

This document is made available through the declassification efforts  
and research of John Greenewald, Jr., creator of:

# The Black Vault

---



The Black Vault is the largest online Freedom of Information Act (FOIA)  
document clearinghouse in the world. The research efforts here are  
responsible for the declassification of hundreds of thousands of pages  
released by the U.S. Government & Military.

**Discover the Truth** at: **<http://www.theblackvault.com>**



NATIONAL SECURITY AGENCY  
CENTRAL SECURITY SERVICE  
FORT GEORGE G. MEADE, MARYLAND 20755-6000

FOIA Case: 100508A  
12 May 2017

JOHN GREENEWALD  
[REDACTED]

Dear Mr. Greenewald:

This responds to your Freedom of Information Act (FOIA) request of 3 January 2017 for Intellipedia pages on "Wernher VonBraun and/or Wernher von Braun." As stated in our previous letter, dated 4 January 2017, your request was assigned Case Number 100508. A copy of your request is enclosed. For purposes of this request and based on the information you provided in your letter, you are considered an "all other" requester. As such, you are allowed 2 hours of search and the duplication of 100 pages at no cost. There are no assessable fees for this request. Your request has been processed under the FOIA.

For your information, NSA provides a service of common concern for the Intelligence Community (IC) by serving as the executive agent for Intelink. As such, NSA provides technical services that enable users to access and share information with peers and stakeholders across the IC and DoD. Intellipedia pages are living documents that may be originated by any user organization, and any user organization may contribute to or edit pages after their origination. Intellipedia pages should not be considered the final, coordinated position of the IC on any particular subject. The views and opinions of authors do not necessarily state or reflect those of the U.S. Government.

We conducted a search of all three levels of Intellipedia for the requested topic, and located one document that is responsive to your request. Although the enclosed document indicates an article on this topic is available on the SIPR (SECRET) level of Intellipedia, our search did not locate it. The document is enclosed. Certain information, however, has been deleted from the enclosures.

This Agency is authorized by statute to protect certain information concerning its activities (in this case, internal URLs) as well as the names of its employees. Such information is exempt from disclosure pursuant to the third exemption of the FOIA, which provides for the withholding of information specifically protected from disclosure by statute. The specific statute applicable in this case is Section 6, Public Law 86-36 (50 U.S. Code 3605). We have determined that such information exists in this record, and we have excised it accordingly.

In addition, personal information regarding individuals has been deleted from the enclosures in accordance with 5 U.S.C. 552 (b)(6). This exemption protects from disclosure information that would constitute a clearly unwarranted invasion of personal privacy. In balancing the public interest for the information you request

against the privacy interests involved, we have determined that the privacy interests sufficiently satisfy the requirements for the application of the (b)(6) exemption.

Since these deletions may be construed as a partial denial of your request, you are hereby advised of this Agency's appeal procedures. You may appeal this decision. If you decide to appeal, you should do so in the manner outlined below.

- The appeal must be in writing and addressed to:

NSA/CSS FOIA/PA Appeal Authority (P132),  
National Security Agency  
9800 Savage Road STE 6932  
Fort George G. Meade, MD 20755-6932

- It must be postmarked no later than 90 calendar days of the date of this letter.
- Please include the case number provided above.
- Please describe with sufficient detail why you believe the denial of requested information was unwarranted.
- NSA will endeavor to respond within 20 working days of receiving your appeal, absent any unusual circumstances.
- Appeals received after 90 days will not be addressed.

You may also contact our FOIA Public Liaison at [foialo@nsa.gov](mailto:foialo@nsa.gov) for any further assistance and to discuss any aspect of your request. Additionally, you may contact the Office of Government Information Services (OGIS) at the National Archives and Records Administration to inquire about the FOIA mediation services they offer. The contact information for OGIS is as follows:

Office of Government Information Services  
National Archives and Records Administration  
8601 Adelphi Rd- OGIS  
College Park, MD 20740  
[ogis@nara.gov](mailto:ogis@nara.gov)  
(877) 684-6448  
(202) 741-5770  
Fax (202) 741-5769

Sincerely,



for  
JOHN R. CHAPMAN  
Chief, FOIA/PA Office  
NSA Initial Denial Authority

Encls:  
a/s

[REDACTED]

---

**From:** donotreply@nsa.gov  
**Sent:** Tuesday, January 03, 2017 3:34 PM  
**To:** donotreply@nsa.gov  
**Subject:** FOIA Request (Web form submission)

Title: Mr.

Full Name John Greenewald

email: john@greenewald.com

Company: The Black Vault

Postal Address: [REDACTED]

Postal City: [REDACTED]

Postal State-prov: CA

Zip Code: [REDACTED]

Country: United States of America

Home Phone: [REDACTED]

Work Phone: [REDACTED]

Records Requested: To whom it may concern,

This is a non-commercial request made under the provisions of the Freedom of Information Act 5 U.S.C. S 552. My FOIA requester status as a "representative of the news media" however due to your agency's denial of this status, I hereby submit this request as an "All other" requester.

I prefer electronic delivery of the requested material either via email to john@greenewald.com, FAX 1-818-659-7688 or via CD-ROM or DVD via postal mail. Please contact me should this FOIA request should incur a charge.

I respectfully request a copy of the Intellipedia entry (from all three Wikis that make up the Intellipedia) for the following entry(s) (Or whatever similar topic may pertain if it is slightly worded differently):

Wernher VonBraun

and/or

Wernher von Braun

Thank you so much for your time, and I am very much looking forward to your response.

Sincerely,

John Greenewald, Jr.

[REDACTED]

[REDACTED]

FAX 1-818-659-7688

# (U) Wernher von Braun

UNCLASSIFIED//~~FOUO~~

(b) (3) - P.L. 86-36

From Intellipedia

You have new messages (last change).

**Wernher Magnus Maximilian Freiherr<sup>[1]</sup> von Braun** (March 23, 1912 – June 16, 1977), a German rocket physicist and astronautics engineer, became one of the leading figures in the development of rocket technology in Germany and the United States. Wernher von Braun is sometimes said to be the preeminent rocket engineer of the 20th century.<sup>[2]</sup>

In his 20s and early 30s, von Braun was the central figure in Germany's pre-war rocket development program, responsible for the design and realization of the deadly V-2 combat rocket during World War II. After the war, he and some of his rocket team were taken to the United States as part of the then-secret Operation Overcast. In 1955, ten years after entering the country, von Braun became a naturalized U.S. citizen.

Von Braun worked on the American intercontinental ballistic missile (ICBM) program before joining NASA, where he served as director of NASA's Marshall Space Flight Center and the chief architect of the Saturn V launch vehicle, the superbooster that propelled the Apollo spacecraft to the Moon.<sup>[3]</sup> He is generally regarded as the father of the United States space program, both for his technical and organizational skills, and for his public relations efforts on behalf of space flight.<sup>[4]</sup> He received the 1975 National Medal of Science.



See the Wikipedia article  
***Wernher von Braun***

## Dr. Wernher von Braun



Von Braun (with armcast) immediately after his surrender in 1945

<b>Born</b>	March 23, 1912 Wirsitz, German Empire
<b>Died</b>	June 16, 1977 (aged 65) Alexandria, Virginia, USA
<b>Cause of death</b>	Cancer
<b>Occupation</b>	German rocket engineer and designer.
<b>Spouse(s)</b>	Maria Luise von Quistorp (1947–1977)

See the SIPRNET Intellipedia page at ***Wernher von Braun*** (Configure your browser for MDDS)



## Contents

- 1 Biography
  - 1.1 Early life
  - 1.2 German career
    - 1.2.1 The Prussian rocketeer
    - 1.2.2 Slave labor
    - 1.2.3 Arrest and release by the Nazi regime

- 1.3 Surrender to the Americans
- 1.4 American career
  - 1.4.1 U.S. Army career
  - 1.4.2 Popular concepts for a human presence in space
  - 1.4.3 Concepts for orbital warfare
  - 1.4.4 NASA career
  - 1.4.5 Career after NASA
- 1.5 Death
- 2 Published works
- 3 Quotations
- 4 Honors
- 5 Posthumous recognition and critique
- 6 Cultural references
  - 6.1 On film and television
  - 6.2 In print media
  - 6.3 In novels
  - 6.4 In computer games
- 7 See also
- 8 References
  - 8.1 Notes
  - 8.2 Bibliography
- 9 Further reading
- 10 External links

## Biography

### Early life

Wernher von Braun was born in Wirsitz (Wyrzysk), Province of Posen, German Empire. He was born second of three sons. His father, the conservative civil servant Magnus Freiherr von Braun (1877–1972), although never a party politician, served as a Minister of Agriculture in the Federal Cabinet during the Weimar Republic. His mother, Emmy von Quistorp (1886–1959) could trace ancestry through both her parents to medieval European royalty. Von Braun also had a younger brother, also named Magnus Freiherr von Braun, born in 1919.<sup>[5]</sup> Upon Wernher von Braun's Lutheran confirmation, his mother gave him a telescope, and he discovered a passion for astronomy and the realm of outer space. When Wyrzysk was ceded to Poland in 1918, his family, like many other German families, moved. They settled in Berlin, where the 12-year-old von Braun, inspired by speed records established by Max Valier and Fritz von Opel,<sup>[6]</sup> caused a major disruption in a crowded street by firing off a toy wagon to which he had attached a number of fireworks. The youngster was taken into custody by the local police until his father came to collect him.

Starting in 1925, von Braun attended a boarding school at Ettersburg castle near Weimar where at first he did not do well in physics and mathematics. In 1928 his parents moved him to the Hermann-Lietz-Internat (also a residential school) on the East Frisian North Sea island of Spiekeroog, where he acquired a copy of the book *Die Rakete zu den Planetenräumen* (*The Rocket into Interplanetary Space*) by rocket pioneer Hermann Oberth. The idea of space travel had always fascinated von Braun, and from that point on he applied himself to physics

and mathematics in order to pursue his interest in rocketry.

Starting in 1930, he attended the Technical University of Berlin, where he joined the *Verein für Raumschiffahrt* (VfR, the "Spaceflight Society") and assisted Hermann Oberth in liquid-fueled rocket motor tests. He also studied at ETH Zurich. Although he worked mainly on military rockets in his later years, space travel remained his primary interest.

## German career

### The Prussian rocketeer

Von Braun was working on his creative doctorate when the National Socialist German Workers Party (NSDAP, or Nazi party) took over Germany, and rocketry almost immediately became a national agenda. An artillery captain, Walter Dornberger, arranged an Ordnance Department research grant for him, and von Braun then worked next to Dornberger's existing solid-fuel rocket test site at Kummersdorf. He was awarded a doctorate in physics<sup>[7]</sup> (aerospace engineering) on July 27, 1934 from the University of Berlin for a thesis titled *About Combustion Tests*; his doctoral advisor was Erich Schumann.<sup>[8]</sup> However, this thesis was only the public part of von Braun's work. His actual full thesis, *Construction, Theoretical, and Experimental Solution to the Problem of the Liquid Propellant Rocket* (dated April 16, 1934) was kept classified by the army, and was not published until 1960.<sup>[9]</sup> By the end of 1934, his group had successfully launched two rockets that rose to heights of 2.2 and 3.5 kilometers.

At the time, Germany was highly interested in American physicist Robert H. Goddard's research. Before 1939, German scientists occasionally contacted Goddard directly with technical questions. Wernher von Braun used Goddard's plans from various journals and incorporated them into the building of the *Aggregat 4* (A-4) series of rockets. One of the A-4 rockets is the well known V-2.<sup>[10]</sup> In 1963, von Braun reflected on the history of rocketry, and said of Goddard's work: "His rockets ... may have been rather crude by present-day standards, but they blazed the trail and incorporated many features used in our most modern rockets and space vehicles." <sup>[6]</sup> Goddard confirmed his work was used by von Braun when, after the war ended, Goddard inspected captured German V-2s, and recognized many components which he had invented.<sup>[citation needed]</sup>

There were no German rocket societies after the collapse of the VfR, and civilian rocket tests were forbidden by the new Nazi regime. Only military development was allowed and to this end, a larger facility was erected at the village of Peenemünde in northern Germany on the Baltic Sea. This location was chosen partly on the recommendation of von Braun's mother, who recalled her father's duck-hunting expeditions there. Dornberger became the military commander at Peenemünde, with von Braun as technical director. In collaboration with the Luftwaffe, the Peenemünde group developed liquid-fuel rocket engines for aircraft and jet-assisted takeoffs. They also developed the long-range A-4 ballistic missile and the supersonic Wasserfall anti-aircraft missile.

In November 1937 (other sources: December 1, 1932), von Braun joined the National Socialist German Workers Party. An Office of Military Government, United States document dated April 23, 1947 states that von Braun joined the Waffen-SS (Schutzstaffel) horseback riding school in 1933, then the National Socialist Party on May 1, 1937 and became an officer in the Waffen-SS from May 1940 until the end of the war.

Amongst his comments about his NSDAP membership von Braun has said:

I was officially demanded to join the National Socialist Party. At this time (1937) I was already technical director of the Army Rocket Center at Peenemünde ... My refusal to join the party would have meant that I would have to abandon the work of my life. Therefore, I decided to join. My



membership in the party did not involve any political activities ... in Spring 1940, one SS-Standartenführer (SS Colonel) Müller ... looked me up in my office at Peenemünde and told me that Reichsführer-SS Heinrich Himmler had sent him with the order to urge me to join the SS. I called immediately on my military superior ... Major-General W. Dornberger. He informed me that ... if I wanted to continue our mutual work, I had no alternative but to join.<sup>[citation needed]</sup>

That claim has been often disputed because in 1940, the Waffen-SS had shown no interest in Peenemünde yet. Also, the assertion that persons in von Braun's position were pressured to join the Nazi party, let alone the SS, has been disputed. Braun claimed to have worn the SS uniform only once.<sup>[11]</sup> He began as an Untersturmführer (Second Lieutenant) and was promoted three times by Himmler, the last time in June 1943 to SS-Sturmbannführer (Wehrmacht Major).

The first successful test of an A-4 missile came in October 1942: later, SS leader Himmler would rechristen the missile the V-2 (V for vengeance). On December 22, 1942, Adolf Hitler signed the order approving the production of the A-4 as a "vengeance weapon" and the group developed it to target London. Following von Braun's July 7, 1943 presentation of a color movie showing an A-4 taking off, Hitler was so enthusiastic that he personally made him a professor shortly thereafter.<sup>[12]</sup> In Germany and at this time, this was an absolutely unusual promotion for an engineer who was only 31 years old.

By now the British and Soviet intelligence agencies were aware of the rocket program and von Braun's team at Peenemünde. Over the nights of 17 and 18 August 1943 RAF Bomber Command's Operation Hydra dispatched raids on the Peenemünde camp consisting of 596 aircraft and dropping 1,800 tons of explosives.<sup>[13]</sup> The facility was salvaged and most of the science team remained unharmed, however the raids killed von Braun's engine designer Walter Thiel and Chief Engineer Walther, and the rocket program was delayed.<sup>[14][15]</sup> In 1944 three more American air raids followed. The production facilities were transferred to underground facilities of the new factory complex known as Mittelbau-Dora in the Harz Mountains; Himmler's SS tried hard to snatch the elite program from the army.

The first combat A-4s, renamed the V-2 (*Vergeltungswaffe 2* "Retaliation/Vengeance Weapon 2") for propaganda purposes, was launched toward Paris and London on September 8, 1944, only 21 months after the project had been officially commissioned. Von Braun's interest in rockets was specifically for the application of space travel, which led him to say on hearing the news from London: "The rocket worked perfectly except for landing on the wrong planet." He described it as his "darkest day".<sup>[citation needed]</sup> A total of 5,789 A-4/V-2 rockets were produced.

### **Slave labor**

SS General Hans Kammler, who as an engineer had constructed several concentration camps including Auschwitz, had a reputation for brutality and had originated the idea of using concentration camp prisoners as slave laborers in the rocket program. Arthur Rudolph, chief engineer of the V-2 rocket factory at Peenemünde, endorsed this idea in April 1943 when a labor shortage developed. More people died building the V-2 rockets than were killed by it as a weapon.<sup>[16]</sup> Von Braun admitted visiting the plant at Mittelwerk on many occasions, and called conditions at the plant "repulsive", but claimed never to have witnessed any deaths or beatings, although it had become clear to him by 1944 that deaths had occurred.<sup>[17]</sup> He denied ever having visited the Mittelbau-Dora concentration camp itself, where 20,000 died from illness, beatings, hangings and intolerable working conditions.<sup>[18]</sup>

On August 15, 1944, von Braun wrote a letter to Albin Sawatzki, manager of the V-2 production, admitting that

he personally picked labor slaves from the Buchenwald concentration camp, who, he admitted 25 years later in an interview, had been in a "pitiful shape".<sup>[3]</sup>

In *Wernher von Braun: Crusader for Space* numerous quotes from von Braun show he was aware of the conditions, but felt completely unable to change them. From a visit to Mittelwerk, von Braun is quoted by a friend:

It is 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!... I realized that any attempt of reasoning on humane grounds would be utterly futile.  
(Page 44)

When asked if von Braun could have stood up against the brutal treatment of the slave laborers, von Braun team member Konrad Dannenberg told *The Huntsville Times*, "If he had done it, in my opinion, he would have been shot on the spot."<sup>[19]</sup>

- see 2009 book **Missiles for the Fatherland: Peenemuende, National Socialism and the V-2 Missile** by Michael B. Petersen (New York: Cambridge University Press) 2009 ISBN 978-0-521-88270-5.
  - Peterson's book deals with the community of German missile builders in Peenemiinde on the island of Usedom and the myth they created about themselves and their motivations after the war, portraying themselves as victims. Peterson's book deconstructs the entire mythology of the rocketeers just "doing their duty" (as Waldheim had claimed) rather than serving the Nazi regime and its expansionist and destructive goals. The rocket scientists at Peenemunde (and later at the relocated production facility Dora-Mittelbau) "thoroughly enmeshed themselves in the structures and practices of the National Socialist regime." None of them questioned the central mission of producing missiles for the purpose of defending the Nazi state. The Peenemünders saw themselves as the saviors of Germany by building the weapons that would save Europe from the Soviets and exert revenge on the British for their terror attacks on German cities.

## Arrest and release by the Nazi regime

According to André Sellier, a French historian and survivor of the Mittelbau-Dora concentration camp, Himmler had von Braun come to his Hochwald HQ in East Prussia sometime in February 1944. To increase his power-base within the Nazi régime, Heinrich Himmler was conspiring to use Kammler to wrest control of all German armament programs, including the V-2 program at Peenemünde. He therefore recommended that von Braun work more closely with Kammler to solve the problems of the V-2, but von Braun claimed to have replied that the problems were merely technical and he was confident that they would be solved with Dornberger's assistance.

Apparently von Braun had been under Sicherheitsdienst (SD) surveillance since October 1943. A report stated that he and his colleagues Klaus Riedel and Helmut Gröttrup were said to have expressed regret at an engineer's house one evening that they were not working on a spaceship and that they felt the war was not going well; this was considered a "defeatist" attitude. A young female dentist had denounced them for their comments. Combined with Himmler's false charges that von Braun was a Communist sympathizer and had attempted to sabotage the V-2 program, and considering that von Braun was a qualified pilot who regularly piloted his government-provided airplane that might allow him to escape to England, this led to his arrest by the Gestapo. Kammler, highly dedicated to Himmler, is thought to have been instrumental in these activities.

The unsuspecting von Braun was detained on March 14 (or March 15)<sup>[20]</sup>, 1944 and was taken to a Gestapo cell in Stettin (now Szczecin, Poland), where he was imprisoned for two weeks without even knowing the charges against him. It was only through the Abwehr in Berlin that Dornberger was able to obtain von Braun's conditional release and Albert Speer, Reichsminister for Munitions and War Production, convinced Hitler to reinstate von Braun so that the V-2 program could continue. Citing from the "Führerprotokoll" (the minutes of Hitler's meetings) dated May 13, 1944 in his memoirs, Speer later relayed what Hitler had finally conceded: "In the matter concerning B. I will guarantee you that he will be exempt from persecution as long as he is indispensable for you, in spite of the difficult general consequences this will have."

## **Surrender to the Americans**

The Soviet Army was about 160 km from Peenemünde in the spring of 1945 when von Braun assembled his planning staff and asked them to decide how and to whom they should surrender. Afraid of Soviet cruelty to prisoners of war, von Braun and his staff decided to try to surrender to the Americans. Kammler had ordered relocation of von Braun's team into central Germany; however, a conflicting order from an army chief ordered them to join the army and fight. Deciding that Kammler's order was their best bet to defect to the Americans, von Braun fabricated documents and transported 500 of his affiliates to the area around Mittelwerk, where they resumed their work. For fear of their documents being destroyed by the SS, von Braun ordered the blueprints to be hidden in an abandoned mine shaft in the Harz mountain range.<sup>[21]</sup>

While on an official trip in March, von Braun suffered a complicated fracture of his left arm and shoulder after his driver fell asleep at the wheel. His injuries were serious, but he insisted that his arm be set in a cast so he could leave the hospital. Due to this neglect of the injury he had to be hospitalized again a month later where his bones had to be re-broken and re-aligned.<sup>[21]</sup>

In April, as the allied forces advanced deeper into Germany, Kammler ordered the science team to be moved by train into the town of Oberammergau in the Bavarian Alps where they were closely guarded by the SS with orders to execute the team if they were about to fall into enemy hands. However, von Braun managed to convince SS Major Kummer to order the dispersion of the group into nearby villages so that they would not be an easy target for U.S. bombers.<sup>[21]</sup>

On May 2, 1945, upon finding an American private from the U.S. 44th Infantry Division, von Braun's brother and fellow rocket engineer, Magnus, approached the soldier on a bicycle, calling out in broken English: "My name is Magnus von Braun. My brother invented the V-2. We want to surrender."<sup>[5][22]</sup>

The American high command was well aware of how important their catch was: von Braun had been at the top of the *Black List*, the code name for the list of German scientists and engineers targeted for immediate interrogation by U.S. military experts. On June 19, 1945, two days before the scheduled handover of the area to the Soviets, US Army Major Robert B. Staver, Chief of the Jet Propulsion Section of the Research and Intelligence Branch of the US Army Ordnance in London, and Lt Col R. L. Williams took von Braun and his department chiefs by jeep from Garmisch to Munich. The group was flown to Nordhausen, and was evacuated 40 miles southwest to Witzenhausen, a small town in the American Zone, the next day.<sup>[23]</sup> Von Braun was subsequently recruited to the U.S. under Operation Overcast.

## **American career**

### **U.S. Army career**

On June 20, 1945, U.S. Secretary of State Cordell Hull approved the transfer of von Braun and his specialists to America; however this was not announced to the public until October 1, 1945.<sup>[24]</sup> Since the paperwork of those Germans selected for transfer to the United States was indicated by paperclips, the transfer of von Braun and his colleagues became known as Operation Paperclip, an operation that resulted in the employment of many German scientists by the U.S. Army.<sup>[25]</sup>

The first seven technicians arrived in the United States at New Castle Army Air Field, just south of Wilmington, Delaware, on September 20, 1945. They were then flown to Boston and taken by boat to the Army Intelligence Service post at Fort Strong in Boston Harbor. Later, with the exception of von Braun, the men were transferred to Aberdeen Proving Ground in Maryland to sort out the Peenemünde documents, enabling the scientists to continue their rocketry experiments.

Finally, von Braun and his remaining Peenemünde staff were transferred to their new home at Fort Bliss, Texas, a large Army installation just north of El Paso. While there, they trained military, industrial and university personnel in the intricacies of rockets and guided missiles. As part of the Hermes project they helped to refurbish, assemble and launch a number of V-2s that had been shipped from Germany to the White Sands Proving Grounds in New Mexico. They also continued to study the future potential of rockets for military and research applications. Since they were not permitted to leave Fort Bliss without military escort, von Braun and his colleagues began to refer to themselves only half-jokingly as "PoPs", "Prisoners of Peace".

During his stay at Fort Bliss, von Braun mailed a marriage proposal to 18-year-old Maria Luise von Quistorp, his cousin on his mother's side. On March 1, 1947, having received permission to go back to Germany and return with his bride, he married her in a Lutheran church in Landshut, Germany. He and his bride and his father and mother returned to New York on March 26, 1947. On 9 December 1948, the von Brauns' first daughter, Iris Careen, was born at Fort Bliss Army Hospital. The von Brauns eventually had two more children, Margrit Cécile on May 8, 1952 and Peter Constantine on June 2, 1960. On April 15, 1955, von Braun became a naturalized citizen of the United States.

In 1950, at the start of the Korean War, von Braun and his team were transferred to Huntsville, Alabama, his home for the next twenty years. Between 1950 and 1956, von Braun led the Army's rocket development team at Redstone Arsenal, resulting in the Redstone rocket, which was used for the first live nuclear ballistic missile tests conducted by the United States.

As director of the Development Operations Division of the Army Ballistic Missile Agency (ABMA), von Braun, with his team, then developed the Jupiter-C, a modified Redstone rocket.<sup>[26]</sup> The Jupiter-C successfully launched the West's first satellite, Explorer 1, on January 31 1958. This event signaled the birth of America's space program.

Despite the work on the Redstone rocket, the twelve years from 1945 to 1957 were probably some of the most frustrating for von Braun and his colleagues. In the Soviet Union, Sergei Korolev and his team of scientists and engineers plowed ahead with several new rocket designs and the Sputnik program, while the American government was not very interested in von Braun's work or views and only embarked on a very modest rocket-building program. In the meantime, the press tended to dwell on von Braun's past as a member of the SS and the slave labor used to build his V-2 rockets.

### **Popular concepts for a human presence in space**

Repeating the pattern he had established during his earlier career in Germany, von Braun – while directing military rocket development in the real world – continued to entertain his engineer-scientist's dream of a future world in which rockets would be used for space exploration. However, instead of risking being sacked, he now

was increasingly in a position to popularize these ideas. The May 14, 1950 headline of *The Huntsville Times* ("Dr. von Braun Says Rocket Flights Possible to Moon") *might have marked the beginning of these efforts*. In 1952, von Braun first published his concept of a manned space station in a *Collier's Weekly* magazine series of articles entitled *Man Will Conquer Space Soon!* *These articles were illustrated by the space artist Chesley Bonestell and were influential in spreading his ideas. Frequently von Braun worked with fellow German-born space advocate and science writer Willy Ley to publish his concepts which, unsurprisingly, were heavy on the engineering side and anticipated many technical aspects of space flight that later became reality.*

The space station (to be constructed using rockets with recoverable and reusable ascent stages) would be a toroid structure, with a diameter of 250 feet (76 m), would spin around a central docking nave to provide artificial gravity, and would be assembled in a 1,075 miles (1,730 km) two-hour, high-inclination Earth orbit allowing observation of essentially every point on earth on at least a daily basis. (More than a decade later, the movie version of *2001: A Space Odyssey* would draw heavily on this design concept in its visualization of the orbital space station.) The ultimate purpose of the space station would be to provide an assembly platform for manned lunar expeditions.

Von Braun envisaged these expeditions as very large-scale undertakings, with a total of 50 astronauts travelling in three huge spacecraft (two for crew, one primarily for cargo), each 49 m long and 33 m in diameter and driven by a rectangular array of 30 jet propulsion engines.<sup>[27]</sup> Upon arrival, astronauts would establish a permanent lunar base in the Sinus Roris region by using the emptied cargo holds of their craft as shelters, and would explore their surroundings for eight weeks. This would include a 400 km expedition in pressurized rovers to the Harpalus crater and the Mare Imbrium foothills.

At this time von Braun also worked out preliminary concepts for a manned Mars mission which used the space station as a staging point. His initial plans, published in *The Mars Project* (1952), had envisaged a fleet of ten spacecraft (each with a mass of 3,720 metric tons), three of them unmanned and each carrying one 200-ton winged lander<sup>[28]</sup> in addition to cargo, and nine crew vehicles transporting a total of 70 astronauts. Gigantic as this mission plan was, its engineering and astronautical parameters were thoroughly calculated. A later project was much more modest, using only one purely orbital cargo ship and one crewed craft. In each case, the expedition would use minimum-energy Hohmann transfer orbits for its trips to Mars and back to Earth.

Before technically formalizing his thoughts on human spaceflight to Mars, von Braun had written a science fiction novel, set in 1980, on the subject. According to his biographer, Erik Bergaust, the manuscript was rejected by no less than 18 publishers. Von Braun later published small portions of this opus in magazines, to illustrate selected aspects of his Mars project popularizations. The complete manuscript did not appear as a printed book until December 2006.<sup>[29]</sup>

In the hope that its involvement would bring about greater public interest in the future of the space program, von Braun also began working with Walt Disney and the Disney studios as a technical director, initially for three television films about space exploration. The initial broadcast devoted to space exploration was *Man in Space*, which first went on air on March 9, 1955.

### Concepts for orbital warfare

Von Braun developed and published his space station concept during the very "coldest" time of the Cold War, when the U.S. government for which he worked put the containment of the Soviet Union above everything else. The fact that his space station – if armed with missiles that could be easily adapted from those already available at this time – would give the United States space superiority in both orbital and orbit-to-ground warfare did not escape him. Although von Braun took care to qualify such military applications as "particularly dreadful" in his



popular writings, he elaborated on them in several of his books and articles. This much less peaceful aspect of von Braun's "drive for space" has recently been reviewed by Michael J. Neufeld from the Space History Division of the National Air and Space Museum in Washington.<sup>[30]</sup>

## NASA career

The U.S. Navy had been tasked with building a rocket to lift satellites into orbit, but the resulting Vanguard rocket launch system was unreliable. In 1957, with the launch of Sputnik 1, there was a growing perception within the United States that America lagged behind the Soviet Union in the emerging Space Race. American authorities then chose to utilize von Braun and his German team's experience with missiles to create an orbital launch vehicle.

NASA was established by law on July 29, 1958. One day later, the 50th Redstone rocket was successfully launched from Johnston Atoll in the south Pacific as part of Operation Hardtack. Two years later, NASA opened the new Marshall Space Flight Center at Redstone Arsenal in Huntsville, Alabama, and the ABMA development team led by von Braun was transferred to NASA. In a face-to-face meeting with Herb York at the Pentagon, von Braun made it clear he would go to NASA only if development of the Saturn was allowed to continue.<sup>[31]</sup> Presiding from July 1960 to February 1970, von Braun became the center's first Director.



Congressman Gerald Ford, MSFC director **Wernher von Braun**, Congressman George H. Mahon, and NASA Administrator James E. Webb visit the Marshall Space Flight Center for a briefing on the Saturn program, 1964

The Marshall Center's first major program was the development of Saturn rockets to carry heavy payloads into and beyond Earth orbit. From this, the Apollo program for manned moon flights was developed. Wernher von Braun initially pushed for a flight engineering concept that called for an Earth orbit rendezvous technique (the approach he had argued for building his space station), but in 1962 he converted to the more risky lunar orbit rendezvous concept that was subsequently realized.<sup>[32]</sup> His dream to help mankind set foot on the Moon became a reality on July 16, 1969 when a Marshall-developed Saturn V rocket launched the crew of *Apollo 11* on its historic eight-day mission. Over the course of the program, Saturn V rockets enabled six teams of astronauts to reach the surface of the Moon.

During the late 1960s, von Braun played an instrumental role in the development of the U.S. Space & Rocket Center in Huntsville. The desk from which he guided America's entry in the Space Race remains on display there.

During the local summer of 1966/67, von Braun participated in a field trip to Antarctica, organized for him and several other members of top NASA management.<sup>[33]</sup> ([2] (<http://history.msfc.nasa.gov/vonbraun/photo/13.html>) Photo of von Braun at South Pole]) The goal of the field trip was to determine whether the experience gained by US scientific and technological community during the exploration of Antarctic wastelands would be useful for the manned exploration of space. Von Braun was mainly interested in management of the scientific effort on Antarctic research stations, logistics, habitation and life support, and in using the barren Antarctic terrain like the glacial dry valleys to test the equipment that one day would be used to look for signs of life on Mars and other worlds.

In an internal memo dated January 16, 1969<sup>[34]</sup> von Braun had confirmed to his staff that he would stay on as a Center Director at Huntsville to head the Apollo Applications Program. A few months later, on occasion of the first moon-landing, he publicly expressed his optimism that the Saturn V carrier system would continue to be developed, advocating manned missions to Mars in the 1980s<sup>[35]</sup>

However, on March 1, 1970, von Braun and his family relocated to Washington, D.C., when he was assigned the post of NASA's Deputy Associate Administrator for Planning at NASA Headquarters. After a series of conflicts associated with the truncation of the Apollo program, and facing severe budget constraints, von Braun retired from NASA on May 26, 1972. Not only had it become evident by this time that his and NASA's visions for future U.S. space flight projects were incompatible; it was perhaps even more frustrating for him to see popular support for a continued presence of man in space wane dramatically once the goal to reach the moon had been accomplished.

### **Career after NASA**

After leaving NASA, von Braun became Vice President for Engineering and Development at the aerospace company, Fairchild Industries in Germantown, Maryland on July 1, 1972.

In 1973 a routine health check uncovered kidney cancer which during the following years could not be controlled by surgery.<sup>[36]</sup> Von Braun continued his work to the degree possible, which included accepting invitations to speak at colleges and universities as he was eager to cultivate interest in human spaceflight and rocketry, particularly with students and a new generation of engineers. On one such visit in the spring of 1974 to Allegheny College, von Braun revealed a more personal, down-to-earth side of himself as a man in his early 60s, beyond the public persona most saw, including an all-too-human allergy to feather pillows and a subtle, if not humorous disdain for some rock music of the era.

Von Braun helped establish and promote the National Space Institute, a precursor of the present-day National Space Society, in 1975, and became its first president and chairman. In 1976, he became scientific consultant to Lutz Kayser, the CEO of OTRAG, and a member of the Daimler-Benz board of directors. However, his deteriorating condition forced him to retire from Fairchild on December 31 1976. When the 1975 National Medal of Science was awarded to him in early 1977 he was hospitalized, and unable to attend the White House ceremony.

### **Death**

On June 16, 1977, Wernher von Braun died of colon cancer in Alexandria, Virginia at the age of 65.<sup>[37][38]</sup> He was buried at the Ivy Hill Cemetery in Alexandria, Virginia.<sup>[39]</sup>

### **Published works**

- *The Mars Project*, Urbana, University of Illinois Press, (1953).

With Henry J. White, translator.

- *First Men to the Moon*, Holt, Rinehart and Winston, New York (1958).

Portions of work first appeared in *This Week Magazine*.

- *History of Rocketry & Space Travel*, New York, Crowell (1975). With

Frederick I. Ordway III.

- *The Rocket's Red Glare*, Garden City, N.Y.: Anchor Press, (1976).

With Frederick I. Ordway III.

- *Project Mars: A Technical Tale*, Apogee Books, Toronto (2006). A

previously unpublished science fiction story by Dr. von Braun. Accompanied by paintings from Chesley Bonestell and von Braun's own technical papers on the proposed project.

- *The Voice of Dr. Wernher von Braun*, Apogee Books, Toronto (2007). A

collection of speeches delivered by von Braun over the course of his career.

## Quotations

Upon surrendering with his rocket team to the Americans in 1945: "We knew that we had created a new means of warfare, and the question as to what nation, to what victorious nation we were willing to entrust this brainchild of ours was a moral decision more than anything else. We wanted to see the world spared another conflict such as Germany had just been through, and we felt that only by surrendering such a weapon to people who are guided by the Bible could such an assurance to the world be best secured."<sup>[40]</sup>

"All of man's scientific and engineering efforts will be in vain unless they are performed and utilized within a framework of ethical standards commensurate with the magnitude of the scope of the technological revolution. The more technology advances, the more fateful will be its impact on humanity."

"Scientific concepts exist only in the minds of men. Behind these concepts lies the reality which is being revealed to us, but only by the grace of God."

"If the world's ethical standards fail to rise with the advances of our technological revolution, the world will go to hell. Let us remember that in the horse-and-buggy days nobody got hurt if the coachman had a drink too many. In our times of high-powered automobiles, however, that same drink may be fatal...."<sup>[41]</sup>

On Adolf Hitler: "I began to see the shape of the man – his brilliance, the tremendous force of personality. It gripped you somehow. But also you could see his flaw — he was wholly without scruples, a godless man who thought himself the only god, the only authority he needed."<sup>[42]</sup>

## Honors

- Knight Cross of the War Merit Cross in 1944
- Elected Honary Fellow of the British Interplanetary Society

in 1949<sup>[43]</sup>

- Deutsches Bundesverdienstkreuz in 1959
- Smithsonian Institution Langley Medal in 1967
- NASA Distinguished Service Medal in 1969
- National Medal of Science in 1975
- Werner-von-Siemens-Ring in 1975
- Civitan International World Citizenship Award<sup>[44]</sup>



## Posthumous recognition and critique

- Apollo space program director Sam Phillips was quoted as saying that he did not think that America would have reached the moon as quickly as it did without von Braun's help. Later, after discussing it with colleagues, he amended this to say that he did not believe America would have reached the moon at all.
- The von Braun crater on the moon was so named by the International Astronomical Union in recognition of von Braun's contribution to space exploration and technology.
- Von Braun received a total of 12 honorary doctorates, among them (on January 8, 1963) one from the Technical University of Berlin from which he had graduated.
- Von Braun was responsible for the creation of the Research Institute at The University of Alabama in Huntsville. As a result of his vision, the university is one of the leading universities in the nation for NASA-sponsored research. The building housing the university's Research Institute was named in his honor, Von Braun Research Hall, in 2000.
- Several German cities (Bonn, Neu-Isenburg, Mannheim, Mainz), and dozens of smaller towns have named streets after Wernher von Braun.
- The Von Braun Center (built 1975) in Huntsville, Alabama is named in von Braun's honor.
- Scrutiny of von Braun's use of forced labor at the *Mittelwerk* intensified again in 1984 when Arthur Rudolph, one of his top affiliates from the A-4/V2 through to the Apollo projects, left the United States and was forced to renounce his citizenship in front of the alternative of being tried for war crimes.<sup>[45]</sup>
- A science- and engineering-oriented Gymnasium in Friedberg, Bavaria was named after Wernher von Braun in 1979. In response to rising criticism, a school committee decided in 1995, after lengthy deliberations, to keep the name but "*to address von Braun's ambiguity in the advanced history classes.*"
- An avenue in the Annadale section of Staten Island, NY was named for him in 1977.

## Cultural references

### On film and television

Wernher von Braun has been featured in a number of movies and television shows or series about the Space Race:

- *I Aim at the Stars* (1960), also titled *Wernher von Braun*

and *Ich greife nach den Sternen* ("I reach for the stars"): von Braun played by Curd Jürgens). Satirist Mort Sahl suggested the subtitle "(But Sometimes I Hit London)".

- *Dr. Strangelove or: How I Learned to Stop Worrying and Love the Bomb* (1964): Dr Strangelove is usually held to be based at least

partly on von Braun.<sup>[46]</sup>

- *Mababangong Bangungot (Perfumed Nightmare)* (1977): Director

and star Kidlat Tahimik is president of a Wernher von Braun club and is fascinated with "First World" progress, particularly von Braun's efforts in the U.S. space program.

- *Mobile Suit Gundam* (1979): The largest Lunar city in the

Universal Century era is called 'Von Braun City'. The city is the home of Anaheim Electronics, is a strategic point in space, and is built around Neil Armstrong's footprint in the Apollo missions.

- *The Right Stuff* (1983): The Chief

Scientist, played by Scott Beach, was clearly modeled on von Braun.

- *From the Earth to the Moon*

(TV, 1998): von Braun played by Norbert Weisser.

- *October Sky* (1999): In this film about American rocket

scientist Homer Hickam, who as a teenager admired von Braun, the scientist is played by Joe Digaetano.

- *Space Race* (TV, BBC co-production with

NDR (Germany), Channel One TV (Russia) and National Geographic TV (USA), 2005): von Braun played by Richard Dillane.

- *Alphaville, une étrange aventure de Lemmy Caution* (1965,

directed by Jean-Luc Godard): Howard Vernon plays Professor Von Braun (also known as Leonard Nosferatu), the inventor of the "Alpha 60" super-computer which rules Alphaville.

- "Race to Space" (2001) James Woods portrays a character that the

film's director states was "clearly modeled" after von Braun, working on the Mercury program sending the first chimp "Ham" (renamed Mac) into space.<sup>[citation needed]</sup>

- *Planetes* (TV, 2004): There is an upcoming exploratory mission

to Jupiter on a new fusion powered ship, the *Von Braun*.

- *Alien Planet* (TV, 2005): A spacecraft, named *[[VonBraun*

(*Alien Planet*)]*VonBraun*], is named after him.

- *Wernher von Braun - Rocket Man for War and Peace* (<http://www.dw-world.de/dw/episode/0,2144,2617731,00.html>) A three part

(part1 (<http://www.dw-world.de/dw/episode/0,2144,2617731,00.html>) , part 2 (<http://www.dw-world.de/dw/episode/0,2144,2617732,00.html>) , part 3 (<http://www.dw-world.de/dw/episode/0,2144,2617733,00.html>) ) documentary - in English - from the German International channel DW-TVDW-TV. (<http://www.dw-world.de/dw/0,,266,00.html>) Original German version Wernher von Braun - Der Mann für die Wunderwaffen

(<http://www.mdr.de/doku/archiv/geschichte/109389.html>) by the Mitteldeutscher Rundfunk.

## In print media

- In an issue of *Mad Magazine* in the late 1950s, artist Wallace Wood

depicted von Braun at the launch of a rocket, ready to listen to a radio transmitting the rocket's signals. Suddenly he says, "HIMMEL! Was ist los?" and then explains, "Vat iss wrong is vit der RADIO! It iss AC...und der control room iss DC!"

- In Warren Ellis' graphic novel *Ministry of Space*, Von Braun

is a supporting character, settling in Britain after World War II, and being essential for the realization of the British Space Program.

## In novels

- *The Good German* by Joseph Kanon. Von Braun and other scientists

are said to have been implicated in the use of slave labour at Peenemünde; their transfer to the US forms part of the narrative.

- *Space* by James Michener. Von Braun and other

German scientists are brought to the US and form a vital part of the US efforts to reach space.

- *Gravity's Rainbow* by Thomas Pynchon. The plot involves British

intelligence attempting to avert and predict V-2 rocket attacks. The work even includes a gyroscopic equation for the V2. The first portion of the novel, "Beyond The Zero", begins with a quote from Von Braun: "Nature does not know extinction; all it knows is transformation. Everything science has taught me, and continues to teach me, strengthens my belief in the continuity of our spiritual existence after death."

- *New Dictionary*, a short story by Kurt Vonnegut in his collection

*Welcome to the Monkey House* notes Von Braun as one of the things an old dictionary doesn't mention.

- *Mother Night* by Kurt Vonnegut has a scene in which a

character reads a *Life* magazine with Von Braun on the cover.

## In computer games

- In the 1999 PC game *System Shock 2*, the

main starship is named the *Von Braun*.

## See also

- Robert Goddard

## References

### Notes

1. ↑ {{ German title Freiherr }}
2. ↑ [<http://www.archives.gov/locations/calendar/08-january.pdf> From the SS to Citizenship to the Moon: von Braun's Odyssey] (PDF). *The National Archives in the Regions. National Archives and Records Administration (January 2008)*.
3. ↑ <sup>3.0</sup> <sup>3.1</sup> Biography of Wernher Von Braun (<http://history.msfc.nasa.gov/vonbraun/bio.html>) . *MSFC History Office. NASA Marshall Space Flight Center*.
4. ↑ <http://earthobservatory.nasa.gov/Library/Giants/vonBraun/>
5. ↑ <sup>5.0</sup> <sup>5.1</sup> Spires, Shelby G., "Von Braun's brother dies; aided surrender", *The Huntsville Times*, 2003-06-27, p. 1A.
6. ↑ <sup>6.0</sup> <sup>6.1</sup> Recollections of Childhood: Early Experiences in Rocketry as Told by Werner Von Braun 1963 (<http://history.msfc.nasa.gov/vonbraun/recollect-childhood.html>) . *MSFC History Office. NASA Marshall Space Flight Center*.
7. ↑ [1] (<http://www.astronautix.com/astros/vonbraun.htm>)
8. ↑ Neufeld, Michael J. *Von Braun: Dreamer of Space. Engineer of War* (Knopf, 2007) p. 61.
9. ↑ Konstruktive, theoretische und experimentelle Beiträge zu dem Problem der Flüssigkeitsrakete. *Raketentechnik und Raumfahrtforschung*, Sonderheft 1 (1960), Stuttgart, Germany
10. ↑ Template:ScienceWorldBiography
11. ↑ Wernher von Braun in SS uniform (<http://www.reformation.org/wernher-von-braun.html>) . *The Reformation Online*.
12. ↑ Speer, Albert (1969). *Erinnerungen* (p. 377). Verlag Ullstein GmbH, Frankfurt a.M. and Berlin, [ISBN 3-550-06074-2]
13. ↑ "Peenemunde, 17 and 18 August 1943 (<http://www.raf.mod.uk/bombercommand/peenemunde.html>) ". *RAF History - Bomber Command*. Royal Air Force. Retrieved on 2006-11-15.
14. ↑ Middlebrook, Martin (1982). *The Peenemünde Raid: The Night of 17-18 August 1943*. New York: Bobs-Merrill, 222.
15. ↑ Dornberger, Walter (1952 -- US translation V-2 Viking Press:New York, 1954). *V2--Der Schuss ins Weltall*. Esslingen: Bechtle Verlag, 164.
16. ↑ Mittelbau Overview (<http://www.v2rocket.com/start/chapters/mittel.html>)
17. ↑ Excerpts from "Power to Explore" (<http://history.msfc.nasa.gov/vonbraun/excerpts.html>) . *MSFC History Office. NASA Marshall Space Flight Center*.
18. ↑ Jaroff, Leon, "The Rocket Man's Dark Side (<http://www.time.com/time/columnist/jaroff/article/0,9565,220201,00.html>) ", *Time*, 2002-03-26. URL accessed on 2008-06-29.
19. ↑ Roop, Lee, "Aide says von Braun wasn't able to stop slave horrors: Objection would have gotten rocket pioneer shot, Dannenberg says", *The Huntsville Times*, 2002-10-04.
20. ↑ [<http://history.msfc.nasa.gov/vonbraun/highlights.html> Highlights in German Rocket Development from 1927-1945]. *MSFC History Office. NASA Marshall Space Flight Center*.
21. ↑ <sup>21.0</sup> <sup>21.1</sup> <sup>21.2</sup> [[Deborah Cadbury|Cadbury, Deborah]] (2005). *"Space Race"*. [[BBC Worldwide Limited]].
22. ↑ McDougall, Walter A. (1985). ...*The Heavens and the Earth: A Political History of the Space Age*. New York: Basic Books.
23. ↑ McGovern, J (1964). *Crossbow and Overcast*. New York: W. Morrow, p182.
24. ↑ Outstanding German Scientists Being Brought to U.S. (<http://www.v2rocket.com/start/chapters/paperclip.gif>) . *War Department press release. V2Rocket.com (1945-10-01)*.
25. ↑ Operation Paperclip Casefile ([http://www.conspiracyarchive.com/NWO/project\\_paperclip.htm](http://www.conspiracyarchive.com/NWO/project_paperclip.htm)) . *Conspiracy Archive* (1997-08-08). Retrieved on 2008-05-20.
26. ↑ "Reach for the Stars (<http://www.time.com/time/magazine/article/0,9171,862899-1,00.html>) ", *TIME Magazine*, 1958-02-17.
27. ↑ Woodfill, Jerry. [<http://er.jsc.nasa.gov/seh/lunarlan.html> Gallery of Wernher von Braun Moonship Sketches]. *The Space Educator's Handbook*. NASA Johnson Space Center.
28. ↑ Woodfill, Jerry. Gallery of Wernher von Braun Mars Exploration Sketches (<http://er.jsc.nasa.gov/seh/vonlift.html>) . *The Space Educator's Handbook. NASA Johnson Space Center*.
29. ↑ von Braun, Wernher: Project MARS: A Technical Tale. ISBN-10: 0973820330, ISBN-13: 978-0973820331)

30. ↑ Neufeld MJ: "Space superiority": Wernher von Braun's campaign for a nuclear-armed space station, 1946–1956. *Space Policy* 2006; 22:52–62.
31. ↑ Stages to Saturn - The Saturn Building Blocks - THE ABMA TRANSFER (<http://history.nasa.gov/SP-4206/ch2.htm>) . NASA.
32. ↑ [<http://history.nasa.gov/Apollo6/apollo6.pdf> Concluding Remarks by Dr. Wernher von Braun about Mode Selection for the Lunar Landing Program] (PDF). *Lunar Orbit Rendezvous File*. NASA Historical Reference Collection (1962-06-07).
33. ↑ Space Man's Look at Antarctica. *Popular Science*, Vol. 190, No. 5, May 1967, pp. 114-116.
34. ↑ von Braun, Wernher (1969-01-16). Adjustment to Marshall Organization, Announcement #4 . *MSFC History Office*. NASA Marshall Space Flight Center.
35. ↑ "Next, Mars and Beyond (<http://www.time.com/time/magazine/article/0,9171,901107,00.html>) ", *Time (magazine)*, July 25, 1969. URL accessed on 2007-06-21.
36. ↑ German sources mostly specify the cancer as renal, while American biographies unanimously just mention cancer. The time when von Braun learned about the disease is generally given as between 1973 and 1976. The characteristics of renal cell carcinoma, which has a bad prognosis even today, do not rule out either time limit.
37. ↑ "Von Braun, Who Helped Put Men on Moon, Dies at 65: German-Born Scientist Succumbs to Cancer of Colon; Was Pioneer in Space Rocket Technology", *Los Angeles Times*, 1977-06-17, p. A2.
38. ↑ "Wernher von Braun, Rocket Pioneer, Dies; Wernher von Braun, Pioneer in Space Travel and Rocketry. Dies at 65". *New York Times*, 1977-06-18. URL accessed on 2007-06-21.
39. ↑ Dr. Wernher von Braun (<http://www.findagrave.com/cgi-bin/fg.cgi?page=gr&GSln=Von+braun&GScid=50747&GRid=4323&>) . *Find A Grave*. Retrieved on 2008-08-09.
40. ↑ David Wolper, television series, *Biography* (1961-64), *Wernher von Braun*.
41. ↑ Eric Bergaust, *Wernher von Braun* (Washington, D.C.: National Space Institute, 1976), p. 166
42. ↑ Bergaust, *ibid.*, p. 62.
43. ↑ "Prof Dr Wernher Von Braun", *Journal of the British Interplanetary Society* March 1950 vol 9 No.2, 1950
44. ↑ Armbruster, Margaret E. (1992). *The Civitan Story*. Birmingham, AL: Ebsco Media, 95.
45. ↑ William E., Sr. Winterstein Secrets Of The Space Age: The Sacrifices and Struggles To Get To The Moon: The Aftermath: What Happened After Lunar Mission, Intrigue and United States Space Heroes Betrayed (Hardcover) Robert D. Reed Publishers June 30, 2005 ISBN 1931741492
46. ↑ Neufeld, *Von Braun*, p. 406. Dr Strangelove was widely held to be a composite of Edward Teller, Herman Kahn, and von Braun; but only von Braun shared Strangelove's Nazi past.

## Bibliography

- Bergaust, Erik (1976), *Wernher von Braun: The authoritative and definitive biographical profile of the father of modern space flight (Hardcover)*, National Space Institute (1976), ISBN 0917680014
- Bilstein, Roger E. (2003), *Stages to Saturn: A Technological History of the Apollo/Saturn Launch Vehicles (Paperback)*, University

Press of Florida (July 2003), ISBN 0813026911

- Crouch, Tom D. (1999), *Aiming for the Stars: The Dreamers and Doers of the Space Age (Hardcover)*, Smithsonian (September 17,

1999), ISBN 1560983868

- Dunar, Andrew J & Waring, Stephen P (1999), *Power to Explore: a History of Marshall Space Flight Center, 1960–1990*, Washington, DC: United States Government Printing Office, ISBN 0-16-058992-4 Available electronically at

<http://history.msfc.nasa.gov/book/toc.html>

- Eisfeld, Rainer (2000), *Mondsüchtig*, Hamburg: Rohwolt, ISBN 3-499-60943-6

- Erlebnisbericht Adam Cabala, in: Fiedermann, Heß, Jaeger: Das KZ Mittelbau Dora. Ein historischer Abriss. Berlin 1993, S.100
- Freeman, Marsha (1993), *How we got to the Moon: The Story of the German Space Pioneers (Paperback)*, 31st Century Science Associates (October 1993), ISBN 0962813419
- Lasby, Clarence G (1971), *Project Paperclip: German Scientists and the Cold War*, New York, NY: Atheneum, ISBN B0006CKBHY
- Neufeld, Michael J (1994), *The Rocket and the Reich: Peenemünde and the Coming of the Ballistic Missile Era*, New York: Free Press, ISBN 0-02-922895-6
- Neufeld, Michael J (2007), *Von Braun: Dreamer of Space, Engineer of War*, New York: Alfred A. Knopf, ISBN 978-0-307-26292-9
- Ordway, Frederick I., III (2003), *The Rocket Team: Apogee Books Space Series 36 (Apogee Books Space Series) (Hardcover)*, Collector's Guide Publishing Inc; Har/DVD edition (September 1, 2003), ISBN 1894959000
- Sellier, André (2003), *A History of the Dora Camp: The Untold Story of the Nazi Slave Labor Camp That Secretly Manufactured V-2 Rockets*, Chicago, IL: Ivan R Dee, ISBN 1-56663-511-X
- Stuhlinger, Ernst (1996), *Wernher von Braun: Crusader for Space*, Malabar, FL: Krieger Publishing Company, ISBN 0-89464-980-9
- Tompkins, Phillip K. (1993), *Organizational Communication Imperatives: Lessons of the Space Program (Paperback)*, Roxbury Publishing

Company (1993), ISBN 0935732403

- Ward, Bob (2005), *Dr. Space: The Life of Wernher von Braun*, Annapolis, MD: Naval Institute Press, ISBN 1-59114-926-6
- Template:ScienceWorldBiography
- Willhite, Irene E. (Editor) (2007), *The Voice of Dr. Wernher von Braun: An Anthology (Apogee Books Space Series) (Paperback)*, Collector's Guide Publishing, Inc. (May 1, 2007), ISBN 1894959647
- Winterstein, William E., Sr. (2005), *Secrets Of The Space Age: The Sacrifices and Struggles To Get To The Moon: The Aftermath: What Happened After Lunar Mission, Intrigue and United States Space Heroes Betrayed (Hardcover)*, Robert D. Reed Publishers (June 30, 2005), ISBN 1931741492

## Further reading

- Neufeld, Michael J. (2007). *Von Braun: Dreamer of Space. Engineer of War*. Knopf.
- Biddle, Wayne (2009). *Dark Side of the Moon: Wernher von Braun, the Third Reich & the Space Race*. W.W. Norton.

**Dark Side of the Moon** does not pretend to offer a full-length biography of Von Braun. It is essentially an essay with only 152 pages of actual text, focusing on the Nazi question and Biddle's views of von Braun's culpability in Nazi crimes related to the V-2 rocket program, and his moral inadequacy. Biddle explains in his introduction that he stops in the late 1950s because von Braun, after the launch of Sputnik I, "became all about hardware so to speak."

## External links

- Dr. Wernher von Braun (<http://www.redstone.army.mil/history/vonbraun/welcome.html>) – At the Redstone Arsenal Historical



Wikimedia Commons has media related to:  
**Wernher von Braun**

#### Information pages

- Wernher Von Braun (<http://www.loc.gov/rr/mss/text/vonbraun.html>)



Wikiquote has a collection of quotations related to:  
**Wernher von Braun**

– A Register of His Papers in the Library of Congress

- Template:Findagrave - Photos of Wernher von Braun's

#### gravesite

- The capture of von Braun and his men (<http://efour4ever.com/44thdivision/vonbrauncapture.html>) – At the U.S. 44th Infantry Division website
- Wernher von Braun bio (<http://history.msfc.nasa.gov/vonbraun>) –

#### Marshall Space Flight Center (MSFC) History Office

- "The Disney - von Braun Collaboration and its Influence on Space Exploration" ([http://history.msfc.nasa.gov/vonbraun/disney\\_article.html](http://history.msfc.nasa.gov/vonbraun/disney_article.html))

– By Mike Wright, MSFC

- coat-of-arms of Dr. Wernher von Braun (<http://home.att.net/~numericana/arms/vonbraun.htm>)
- Photo of von Braun in SS uniform (<http://www.reformation.org/wernher-von-braun.html>)
- Remembering Von Braun (<http://www.thespacereview.com/article/656/1>)

– by Anthony Young - The Space Review Monday, July 10, 2006

- The Mittelbau-Dora Concentration Camp Memorial ([http://www.dora.de/index\\_cten.html](http://www.dora.de/index_cten.html))
- *The old dreams, and the modern reality.* ([http://mintmedia.co.nz/research/index.php/Wernher\\_von\\_Braun](http://mintmedia.co.nz/research/index.php/Wernher_von_Braun)) Wernher von Braun interviewed by

#### Jules Bergman circa 1969.

- Article on von Braun, Huntsville, and German rocket scientists (<http://www.iht.com/articles/2007/12/31/america/31huntsville.php>)

Retrieved from [redacted]

Categories: Articles with unsourced statements from February 2007 | Articles with unsourced statements from July 2007 | Articles with unsourced statements from July 2008 | Physics

UNCLASSIFIED//~~FOUO~~

(b) (3) - P.L. 86-36

- This page has been accessed 2,131 times.

- 2 [redacted]

[redacted] watching users

- This page was last modified 17:33, 17 June 2016 by [redacted] Most recent editors: [redacted]

(b) (6)



and others.

c2linipcdweb2j

Use of this U.S. Government system, authorized or unauthorized, constitutes consent to monitoring of this system. Unauthorized use may subject you to criminal prosecution.

Evidence of unauthorized use collected during monitoring may be used for administrative, criminal, or other adverse actions.

(b) (6)

This page contains dynamic content -- Highest Possible Classification is **TOP SECRET//HCS-P//SI-G//TK//NOFORN//ORCON**