WPI

Wernher von Braun

An Ethical Analysis

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I. Introduction

Few figures in recent history inspire as vigorous ethical debate as Wernher von Braun, the architect of both the Nazi V-2 missile program and later the United States Saturn V missile program. Rarely can a figure so easily be argued to lie on either side of the ethical divide; an active participant in one of history's most reviled regimes on the one hand and the vaunted hero of America's victory in the space race on the other. The advances he made in rocket technology are responsible for the deaths of over 7,000 people in V-2 attacks, and are implicated in the deaths of 12,000 more forced laborers, through his overseeing the building of more than 3000 missiles. On the other hand, he is also largely responsible for the placement of the first men on the moon, one of mankind's greatest technological achievements. Reconciling these two diametrically opposed extremes in one man is a difficulty which has fuelled debate for at least 50 years. Writers on each side find reasons to either condemn von Braun as a willing Nazi and a villain, or to praise him as an American and engineering hero. Neither of these polar viewpoints, however, treats the subject with the nuance and objective discussion required by the study of a real human being. The study of Wernher von Braun and his work with the Nazis tells of a man so focused on his single-minded goal of human spaceflight he is willing to work for whoever will provide the support and funding to further this aspiration, no matter the human and moral cost, but who finds a measure of redemption in ushering in the space age.

More important than the debate between those for and those against von Braun is a deeper ethical problem. At its heart, it comes down, on the one hand, to the responsibility of a nation to look out for itself and its people, advancing interests which may be very much at odds with those of competing nations. This responsibility to look out for a nation's own interests often clashes with its moral responsibilities, with arguably immoral acts being committed for the greater good. On the other hand lies the responsibility of the individual to balance the advancement of human

technology and knowledge with the protection of human rights and the prevention of harm to other people which may result from his work. Our analysis in this interactive qualifying project (IQP) will focus largely on these two points.

We will first discuss Wernher von Braun the engineer, who was filled with a passion for rocketry and manned spaceflight from a very early age, but whose zeal for this goal blinded him to his moral responsibilities. In order to fund and further his rocketry, he was willing to work with the Nazis, who were all too happy to use his revolutionary rockets as the first ballistic missiles to be used in war, killing thousands in Britain, thousands in Belgium, and thousands more through forced slave labor in Germany. His tendency to ignore the plight of the victims of the Holocaust and even to use their labor, whether it was his choice or not, has forever tainted what is otherwise undoubtedly a lifetime of amazing engineering feats. His postwar work for the United States in the Cold War space race again represented his ability to attach himself to whatever political cause or entity was willing to fund his research. It is perhaps through sheer chance that his new patrons were on firmer moral footing than the old.

Second, we will look at the role of the United States and its agenda, responsibilities, moral failures and possible justifications thereof. Despite the horrors of World War II and the Holocaust, by the early 50s the United States was in a growing stand-off with its erstwhile ally of convenience, the USSR, and was willing to forget the past injustices committed by Nazi scientists and engineers in exchange for an advantage in its new rivalry. Wernher von Braun, then, represented a trump card which the United States could not afford to ignore and was eagerly obtained and employed in the Saturn rocket program. The conflict between the desire for justice and the need for skilled engineers for the Cold War was ultimately decided in favor of acquiring an advantage against the Soviets, a decision which has been questioned by many ever since it was made public.

II. Biography

1. Family Background

Wernher Magnus Maximilian Freiherr von Braun was born on March 23rd, 1912 to Magnus Freiherr and Emmy von Braun. He was born in what was then Wirsitz, in the province of Posen, in the German Empire, but what is now, since the end of the Second World War, Wyrzysk, Poland. Both of his parents came from the landed "Junker" Prussian aristocracy. The von Braun family traced itself back to at least 1285 in Silesia, and in 1573, the von Brauns were made Reichsfreiherren (roughly, Barons) by the Holy Roman Emperor Maximilian II for their success as military commanders. His more recent von Braun ancestors were located in East Prussia, where they were wealthy landowners in Neucken, south of Königsberg. It was at this estate in Neucken which Wernher's father Magnus von Braun was born (in February, 1878) and raised. Magnus' father Maximilian was a Lieutenant Colonel in the Prussian military, and had inherited the von Braun estate due to the deaths of his three brothers, also Prussian officers, in the Austro-Prussian War of 1866. Prussian military values were therefore a large part of the von Braun identity, like those of many of the families whom made up the Prussian aristocracy. With this focus on military participation also came a devotion to the Prussian leadership in the Hohenzollern dynasty, who by Magnus' birth were not only Kings of Prussia, but also the emperors of a new German Kaiserreich (Neufeld 8).

The youngest of five siblings, and therefore with little chance of inheriting the family estate, Magnus von Braun joined the Prussian civil service, after brief military service that saw him promoted to the rank of lieutenant in the army reserve. He served in a variety of low-level, often unpaid positions before being appointed adjutant to the minister of the Prussian Trade Ministry in Berlin. It was there that he met Emmy von Quistorp, whom he married less than a year after meeting. The von Quistorps were part of the same Junker aristocracy to which Magnus belonged,

though they were ennobled much more recently, being raised to the aristocracy in 1782 by the Austrian emperor (Neufeld 11).

In 1911, Magnus von Braun was appointed County Commissioner in the town of Wirsitz. It was in Wirsitz that Wernher was born, and it was there that the family lived when the First World War broke out on July 29th, 1914. Like those of many people across Europe and the colonial world, the life of the von Braun family was thrown into upheaval by the war. Magnus remained in Wirsitz, where he oversaw mobilization of the local army, and kept the children with him. Emmy, however, travelled to Berlin, bringing with her the town's savings and financial documents to be stored safely in the capital (Neufeld 13). For periods during 1914 Wirsitz was dangerously close to areas occupied by the Russian invading forces, but Magnus remained in Wirsitz, and the Russians were ultimately driven back. In 1915, Magnus was made an adjutant in the Reich interior office in Berlin, but remained County Commissioner in Wirsitz, and commuted back and forth between the two posts for the next two years. In 1917 Magnus was appointed Press Secretary for the newly appointed Chancellor, Georg Michaelis. Michaelis' stint in office was extremely short lived and unsuccessful, though, and both he and Magnus were forced to resign mere months later (Neufeld 14). Magnus was called up from the army reserves, presumably as a result of this embarrassing removal from office, and was made administrator in Lithuania and Poland, which were under German occupation. After Magnus was removed from office in Berlin and through most of 1918, Emmy and the children stayed in Crenzow at the estate of her brother, who was a prisoner of the British. As a result, for much of the war, the children saw their father very little, though they themselves were insulated from most of the pain the lower classes went through at the time. Victory on the Eastern Front and the collapse of Tsarist Russia saw Magnus' fortunes improve again, but this was short-lived. Victory in the east was followed by defeat in the west and with it the dismantling of the German government and the Prussian bureaucracy to which he owed his career. After the war, Magnus held a handful of different positions in and out of Berlin, but ultimately his

conservative politics proved unpopular with the now socialist-controlled Prussian Parliament, and he was appointed Regierungspräsident in Gumbinnen, East Prussia in order to remove him from political life (Neufeld 15).

On March 13, 1920 the government was taken over in a coup by conservative monarchists in what is now known as the Kapp Putsch, when General Walther von Lüttwitz ordered the MarinebrigadeEhrhardt to occupy Berlin, removing the existing government and naming Wolfgang Kapp, an elderly Prussian civil servant, as Chancellor. This coup occurred in direct response to the forced dismantling of much of the military strength of the German Empire under the Versailles Treaty, and its members were largely of the Prussian military class, whose devotion to the monarchy and fierce nationalism had not faded in the year and a half since the end of hostilities. Upon announcement of the new government, the governor of East Prussia publicly recognized and supported the coup, and Magnus von Braun quickly followed suit. They were two of the very few officials who publically supported the coup, and this tied their fates to that of Kapp and the other conspirators. When the coup failed after only four days, Magnus was removed from office and put under investigation. Though he was not tried for treason, unlike some who participated in the putsch, this ended his political career for much of the Weimar Republic (Neufeld 18-19; Wikipedia, Wolfgang Kapp).

In 1932, under pressure from extreme paramilitary organizations on both the left and right, Weimar President Hindenburg appointed the conservative Franz von Papen as Chancellor, ordering the formation of a far-right cabinet which would help bring the Nazis into government participation in a bid to add to Hindenburg's political base (Neufeld 56). Magnus von Braun was invited into the cabinet, which was made up of like-minded right-wing Prussian Junkers, much more dedicated to the Kaiserreich's conservative politics than those of the Nazis. Magnus was therefore an active member in the unconstitutional actions of the Papen government which were largely responsible

for the rise of Adolph Hitler and the Nazis, such as the consolidation of the Prussian government under the control of the Chancellor and his council. Eventually, further attempts to bring the Nazis into power in an ill-thought-out attempt to shore up the old right led to Hitler's Chancellorship and the cabinet was dissolved. Though Magnus von Braun's political loyalty belonged to the German Reich and the days of the Kaiser, his and his contemporaries' attempts to widen their base through alliance with the Nazis would usher in the Third Reich. Although Magnus was, by his and his sons' accounts, opposed to much of what Hitler and his Nazis stood for, he was all too willing to work with and assist them to further his own agenda. By his own account, had he been given the chance, he would have continued in his role in the cabinet under Hitler (Neufeld 60). This willingness to work with the Nazis despite not being an ardent party member was something which was echoed in the life of his son.

Magnus von Braun was the primary source of much of his son's political views. Throughout Wernher's young life, Magnus was an ardent conservative, a devout monarchist, and a Prussian elitist. Though his support was firmly behind the Hohenzollern monarchy, he was more broadly opposed to democracy in general, especially the socialist-controlled democracy of the Weimar Republic. Michael Neufeld quotes Magnus saying, as late as the 1960s while living in America, "This democracy thing is just a passing fad" (Neufeld 10). Wernher was very much raised in an atmosphere of aristocracy and yearning for the state of things in the Empire, as well as of intense frustration with the loss of German face, power, and the instability that democracy brought with it. The fact that his family's status and comfort were directly negatively impacted by the Weimar republic and its left-wing policies surely impacted the young von Braun. At the very least, his ambivalence towards the destruction of the Republic by the Nazis he would later work for was influenced strongly by this familial background.

Though he obtained his conservative, nationalist political views from his father, it was his mother and her family to whom von Braun owed his interest in the natural sciences and, of course, astronomy. His grandfather Wernher von Quistorp, in addition to serving in the Prussian cavalry and embracing his role as an estate holder, also followed in the Quistorp family tradition of intellectualism (prior to the addition of the "von" to their name, the Quistorps were well known as "theologians, university professors, and merchants" (Neufeld 11). Wernher von Quistorp obtained a doctorate in law as well as pursuing a lifelong love of ornithology, and was in personal correspondence with many leading ornithologists of the time. As a girl, she often assisted with her father's ornithological pursuits, as well as pursuing her own interests in natural science, biology, and astronomy. Emmy, therefore, was raised in a setting wherein love of science was nourished and attempted to create a similar setting for her sons (Neufeld 12).

2. Early Life

From a young age von Braun had a passion for the natural sciences, a passion which was stoked by his mother, Emmy. In 1925, for his Lutheran confirmation, his mother gave him a telescope instead of the gold pocket watch traditional for those in his class. The gift was a huge hit, inspiring a love of astronomy in the young Wernher which would last a lifetime (Neufeld 21-22). Despite this inspiration, he later had great difficulty in math and physics while attending the French Gymnasium. In an attempt to focus his restless energy, his parents enrolled him in the Hermann-Lietz-Internat school on a sandy North Sea island. It was here that he received a copy of *Die Rakete zu den Planetenräumen* by Hermann Oberth, which ignited his interest in rocketry, a passion which came to define his life. Previously, mathematics and physics had not interested him, but now he suddenly found them necessary to understand the language of rocketry. "Opening [Oberth's treatise] I was aghast", said von Braun, according to a popular anecdote originating in a 1958 interview. "Its pages were a hash of mathematical formulas. It was gibberish. I rushed to my

teachers. 'How can I understand what this man is saying?', I demanded. They told me to study mathematics and physics, my two worst courses" (Neufeld 24). From this point on, he excelled in these two subjects, eventually advancing past his peers, in math especially. Oberth's writings were a huge inspiration to von Braun. Not only was Oberth a leading proponent of the possibility of using rockets to reach space, he also introduced von Braun to the idea of rockets delivering explosive or poison gas payloads to enemy cities in future wars. Though von Braun's own writings at the time focused on civilian uses for the technology, he was not opposed to the idea of their military use (Neufeld 34). It was also at the Lietz School that von Braun first showed the leadership skills which would prove vital in his later life. As he focused on math and began to advance past the other students, he was asked to fill in for a sick professor and began teaching the math class of the students a year above him. "Suddenly it became my responsibility to see that every classmate should get a passing mark", he would later say (Neufeld 35). That he excelled in this role is perhaps no surprise, given his later achievements.

After he graduated from the Lietz School in 1930, he moved back to Berlin to attend the Technische Hochschule (then called the Berlin-Charlottenburg Institute of Technology) for a degree in mechanical engineering, as it was the closest then offered to aeronautics. Though he had become a member of the Verein für Raumschiffahrt (Spaceflight Society) while attending the Lietz School, he became a more active participant at this point. Much of the earlier rocketry craze had petered out just before von Braun's return to Berlin, and the leading rocketry journal was closed due to lack of funds. As the lack of funding became a more general issue for the field, some of the society, including von Braun, turned to government funding, primarily from the military. Thanks to rockets being one of a small number of areas of military research allowed by the Versailles Treaty, the desired funding was readily found. At this point, however, von Braun was simply a young man on the sidelines of the society, helping clean up, when not studying. Even then, though, he impressed most of those associated with him with his zeal and optimistic energy (Neufeld 43).

After only a semester, von Braun transferred to the Federal Technical University in Zurich, but transferred back to Berlin to continue the degree after another semester. While he was away, the Rocket Society successfully tested a liquid-fuelled rocket von Braun had assisted with. Upon his return, he continued assisting with the rocketry work as much as possible. Up to this point, though, the military funding was for the work of others, with von Braun merely an assistant (Neufeld 44-50).

3. Life in Germany

In 1932, von Braun began a secret doctoral dissertation for the army, at the Friedrich-Wilhelms-Universität in Berlin. Much of his doctoral work, which focused on liquid-fuelled rocket systems, was kept secret until 1960. While von Braun was working on his doctorate, Hitler became chancellor of Germany, marking the rise of the Nazi Party. As a result, the political and military climate in 1934 when he graduated was very different from that when he began the degree (Neufeld 55, 56).

Under the Nazis, civilian rocket tests were outlawed, and the only avenue open to German rocketry researchers was either to leave the country to pursue their work or to work for the military. Wernher von Braun chose the second of the two options, working for the Army at the existing rocket fuel test site at Kummendorf and helping found the Army Rocket Center in Peenemünde. In 1937 he joined the National Socialist Party and in 1940 the Waffen SS, later claiming it was officially demanded of him, an explanation some dispute (Neufeld 50-60).

While working as director of the Army Rocket Center, von Braun famously directed the A-4 (later V-2) liquid-fueled rocket project, which would become the first working ballistic missile used in warfare and is considered the precursor to all modern rockets. The A-4 was also the first man-

made object to reach space, when a prototype reached an altitude of 200km in 1942 (Neufeld 60-70, Wikipedia "V-2").

During the production of the V-2 rocket, prisoners from the concentration camp Mittelbau were used as slave labor under horrific conditions, a fact of which he was admittedly aware, though he later claimed not to be responsible for their use, stating that he felt powerless to prevent it. Some prisoners later claimed to have witnessed a closer involvement with Mittelbrau than von Braun would ever admit. According to official SS documents, as many as 12,000 slave laborers died during the production of the V-2 (Neufeld 150-170).

In 1944 von Braun was arrested by the Gestapo, following a year of surveillance by the Sicherheitsdienst, during which he was overheard telling colleagues that he saw no possibility of victory in the war. In addition to this lack of faith in the war effort, it has been suggested that Himmler was looking for an excuse to get rid of von Braun after he resisted Himmler's attempts to gain more control over the rocket program by planting his own people in key positions (Neufeld 170-175, Wikipedia "Wernher von Braun").

In 1945, after the downturn in the fortunes of the Nazi war effort and especially after his arrest and interrogation by the Gestapo, von Braun became thoroughly disillusioned with the regime. Due to this change of heart, he arranged to be captured by the invading Americans, using his importance to German rocketry to avoid harsh treatment and retribution for his work on the V-2 program.

4. Life in America

As the war neared its end, the allies moved ever deeper into Germany and von Braun and his fellow German scientists were ordered to move to southern Germany as a precaution. It was here that he suggested they should surrender to the American forces. It seemed to him the opportune time to do so, as Hitler's death had freed them from any potential obligation they may have felt toward the Nazi party. He also believed that they would be found soon anyway, and was afraid that if the Soviet army found them first, they would not be treated kindly due to the horrible treatment the Russian prisoners at Dora had received (Neufeld 204). It was von Braun's younger brother Magnus who was sent to make the initial contact with the American forces. Although the Americans were skeptical, he knew the location of Wernher von Braun as well as other key scientists that they were on the lookout for. As a result they allowed him to go with the promise that he would return with them as he claimed. Magnus von Braun returned with Wernher von Braun leading an advance team of seven scientists. Two of the scientists had buried the archive of rocket research before they left, in the hope that they could use it to bargain with the American forces

When Wernher von Braun arrived to meet the American forces, he was treated very well, as he had been on the list of scientists the Americans wanted to interview. His name had been known to the British intelligence since 1943, Russian NKVD since 1935 and the United States' intelligence since 1944 (Neufeld 202). When they left Germany, von Braun and his advance party of seven had left several thousand of their fellow scientists, as well as most of their families, behind. At the time of his departure there were no working organized communication services and it was not until nine months later that von Braun got word that his parents were alive and it would be a year from his departure before he would be able to see them again.

After Wernher von Braun and his advance team of scientists were captured, they were processed as part of the American program Operation Overcast, he was appointed his team's spokesperson because he spoke the best English (Neufeld 203). The purpose of the program was to acquire German technology and expertise through the exploitation of Nazi scientists at the end of the war. It was also often referred to as Project Paperclip because paperclips were used to mark the files of the candidates that were selected to work for the US. Initially the intent was just to interview the scientists. However, upon hearing their interviews, American officials deemed their recruitment by the United States a necessity, specifically citing their potential importance in the Pacific war effort (Wikipedia "Operation Paperclip"). It was also clear to the people who conducted the interviews that von Braun and others from his group held some racist views. However, of the entire advance party of scientists, he was ranked as one of the scientists who were most adaptable to the American lifestyle (Neufeld 204). Finally, Wernher von Braun got his chance to present his ideas to two British CIOS investigators in a memorandum: "Survey of Development of Liquid Rockets in Germany and Their Future Prospects" (Neufeld 204). In it, he stated that the V-2 rocket was just an intermediate step and that the study of rockets had considerable potential for both military and civilian applications. Lastly, he discussed the use of rockets for space travel. What the allied forces had learned from the war, if nothing else, was that the key to future military power lay with advanced technology (Neufeld 206). They saw this as a chance to use German scientists to further this goal for both the short term and the long term.

Wernher von Braun was then told to acquire and assemble 100 V-2 rockets; with the help of the American forces he was able to accomplish this before the Soviet forces found Peenemünde. It was around this time that the United States forces found the Peenemünde archive containing roughly 14 tons of documents that had been hidden in a mine. Von Braun also helped compile a list of names of scientists and their families to evacuate to the US that would constitute the minimum amount of scientists and diverse expertise necessary to continue his rocket research. The list he had

initially compiled had been a longer list than the US forces had wanted to transfer but von Braun was eventually talked down to an amount that the US thought to be acceptable. Though von Braun believed the US to be the best place to continue his rocket research, some of his subordinates did not share his enthusiasm and harbored doubts about the length of time they would stay in the US and the terms of the contract regarding their new employment there (Neufeld 206-210).

In July 1945 von Braun and his friends were to be sent to the United States along with 350 German specialists, with the rationale that their assistance was needed for the war against Japan. Before he could be sent to the US, the British "Backfire" group (England's version of the JIOA) asked for the apprehension of von Braun, as well as other key scientists. This request was politely ignored, because the American forces needed von Braun as well as the other scientists that the British were requesting. A month later the British group changed their request to borrowing Wernher von Braun, Axster, Steinhoff, and Rees for one week; to which the US agreed (Neufeld 211). During his stay in Britain he was interviewed and he was also asked about any German scientists he would recommend that the US was not taking. He also took note of the damage done to some of the buildings by his V-2 rockets, though in later remarks about it he did not appear to show any remorse for it (Neufeld 212).

In September 1945 von Braun and his staff were finally sent to Fort Bliss, Texas as part of Operation Overcast. As von Braun was in the first group to be transferred to the US he arrived in October 1945. However, the last group did not arrive until January 1946 (Neufeld 213-216). Here he was met with less respect than he was used to. In Germany he had many engineers who answered to him, but now he had to report to a young American major, with whom he did not get along. Initially, the Germans found their living conditions as well as the restrictions placed on them intolerable (Neufeld 217-218). As time went on, the restrictions became more lax at Fort Bliss, and von Braun and his followers continued to train American personal in rockets and guided missiles.

They also continued to study the future potential of rockets for military and research application, as well as other projects such as the supersonic ramjet.

In 1950 von Braun and his team were moved to Huntsville, Alabama where he led the Army's rocket development team. Under his direction the Redstone rocket was created and was later used for the first live nuclear ballistic missile tests conducted by the United States. Later a modified version was used to successfully launch America's first satellite, Explorer 1, on January 31, 1958, signaling the birth of the American space program. Because the USSR had launched Sputnik 1 in 1957 (a year earlier) there was a growing belief that the US was behind the Soviet Union in the emerging space race (Wikipedia "Wernher von Braun"). In an interview in July 1946, Wernher von Braun also discussed the use of satellites as attack platforms to drop atomic bombs and stated that the "nation that first reaches this goal possesses an overwhelming military superiority over other nations," (Neufeld 211-212). He clearly was implying that if the US did not win the space race, they would have to deal with this threat from the USSR. Sputnik's launch was also a personal disappointment to von Braun, as his own satellite project had suffered two years of official setbacks, without which the US might have beat the USSR in launching a satellite into space (Neufeld, 312).

On July 29, 1958 NASA was officially established. A year after the creation of NASA von Braun and his development team were transferred to NASA's Marshall Space Flight Center. In a Pentagon meeting, he told Herb York that the continuation of the Saturn program was a requirement for his transition to NASA (Wikipedia "Wernher von Braun"). In July 1960 von Braun became the center's first director and remained in that post until February 1970. The first major program von Braun was in charge of was the development of Saturn rockets to carry heavy payloads such as satellites into earth's orbit and beyond. The Apollo program was later developed from this program and on July 16, 1969 his dream for mankind to set foot on the moon became a

reality as a Saturn V rocket launched the crew of Apollo 11 on its eight-day mission (Neufeld 333-433).

On March 1, 1970 von Braun was appointed NASA's Deputy Associate Administrator for Planning at NASA's headquarters. On May 26, 1972 he retired from NASA after several conflicts about the fate of the Apollo program and strict budget constraints. At this time it had become obvious to him that his plans for future space flights were in conflict with NASA's plans for future space flights. It also further frustrated him to see the declining of public support for manned space missions, once the US beat the USSR to the moon (Wikipedia "Wernher von Braun"). After leaving NASA, von Braun became vice president at the aerospace company Fairchild Industries in Germantown, Maryland on July1, 1972. In 1973 von Braun was diagnosed with kidney cancer which could not be controlled with surgery. Though he was ill, he continued to try and interest the public in space flight by speaking to students and engineers at universities and colleges. His declining health, however, forced him to retire from Fairchild on December 31, 1976 and he was later awarded the National Medal of Science though he was hospitalized and unable to attend the ceremony (Neufeld 442-472). On June 16, 1977 he died of pancreatic cancer, and was buried in the Ivy Hill Cemetery in Alexandria Virginia. Where the only grave marker belonging to one of the most controversial figures in recent US history is a simple plaque bearing his name, the years he lived and a single inscription: Psalms 19:1 (his favorite biblical scripture) (Neufeld 472).

III. Nazi Research and the V-2 Program

1. Nazi Membership

It was shortly after being appointed to his post in Peenemünde that von Braun officially joined the Nazi Party. Later, in 1940, he would become an officer in the Waffen-SS. This damning membership as a Nazi and especially in the notorious SS (who were responsible for most of the atrocities committed in the Holocaust) was addressed by von Braun. He would later explain that he was commanded to join first the Nazi Party and later the SS, and that his refusal would have been the end of his career and the abandonment of his life's work. He claims that as much as he would have liked to avoid joining the party, it was preferable to him to the complete destruction of his dreams and his work (Piszkiewicz I 58, Neufeld 120-121). This story is dismissed by writers such as Dennis Piszkiewicz, who claim that photos showing him with top Nazi leaders wearing his SS uniform show that he was more heavily involved in the organization than he was later willing to admit. In addition, they claim the SS had not shown any interest in Peenemünde at the time he joined (Piszkiewicz I 57-60). On the other hand, Major Joseph Sestito, the security officer overseeing the Peenemünde team at Redstone Arsenal in Hunstville, AL, supported von Braun's explanation, saying "I'm fairly sure that these men became members more or less as a matter of expediency, rather than ideology.", continuing "I believe they joined Nazi organizations primarily to hold on to their jobs" (Lang 80).

Wernher von Braun's exposure to the Nazi Party did not, of course, begin with his work on the V-2. While completing his secret dissertation for the Army after Hitler's rise to the Chancellorship in 1933, the Nazi takeover was progressing around him at an ever-increasing pace. He could not possibly have been unaware of events such as "the Nazis' torchlight parade directly past the Agriculture Ministry on the night of 30 January, the Reichstag fire of 27-28 February, the mass arrests of Communists and Socialists that followed, the Reichstag's passage of an act giving Hitler

dictatorial power on 23 March [...], the often thuggish anti-Jewish boycott of 1 April, or the now-infamous book bonfire staged by Nazi students at his University on 10 May" (Neufeld 61). These events, which gave much of the western world pause, seem to have been insignificant to von Braun, who claimed he was "very little interested in the 'world around me,' and downright naive in my views of political matters", claiming the greatest impact Hitler's rise had on him at the time was that his father "lost his job in the process" (Neufeld 61). The fact that, apart from his father, many of his closest associates were military officers who directly benefited from the Nazis is sure to have contributed to this indifference.

His claims of indifference and lack of political interest are backed up by much of the available evidence. For example, some of his closest associates and friends were from opposite extremes of the political spectrum. Arthur Rudolph, who was hired at Kummensdorf in August 1934, and would work with von Braun through the Saturn V program, was a committed Nazi, who became a member of the SA "long before it was opportunistic to do so" (Neufeld 75). He was also a spaceflight enthusiast from an early age, and easily bonded with von Braun because of it. According to Rudolph, von Braun and he would often stay up all night discussing spaceflight and developing formulae, but Rudolph makes no mention of political discussions. On the other hand, von Braun was also close friends with Klaus Riedel, who was far-left in political leanings (Neufeld 76). His relationships with both men seem to have revolved solely around rocketry work, with little to no attention paid to their very different political ideologies, at a time when such ideologies were paramount for many Germans.

In 1933 all faculty with leftist political views or Jewish ancestry were expelled from von Braun's university. This was followed by significant pressure on all students to either join the Party or at least to join SA-affiliated organizations. When the SA gave a temporary allowing student to sign up for a non-binding probationary period, von Braun joined the SS horseback riding school of the

Reitersturm I in western Berlin, where he claimed he took riding lessons twice a week but did not participate in any SS activities outside of this (Neufeld 63). He would have been required to wear his SS uniform during these lessons, as well as being subjected to indoctrination. Two things in particular, though, back up von Braun's claims to have not been a believer. First, he only joined after significant pressure was put on the university, after seeing his professors expelled around him. Second, he only joined when a probationary membership which he could back out of was possible. Indeed, as soon as this probationary period was over, he dropped out of the organization, and was not part of the SS again until he rejoined in 1940 (Neufeld 64). This rejoining of the SS was allegedly again due to pressure from the Nazi establishment. According to von Braun, and backed up by other anecdotal accounts, he received an offer of SS membership as Untersturmführer, and it was stressed to him that it was a "very definite desire of Himmler" that he join (Neufeld 121). He initially resisted but consulted Dornberger before acting one way or the other. Dornberger, according to von Braun, informed him that the SS had been attempting to gain access to the rocketry work, and that if von Braun wished to continue his work, he had no choice but to accept SS membership. The offer came at the beginning of the war, at a time when the political future of the rocketry group was very much in question. Materials and funds were scarce, and their group was not a priority at that time for the Nazi leadership. As a result, von Braun claims to have felt trapped. Perhaps unsurprisingly, therefore, von Braun accepted the offer (Neufeld 121-122).

The question "how much of a Nazi was he?" is central to much of the writing about von Braun, but his membership in the party by itself is not necessarily the complete endorsement of the Nazis that some have claimed. The picture was likely more nuanced, and the very real fear of ending up on the Nazi regime's bad side was pervasive in much of this period. Though some who rejected as much participation as von Braun engaged in remained untouched by the Nazis, the fear that was created in the minds of those who may have been on the fence was often much greater than this would suggest, and many were in fear of being persecuted by the regime if they didn't play along.

In addition, much of the work von Braun was involved in was increasingly difficult to do without Nazi membership. Given this context, and the evidence that von Braun did not participate first-hand in the politics of the organizations, his membership is perhaps understandable.

2. V-2 Program

His cooperation with the regime was certainly not, however, completely innocent. Though he later claimed not to be a Nazi sympathizer, von Braun was certainly at the very least a Prussian nationalist, who had no ethical problem assisting with the military aims of his country. Von Braun himself seems to have thought little about politics, whether for or against the Nazis. According to those who knew him in Germany, his political views mirrored those of his father: that "the German Republic was no good and the Nazis ridiculous", but he otherwise believed politics to be a distraction to which he was at best indifferent (Neufeld 55). Part of this set of social and political values inherited from his father was loyalty to the monarchy and a sense of duty to serve in its military and civil service. Therefore, when the military made its offer in 1932 to hire von Braun at Kummersdorf, it was an offer he did not hesitate to accept.

When he began his military work, before the Nazi rise to power, he seems to have seen the military as a simple source of patronage, with little interest in how his research was used by those who funded it. In a 1950 interview with *New Yorker* journalist Daniel Lang, quoted in Michael Neufeld's v*on Braun: Dreamer of Space, Engineer of War*, he reveals his thoughts going into his military-funded research. "We felt no moral scruples about the possible use of our brainchild", he told Lang. "We were interested solely in exploring outer space. It was simply a question with us of how the golden cow could be milked most successfully". Though he referred in this case to the pre-

Nazi Army, this ability to take funding from the military with no regard to the lives his research might cost continued through the Nazi period (Lang 83, Neufeld 54).

Beginning just prior to Hitler's rise to power, but ramping up significantly afterwards, a concerted effort was made by the military to establish a monopoly in rocketry research. Beginning in early 1933, this effort involved arresting men like Rolf Engel, ostensibly for working with the Soviets, and active harassment of others such as Rudolf Nebel, whose showmanship and attempts to popularize his work ran counter to the military's desire for complete secrecy. He was ultimately arrested during the Night of Long Knives on June 34th, 1934, for publishing a leaflet which discussed military uses for rockets (Neufeld 66). After the SS purge of the SA and other dissenters in that single night, all amateur rocketry was completely stamped out, with many previously amateur participants hired into Dornberger's Kummersdorf group. In this context, then, von Braun's earlier decision to accept military funding for his work was now irreversible, at least without his leaving the country. Despite the assassinations giving von Braun a "glimmer of the nature of the regime" and perhaps giving him second thoughts (Neufeld 69), it was now impossible to continue rocket research in Germany outside of the military (Neufeld 76).

Milking von Braun’s golden cow meant using his rocket research to build missiles for the German military. Beginning with his work for Dornberger's Kummensdorf group in 1932, von Braun was employed by the military in order to develop rockets with the intent of using them as weapons, delivering either explosive or chemical payloads. Though his military work developing rockets was from the beginning explicitly for their use as weapons, most if not all of the research would be directly applicable to space flight. This allowed von Braun to please his patrons yet further his own agenda as well. His early work focused on liquid-fueled engines, but as time went on, he began directing higher-level systems, with the specifics being designed by those under him. After successful development of the A-1 and A-2 rockets, a new rocket site was developed in

Peenemünde for the building of the larger A-3 and A-4 (V-2) rockets (Neufeld 80,81). Developed beginning in 1942, the V-2 was a large, liquid-fueled missile, whose gyroscopic guidance system allowed it to be fired with great accuracy, delivering its 2,200 lb. warhead to targets up to 200 miles away. Over the course of the war, 5,200 V-2 missiles were produced, largely at the Mittelwerk facility, using slave labor. They were first used against the allies on September 8, 1944, with an attack on Paris which caused only minor damage. From this point until the end of the war, missiles were fired at England, Belgium, the Netherlands, France, and even occupied Germany. The attacks are estimated to have caused 7,250 deaths of both military personnel and civilians, and many more injuries (Wikipedia "V-2"). In addition, the V-2 was the world's first military ballistic missile, capable of guided precision at long range, and as such is to some extent the predecessor of every military missile produced since. As the V-2 was largely von Braun's brainchild, a product of his zeal for government patronage for his space travel research, it is tempting to lay these deaths and injuries at his feet. Certainly he bears some responsibility for them, but was his work for his nation's military in and of itself immoral?

Von Braun was, at least in his youth, a patriotic Prussian German from a military aristocratic background. National service, especially in the military and government, was a large part of his upbringing. In this context, it is perhaps forgivable that von Braun accepted military funding for his work and in return provided his country with new military technologies. This is an act which is mirrored in nearly every country on the globe and is no more immoral, by itself, than Sir Hiram Maxim's invention of the modern machine gun, responsible for many thousands of deaths in World War I, or that of the engineers who developed unmanned drones used by the United States today. These acts are only immoral in as much as war itself is immoral. Indeed, the nation for whom von Braun began his work, the Weimar Republic, was, though internally chaotic, a parliamentary democracy without the overt militarism of the later Nazi state. The crucial difference, however, comes in his continued military work after the Nazi takeover, despite his increasing awareness of

the horrors which the Nazis truly stood for and, especially, the lack of difference this seems to have made to him and his work.

The death toll, mentioned above, caused by the V-2, including the deaths of slave laborers, is estimated to be 20,000 for the entire war. In contrast, the death toll in a single night, in the fire-bombing of Dresden, has been estimated anywhere between 20,000 and 500,000 (Wikipedia "Fire Bombing of Dresden). The Lancaster bombers used in this bombing run are therefore responsible for at least as many civilian deaths in one night as the V-2 caused throughout the period it was used. Few ethical analyses have been done on the morality of the engineers at Avro who designed and built it, however. Perhaps the single most morally questionable character involved with the firebombing is Sir Arthur "Bomber" Harris, the Commander-in-Chief of England's Bomber Command at the time.

Sir Arthur Harris was a driving force behind the firebombing as well as other controversial area bombings with no specific military target. When he was appointed to the position of Commander-in-Chief, Bomber Command had only made a minimal contribution to the war, and he saw it as his job to change that. The USSR was pressuring the western allies to do something to aid them on the Eastern Front, and the plan to use area bombing techniques was given the go-ahead despite its controversial nature. The successes of the missions were initially small due to limited aircraft and the lack of navigational aids, however as these obstacles diminished, successes increased. The official statements regarding these area bombings were that they were attacking specific targets and that any civilian casualties were not intentional. Despite the controversy, Harris made it clear to the English government that he wanted the real reason for the bombings to become public (Wikipedia “Sir Arthur Harris, 1st Baronet”).

The Combined Bomber Offensive (the plan to utilize area bombing runs against German civilians) could be argued to be immoral because of the countless civilian lives which were lost

especially during the attack on Dresden. It could be argued likewise that the Manhattan project was also immoral because the nuclear bomb was used to decimate two cities in Japan comprising mostly a civilian population. It should also be taken into account that the bombing of Dresden was done late in the war and that Dresden was not a key military target. In contrast the nuclear bomb was used to force Japan to surrender, resulting in less loss of life then if they had not used it and had to invade Japan. The bombing of Dresden towards the end of the war was seen by some as unjustified, as Dresden had little or no military significance. The bombing of Dresden was also seen by others as justified because it had industrial targets and thus constituted a legitimate target. The bombing of Dresden remains highly controversial to this day (Wikipedia “Bombing of Dresden in World War II”).

Perhaps a stronger parallel than that between Harris and von Braun exists between Peenemünde and the Manhattan Project. Some of the era's brightest physicists and engineers, including Enrico Fermi and Robert Oppenheimer, worked as part of a massive, top secret military plan to develop an atomic bomb. Many of the physicists were, like von Braun, primarily interested in peaceful research, but were driven to develop a weapon during the war. The fact that the US Military was willing to pour two billion dollars into the project must certainly have been a factor as well (Wikipedia "Manhattan Project"). Like von Braun, these scientists were conducting research in an area in which it was very expensive to field-test and the military was the only organization willing to spend the sums needed. When the project's creations, Fat Man and Little Boy, were dropped on Hiroshima and Nagasaki in 1945, they caused an estimated 150-246,000 deaths combined (Wikipedia "Atomic Bombing of Hiroshima and Nagasaki"). Though the ethics involved in this act have been studied far more thoroughly than those of the conventional bombings of German cities, it helps put the V-2 program into some perspective.

The main difference between these examples and the V-2 was the regime for which it was made. Though the desire of the army of the Weimar Republic to simply rebuild and regain face after the humiliation of the Versailles Treaty was replaced by a rabid Nazi desire for expansion and racial purification, von Braun continued his work, apparently unbothered. His golden cow was now much more sinister than it had been, but he does not seem to have disliked the milk it provided enough to act on it. If he ever seriously questioned his role in this work, especially before the outbreak of war, it was not enough to cause him to give up his position or his goals. Major James P. Hamill, the Peenemünde group's military handler in Operation Overcast and beyond, said of von Braun's rocket tunnel-vision: "That guy ... wants to go to the moon. That's his passion- interplanetary travel. Whether it will be war or peace on earth comes after that for him" (Lang 81). As the Nazi regime went further with their plans in the Holocaust and von Braun was pulled ever deeper into complicity with some of the atrocities committed therein, he continued his work towards this dream without regard for the effects of his work, whether through blindness or lack of caring.

3. Mittelwerk Slave Labor

Von Braun came face to face with the Nazi regime's true character at the latest in 1943, when severe labor shortages caused some in the Nazi establishment to begin using concentration camp slave labor to push forward military construction. An underground factory was built, named Mittelwerk, which used laborers primarily from the Mittelbrau-Dora labor camp, and which produced both the V-1 flying bomb and the V-2 missile. Wernher von Braun later admitted to having been aware of the use of slave labor, as well as the extreme cruelty with which the laborers were treated. He is known to have been shown multiple construction camps, including Mittelwerk, and must have been aware on some level of the conditions there (Neufeld 161). He also later

admitted to having personally chosen laborers from the Buchenwald concentration camp and was certainly aware of the horrors occurring there. According to one later account, von Braun allegedly told his associate Ernst Stuhlinger that conditions for the laborers were "hellish. My spontaneous reaction was to talk to one of the SS guards, only to be told with unmistakable harshness that I should mind my own business, or find myself in the same striped fatigues!", continuing that he "realized that any attempt of reasoning on humane grounds would be utterly futile" (Stuhlinger 44). This seems to have ended any attempt on his part to engage with the SS or the Nazi establishment to change things for the better, though at least one prisoner, the non-Jewish French physicist Charles Sadron, was protected by von Braun and placed in relatively good conditions in the factory. There is no evidence, however, that this protection of prisoners was widespread, and it should be noted that Sadron was not only an established rocket scientist but also non-Jewish (Neufeld 178). In addition, some prisoners, such as Robert Cazabonne, recalled after the war that von Braun had at least been present for many of the atrocities, including the hanging of prisoners from chains. One prisoner in particular, captured French resistance fighter Guy Morand, claimed that von Braun actually ordered him flogged and forced him to say that he deserved to be hanged (Biddle 124-125). While these extreme allegations are unable to be confirmed, there is certainly evidence that von Braun was actively involved in the allocation of slave labor to different parts of the program. Overall responsibility for the use of slave labor lay with his superiors, and he certainly was not given a choice as to their use, but that von Braun was aware of much of what was going on is nearly certain (Neufeld 160-166).

Though he was undoubtedly aware of some of the conditions the prisoners faced, whether or not he actually participated in the Holocaust is less certain. His claims that he had no choice but to do as he was told are, on the one hand, understandable. The Nazis were capable of incredible brutality and had shown no restraint previously in acting against those whom they saw as acting against the party's interests. In this atmosphere of paranoia and the very real danger of a visit from

the Gestapo at any moment if one strayed from the party line (a visit they would eventually pay von Braun), it is difficult to truly condemn someone for failing to act. Some psychological research performed since the war, including the famous Milgram experiment, has shown that the von Braun's failure to question his situation may be the norm instead of the exception (Kowalski 56-58). In fact, his own account of questioning the beatings and being told it was not his responsibility is a very close parallel to the experiment itself. On the other hand, this is an excuse used by many perpetrators of horrendous acts during the Holocaust, and it is certain that von Braun was not only aware of what was going on, but that he actively participated in it, even on a low level of responsibility. Von Braun seems to have accepted his situation and the idea that he was powerless to effect real change, avoiding looking into matters too deepy. He simply continued in his work, allowing his dreams of space flight to obscure any doubts that he may have had. At the same time, his actions do not seem to be those of a true Nazi believer. The possibility that he protected Sadron as well as resistanced the attempted SS takeover of Peenemünde show that his true feelings, though he allowed them to be suppressed for his work, were not in line with those of the upper Nazi echelon. By most accounts, when approached by Heinrich Himmler about the transfer of authority to the SS, von Braun did not play along, resulting in his imprisonment and interogation by the Gestapo three weeks later. He was only released through the actions of Dornberger and Albert Speer, who took the issue directly to Adolf Hitler. Despite these shows of resistance to SS infringement, von Braun's Nazi career speaks mostly of inaction and acceptance of authority. Ultimately, this inaction, whether it stemmed from a feeling of fear and helplessness or from a genuine lack of caring about the plight of others, or even a combination thereof, tarnished his later career and caused him to become for many the archetype of the inhuman scientist, willing to accept any human cost to further his work. This reputation may or may not be truly deserved, but he undoubtedly was at the very least complicit in the evils of others, and this moral failing continues to dog his reputation today.

IV. The United States, Operation Paperclip and Nazi Engineering

1. Operation Overcast

At the end of the war Wernher von Braun and many other German scientists were recruited to work for the United States under Operation Overcast. Not everyone approved of this plan, and it was even suggested that all the German and Japanese scientists who helped create weapons during the war should be confined to a distant island (Lasby 51). After the scientists were interviewed, a telegram was sent to the pentagon requesting the evacuation of the German scientists. The fall of Germany had created a power vacuum in Europe, as well as a mad grab for German technology and expertise. As the Truman administration did not allow the recruitment of scientists with a strong connection to the Nazi government only those who were moderate members or were directly against the Nazi party were accepted (Lasby 210-212).

During World War II, the United States and Great Britain allied themselves with the USSR for the specific purpose of fighting Germany, which was seen as the greater of two evils. The Americans and the British were by no means friends of the USSR during or before World War II. Thus the Americans and the British went back to seeing the USSR as an adversary as soon as Germany was defeated. It was also well known that the USSR was gathering up all of the German technology it could after Germany was defeated. This gave rise to a growing fear in the West that the USSR might attack the US and its allies with their captured German technology. This fear of what the USSR might potentially do with German technology played more than a small role in the United States' decision to obtain what German scientists they could to prevent as much German knowledge as possible from falling into Soviet hands. The American acquisition of German scientists and

knowledge may have also helped prevent a possible third world war by preventing the USSR from gaining a military technological advantage.

During the final days of the war in Europe, as the western allies advanced into Germany, they began finding concentration camps, where the prisoners had lived and died en masse under mercilessly brutal conditions. An example of such a slave labor camp was Dora, which provided workers for Mittelwerk, where the prisoners were forced to build German rockets under the direction of von Braun and his team. At the same time, the United States remained at war with Japan, and the need for German scientific and engineering expertise was pressing. They knew, however, that if they did recruit the German scientists with Nazi pasts linked to concentration and slave labor camps, the public reaction would be resoundingly negative. The moral dilemma facing the US, was to either continue on without the German scientists in the war against Japan, or recruit the German scientists despite their involvement in the atrocities of the concentration and slave labor camps. The hiring of the German scientists however, might give them the possible leg up they needed for the war against Japan and the invasion of the Japanese mainland that was being planned.

The morality of Operation Overcast is intrinsically tied to the individuals being recruited. Most if not all of the recruits from von Braun's Peenemünde group were involved solely in the engineering and management of the V-2 Program. Though some may have agreed more or less strongly with the racial policies of Nazi Germany, evidence does not suggest that any were in a position to act in the atrocities being committed. The slave labor at Mittelwerk, for example, was managed solely by the SS, and SS leadership were ultimately responsible. Though many have decried the tendency of some party members to claim, after the war, to have been unwilling witnesses to the acts of others, without personal responsibility for those acts, this seems to have genuinely been the case for many working on the V-2.

Ultimately, what makes one recruit morally acceptable and another unacceptable is his or her personal responsibility. While recruiting a man like von Braun, weighing his involvement in

Mittelwerk against the needs of the country, can be argued to be morally justifiable, hardly the same argument could be made for the likes of Adolph Hitler or Heinrich Himmler. No matter the national interest, the direct causation of the deaths of 6 million innocent people cannot be outweighed. Though these extreme examples may seem obvious, a finer comparison can be made by looking at Albert Speer, the architect of the Nazi regime, and Minister of Armaments for the second half of the war. Speer was, by most accounts, not in full support of the Nazi Party's use of slave labor, similarly to von Braun. Speer was completely swept up by the cult of Hitler, however, and was a true believer of the German leadership nearly to the end. He was made Minister of Armaments in 1942 and excelled beyond all expectations in the role of organizing the country's war effort. Part of this organization, though, was the use of slave laborers taken from the occupied territories. Though the program was not favored by Speer, he was eventually convince to implement it. As the head of nearly all war production in the country, he was directly responsible for factories such as Mittelwerk and the use of slavery there and even toured Mittelwerk personally. There is even more controversy and dispute over Speer's personal involvement with the Holocaust than over von Braun's, but it is certain that not only did Speer know about the use of slave labor, he directed it (Wikipedia "Albert Speer"). This personal responsibility for the decision making separates him from the men of the Peenemünde group, who were by most accounts simply told they were to use the slaves and were not given a choice in the matter. It is on this point of personal responsibility, then, that the closest thing to a line can be drawn separating those who might possibly be justifiable recruits from those whose recruitment would be immoral regardless of context, due to the severity of their crimes.

2. Public Opinion of Wernher von Braun

In December 1946 a Gallup poll was taken (sponsored by the Gallup Poll News Service) which asked the American public if bringing over German scientists was a good or bad idea (see Gallop). The majority of Americans decided it was a bad idea (Lasby 191-204). There was however a definite correlation between the results and the amount of formal education received; those with more education favored the plan and those with less opposed it. The results also seemed to depend on the areas of the country where the poll was taken. Those who voted against the importation of German scientists did so for many reasons. They believed that the German scientists could not be trusted and would influence how Americans thought, and that they also would gain knowledge from the United States and use it against us someday (Lasby 191-204). Those who voted in favor of the importation of German scientists believed that the US could profit from their knowledge and that it would be better to have the scientists here than in Russia (Lasby 191-204). The public impression of von Braun when he was introduced to America varied. In Tom Lehrer's satirical song: "Wernher von Braun;" he is described as "apolitical," "opportunistic" and that he did not care what happened as long as his rockets got off the ground (Lehrer). It can also be clearly seen how others were charmed by him as evident in the uncritical article "A Romantic Urge" written by Daniel Lang. In the article he describes von Braun as "exuberant," and is inspired by his romantic ideas of space flight. The article's title itself was a reference to this and showed how the author was charmed by von Braun (Lang). Nowhere in the article does von Braun talk about the questionable side of his Nazi past (such as the use of slave labor in the building of the V-2 Rockets) and Daniel Lang did not ask him either. What they did talk about included such topics as the honors von Braun received for his rocketry work in Germany, whether he went to church or not during his time in Germany, and von Braun's family. Overall, the article depicts him as an ideal family man. In general, Americans

who distrusted or approved of him did so for the same reasons as indicated by the poll taken before his introduction to the American public.

In 1959 the United States Army paid for the production of a movie for the German audience entitled "I Aim for the Stars" (Hübner). The US Army did this because they saw von Braun's celebrity status as a "useful promotional and recruiting tool (Stafford). In the movie he was portrayed as a scientist that only wanted to build rockets, and had no real Nazi political ties. However, the general public reaction to the movie in America was that it was uncritical. The movie also did not receive good reviews from British critics, which is probably due to the damage his rockets had caused (Stafford). In 2002 a documentary was made for German television about von Braun entitled "Rocket Man for War and Peace". It showed how Nazi scientists, especially von Braun, had helped America after the fall of Germany in World War II and how he was able to accomplish great things while working for the United States, such as helping the US win the space race. By the 21st century, documentaries like this show that the public opinion of von Braun in Germany had come more into alignment with the view of the movie "I Reach for the Stars" almost 50 years earlier.

3. World War II, US War with Japan

"Despite the fact that she was militarily finished, Japan's leaders were going to fight right on. To not lose national 'face' was more important than hundreds and hundreds of thousands of lives. And the people concurred, in silence, without protest" (Jones 242). They did this because not surrendering was a deeply engrained aspect of their culture (Jones 242). Intercepted Japanese messages also indicated that the Japanese believed they could fight the Allied invasion forces long enough to break American morale and negotiate a more favorable outcome than an unconditional surrender (Frank). Military analysts gave varied estimates of casualties in the projected invasion. The casualty estimates ranged as high as 1.7-4 million American casualties and 5-10 million

Japanese casualties in a report by William Shockley for the Secretary of War (Frank 340). With the use of the atomic bomb, a weapon that was sure to cause untold and indiscriminate damage, they could save many more lives that would have surely been lost otherwise. At the time, though, there was no guarantee that if the atomic bomb mission was a success, it would necessarily end the war.

The approval for German scientists to come to work for the United States was made by the US Secretary of War in June 1945, but not announced to the American public until October 1945 (Dungan). As he was the Secretary of War, he would have also known about the then highly secret US atomic bomb project, and that it was not guaranteed the atomic bomb would end the war. Because of this engineers like von Braun, with knowledge that could be immediately used to build weapons that could help in this event, were absolutely necessary. Also, those in charge of Operation Overcast were of the general opinion that the covering-up of a relatively small group of German scientists was justified when compared to the millions of American lives that would be saved. There was also some question as to whether or not the atomic bomb would work, as it was not tested until July 16, 1945 a month after von Braun's hiring by the US was approved. When the atom bombs were eventually dropped and the war ended, the program which was already in place to use the Nazi scientists continued under the now-imminent Soviet threat.

4. Cold War

After the war, both the United States and the USSR started programs for rocket research based on acquired German designs. Wernher von Braun and his team had created the Redstone Rocket by the 1950s which was the first rocket to launch a live nuclear bomb in tests. This, as well the power vacuum created in Europe, the development of the atomic warhead by first the United States and then the USSR, the expansion of the spheres of influence of both the United States and the USSR and a growing lack of trust were contributing factors which precipitated a cold war between the United

States and the USSR. The later development of intercontinental ballistic missiles (ICBMs) in 1959 by both sides further heightened the tension of the Cold War. The United States ICBM design also stemmed from von Braun's A9/A10 rocket, which he had designed earlier in his career, when he worked for the Nazis. Without von Braun's help, the United States may not have been able to create the rockets and ICBMs which were stockpiled during the Cold War as quickly as they did, and it could have ended very differently.

5. US Space Race

In the 1950's the United States Army and later NASA began an extensive effort to sell the American public on space flight. In 1955 von Braun worked with Walt Disney as a technical director for three television shows: "Man in Space", "Man and the Moon" and "Mars and Beyond." He also wrote several articles and books popularizing his ideas on space travel such as "Project MARS: A Technical Tale," "First Men to the Moon," and "Man Will Conquer Space Soon." In these shows and articles von Braun helped sell the American public on space flight. Thus it was through the popularization of space flight that he was also sold to the American public.

The US had established a sounding rockets (atmospheric rockets) naval research center in December 1945, but this program was shelved when the Army's V-2s became available. Later, during the space race, the US chose to modify their sounding rocket technology rather than modify their military rockets. Thus project Vanguard was established in September 1955. However the Vanguard rockets it produced proved unreliable. During this time the army was turned down repeatedly in their requests to use the Juno-1 carrier vehicle that von Braun and his team of Redstone rocket scientists had designed. With the launch of the USSR's Sputnik, von Braun's team's carrier vehicle (Juno-1) was finally given the go-ahead, and on January 1958 it launched the United States' first satellite.

Initially, President Eisenhower declared that the United States was not in a space race with the USSR. After the launch of Sputnik on October 4th 1957 the US officially entered the space race due primarily to the effort of Senator Lyndon B. Johnson (Wasser). In a speech to the US Senate, he used the general fear the recent launch of Sputnik caused and expounded upon the potentially devastating technological powers the winner of the space race would have. If the US continued not to make the control of space a national priority, then the USSR would most certainly possess such technology before them. Therefore, the US could not afford to continue to make their decisions from the standpoint of their budget alone. Thus, the US public was swayed to support the space race through fear initially caused by the launch of Sputnik, and fear of what might happen if the USSR won the space race.

Wernher von Braun also proved to be indispensible during the space race as it allowed him to finally put all of his effort directly into the development of space travel technology, and he proved to be a wholehearted willing participant in the endeavor. Both countries also saw the space race as necessary for national security and as a way to prove their technological and ideological superiority. Their victory or defeat in this technological arms race would have great effect on each country's power and sphere of influence. However with the launch of Sputnik by the USSR two years after the unofficial beginning of the space race, many Americans believed the USSR to be ahead, and Wernher von Braun and his German team's experiences were finally put to use in creating an orbital launch vehicle. Wernher von Braun and his team launched the Explorer I satellite a year later using a modified Redstone Rocket called the Jupiter-C, signaling the birth of the American space program. The team had actually launched a Jupiter-C rocket before the Soviet Sputnik, but only to test nose-cone reentry technology. Later von Braun was appointed director of the Marshall Space Flight Center of the newly created NASA in 1960 where he again proved his value to the United States. The first major program he directed was the development of Saturn Rockets to carry heavy payloads into space. The Apollo program was later created utilizing the

Saturn Rockets (though von Braun had no direct involvement in the Apollo program) and finally, in 1969, the US beat the USSR in the last and most important event of the space race, as American astronauts landed on the Moon.

The first moon landing was, among other things, an important public relations victory for the US. During the Space Race there was a belief that whoever had the advantage in space would control space and thus control the earth. The United States landing on the moon first, then, signaled the end of the space race, and that the US had gained the advantage in space. It also was a testimony to the new technologies that were created and honed for the purpose of sending a team of men to the moon. As von Braun helped the US gain this advantage, and he helped hone ICBM technology through rocket propulsion discoveries gained during the space program, it can readily be seen how von Braun proved to be an asset during both the space race, and the cold war.

The recruitment of von Braun by the United States despite his Nazi Party affiliation could be argued by many to constitute a moral failure. However, it should be taken into account that if World War II has shown anything, it is that the country with the most advanced technology has a significant advantage in war. Had Germany managed to perfect and use the many technologies they had in the works a bit earlier, it is conceivable they might have won the war, or at least forced an ending that did not involve unconditional surrender. Also, as previously discussed, evidence suggests that von Braun was not an ardent Nazi, but rather an engineer who cared for nothing else but building a rocket that could achieve space flight at all costs. Though this is still very weak moral footing, von Braun's further contributions to the US during the Cold War and space race were indispensible. The US winning the space race brought us some sense of peace of mind as it proved the US had gained a significant technological advantage over the USSR which acted as a deterrent to war. Had the USSR landed on the moon first it would have shown that they had a technological advantage and the cold war could possibly have ended more in their favor. It is conceivable that if

the US had not recruited von Braun through Operation Overcast, then the history of the US could be very different from what we know today. Though the recruitment of German scientists and the hiding of their Nazi affiliated pasts was arguably a moral failure of the US to, it was one which most involved would surely have looked at as a hard bargain that paid off.

V. Conclusion

Wernher von Braun's life was one dedicated wholeheartedly to the goal of putting men in space and on the moon. To achieve this goal, he made many morally questionable decisions which have been discussed ever since. He cared only about developing rockets for space travel, paying no attention to politics, accepting funding from whichever military was willing to support his work, and, ultimately, not caring how his research was used. As satirist Tom Lehrer famously, yet accurately, said, in his song about von Braun, "Once the rockets are up, who cares where they come down?" Much of von Braun's early adult life was spent building rockets for the Nazis, culminating in the V-2 program, which caused more deaths to slave laborers building them than it did to enemy soldiers and civilians. In stark contrast, his post-war life was spent managing the manned space flight program at NASA, resulting in one of the most lauded technological achievements in human history, when the Apollo program successfully landed men on the moon. However, despite this dichotomy and work by many authors to paint von Braun as either a Nazi and full participant in the horrors of the Holocaust or as the patron saint of the American space program, von Braun's life was not so simple as to allow such black and white characterizations.

Wernher von Braun was raised as a patriotic Prussian, from a culture of military and political service, and his ready acceptance of military funding for his research was therefore a natural outgrowth of his upbringing. His development of the V-2 and its use against British, French and Belgian cities was in and of itself no more immoral than the actions of many engineers, of various nations, who developed weapons which were used in the war. The British Lancaster bombers which dropped incendiaries on Dresden, Germany, in the infamous firebombing of February, 1945, killed magnitudes more civilians in that single bombing than the V-2 did during the war, even factoring in slave labor deaths. Though the targeting of civilians during times of war is certainly

arguably immoral, the V-2 program, on its face, was no less moral, and of far lower magnitude in its effects, than many similar actions by the allies. What is far less easily defended is von Braun's involvement in the use of slave labor. This complicity in the Holocaust, no matter how superficially he himself may have been involved, was a black mark which would mar his career, no matter the heights to which it might later rise. Any moral discussion of von Braun, therefore, must center on this issue. In the end, though, the evidence suggests that his worst crime was to be so driven by his passion for space flight that he ignored and accepted the actions of others around him. Though von Braun was hardly the only German to turn a blind eye to the atrocities of the Nazis, he was face-to-face with slave laborers on a daily basis. Though he expressed regret for his inaction late in life, he made no serious attempt at the time to stop the use of slaves to build his rockets. It is uncertain whether it was due to the abuse of slave labor or simply the disappearing hopes of the German military effort, but late in the war, von Braun was enough at odds with the Nazi Party to be outspoken about his criticisms of the regime, resulting in his imprisonment by the Gestapo. This act, in turn, ultimately caused him to defect to the advancing Americans, an act which would set the stage for the next period in his life.

From the beginning, von Braun's new life in the US revolved around bringing the technical expertise of his Peenemünde group to bear on the US military's rocket program. Largely through his and his group's efforts, the US recovered from early losses in the space race to eventually land men on the moon, an event still seen as one of the defining moments for humanity. Coworkers in NASA have consistently claimed that this would not have happened without von Braun at the helm of the Saturn V program. In order to achieve these technological victories, though, the United States government first had to make the decision to facilitate the acquiring of von Braun and his group. In the process, the Nazi pasts of those involved were largely ignored and, in some cases, actively rewritten. The second component of any ethical discussion of the life of von Braun, then, is the

moral choice faced by the United States when balancing the pasts and actions of a group of people which it saw as a potential technical gold mine.

At the time von Braun and his group were acquired by the US, the war against Japan was still raging, and projected to go on for a period of years. The atomic bomb was still a wild card and any advantage which could be gained from using the rocket expertise of the German engineers was weighed with this context in mind. After Japan's surrender in 1945, the priorities changed somewhat, and the focus shifted to the USSR and the threat they posed. The Soviets were all too happy to snatch up any German technology and personnel they came across as they moved west towards Berlin and the US risked falling behind if they didn't seize any advantage presented to them. The V-2 program's success showed the potential for rockets to target enemy cities out of range of artillery, without the massive risk to personnel a bombing sortie involved. Combined with the Manhattan Project's success with the atomic bomb and the soviets following suit with their own bomb, the potential for ICBMs as the defining weapon of the cold war was clear. The advances which von Braun had the potential to achieve with his rocketry research were, therefore, directly applicable to the development of these ICBMs.

In addition to pure military advantage, the US eventually saw a massive potential for a morale and PR victory in von Braun's work. The prestige gained by the Soviet Union after they, first, successfully inserted Sputnik into earth orbit and then sent Yuri Gagarin into space and back was humbling for the United States and its western allies. Being the first to send a man to the moon and back was seen as America's chance to reverse the effects of these losses. As the Cold War developed into a true nuclear stand-off, direct military confrontation became impossible. The competition between the two superpowers was, therefore, focused onto proxy wars like Vietnam and Afghanistan, cultural competitions such as the Olympics, and the technological Space Race. In this context, the success of the Saturn V and Apollo programs gained significant national

importance. Though von Braun's past was not completely ignored, the US government, in this context, had an interest in not focusing too long on any potential blemishes they might find in his career for the Nazis.

Ultimately, Wernher von Braun's greatest moral failing was his focus, to the exclusion of all else, on achieving manned spaceflight. His entire life was spent struggling to attain this goal, and had he been born in America or Britain, a discussion of his life would likely be far more one-dimensional. As it happened, he grew up in a Germany that was in interbellum turmoil, and began his rocketry in earnest at the time of the rise of Adolph Hitler and the Nazis. His complete disinterest in politics and events in the world around him allowed him to be willingly pulled into the atrocities of the SS and complicity, on some level, in the deaths of 12,000 slave laborers. He may not have been the one directly responsible for their deaths, but his lack of action in the face of the Holocaust is a lesson to all engineers and scientists. No scientific or engineering work takes place in a vacuum, and although von Braun's situation is an extreme example, it is still illustrative of the responsibility of all engineers to not only ensure their work itself is ethical, but that the context of their work is ethical. Wernher von Braun's desire to put men into space was in and of itself a worthy goal, but by integrating himself into the Nazi establishment in order to achieve it, he allowed his work, overall, to become tainted.

Appendix: Views of Wernher von Braun

1. Michael J. Neufeld

Michael J. Neufeld's *Von Braun: Dreamer of Space, Engineer of War* is a comprehensive biography, which makes an earnest effort to be a fair, unbiased account of von Braun's life. The chair of the Space History Division of the Smithsonian's National Air and Space Museum, Neufeld also wrote an earlier, similarly balanced book on Peenemünde, specifically, entitled *The Rocket and the Reich: Peenemünde and the Coming of the Ballistic Missile.* Though *The Rocket and the Reich* is certainly full of pertinent information to our discussion, this information is repeated in *Dreamer of Space*, and the later work is therefore used in our analysis. Neufeld's work is heavily referenced in this IQP, as it is, in our opinion, the most balanced, unbiased, and at the same time comprehensive, work on the topic of von Braun and the morality of his life's work that currently exists. Where many other authors, as we shall discuss, write their biographies with an agenda, either for or against von Braun, Neufeld's only agenda seems to have been to document the truth. This is not to say that there are not inherent biases in many of the sources he used, but for the most part these are clearly stated. Where other authors dwell on photos of von Braun in full Nazi uniform, for example, and others ignore them altogether, Neufeld discusses not just the photos, but the context around them, very rarely speculating further than the evidence allows. Due to the quality of the work both as an exhaustive source on von Braun and as an unbiased account of his degree of involvement in the Nazi war crimes of World War II, *Wernher von Braun: Dreamer of Space, Engineer of War* is our primary source in this IQP. (Neufeld)

2. Pro-von Braun Authors

The biographies of von Braun which can be said to be biased for von Braun are largely written by people who worked with him in his time at NASA. The foremost of these authors are Ernst Stuhlinger and Frederick Ordway, both of whom worked with von Braun. Stuhlinger was a member of the Peenemünde group under von Braun, and was brought to the US along with the rest of the team as part of Operation Overcast. As such, he was a coworker of von Braun's for approximately 35 years, both in Germany and the US, and any moral failings von Braun may have had would have been, at least in part, shared by Stuhlinger. Ordway, on the other hand, was an American scientist, who worked for NASA at the Redstone Arsenal, and was a coworker of von Braun's during approximately 25 years of his American work. Both authors produced works on von Braun, including his work in World War II for the Nazis. Both also largely leave von Braun out of the picture for any discussion of slave labor and war crimes. In Ordway's *The Rocket Team*, the use of slave labor is discussed, though not to the extent it is analyzed in less positively biased works, but the blame for it is placed wholly in the hands of the SS, stressing that the engineers and scientists were not even permitted to talk to the laborers without SS supervision. Though *The Rocket Team* covered the entire Peenemünde group, as well as many NASA workers who were not part of Peenemünde, it is interesting to note that von Braun himself does not come up in the discussion of slave labor at all (Ordway 70-71).

A later book, specifically about von Braun, was written by Ordway and Stuhlinger together, entitled *Wernher von Braun, Crusader for Space: A Biographical Memoire*. This work again discusses the use of slave labor. In this case, it does discuss von Braun's role, but claims he knew little of what was really going on, and in fact made efforts to make life better for at least one prisoner, Charles Sadron. Some of the claims made in this work are criticized by Neufeld in *Dreamer of Space* for being contrary to known evidence of von Braun's knowledge of the concentration camp labor, and

that attempts to assist Sadron actually resulted in deepening von Braun's complicity in the abuse of others (Stuhlinger & Ordway, Neufeld 179).

In addition to the biographies by those who actually worked with von Braun at NASA, other authors have produced pro-von Braun works without being directly involved in his space research. The first of these authors we will discuss is Bob Ward, a reporter for the Huntsville Times in Huntsville, AL, who wrote the biography *Dr. Space: The Life of Wernher von Braun.* Though not a NASA employee or a coworker of von Braun's, Ward nonetheless sees von Braun through the eyes of an American NASA enthusiast. *Dr. Space* is largely uncritical of von Braun's past, and a common criticism of his work is that it draws heavily from letters and memoires of von Braun's friends and coworkers (Publishers Weekly review). Much of the bias in *Dr. Space* indeed comes from the fact that Ward largely uses biased sources and accepts them uncritically. The result is much like the work of Stuhlinger and Ordway: glowing praise of von Braun and his NASA accomplishments with little discussion of his involvement in the use of slave labor or his Nazi membership.

3. Anti-von Braun Authors

In contrast to the works of those involved with NASA and Peenemünde and their uncritical praise, some authors can be described as vehemently anti-von Braun. Foremost of these authors are Dennis Piszkiewicz and Wayne Biddle. Piszkiewicz has authored two books, *The Nazi Rocketeers: Dreams of Space and Crimes of War* and *Wernher von Braun: The Man Who Sold the Moon*, while Biddle wrote the recent *Dark Side of the Moon: Wernher von Braun, the Third Reich, and the Space Race*. Both authors are open in their purpose: to show that Wernher von Braun was actively involved in Nazi war crimes and the holocaust, and that he should have been tried and convicted for these activities along with many other Nazis. No attempt at balance is made by these authors, which taints what are often otherwise valid arguments, many of which are discussed, with

context, by Neufeld. For example, documents from the time show that von Braun visited the camps, and was involved in prisoner selection, to some degree. Where Neufeld simply discusses what we actually know about these sources and von Braun's activities, Piszkiewicz and Biddle use them as a starting point for speculation on unsubstantiated, much deeper involvement in the holocaust. These authors discuss many of the same ideas we present in this IQP, but unfortunately, their open bias renders them largely unusable in a scholarly discussion. Their real purpose, then, is as examples of an important public view of von Braun, which is largely in direct response to the uncritical stance of NASA, the US government, and many of the previously discussed authors. To many, his work with the Nazis, his Nazi and SS membership, and his knowledge (the degree of which is debated) of slave labor in and of themselves are enough to condemn him. The government and NASA's subsequent underplaying of this history are therefore seen a sinister cover-up (Pizkiewicz, Biddle) (not exactly sure how to reference these, since I discussed them at a top level, not details on specific pages).

4. Film and Television

As mentioned above, in the 1959 movie “I Aim for the Stars” or “Ich Greife nach den Sternen,” Von Braun is portrayed as a scientist who only wanted to build rockets and that he had no real political ties to the Nazi government. It is clear when watching it, that it is a biased film that is in favor of Von Braun. This is probably due in no small part to the fact that Von Braun was involved heavily with the making of the movie. The director of the film also makes it clear that, during the making of the movie, he wanted to make it more critical but was unable to and was not happy with how it turned out (Hübner “Wernher von Braun: Rocket Man for War and Peace”).The movie was also generally viewed as uncritical and was suspected of being whitewashed (Hübner “Wernher von Braun: Rocket Man for War and Peace”).

The documentary entitled "Rocket Man for War and Peace," glorified von Braun and expounded upon all his accomplishments. It briefly mentioned his use of slave labor to build the V-2 rockets, however that was not the documentaries focus and only consisted of the first third of the documentary. It also did not appear to be very critical regarding his moral responsibilities for the atrocities the slave laborers suffered building his rockets during World War II. The documentaries main focus was what he accomplished after he was brought to America, and how he was instrumental in getting a manned mission to the moon. The most critical part of the movie was when Thompson, J. L. the director of "Ich Greife nach den Sternen," talked about his experience with von Braun. He talked about how he always got into arguments with von Braun, because he would state that he was not a Nazi and yet he had joined the Nazi party (Hübner "Wernher von Braun: Rocket Man for War and Peace").

The song "Wernher Von Braun" by Tom Lehrer is a satirical song that is biased against von Braun. In the song he describes von Braun as "apolitical," that he didn't care where his rockets went down as long as they went up, and that he didn't care if you called him a Nazi. The song was clearly meant to play on the resentment people felt about having German scientists such as von Braun working for the United States. The song goes on to sarcastically say that we should be grateful, "like the widows and cripples in old London town who owe their large pensions to Wernher von Braun," (Lehrer)

The NASA MSFC History Office website was clearly biased in favor of von Braun. The biography on von Braun appears to gloss over the fact that he was a Nazi and that he used a slave labor force to help build his rockets. The article mainly focuses on his building of the rockets and how his V-2 rockets were the predecessors of the rockets used in the United States space program.

The book "Project Paperclip," by Clarence Lasby proved to be an unbiased source concerning the importation of von Braun and other German scientists. The author remained

objective when he talked about how the scientists came to work for the United States and why. The author also makes no mention or implication of whether or not the bringing over of German scientists was ultimately a bad or good idea. Instead he just suggests that only the future will prove this to be one way or the other.

The Wikipedia article: "Wernher von Braun," was relatively critical. It talked about his time as a Nazi and gave accounts of both sides of the story, of whether he was an ardent Nazi or just an apolitical opportunist. It also talks about his early life prior to him becoming a Nazi, and his life in America after he surrendered to the American forces at the end of World War II. The web article goes on to talk about his accomplishments at NASA, and his contributions to the American rocket program.

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