Lunar Colonies and Nuking the Moon: Science Fiction, Cold War Anxiety, and the U.S. Space Program

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A graduating Essay Submitted in Partial Fulfillment of the Requirements, in the
Honours Programme.
For the Degree of
Bachelor of Arts
In the
Department
Of
History

The University of Victoria
March 10, 2017

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"I called the moon my home for three days of my life, and I'm here to tell you about it. That's science fiction."

–Eugene Cernan, Apollo 17 Astronaut, *In the Shadow of the Moon*

Introduction

On 25 January 2012, Republican presidential hopeful Newt Gingrich addressed an enthusiastic crowd of 700 people. He began by calling for the creation of a new "generation of courageous people," who could "do something big, and bold, and heroic." This new generation would have to study math and science, so that a "bigger and better future" could be built for the American people. To Gingrich, young minds could be inspired to pursue these careers by reinvigorating the American space program. In light of this, he declared that "by the end of my second term, we will have the first permanent base on the moon. And it will be American." The announcement struck a chord with the crowd, which erupted into applause and gave Gingrich a standing ovation. Gingrich then continued, addressing some of his critics within the Republican presidential candidate race. He noted that many had attacked him for being grandiose in his bold plans for the American space program. In Gingrich's mind, however, this was not problematic. Citing influential Americans such as Abraham Lincoln, the Wright brothers, and John F. Kennedy, he gladly accepted the charges of grandiosity laid against him. In fact, he considered the entire American people "instinctively grandiose, because we believe in a better future."[1] The crowd rose to their feet in applause again, no doubt excited and inspired by the possibility of returning to the moon and ultimately a time of technological optimism.

Gingrich's candidacy floundered soon after. Faced with pressing economic issues, the Republican Party and the American people clearly believed Gingrich's space project was an expensive and risky anomaly that should not take priority over more immediate concerns. Yet, unbeknownst to Gingrich, his supporters, and most American citizens, this was not the first time in U.S. history that there had been serious discussion of establishing a colony on the moon. In the late 1950s and early 1960s, both the U.S. Air Force and the U.S. Army developed detailed plans

[1] "Gingrich promises US moon colony by 2020," NBC News, January 25 2012, accessed January 1, 2017, http://firstread.nbcnews.com/_news/2012/01/25/10237875-gingrich-promises-us-moon-colony-by-2020.

to establish permanent lunar settlements. In fact, these plans took the moon base project further than even Gingrich had imagined. Motivated by science fiction culture and Soviet competition, U.S. officials began to perceive the moon as a Cold War frontier and the ultimate proving ground for American military and technological superiority. Similar plans went as far to suggest that detonating nuclear devices on the moon was both feasible and valuable for studying the possibility of space warfare. Indeed, Gingrich was not alone in his consideration of establishing an American lunar presence. Compared to the ambitious plans of his Cold War predecessors, Gingrich's proposal resembled a watered down continuation of past dreams that failed to materialize. And those plans reveal much about the American objectives and anxieties that drove the U.S. space program.

Although no military bases or colonies have ever been established on the moon, the U.S. has indeed landed twelve men on the moon and returned them to the earth. Between 1968 and 1972, NASA's Apollo program sent a total of nine manned missions to the moon. Of these, six landed crews of two men on the moon, whose surface time ranged from 21 hours to almost four days. To this day, countless Americans harken back to the Apollo moon landings as the epitome of American scientific progress and innovation. Monika Gisler and Didier Sornette refer to the Apollo moon landings as "one of the most striking modern examples of a fundamental innovation process," while Andrew Reichstein notes that many consider the Apollo program to be "the beginning of the space age, the dawn of space travel."[2] Forty-five years after the last moon shot, the Apollo program is still considered NASA's greatest success. Even as the international space station dwarfed the Apollo program in size and spending, it has yet to

[2] Monika Gisler and Didier Sornette, "Exuberant Innovations: The Apollo Program" in *Society* 46, no. 1 (Winter 2009): 56, http://link.springer.com.ezproxy.library.uvic.ca/article/10.1007/s12115-008-9163-8/fulltext.html, and Andrew Reichstein, "Space-The Last Cold War Frontier?" in *Amerikastudien / American Studies* 44, no. 1 (2012): 113, http://www.jstor.org/stable/41157439.

approach the sense of wonder, fascination and pride that Americans felt when men walked on the moon.[3] Considering that most of Gingrich's supporters lived through this exciting period of American history, it is little wonder that he could stir public enthusiasm for an expanded space program and new moon missions.

Undoubtedly, the moon has captured many Americans' imagination for much of the second half of the twentieth century and into the twenty-first century. This is intrinsically tied to the Apollo missions, which have "cast a long shadow over American society" since the program's end in 1972.[4] In light of Apollo's lasting effects on American society, it seems important to seek out the beginnings of the country's fascination with the moon and its conquest. When did the moon enter the imagination of the U.S. public and officials? How did lunar exploration make the transition from fantasy to reality? Why was it that U.S. officials placed such importance on reaching the moon? Considering that the Apollo program proceeded despite going well over its 20 billion dollar budget, it is clear that the conquest of the moon was a matter of utmost importance to U.S. officials.[5] This paper will seek to address these issues and shed new light on the American fascination with the moon.

The moon landings have prompted ample historical debate and discussion. One of the most common trends in the academic literature is to credit the moon landings to leading figures in the U.S. government. Roger Launius, for example, considers the Apollo program almost entirely the result of President John F. Kennedy's initiative. According to Launius, "everything changed" when Kennedy made his famous moon challenge speech on 25 May 1961. It was this

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[3] David Bruggeman, "NASA: A Path Dependent Organization" in *Technology in Society* 24, no. 4 (Fall 2002): 420, http://www.sciencedirect.com.ezproxy.library.uvic.ca/science/article/pii/S0160791X02000337.
[4] Roger D. Launius, "Interpreting the Moon Landings: Project Apollo and the Historians" in *History and Technology*, 24, no. 3 (2006): 244, http://web.b.ebscohost.com.ezproxy.library.uvic.ca/ehost/pdfviewer.
[5] Reichstein, "Space-The Last Cold War Frontier?," 123.

speech that "set in train" the series of events that culminated in the moon landings.[6] For his part, Andrew Reichstein ascribes the moon landings to Lyndon B. Johnson's efforts, arguing that Johnson "grasped at the opportunity to make space an issue for the Democrats and thus enhance his own political career."[7] In 1961, responding to a memorandum issued by President Kennedy after the Soviet Union's launch of the first man in space, Johnson declared that "manned exploration of the moon… is essential as an objective."[8]

Other accounts of the moon landings place greater importance on economic and social factors. For example, Monika Gisler and Didier Sornette use the economic "bubble theory" to explain how the Apollo program became a top priority for U.S. government officials. They argue that once the program was first "nucleated" by a special interest group (the Kennedy and Johnson administration), it was "inflated to a very large size" through a process of over-enthusiasm and positive feedback loops.[9] This is perceived to be the result of the individual, political and financial risks undertaken by the Apollo program, which in turn caused an "extraordinary commitment" on the part of the U.S. public and government to complete the project.[10] Similarly, David Bruggeman argues that the moon landings reflected a need for political victories and American heroes in the context of the Cold War. He recognizes astronauts as a "powerful symbol of American strength," a particularly desirable asset during the Cold War. In a time shrouded by uncertainty and fear, the nation was desperate for heroes, and it created them with the Apollo program.[11]

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[6] Robert D. Launius, "Kennedy's Space Policy Reconsidered: A Post-Cold War Perspective" in *Air Power History* 50, no. 4 (Winter 2003): 20, http://web.b.ebscohost.com.ezproxy.library.uvic.ca/ehost/pdfviewer.
[7] Reichstein, "Space-The Last Cold War Frontier?," 115.
[8] Ibid., 119-122.
[9] Gisler and Sornette, "Exuberant Innovations: The Apollo Program," 57.
[10] Ibid., 67, 55.
[11] Bruggeman, "NASA: A Path Dependent Organization," 422.

Despite their strengths, these interpretations fail to account for American fascination with the moon. To explain this it is essential to examine the 1950s, before the Apollo program began development. From here, it is possible to observe cultural factors that caused the moon to permeate the American imagination. Of particular importance is the rise of the science fiction genre coupled with growing concern toward Soviet technological advancements. From radiation produced monsters and nuclear fallout to interstellar space travel, science fiction reflected American hopes, fears, and anxieties of the time and provoked new ways of thinking among the American public and officials. Along with the Soviet challenge, science fiction played a crucial role in placing the moon on the American "radar."

Divided into three chapters, this paper will seek to explain when, how and why the moon became so prominent in official U.S. discourse. The first chapter will examine the loss of confidence the U.S. experienced as Soviet military technology first matched and then seemingly surpassed that of the Americans. It will also explore the growing popularity of the science fiction genre, which reflected both the hope and anxiety of Cold War culture. The second chapter will continue to follow the Space Race, and by observing official concerns about Soviet moon colonization it will demonstrate how science fiction came to influence top U.S. military officials. Finally, the third chapter will examine U.S. plans for lunar bases and nuclear detonations by drawing upon recently declassified documents. These documents reveal that the moon was considered the next logical progression of the Space Race, as well as further influence of science fiction culture. Ultimately, this paper will argue that science fiction and early Soviet space successes caused the U.S. to look to the moon as the next Cold War frontier. The moon was thus pulled from the realm of fantasy during this time and placed within American grasp. Although

the proposed lunar bases and nuclear detonations never took shape, the moon was now grounded in realm of possibility which made the later Apollo moon landings possible.

Chapter One: The Sputnik Shock

On the morning of 5 October, 1957, the American public awoke to shocking newspaper headlines announcing "Reds Fire 'Moon' into Sky!"[12] The previous day, the Soviet Union had successfully launched the first artificial satellite into space, using the newly developed R-7 booster rocket. Officially named Sputnik I, the satellite was little more than a metal sphere that emitted a radio signal that could be heard by anyone with a radio as it passed overhead. While this "red moon" posed no direct military threat, Americans who had their radios tuned to Sputnik I's frequency could be reminded every 96 minutes that the Russians had surpassed them in ballistic missile technology. Indeed, the launch of Sputnik I was not the only event that concerned the American public and officials in the 1950s. Throughout the decade, Soviet technological advancement continually reminded the U.S. that it might no longer be at the cutting edge of scientific progress. Nevertheless, Sputnik I was significant because it served to crystallize American fears that the nation had fallen behind the communist world, and it exacerbated the anxiety and insecurity that characterized the 1950s and early 1960s.

Before analyzing the launch of Sputnik I and its effects on American officials and public, it is important to understand its historical context. This begins with the history of American technological and military superiority in the immediate post-World War II period. As Thomas Mahnken has noted, "the U.S. entered the Cold War with a sense of confidence."[13] The successful use of nuclear bombs in Hiroshima and Nagasaki convinced Americans that they had a trump card they could pull if the communist threat reached new heights.[14] This trump card, in the form of nuclear bombs, was expected to be effective for decades to come. As Mahnken

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[12] "Reds Fire 'Moon' into Sky!," *Chicago Tribune*, October 5 1957, 1, accessed January 20, 2017, http://archives.chicagotribune.com/1957/10/05/page/1.
[13] Thomas G. Mahnken, *Technology and the American Way of War* (New York: Columbia University Press, 2008), 16.
[14] Ronnie D. Lipschutz, *Cold War Fantasies: Film, Fiction and Foreign Policy* (Maryland: Rowman & Lifflefield Publishers, 2001), 27.

observes, General Leslie Groves (the former head of the Manhattan Project) estimated that the American nuclear monopoly would last for at least two decades. Other officials agreed, including Vannevar Bush, who chaired the Office of Scientific Research and Development under the Franklin Roosevelt presidency. Noting in early 1949 that "to build a large stock of atomic bombs is an undertaking that will strain the resources of any highly industrialized nation," Bush also agreed that the American nuclear monopoly was durable and likely to last for some time.[15] Assuming their nuclear monopoly was secure, U.S. officials believed they could "deter virtually all military challenges" that the communist world might present them with.[16] Further, the U.S. boasted a massive strategic bomber fleet, as well as bases from which it could easily strike Soviet cities.[17] With a nuclear monopoly and unrivalled air power, Americans saw little reason to fear the Soviet Union's military or technological capabilities. Communism itself was frightening, but its proponents were no match for the awesome military and technological power of the U.S.

On 29 August 1949, the Americans' sense of confidence was destroyed. Their nuclear monopoly ended as the Soviet Union successfully tested its first nuclear weapon.[18] Then, only a month later, Mao Zedong's Communist Party of China secured victory over the Chinese Nationalist government and declared the People's Republic of China. In combination with North Korea's invasion of South Korea, the Malayan communist insurgency, and nationalist uprisings in French Indochina, in the early 1950s it seemed to many Americans that communism was "on a march."[19] These events caused a significant amount of soul searching in the U.S., and many officials decided there had to be secret communist agents within the nation that were passing

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[15] Mahnken, *Technology and the American Way of War*, 16.
[16] Ibid., 17.
[17] Trevor Brown, "The American and Soviet Cold War Space Programs" in *Comparative Strategy* 30, no. 2 (Summer 2011): 177, http://www.tandfonline.com.ezproxy.library.uvic.ca/doi/pdf/10.1080/01495933.2011.561736.
[18] Mahnken, Technology and the American Way of War, 17.
[19] Lipschutz, *Cold War Fantasies: Film, Fiction and Foreign Policy*, 27

information to the Soviets. With their nuclear monopoly broken and the spread of communism proceeding seemingly unchecked, the Americans' confidence that characterized the late 1940s gave way to "war fear, fever and fervor."[20] Nevertheless, the Americans had almost five years to build up their nuclear arsenal. Surely the existing nuclear stockpiles would be able to stave off the communist threat for some time to come.

Although the U.S. had a much larger nuclear stockpile at the outset of the 1950s, American officials feared that the Soviet Union would surpass them in nuclear and military capability. In April 1950, the CIA estimated that the Soviet Union could accumulate two hundred nuclear bombs by 1954. To CIA officials, this was the number that could allow the Soviet Union to defeat the U.S. in a war, so increasing urgency was placed on the U.S. nuclear program. In August 1953, fears escalated even further as the Soviets tested their first hydrogen bomb, only a year after the United States.[21] It was not, however, only nuclear weapons that concerned American officials at this time. In addition to the Soviet nuclear threat, the Soviets' rapidly advancing ballistic missile program and expanding bomber fleet further contributed to the Americans' anxiety. Following the successful flight of a Soviet R-5 intercontinental ballistic missile (ICBM) in March 1953, a report from the Strategic Missiles Evaluation Group noted that "most of the members believe that the Russians are probably significantly ahead of us in long-range ballistic missiles."[22] Taking into consideration the emerging missile gap, the CIA warned that "the U.S. is losing, if it has not already lost, its longstanding invulnerability to crippling attack."[23] Then, in May 1954, the Soviets unveiled their first strategic jet bomber, the M-4 Bison. Months later, they revealed the Tu-95 Bear as their second jet bomber. These aircraft came on

[20] Lipschutz, *Cold War Fantasies: Film, Fiction and Foreign Policy*, 35.
[21] T.A. Heppenheimer, *Countdown: A History of Space Flight* (New York: John Wiley & Sons, 1997), 77.
[22] Ibid.
[23] Heppenheimer, *Countdown: A History of Space Flight*, 77.

the heels of the Americans' B-52 jet bomber, which had only been developed a year earlier. To make matters worse, U.S. intelligence operatives observing a Soviet air show in 1955 vastly over-estimated the number of jet bombers in a display, leading the U.S. intelligence community to "revise its estimate of Soviet bomber production sharply upward." Fears surrounding a bomber gap quickly took shape, as U.S. officials worried the Soviet Union was in possession of far more bombers than it actually had. [24] Thus, by the mid-1950s, American officials found themselves in a state of paranoia. The Soviets, it seemed, now had the upper hand in the Cold War.

The effects of this Cold War paranoia on American society revealed themselves in a number of different ways. Fearing a nuclear holocaust, many families built bomb shelters in their backyards or basements and stocked them with enough canned food to last for months or years at a time. Indeed, government officials encouraged such activities. In California, Governor Earl Warren urged his constituents to build family-sized nuclear shelters. The American media also stressed the importance of nuclear shelters, as the *Chicago Tribune* informed readers that its publisher Robert McCormick "had already built one for himself."[25] Other civil defence initiatives included a series of short films and booklets that promised to increase American citizens' chances of survival if they got caught outside a shelter during a nuclear attack. Meanwhile, school teachers practiced air raid drills and preached the doctrine of "duck and cover" in an attempt to convince worried children (and perhaps themselves) that there may actually be a chance of surviving a nuclear blast.[26] Yet, despite all these efforts, most Americans knew that if a nuclear attack did occur, their prospects would be bleak. In 1952, New York City,

[24] Mahnken, *Technology and the American Way of War*, 19.
[25] Allan M. Winkler, *Life Under a Cloud: American Anxiety about the Atom* (New York: Oxford University Press, 1993), 113.
[26] Ibid., 114-115.

San Francisco and Seattle began providing citizens with military dog tags for post nuclear attack identification purposes.[27] Clearly, many Americans perceived themselves to be on the brink of destruction.

This paranoia found expression in the rising popularity of the science fiction genre. As John Griffiths observes, "by the 1950s science fiction had become a firmly established genre… with a wide non-specialist following." Considering science fiction has been reported to be a "particularly sensitive form of [entertainment] for reflecting the moods and psychoses of its host society," it quickly became a popular medium through which American Cold War paranoia was reproduced, and disseminated.[28] This popular new genre would play a significant role in casting Americans' attention towards the moon.

The science fiction genre focused on timely issues through all of its mediums (movies, T.V. shows, comic books, etc.). In the early 1950s, with the beginning of the nuclear arms race, science fiction writers and producers created "a speculative but still devastating appraisal of radiation hazards and their consequences."[29] This led to the rise of the "radiation-produced monster" sub-genre, which depicted various mutants and monsters that were created by radioactive explosions or leaks.[30] An example includes the movie *Them!* (1954), in which a nuclear test in a New Mexico desert causes a colony of ants to mutate to enormous sizes. In addition to providing commentary on the unknown possibilities of genetic mutation and environmental disaster, the giant ants in *Them!* also served as "metaphors for invading

[27] Winkler, *Life Under a Cloud: American Anxiety about the Atom*, 114-115.
[28] John Griffiths, *Three Tomorrows: American, British and Soviet Science Fiction* (London: The Macmillan Press, 1980), 53.
[29] Winkler, *Life Under a Cloud: American Anxiety about the Atom*, 97.
[30] Lincoln Geraghty, *American Science Fiction Film and Television* (New York: Berg Publishers, 2009), 24.

communist hoards" that the Americans so deeply feared. [31] Often financially successful, these types of films played a crucial role in pushing the nuclear fallout issue even further into public view.[32] Clearly, the science fiction genre had found a receptive audience among the anxious American public.

As the nature of the Soviet threat changed, so too did the content of science fiction. Although the threat of nuclear annihilation remained, science fiction writers and producers picked up on the increasing importance of ballistic missiles and rockets in the Cold War arena and began to imagine a world where humans were no longer bound to planet earth.[33] Thus emerged the space drama sub-genre, which featured swashbuckling interstellar heroes who travelled the galaxy in high-tech space ships to fight evil and find adventure. Television series such as *Captain Video and his Video Rangers, Space Patrol* and *Tom Corbett, Space Cadet* all appeared in the early 1950s and became increasingly popular as the decade went on.[34] As noted by Lincoln Geraghty, these series contributed to the "fascination with all things space" that dominated the mid to late 1950s.[35] An example of the nation's new space obsession was the latest trend in automobile design; cars with "sleek outlines and exaggerated tail fins" acted as "suburban replicas" of the new rockets being tested by the American military. With space-themed domestic technology all around them and space operas broadcasted straight to their living rooms, "Americans were ready to believe anything was possible through science and

[31] Geraghty, *American Science Fiction Film and Television*, 25.
[32] Winkler, *Life Under a Cloud: American Anxiety about the Atom*, 101.
[33] Geraghty, *American Science Fiction Film and Television*, 27.
[34] Ibid.
[35] Ibid., 27-28.

technology."[36] Although both the Americans and the Soviets were yet to launch anything into outer space, the Space Age had certainly arrived in the U.S. by the mid-1950s.

With science fiction serving as their "graphic inspiration," American scientists and officials embarked on the Space Race with the Soviet Union.[37] Preliminary discussions on space operations had begun by the early 1950s, as U.S. officials began seeking new and innovative ways to spy over the Iron Curtain. Then, in 1955, plans for rockets capable of reaching outer space left the drawing board when U.S. scientists began working on a satellite program in preparation for the 1957 International Geophysical Year (IGY).[38] Yet, despite the Americans' obsession for technology and all things space related, progress towards an outer space capable rocket came slowly. At the time, there were two rockets in development that were deemed capable of carrying a satellite into space. The first was the Army's Redstone missile, which was designed by German rocket scientist Wernher von Braun. The second, which was still in early development stages, was the Naval Research Laboratory's Vanguard proposal. Believing the Navy would be better equipped to track a low earth satellite, President Eisenhower gave the project to them. According to Walter McDougal, Eisenhower's decision to consign the satellite project to the Navy significantly hindered the United States' first successful satellite launch, as the Vanguard program was underfunded and three burn stages had to be made from scratch.[39] While Buck Rogers and Tom Corbett cruised the galaxies in the U.S. imagination, the early American space program remained firmly rooted to the ground.

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[36] Geraghty, *American Science Fiction Film and Television*, 27-28.
[37] Ibid., 27.
[38] Walter A. McDougal, "Sputnik, the Space Race, and the Cold War" in *Atomic Scientists*, Bulletin 41, no. 5 (Spring 1985): 20-21. http://web.a.ebscohost.com.ezproxy.library.uvic.ca/ehost/pdfviewer/pdfviewer.
[39] Ibid., 21.

Meanwhile, the Soviet space program was proceeding apace. The Soviets had a significant start to their rocketry program, paradoxically owing to the massive strategic and military advantage the U.S. held over them in the years following World War II. As mentioned above, the U.S. was in possession of a large strategic bomber fleet and overseas military bases from which they could take off and strike Soviet cities. As a result of this disadvantage, the Soviet Union made significant investments in ICBM technology.[40] This began with the reverse engineering of captured German V-2 rockets, which the Soviets found abandoned at German bases in the late stages of World War II. Combining their own research with that of the Germans, the Soviets began developing the "R" family of rockets.[41] By 1953, the R-5 rocket tested successfully and flew a total of a thousand kilometers.[42] In the same year, the Soviets began development on the R-7 rocket, which was to be capable of flying intercontinental distances and carrying nuclear weapons into North America. Although its first two tests ended in failure, the third test of the R-7 on 21 August 1957 was extremely successful; it flew a distance of four thousand miles and became the world's first true intercontinental ballistic missile. Now that the Soviets were confident in the R-7's performance, slight modifications were made to the rocket to enable it to carry a small satellite, and a month and a half later it was ready for the space shot.[43] On 4 October 1957, the modified R-7 blasted off from its launch pad in Kazakhstan, and the small metal sphere on board named Sputnik I became the first man-made object in space.

For a nation paranoid about Soviet military advances and obsessed with outer space, the launch of Sputnik I came as a devastating blow to the United States. Overnight, American fears that the Soviet Union might have surpassed them were crystallized. As reflected by U.S.

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[40] Brown, "The American and Soviet Cold War Space Programs," 177.
[41] Roadl Sagdeev, "Sputnik and the Soviets" In *Science* 318, no. 5847 (Fall 2007): 51, http://www.jstor.org.ezproxy.library.uvic.ca/stable/10.2307/20048513?origin=api&.
[42] Heppenheimer, *Countdown: A History of Space Flight*, 77.
[43] Ibid., 121-123.

astronaut John Glenn, "the American-made television sets, transistor radios, and cars with tail fins… seemed frivolous next to the evidence of Soviet scientific achievement beeping overhead."[44] Foh Kohler and Dodd Harvey have accurately characterized American reactions following the launch of Sputnik I, which they refer to as "an orgy of self-denigration."[45] Not only did the Soviet Union seem to have surpassed them, the launch of Sputnik I also appeared to "reflect genuine merit in the Communist system" as the Soviets had lagged tremendously behind in bombers and nuclear weapons only a few years earlier.[46] The American press had a field day with the event and exacerbated the hysteria. In an interview with U.S. military official Major General John Homer, the *Chicago Daily Tribune* reported that the same rocket used to propel Sputnik I into space "could be used to hurl deadly transoceanic missiles." In addition to new long range strike capabilities, Homer believed that the Soviet Union could use their new satellite technology to spy on the entire world and locate western defence systems and nuclear stockpiles, requiring a "need for heightened vigilance on the home front."[47] Now, as far as Americans were concerned, nuclear bombs could come raining down on them any second. "I had no idea," said a bewildered President Eisenhower, "that the American people were so psychologically vulnerable."[48]

With its confidence and prestige in shambles, the U.S. proceeded to fully commit itself to the Space Race. Somehow, American technological superiority had to be regained and the damage done by Sputnik I reversed. However, steeped in science fiction culture and believing

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[44] John Glenn and Nick Taylor, *John Glenn: A Memoir*, (New York: Bantam Books, 1999), 175.
[45] Foy D. Kohler and Dodd L. Harvey, "Administering and Managing the U.S. and Soviet Space Programs" in *Science* 169, no. 3950 (Summer 1970): 1051, http://www.jstor.org.ezproxy.library.uvic.ca/stable/pdf/1729807.pdf?acceptTC=true.
[46] Heppenheimer, *Countdown: A History of Space Flight*, 125.
[47] "Sees Red Moon Baring West's Arms Secrets," *Chicago Tribune*, October 7 1957, 2, accessed January 20, 2017. http://archives.chicagotribune.com/1957/10/07/page/2/.
[48] McDougal, "Sputnik, the Space Race, and the Cold War," 22.

"the Cold War had converged around the next frontier – space," Americans began to wonder how far the Soviets might go with their technological advances. When Soviet leader Nikita Khrushchev taunted that "The United States now sleeps under a Soviet moon" (a reference to Sputnik I), many Americans wondered if this was indeed a foreshadowing of events to come. [49] Could the Soviets actually conquer the moon?

[49] Glenn and Taylor, *John Glenn: A Memoir*, 175.

Chapter Two: Reds on the Moon

6 December 1957 dawned as a possible day of redemption for the United States. The Navy had finally finished the Vanguard rocket, and the most recent model stood patiently on its launch pad at Cape Canaveral. At the top of the 72-foot rocket sat the TV3 satellite, which weighed in at three pounds and was not much larger than a grapefruit. "Yet," as historian T.A. Heppenheimer observes, "it was weighty indeed, for it carried the hopes of the nation."[50] This was the Americans' first attempt to join the exclusive club of space-faring nations, to which the Soviet Union was the only member. It was also their first opportunity to demonstrate to both the world and themselves that the U.S. was also at the forefront of military technology. Twenty-four seconds into 4:44 PM UTC, the T-minus ten seconds countdown to launch began. When the countdown reached zero, the Vanguard rocket's mission control team pressed the launch button and the engines ignited. For two seconds the rocket lurched upwards, and then disaster struck. As one observer noted, "the vehicle agonizingly hesitated for a moment, quivered again, and in front of our unbelieving, shocked eyes, began to topple." The rocket sank back into the blast tube, creating an explosion so big that "it seemed as if the gates of hell had opened up." The Vanguard's mission control could do nothing but sit in "complete disbelief."[51] The message was all too clear: the U.S. remained considerably behind the Soviet Union in missile and space technology.

Once again, news agencies around the world relentlessly criticized and parodied the event. The *London Daily Herald* referred to the Vanguard failure as a "Flopnik," while the *London Daily Express* called Vanguard a "Kaputnik." The American newspapers' reactions were particularly bitter, with the *New York Herald and Tribune* advising that "the people in Washington should damn well keep quiet until they have a grapefruit or at least something

[50] Heppenheimer, *Countdown: A History of Space Flight*, 127.
[51] Ibid.

orbiting around up there."[52] To make matters worse, the Vanguard failure came on the heels of the Soviets' second outer space success, the launch of Sputnik II. Unlike Sputnik I, which was a lifeless metal sphere, Sputnik II's cargo was very much alive. Inside was a small stray female dog named Laika. And although she died after a day in orbit since the Soviets did not yet have a way to return capsules from space, Heppenheimer notes that Laika's successful launch demonstrated Moscow was "in space to stay." Furthermore, it pointed to the Soviets' intention to send men into space.[53]

It would not be until the beginning of February 1958 that the U.S. would break the Soviet monopoly in outer space, and the Navy's Vanguard rocket would not be the vehicle to do it. After the success of Sputnik I, U.S. defence secretary Neil McElroy authorized Wernher von Braun to continue developing the Army's Redstone missile. Von Braun's design proved to be successful; on 1 February 1958 the Redstone rocket carried the United States' first satellite, Explorer I, into orbit. Excitement over this achievement, however, was short lived. Only three months later the Soviets launched the 2,925 pound Sputnik III satellite into space, which tripled the weight of the previous Sputnik II.[54] Considering Explorer I's weight totalled only 30 pounds, it was all too clear the Soviets still held a tremendous lead in missile and space technology.

Sensing an expanded effort was needed to catch up to the Soviet space program, and reacting to political and public outcry, President Eisenhower set out to re-evaluate and re-imagine the American space program. Of particular concern to the president and his advisors was the Navy-Army rivalry over control of the space program, as the country's top rocket scientists were divided between the two competing military branches. Taking this into consideration,

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[52] Heppenheimer, *Countdown: A History of Space Flight*, 127-128.
[53] Ibid., 128.
[54] Ibid., 130.

Eisenhower began to search outside the military for a new organization into which the nation's top rocket scientists could be consolidated.[55] Initially he tasked the National Advisory Committee for Aeronautics (NACA) with overseeing all space exploration efforts, but it quickly proved to be incapable of making the kind of progress needed to match the Soviet program. Therefore, Eisenhower turned to the President's Science Advisory Committee (PSAC) for further proposals. PSAC recommended that NACA be transformed into a new and effective organization, to be called the National Aeronautics and Space Administration (NASA). The new agency would assume the responsibility of all space exploration efforts, and the development of space rockets would be shifted from the military to NASA's scientists. In fact, NASA would be completely separate from the military, as it would be designated a civilian government organization. Eisenhower agreed, and on 29 July 1958 he signed the National Aeronautics and Space act which transformed NACA into NASA.[56] Surely, now that the nation's top rocket scientists were consolidated into a single organization that held a "blank cheque" to pursue its goals, the gap between the Soviet and American space programs could finally be closed.[57]

Despite the formation of NASA, the Americans would still need a significant amount of time to catch up to the Soviet space program. In January 1959, the space gap was further widened with the Soviets' launch of Lunik I. This time, however, the gap was not the only issue concerning U.S. officials; the nature of the race had been changed completely. The Soviets were now shooting for the moon. Indeed, the Soviets' first "moon shot" was only a partial success, as the Lunik I probe missed the moon by nearly six thousand kilometers. Nevertheless, it became the first spacecraft to escape earth's orbit, the first to pass near the moon, and the first to enter an

[55] Joan Johnson-Freese and Roger Handberg, "Realigning NASA's Destiny" in *Technology in Society* 13, no. 4 (1991): 435, http://www.sciencedirect.com.ezproxy.library.uvic.ca/science/article/pii/0160791X9190045X.
[56] Reichstein, "Space-The Last Cold War Frontier," 117.
[57] Johnson-Freese and Handberg, "Realigning NASA's Destiny," 434.

orbit around the sun.[58] The Soviets' lunar progress continued in September of that year, when Lunik II became the first man-made object to reach the moon. It impacted near the Autolycus crater, scattering over one hundred and fifty Soviet hammer and sickle emblems across the lunar surface in the process.[59] Then, only one month later, the Soviets raised the bar even further with the success of Lunik III. Equipped with a camera, Lunik III entered the lunar orbit and transmitted pictures of the previously unseen far side of the moon back to earth. According to historian Gerard Kuiper, the scientific challenge posed to the U.S. by the Soviets made a "quantum jump" with the success of the Lunik probes.[60] To be sure, they marked an important milestone in space exploration progress, and the highly celebrated NASA had yet to send any probes of their own even close to the moon. But perhaps more importantly, the Lunik probes had a profound effect on the minds of American officials and public alike. Until recently, moon exploration had remained in the realm of science fiction. Now, the interstellar heroes of American television sets and comic books were joined on the moon by robots sent from the Soviet Union. Considering the Soviets had advanced from low orbit satellites to moon probes in only two years, it became easy to imagine Soviet cosmonauts planting the hammer and sickle on the moon in a few years' time.

Official U.S. concerns about the Lunik probes can be observed in a declassified report titled "The Kidnapping of Lunik." Written by Syndey Finer, the report details a covert CIA operation that hijacked a Lunik probe from a touring Soviet exhibition at an unspecified time in 1959. According to Finer, U.S. analysts had reason to believe the touring probe was not a mock up, which resulted in an operation to extract vital information on Lunik's design and

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[58] Heppenheimer, *Countdown: A History of Space Flight*, 155.
[59] Brown, "The American and Soviet Cold War Space Programs," 180.
[60] Gerard P. Kuiper, "The Apollo Program and Lunar Science" in *Atomic Scientists*, Bulletin 29, no. 10 (Winter 1973): 20, http://web.a.ebscohost.com.ezproxy.library.uvic.ca/ehost/pdfviewer/pdfviewer?sid=8a3a8ed0-31cf-4d62-9e20-83dd12c7e2ff%40sessionmgr4002&vid=1&hid=4112.

configuration. When Lunik left its most recent exhibit in the back of a truck, CIA agents stopped the truck and escorted the driver to a hotel room. They then drove the truck to a rented out salvage yard, and proceeded to unpack and examine the probe. After Lunik had been disassembled and extensively photographed, it was quickly put back together and sealed in its original container. The original truck driver then took the probe to its original destination, and the Soviets never discovered that their probe had been "borrowed for a night."[61] Given the political risk involved with such a difficult and sensitive operation, it is clear U.S. officials considered the advances in Soviet lunar exploration to be a serious threat. Steeped in their nation's obsession for all things space and science fiction culture, however, U.S. officials took this threat far further than many have previously imagined.

The Soviet lead in space technology and the success of the Lunik probes prompted discussions far beyond the possibility of manned Soviet moon landings. To some American officials, Soviet moon colonies were a very real possibility that could appear well before the 1970s. On 20 March 1959, the U.S. Army submitted a two-part study called Project Horizon, which was only declassified in July 2014. Closely resembling science fiction productions in its language, the study examined the feasibility of manned American lunar bases (detailed in chapter three) and was clearly motivated by fears of a Soviet colonization of the moon. Project Horizon's analysts seriously considered recent public statements made by the Soviet Union, which claimed the 50th anniversary of the October Revolution would be "celebrated by Soviet citizens on the moon." Noting that the U.S. intelligence community had estimated "the Soviet Union may accomplish a manned lunar landing at any time after 1965," the project's analysts saw no reason

[61] Sydney Wesley Finer, "The Kidnaping of the Lunik" in *Studies in Intelligence* 11, no. 3 (Winter 1967): 33-39, accessed February 1-15, 2017, http://www2.gwu.edu/~nsarchiv/NSAEBB/NSAEBB479/docs/EBB-Moon13.pdf.

to treat the Soviets' promise as an idle threat.[62] In light of this, Project Horizon warned that the Soviet Union stood to gain a number of political and military advantages if it were to establish a presence on the moon. Politically, the project's analysts feared that the establishment of a Soviet lunar colony would be "disastrous to our nation's prestige and in turn to our democratic philosophy." Officials further suggested that the Soviets could establish moon-based weapons systems with which they could strike both earth and space targets. They also feared that the Soviets could use their moon bases to prohibit any American landings or colonization attempts, thus preventing the U.S. from gaining any of the "highly advantageous" benefits that came alongside lunar colonies.[63] Project Horizon's message was clear: it was very possible that the Soviets could establish military bases and colonies on the moon in the next decade. If they did this, the Soviet Union would hold an invaluable advantage in the Cold War.

Project Horizon's analysts did not limit their scope to political and military advantages that the Soviet Union might gain by establishing lunar bases. They took their study as far as a consideration of legal issues that could arise from a Soviet colonization of the moon. These make up a large portion of the second half of Volume I, and are presented as a series of "problems" and then subdivided into a number of different scenarios. Problem I, for example, asked what the legal implications for the U.S. might be if the Soviets hard landed (a landing where a vehicle does not slow itself down prior to impact with the surface) an unmanned vehicle on the moon and proceeded to claim the entire lunar surface for themselves. It then expanded the issue, asking if these claims would hold more legitimacy if the Soviets landed men on the moon who then claimed the moon for their country. Finally, the analysts wondered how the U.S. would react if

[62] United States Army, *Project Horizon, Volume I: Summary and Supporting Considerations*, 20 March 1959, 3, accessed February 1-15, 2017, http://www2.gwu.edu/~nsarchiv/NSAEBB/NSAEBB479/docs/EBB-Moon01_sm.pdf.
[63] Ibid., 3, 2.

"the USSR states that the Russians on the moon have the capability to destroy any aggressor."[64] Problem II posed a more specific question about lunar claims: would the U.S. be obligated by international law to respect Soviet lunar claims if they covered a "reasonable area" of approximately 2000 square miles?" The study then presented a number of "opinions" on the aforementioned problems. In consideration of Problem I and its subsections, the analysts suggested that the "landing of men or flags or even a ship bearing a flag would have no affect [sic] upon territorial claims to the lunar surface as a matter of law." They acknowledged, however, that if the Soviets threatened to destroy American landing attempts, "a new principle of lunar law" would have to be postulated and the issue may be left to resolution by force.[65] With respect to Problem II, the analysts suggested the legitimacy of a specific claim would depend on "effective occupation" of the territory in question. They also recognized once again that "national strength and even resort to war" may be required for resolution of the issue.[66] Although both the Soviets and the Americans were far away from developing the technology necessary to establish moon colonies, U.S. officials had clearly began to perceive the moon as the next Cold War frontier. To them, "the world beyond tomorrow," as depicted by the science fiction series of the time, had arrived by 1959.[67]

Official U.S. concerns surrounding the possibility of a "red moon" persisted well into the 1960s. As was the case with Project Horizon, these types of concerns surfaced shortly after the Soviets achieved more lunar exploration milestones. For example, a declassified 1963 CIA report titled "Soviet Intentions Concerning a Manned Lunar Landing" provided an estimate of Soviet lunar exploration capabilities and a time frame in which they might attempt a manned lunar

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[64] United States Army, *Project Horizon, Volume I: Summary and Supporting Considerations*, 82.
[65] Ibid.
[66] Ibid., 83.
[67] Frank Ray, *Tom Corbett, Space Cadet – Ambush in Space (Classic TV)*, Filmed 1955, Youtube video, 23:50, Posted December 7 2012, https://www.youtube.com/watch?v=mooHeDR08zk.

landing. Noting that the Soviets had launched three unmanned lunar vehicles that year, the report asserted that the Soviets continued to hold a strong interest in lunar exploration. Observing the "considerable technical progress" the Soviets had made in lunar exploration and their development of new booster rockets, the report estimated that the Soviets could attempt a manned moon landing between 1967 and 1969.[68] While the 1963 CIA report considered only the possibility of manned lunar landings, other reports mirrored Project Horizon in their science fiction-like predictions. According to John O'Hara's declassified NSA report, many American officials believed that the first soft lunar landing (a landing where a vehicle slows itself down in order to land on the surface gently), achieved by Lunik IX in February 1966, was a precursor to a Soviet moon colonization attempt. Some of these officials went as far as to predict the Soviets would place "nuclear weapons on the moon and use it as a launching site."[69] Clearly, a trend had developed: each time the Soviets reached a new lunar exploration milestone, American officials reacted by vastly overestimating Soviet capabilities.

The Soviet accomplishments further exacerbated American anxieties and insecurities. By the 1960s, the Soviets had made astounding technological progress; they had developed the first ICBM, placed the first satellite into orbit, launched the first animal into space, and sent probes to the moon all within the span of two years. Meanwhile, the American space program was forced to play catch up. More often than not, the Americans took months to match Soviet space accomplishments. Even with the creation of NASA, which consolidated the nation's rocket scientists and had access to vast monetary resources, the Americans remained on the sidelines of the Space Race as the 1950s drew to a close. With their confidence in shambles and their science

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[68] Office of National Estimates, Central Intelligence Agency, *Soviet Intentions Concerning a Manned Lunar Landing*, 25 April 1963, accessed February 1-15, 2017, http://www2.gwu.edu/~nsarchiv/NSAEBB/NSAEBB479/docs/EBB-Moon05.pdf.

[69] John O'Hara, "Luna 9, the First Soft Landing on the Moon" in *Cryptologic Almanac* (March 2003): 1, accessed February 1-15, 2017, http://www2.gwu.edu/~nsarchiv/NSAEBB/NSAEBB479/docs/EBB-Moon16.pdf.

fiction infused imaginations running wild, some American officials began to fear Soviet lunar colonies were on the horizon. Considering the speed at which outer space technology was developing, it seemed only a matter of time until the moon became the next, and perhaps final, Cold War frontier. Thus, motivated by the speed at which space technology had been advancing and the possibility of a red moon, American officials began planning their approach to the Space Race for the 1960s. If the moon was going to be the next Cold War arena, they would have to get there and militarize it first.

Chapter Three: Star-Spangled Moon Bases

Fifteen minutes before a scheduled press conference, General Greene gave a quick personal interview to journalist Polly Prattles. The topic of their interview was the upcoming circumlunar flight, which was to be flown by none other than the crack female pilot Colonel Briteis. General Greene began with a quick outline of the mission, which was to be launched from the newly developed U.S. military space station. After launch, the flight was to proceed to the dark side of the moon, take a handful of pictures, and then return to the space station. Upon hearing this, Prattles prodded General Greene for the objective behind the circumlunar flight. After all, she had heard numerous complaints that the upcoming flight was simply "just another way of wasting tax money." Without missing a beat, General Green informed her that the circumlunar flight was "a necessary step before establishing a base on the moon." Going into greater detail about the proposed moon base, General Greene explained that "if there is going to be a base on the moon, and there will be, it's in my business to see that it's in safe hands – our own." The immediate purpose of this base would be the military security of the United States, which General Greene considered "the most important thing in the world." Its importance went beyond American security concerns, however, as the moon base would ultimately be used to "consolidate the safety of the free world."[70] It was only a fictional conversation, played out by actors Hayden Rorke and Barbara Morrison on the set of the 1953 film *Project Moonbase*. Yet, what the directors, actors, and audience of *Project Moonbase* did not know was that almost identical conversations would be carried out at the top levels of the U.S. military in only a few years.

The 1950s had witnessed an unprecedented level of scientific advancement, particularly in the fields of rocket and space technology. With new outer space milestones being reached

[70] Richard Talmadge, *Project Moonbase*, 1953, accessed February 11 2017, http://www.dailymotion.com/video/xms8x1_project-moon-base_shortfilms.

every few months, the American public of the 1950s was "left to wonder about the line between reality and fantasy."[71] Indeed, as historian Lincoln Geraghty notes, American citizens during this time could very well ask themselves why they might bother watching science fiction films "when you could turn on the TV and watch the real thing as it happened."[72] There was a strong perception that real science was beginning to take over from the world of fiction, and the result was a nation-wide feeling of technological optimism.[73] Naturally, this feeling was a cause for both excitement and fear among the American people. As explored above, it was not difficult for American officials to observe the Soviet lead in space technology and predict that moon bases were the next logical progression of the Soviet space program. Now that their attention had been drawn to the moon, however, these same officials began to consider a variety of different ways the U.S. could use the moon to its advantage. Pulled from the realm of science fiction, the moon came to be perceived as the next arena in which Cold War competition would be played out. If the U.S. could get to the moon before the Soviets and use it effectively, the Cold War scale could very well be tipped permanently in the Americans' favour.

One of the first studies submitted for the purpose of recommending American military action on the moon was the U.S. Army's Project Horizon. As noted above, the study was motivated primarily by fears of a Soviet moon colonization attempt, which analysts believed could take place as early as 1965. While Project Horizon's analysts devoted a significant amount of attention to the possibility of Soviet moon bases and the implications this could have for the U.S., the main purpose of the study was to consider the feasibility of American military moon bases. Project Horizon was submitted in two volumes, with each volume pertaining to different

[71] Jacob D. Hamblin, *Arming Mother Nature: The Birth of Catastrophic Environmentalism*, (New York: Oxford University Press 2013), 28.
[72] Geraghty, *American Science Fiction Film and Television*, 36.
[73] Ibid., 36, 27.

aspects of the lunar base plan. Volume I, entitled "Summary and Supporting Considerations," provided a broad overview of the project and a number of justifications for the development of American lunar bases. Volume II, entitled "Technical Considerations and Plans," went into further detail about the development schedule, launch procedures and the lunar base itself.

Volume I begins with a number of justifications for the lunar base project. Although the analysts specified that the moon could provide the U.S. with invaluable commercial, military, scientific and political benefits, they seem primarily concerned with the military considerations. Specifically, the analysts considered earth and space surveillance systems and military communication via moon based relay stations to be both possible and effective. Furthermore, they predicted that "the employment of moon-based weapons systems against earth or space targets may prove to be feasible and desirable." Indeed, moon-based nuclear launch sites appeared to provide the U.S. with an escape from nuclear stalemate. With the ability to launch nuclear weapons from the moon, the U.S. would possess a strong deterrent to war because of the "extreme difficulty, from the enemy point of view, of eliminating our ability to retaliate." In addition, if the U.S. established these outposts first, it would be in a position to counter or neutralize enemy moon landing attempts, thus ensuring that this wealth of military advantages would belong to the U.S. alone.[74] In light of these advantages, Project Horizon's analysts recommended that "the establishment of the outpost should be a special project having authority and priority similar to the Manhattan Project in World War II." As stated later in Volume I, the "business as usual" approach that the U.S. took to its space program was not going to catch it up with the Soviet Union. If the U.S. was to establish a lunar base before the Soviets, "a genuine mobilization, on a national scale, of the vast scientific and technical capabilities of this country"

[74] United States Army, *Project Horizon, Volume I: Summary and Supporting Considerations*, 2.

was necessary.[75] Evidently, Project Horizon's analysts genuinely believed that the moon was the next Cold War frontier. Even though neither the U.S. nor the Soviets had placed a man into orbit by this time, the analysts clearly perceived themselves to be in a tight race to the moon.

Given that establishing a lunar base before the Soviets was a matter of utmost importance, Volume I of Project Horizon set a rigorous launch schedule with the goal of establishing the base by the end of 1966. The launch vehicles to be used for the project were the Saturn I and II rockets, predicted to be available by 1964 at the latest. It was imperative that the rockets be ready by then, as the project would require dozens of launches to take place in 1964. By the end of this year, the analysts estimated that there would be a total of 72 Saturn I and II launches, 40 of which would contribute to Project Horizon. The cargo build-up phase was set to begin in early 1965, and the first manned moon landing would take place in April 1965. In total, the build-up phase would require 64 Saturn I launches and 88 Saturn II launches which would transport 490,000 pounds of cargo to the moon. After the lunar base was established in November of 1966, an additional 64 launches per year would be necessary to sustain the lunar base inhabitants. The estimated cost of this project, over an eight and a half year period, was six billion dollars. This number represented the "best estimates of experienced, non-commercial, agencies of the government."[76] Once again, we can observe that Project Horizon's analysts considered themselves to be in an all-out race to the moon. Indeed, massive mobilization at a national level would be required to complete a mission of this scale, especially considering that the U.S. had only a handful of successful outer space launches under its belt at the time. The implementation of Project Horizon could not be a side project; the lunar base program was considered to be a top priority.

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[75] United States Army, *Project Horizon, Volume I: Summary and Supporting Considerations*, 2, 66-67.
[76] Ibid., 7-8.

While Volume I did offer a broad outline of the lunar base itself, Volume II went into far greater detail about the specifics of the proposed base. Each aspect of the lunar base received its own extensive subsection, which are too detailed to explore fully in this study. Broadly, however, the living quarters of the base would be comprised of several cylindrical tanks, 10 feet in outside diameter and 20 in length. They would be connected to each other by flexible connectors to allow inhabitants to walk freely between tanks. Each compartment of the base would serve a different purpose; there would be living quarters, a dining and recreation room, a communications office, scientific laboratories, storage, and a medical hospital. To protect the base from solar radiation and meteor strikes, the tanks would be placed into trenches dug out by a multi-purpose construction vehicle and buried beneath three feet of lunar dirt.[77] Inside, the tanks would "contain installed facilities such as fold away bunks, an electric device for food preparation and melting ice, cabinets for personal items and short period storage of food and water." An earth-like atmosphere inside the quarters would be created by a "simple and reliable" air conditioning system, which would draw on external oxygen and nitrogen tanks. Carbon dioxide would be removed by cycling air through a chemical absorbent and dehumidifier, and power would be provided to the base by a number of nuclear reactors.[78] What the fine details in Volume II demonstrate is the sheer amount of time and consideration that Project Horizon's analysts poured into their assignment. Not only did the analysts consider the lunar base to be a matter of utmost importance, they appear to have genuinely believed that their project would be realized. To the officials overseeing and developing Project Horizon, there was little doubt that the U.S. would establish lunar bases.

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[77] United States Army, *Project Horizon, Volume II: Technical Considerations and Plans*, 20 March 1959, 28-34, accessed February 1-15, 2017, http://nsarchive.gwu.edu/NSAEBB/NSAEBB479/docs/EBB-Moon01A_sm.pdf.
[78] Ibid., 32-34.

This point is further proven by Volume II's exploration of details beyond the construction of the lunar base and transportation methods. The analysts went as far as a consideration of everyday essentials for an astronaut's life on the moon. The "lunar clothing system," as it was called, was planned from the protective metal outer layers all the way down to cotton undershirts, woollen socks and cotton undershorts.[79] The astronauts' sustenance was also accounted for, as each astronaut was to be allocated four pounds of food per day, divided into pre-packaged individual portions. Astronauts working outside the base would be provided with paste foods in collapsible containers, which would be locked into the helmet as to prevent loss of internal suit pressure. In addition, each astronaut would be provided with three quarts of water per day. Even the utensils were considered; knives, forks and spoons would be made of a special type of polystyrene.[80] The astronauts' hygienic needs were considered as well, as 40 pounds of launch weight was reserved for electric shavers, nail clippers, brushes, and deodorant.[81] Once again, it seems clear that lunar bases were not just a matter of speculation for Project Horizon's analysts. Lunar bases appeared to be the next logical progression of the Space Race, and the Army was fully prepared to embrace the challenge.

The U.S. Army's Project Horizon was not the only military study that explored the possibility of manned lunar bases. In April 1960, the U.S. Air Force also submitted a two-part proposal for American lunar bases entitled the Military Lunar Base Program. Unfortunately, we have access only to Volume I of this study; Volume II has either been lost or has yet to be declassified by the U.S. government. Nevertheless, Volume I provides us with an informative summarization of the program. In its justifications behind the lunar base project, the Air Force

[79] United States Army, *Project Horizon, Volume II: Technical Considerations and Plans*, 46.
[80] Ibid., 50, 49.
[81] Ibid., 51.

study closely resembled Project Horizon. Air Force analysts perceived the moon to have immense strategic value, and argued that it could "provide a site where future military deterrent forces could be located." It also considered the possibility of moon-based weapons systems, as the analysts believed a "lunar based earth bombardment system" could have an accuracy range of two to five nautical miles. Since the analysts had concluded a manned lunar base was "technically feasible," they recommended that the project be started immediately so that the base could be completed by December 1968.[82] Furthermore, although it was less specific, the recommended lunar base itself was similar to that suggested by Project Horizon. Striving to meet military requirements, the analysts believed the base should be located underground and "should provide suitable accommodations to support extended tours of duty." In total, the analysts predicted their project to cost 7.7 billion dollars.[83] Thus, the lunar base concept was not exclusive to the U.S. Army. Considering that two different military branches produced similar proposals for the moon, it seems that lunar bases were not uncommon ideas at the time. The perception of the moon as the next Cold War frontier was one that spanned the U.S. military.

U.S. plans for the moon were not limited to lunar bases. The Study of Lunar Research Flights, completed by L. Reiffel on 19 June 1959 for the Air Force Special Weapons Center, examined the possibility of detonating nuclear devices on the surface of the moon. To Reiffel, the explosion of a nuclear bomb on the moon could provide the United States with valuable military information. In particular, Reiffel believed the United States would learn to detect nuclear space tests performed by other countries, and gain a better understanding about the "capability of nuclear weapons for space warfare." Reiffel's study also asserted that a nation

[82] Air Force Ballistic Missile Division, *Military Lunar Base Program or S.R. 183 Lunar Observatory Study Volume I: Study Summary and Program Plan*, accessed February 1-15 2017,12, 7, 13, http://nsarchive.gwu.edu/NSAEBB/NSAEBB479/docs/EBB-Moon03.pdf.
[83] Ibid., 11.

stood to gain significant prestige if it were the first to perform a nuclear detonation on the moon as "a demonstration of advanced technological capability."[84] Aside from military and political benefits, Reiffel held that nuclear explosions on the moon could serve a variety of scientific purposes. Specifically, the study placed a significant amount of attention on lunar seismic information that could be gained from nuclear detonations on the moon's surface. It also considered the visibility of nuclear blasts on the moon and the effects of nuclear radiation on the moon to be other possible areas of interest.[85] Reiffel's study provides another example of how the moon had been transformed into a Cold War arena in the minds of American officials.

Thus, in the late 1950s and early 1960s the moon shifted from the realm of science fiction to reality. It ceased to be a mysterious, unreachable orb in the night sky and became the topic of a number of discussions at the top levels of the U.S. military. With outer space technology advancing at a breakneck pace, American officials saw no reason why the "world of tomorrow" had to wait any longer. Of course, this was not entirely their own initiative; there was the ever-present fear that the Soviets might reach the moon first and secure a wealth of military and political advantages. Inspired by what they had seen on their television screens and motivated by a burning desire to surpass the Soviets, American military officials began to re-imagine the moon as a Cold War tool that could be used in a variety of ways. Permanently manned lunar bases, with the option of lunar bombardment systems, were one of the ways military officials believed the moon could be used to the advantage of the U.S. Others proposed that the moon be used as a nuclear test site, in order to make a political statement and test the capability of nuclear weapons

[84] L. Reiffel, Armour Research Foundation, Illinois Institute of Technology, *A Study of Lunar Research Flights, Volume I*, 19 June 1959, 10, accessed February 1-15 2017, http://nsarchive.gwu.edu/NSAEBB/NSAEBB479/docs/EBB-Moon02.pdf.
[85] Ibid., 45, 15, 95.

for space warfare. Regardless of the uses military officials envisioned, their ambitious plans demonstrate that the Americans were willing to go to any length to win the Space Race.

Epilogue

Despite the enormous amount of time and effort spent on studies such as Project Horizon, the Military Lunar Base Program and Reiffel's Study of Lunar Research Flights, none of these plans were ever realized. No permanently manned lunar bases were ever developed, no lunar bombardment systems were placed on the moon, and no nuclear devices were detonated on the lunar surface. When we consider the reasons why these plans never took place, we must inevitably look to the cost of the proposals themselves. Analysts estimated Project Horizon and the Military Lunar Base Program to cost six billion dollars and 7.7 billion dollars respectively. By the time the Apollo program was completed, it had cost somewhere between 21 and 25 billion dollars.[86] Given that Apollo only landed 12 men on the moon for very short periods of time, it is evident that lunar outposts which required hundreds of launches and a million pounds of cargo to sustain astronauts for months at a time were calculated to be far too expensive. As for Reiffel's study, the reason why nuclear detonations on the moon never took place can be found within his own work. Reiffel himself acknowledged that "unless the climate of world opinion were well-prepared in advance, a considerable negative reaction could be stimulated" by such actions.[87] Taking into account that much of the world was still quite anxious about nuclear bombs at this time, U.S. officials likely decided that nuclear detonations on the moon would only worsen the world's nuclear paranoia. Regardless of whether these plans were technically possible or not, budgetary constraints and the stigma around nuclear weapons took the wind out of them well before they left the drawing board.

In addition to these obstacles, the Soviet space threat did not last. Although the Soviets did indeed hold a sizeable lead at the beginning of the Space Race, it did not persist far into the 1960s. As the Americans made steady progress on the development of the Saturn V heavy lift

[86] Monika Gisler and Didier Sornette, "Exuberant Innovations: The Apollo Program," 58.
[87] Reiffel, *A Study of Lunar Research Flights*, 10.

rocket, which would eventually take astronauts to the moon, the Soviet heavy lift program found itself overwhelmed with difficulties. Not only did the Soviets lack private aerospace companies that could produce rockets and parts relatively cheaply, there was also a bitter split between leading Soviet rocket scientists Sergei Korolev and Valentin Glushko that significantly hindered the development of a heavy lift rocket.[88] As a result, each test of the Soviet N1 heavy rocket either exploded on the launch pad or shortly after lift-off, and the program was consequentially scrapped.[89] This time, it would be the Soviets who had their space program rooted to the ground.

Thus, it would be the American manned lunar landing program that succeeded. On 21 July 1969, Neil Armstrong became the first human being to set foot on an extra-terrestrial surface. He was followed by 11 others over the course of three years, the last of whom left the moon on 7 December 1972. Yet, engulfed in the unifying moment that was the Apollo moon landings, many had forgotten how and why these extraordinary achievements took place. Despite its seemingly globalist and humanitarian message, Apollo was very much the result of Cold War fears and anxieties.

The American psyche had never been so deeply shaken as it was by the launch of Sputnik I. The Soviet success marked the culmination of almost a decade's worth of paranoia, which resulted from the Soviets' development of nuclear and thermonuclear weapons, as well as their quick development of a transcontinental bomber fleet and ICBMs. Reflecting American interests and anxieties, the science fiction genre surged to prominence during this time. For the most part, science fiction focused on the issue of the day across all its mediums. In the early 1950s, this was

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[88] John B. West, "Historical Aspects of the Early Soviet/Russian Manned Space Program," *Journal of Applied Physiology* 91, no. 4 (Fall 2001): 1511, http://jap.physiology.org.ezproxy.library.uvic.ca/content/jap/91/4/1501.full.pdf., and Phillip S. Clark, "The Soviet Manned Lunar Programme and its Legacy," *Space Policy* 7, no.3 (August 1991), 222, 227-228, http://www.sciencedirect.com.ezproxy.library.uvic.ca/science/article/pii/0265964691900064.

[89] Clark, "The Soviet Manned Lunar Programme and its Legacy," 227-228.

the fear of nuclear fallout and radiation, as demonstrated by the prominence of the radiation produced monster sub-genre. Then, in the mid to late 1950s, writers and producers shifted their attention to outer space as discourse on rockets and space travel became more popular among both the American public and officials. The result was an obsession for all things space related, as demonstrated by the popularity of television space operas and tail-finned automobiles. Therefore, when the Soviets launched Sputnik I, the dramatic American reaction was two-fold. Not only was it made clear that the Soviets had surpassed the U.S. in terms of missile and space technology, it was also humiliating that a nation so proud of its technological advancements and futuristic amenities had been beaten into space by the communists. One way or another, the U.S. felt obligated to close the gap between the Soviet space program and its own.

Unfortunately for the Americans, the Soviet space accomplishments continued. Hoping to bridge the space gap as soon as possible, President Eisenhower formed NASA in order to ramp up the American space effort. While this was likely quite beneficial in the long run, it would still take some time for the American space program to catch up with the Soviets. Beginning in early 1959, the Soviets launched a series of lunar probes that defied all U.S. expectations. Considering the Soviets' rapid technological advancement, and with television space operas in the back of their minds, some U.S. officials began to fear that the Soviets may attempt to establish bases on the moon. In the U.S. Army's Project Horizon study, we can clearly see that military officials considered Soviet lunar bases to be a very real possibility. Indeed, these fears occasionally resurfaced during the 1960s, as each time the Soviets reached a new lunar exploration milestone there would be some American officials who predicted the moon would soon be turning red. Clearly, by the end of the 1950s, the moon was perceived to be the next Cold War frontier.

With the lines between science fiction and reality already blurred, U.S. military officials set out to claim the moon. Using military and political advantages as justifications, both the U.S. Army and Air Force submitted plans for the development of military lunar bases. Although Air Force and Army analysts took slightly different approaches to the establishment of lunar bases, they genuinely believed that lunar bases were the next logical progression in the Space Race. Other proposals demonstrated that there was more than one way U.S. military officials considered using the moon; Reiffel's study suggested that nuclear detonations on the moon could also be useful for U.S. military purposes. To the analysts of these ambitious lunar plans, it was a plain fact that Cold War competition was soon going to be played out on the moon.

Ultimately, while the lunar bases and detonations never took shape, these plans demonstrate where, how and why the U.S. officials became obsessed with conquering the moon. In the late 1950s, U.S. military officials began to perceive the moon as the next Cold War arena due to the rapid advance of outer space technology and a science fiction inspired way of thinking. Although U.S. officials eventually abandoned the idea of using the moon as a weapon, it had been pulled from the realm of science fiction and was now rooted within the realm of reality. Thus, with the moon now within human grasp, moon landings appeared to be the perfect way to repair the damage dealt to the American psyche by the initial Soviet lead in missile and space technology. By going to the moon, the Americans finally re-gained the confidence they lost in the 1950s. And they partly had Tom Corbett to thank for it.

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