

Launius, Roger D. *Apollo's Legacy: the Space Race in Perspective*. Smithsonian Books, 2019.