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## Chapter 5

# Ernst Stuhlinger, A Historian<sup>\*</sup>

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### Abstract

Ernst Stuhlinger was a member of the Wernher von Braun rocket team transplanted from Germany, ultimately to Huntsville, Alabama. At the Marshall Space Flight Center (MSFC), Dr. Stuhlinger was the first Director of the Space Sciences Laboratory and the first Associate Director for Science. In 1960, he became a member of the International Academy of Astronautics (IAA).

Dr. Stuhlinger's most widely known historical work is a definitive, two-volume set of books on Wernher von Braun, coauthored with Frederick I. Ordway III. The first volume is an extensively referenced biographical memoir and the second volume is an illustrated memoir. A lesser known Stuhlinger writing described harrowing army experiences on the Russian front in 1942–1943. Although he already held a doctorate in physics, he had been drafted as a private. His German Army support division was diverted to the futile effort to break the Russian encirclement of a German force trapped in Stalingrad. The division was annihilated and Ernst and a few surviving comrades made the long trek out of Russia on foot. On reaching German territory, he received orders to report to Peenemünde for a new assignment of unknown nature to him.

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At appropriate times, as the Space Age matured, organizations in Huntsville held public symposia, panel discussions, and “fireside chats” commemorating various space events. Many of Stuhlinger’s remarks at these events, with fascinating historical insight, are preserved on video recordings. One commemorative event in 2000, was the rededication of a building at the University of Alabama in Huntsville (UAH) as “von Braun Research Hall.” Stuhlinger was an essential member of the committee that designed more than 20 large, framed displays in von Braun Research Hall that summarized the accomplishments of the organizations directed by von Braun, one for each year from 1950 to 1970. When the Marshall Center Retiree Association compiled a historical volume, *50 Years of Rockets and Spacecraft in the Rocket City, Huntsville, Alabama*, Stuhlinger contributed a piece, “Skylab, America’s First Station in Space.” An augmented second edition of the book, published after Stuhlinger’s death, added a reproduction of his historic letter to Sister Mary Jucunda, which explained the value of space activities in the advancement of civilization.

## Background

Stuhlinger was a member of the von Braun rocket team transplanted from Germany to what ultimately became the NASA Marshall Space Flight Center (MSFC) in Huntsville, Alabama. He was a multifaceted scholar who demonstrated a keen appreciation of history and its preservation. It is this aspect of his life that is the subject of this chapter. Ernst Stuhlinger was born in Germany on 19 December 1913 and died on 25 May 2008 in Huntsville, Alabama.<sup>1</sup>

Intellectually, Stuhlinger had broad interests. His diverse working career was only one demonstration of this characteristic. Although it is not the objective here to discuss his long and productive technical career, it is useful as general background to have a succinct tabulation of his professional history.<sup>2</sup> Such a timeline is given in Table 5–1.

In 2008, when the University of Alabama in Huntsville prepared to host a recognition symposium for Dr. Ernst Stuhlinger, the organizers of the symposium wanted to reflect his diverse technical contributions. This resulted in the selection of four discipline areas in which he led major scientific and technological advances. These are shown in the symposium agenda in Table 5–2.

Each session had a first speaker who summarized Stuhlinger’s activities in the subject discipline. Most of these speakers were colleagues who had worked with him in that discipline. But, recognizing Stuhlinger’s dedication to always looking forward, the following speakers emphasized the future prospects of each discipline.

1936	Doctorate in Physics from University of Tübingen, Germany
1936–1941	Assistant Professor, Physics Department, Berlin Institute of Technology (1939–1941 research group studying nuclear energy)
1942–1943	German Army
1943–1945	German rocket programs, Peenemünde
1945–1950	U.S. Army rocket programs, Fort Bliss, Texas
1950–1960	U.S. Army missile programs in Huntsville, Alabama
1960–1968	Director Space Sciences Lab, NASA MSFC, Alabama
1968–1976	Associate Director for Science, NASA MSFC, Alabama
January 1976	Retired from MSFC
1976–1996	Senior Research Scientist and Adjunct Professor, University of Alabama in Huntsville (UAH)
1978	Six months at University of Munich on a Humboldt Fellowship
1980s	Several stays at Max Planck Institute for Nuclear Physics, Heidelberg
1984–1989	Senior Research Associate, Teledyne Brown Engineering, Huntsville, Alabama

**Table 5–1: Ernst Stuhlinger Professional History**

<b>First Session—Space Science</b> Stuhlinger Role in Evolution of Space Science Current and Future Status of Space Science	Chairperson: C. R. Chappell Robert Naumann Martin Kress
<b>Second Session—Electric Vehicles</b> Stuhlinger Role in Electric Vehicles Current and Future Status of Electric Vehicles	Chairperson: Bernard Schroer Dieter Nowak Brian Coley
<b>Third Session—Electrical Propulsion</b> Stuhlinger as a Pioneer in Electrical Propulsion Current and Future Status of Electrical Propulsion	Chairperson: William Snoddy Robert Seitz Frank Curran
<b>Fourth Session— Advanced Space Transportation</b> Early Reusable Space Plane Evolution of Reusable Space Transportation	Chairperson: Owen Garriott Scott Spearing William Escher and Uwe Hueter

**Table 5–2: Dr. Ernst Stuhlinger Recognition Symposium, University of Alabama in Huntsville, 18 November 2008. Organizers: David Christensen and Charles A. Lundquist.**

These symposium talks are accessible online,<sup>3</sup> and it would be futile to try to adequately review their content in the space available here. A book or books would be appropriate to do that. But, since Stuhlinger is so widely recognized for

his work in electrical propulsion, it can be noted that his first paper on the subject was published in 1955 in the *Journal of Astronautics*.<sup>4</sup>

Having recognized Stuhlinger's activities in the important technical disciplines in Table 5-2, it is instructive here to address still another specific aspect of his contributions to society. Namely, he had a deep appreciation for history, and he felt an obligation to help preserve history.

Further, there is another important reason for focusing on this aspect of the life of Ernst Stuhlinger. Those individuals who knew him best, when asked to describe him, uniformly say first that he was a compassionate and kind gentleman, or some similar phrase. Surely he was an outstanding scientist, but his compassion, kindness, and demeanor as a gentleman typically are recognized first. His writings on historical topics illustrate well this most admirable facet of his character.

### **The Biographies of Wernher von Braun**

The best known example of Stuhlinger as a historian is his co-authorship, with Frederick I. Ordway III, of the definitive biographical books on Wernher von Braun. Ordway explained that the biographies were related to his earlier books,<sup>5,6</sup> particularly to *The Rocket Team* that Ordway co-authored with Mitchell R. Sharpe. Recalling his discussions with von Braun on the content of *The Rocket Team*, Ordway said:

I recall vividly von Braun's insistence in our emphasizing the team, which we did, as well as assuring me and others that he had no intention of writing an autobiography or collaborating on an authorized biography. It was team, team, team, the "magnificent team" characterized, he would stress, by "enthusiasm, professionalism, skill, imagination, a sense of perfectionism, and dedication to rocketry and space exploration."<sup>7</sup>

In the years following von Braun's death, and after the publication of *The Rocket Team*, Ordway and Stuhlinger began contemplating a von Braun biography. They began writing seriously in 1990, when Stuhlinger identified a publisher in Germany. By early 1991 they had a manuscript and illustrations in hand. Under Stuhlinger's cognizance, a German translation of the English text was produced and the book, *Wernher von Braun Aufbruch in den Weltraum Die Biographie*, was published in 1992.<sup>8</sup> Subsequently, while signing copies of his book *Blueprint for Space*, Ordway found a willing U.S. publisher, Krieger Publishing Company of Malabar, Florida.<sup>9</sup> Because the illustrations with the manuscript were so informative and extensive, Krieger recommended a two-volume

set. The result was a biographical memoir<sup>10</sup> and an illustrated memoir,<sup>11</sup> each a standalone volume. A later paperback edition combined the volumes.<sup>12</sup>

These books, *Wernher von Braun: Crusader for Space*, are authoritative because they were written and assembled by two serious individuals, who personally observed von Braun's activities throughout much of his career. Ernst Stuhlinger joined the von Braun team in 1943 and was an intimate colleague until von Braun left Huntsville, Alabama, in 1970. Fred I. Ordway III met von Braun in 1952 and had a close working and social relationship with him until von Braun's death.<sup>13</sup> Stuhlinger had an insider's view of von Braun's life and his German heritage, while Ordway had the viewpoint of a native of the United States. The authors, who were also close personal friends, were a knowledgeable and well-balanced team. It is to Stuhlinger's credit that he took time from his demanding scientific work to preserve his knowledge of von Braun.

Nevertheless, Ordway related that Stuhlinger and he recognized that their close association with their subject cut two ways—it gave them personal insight, but raised the question of their objectivity.<sup>14</sup> They knew that some authors were writing critically about von Braun's role in World War II, and this realization motivated them to carefully use primary references to support their text, and to take particular care to achieve objectivity.

Although there have been other books about Wernher von Braun, the Stuhlinger–Ordway books stand as the definitive biography. They will grow in value throughout time as the first lunar landings, and the von Braun team's essential role in their success, become mileposts of civilization.

## Russia in Winter

Early in 1942, Stuhlinger was plucked from his position at the Berlin Institute of Technology and enrolled as a private in the German Army. After half a year on the northern Russian front, he was hospitalized for three months and then assigned to a replacement division along with other limited-duty soldiers who were released from the hospital. At the end of November 1942, this division was loaded on a transport train and sent toward southern Russia. Stuhlinger's vivid history of his subsequent experiences is a dramatic exposition of the realities of war.<sup>15</sup> His opening paragraph sets the tone of this account:

War has many faces—cruel, human and many variations in between. Mainly it is a tremendous waste and destruction of everything that human-kind holds dear: not only of money and material possessions, even more of time for useful work, of the chance to lead a normal life, of the willingness

to do selfless and heroic deeds, of human life. ... War shows how powerless we are against the force of destiny.

The replacement division was originally destined for German occupied territory near the Black Sea. Meanwhile however, the Russian Army surrounded and trapped a large German force in Stalingrad. The replacement division was diverted to a desperate attempt to break the Russian encirclement of Stalingrad.

Before nearing Stalingrad, mail from home reached the division. Stuhlinger received a letter from a girlfriend in Berlin, enclosing only two sugar cubes. He ate one and saved the other in his knapsack. He related that as they approached a village near the Russian lines:

When we entered the village, we passed a howitzer, a medium heavy cannon; four GIs were busy, shooting every few minutes into the next village, which was occupied by Russian forces. Next to the cannon, tied to a tree, there was a small Panje-horse, which had pulled the cannon, his head hanging and being cold. I approached the horse and spoke with him. It lifted its head and pushed his head and neck against me. I gave it my second sugar cube from my knap-sack, which it eagerly took with his soft lips.

The replacement division was not motorized and had only horse-drawn equipment. Its engagements outside Stalingrad were overwhelmingly defeated by the better-equipped Russian forces. Only a few soldiers from the division survived, and in early January 1943 they began an on-foot retreat across Russia in the bitter cold of winter. One night, during the four-month trek westward, the little band of survivors found crowded shelter in a warm farmhouse. There, Stuhlinger described a touching event.

In the evening, the farmwoman came in very excited, and I tried to find out what was the matter. It seemed that a calf was born, and she was afraid the barn was too cold for the newborn to survive the night. There was no more space in her room—but could I maybe keep the calf with me through the night until morning? “Of course, my pleasure!” was my reply. ... She brought the little thing on her arm, and I put it close to me under my coat, laid down and put my finger in his mouth to suck on (useless), and both of us slept soundly till morning. The woman picked it up and thanked me profusely—“spasiba, spasiba.”

Finally, about the end of April 1943, Stuhlinger and a remaining handful of comrades reached German-held territory. There, miraculously waiting for him, were orders to report to Peenemünde to work on a high-priority technical project. Stuhlinger spent the next two years in Peenemünde and then came to the United States.



## Why Space

In 1970, shortly after the first lunar landing, and while he was Associate Director for Science at the Marshall Center, Stuhlinger received a letter from Sister Mary Jucunda in Zambia, Africa. She asked him how he could suggest the expenditure of billions of dollars for a voyage to Mars at a time when many children on this Earth (and in Zambia) were starving to death. Stuhlinger composed a thoughtful, sympathetic, well-articulated answer that required three printed pages.<sup>16</sup>

In the long letter, he presented many sound arguments for the expenditure of a small fraction of a national budget for scientific research and exploration. But the first, and probably most convincing, argument relied on a historical example. In Stuhlinger's own words (slightly condensed here):

About four hundred years ago, there lived a count in a small town in Germany. He was one of the benign counts, and he gave a large part of his income to the poor of the town. This was much appreciated, because poverty was abundant during medieval times, and there were epidemics of the plague which ravaged the country frequently. One day, the count met a strange man. He had a workbench and little laboratory in his house, and he labored hard during the day so that he could afford a few hours every evening to work in his laboratory. He ground small lenses from pieces of glass: he mounted the lenses in tubes and he used these gadgets to look at very small objects. The count was particularly fascinated by the tiny creatures that could be observed with the strong magnification, and which nobody had ever seen before. He invited the man to move his laboratory to the castle, to become a member of the count's household, and to devote all his time to the development and perfection of his optical gadgets as a special employee of the count. The townspeople, however, became angry when they realized that the count was wasting his money, as they thought, on a stunt without purpose. ...But the count remained firm. "I give you as much as I can afford" he said, "but I will also support this man and his work, because I know that someday something good will come out of it." Indeed something very good came out of this work and similar work by others. It is well known that the microscope has contributed more than any other invention to the progress of medicine, and that the elimination of the plague from most parts of the world is largely a result of the studies which the microscope made possible.

After offering this historical account, Stuhlinger went on to note many benefits to civilization and human well-being resulting from the space program.

That Stuhlinger spent much effort composing this letter during a very busy period is a demonstration of his compassionate character and concern for humankind. That he chose a historical anecdote as his first answer to Sister Mary's

question confirms a grasp of the importance of history in guiding current activities.

## Newspaper Replies

As time passed, after von Braun's death in 1977, and after publication of the von Braun books, Stuhlinger became an unofficial spokesman for the surviving rocket team from Peenemünde. When newspapers published critical pieces about the activities in Germany of von Braun and his team, it was often Stuhlinger who contributed a reply, setting straight the historical facts. An example is a long piece in the 26 July 1999 *Huntsville Times*.<sup>17</sup> He began:

At a time when Americans celebrating the 30th anniversary of the Saturn-Apollo moon landing remember July 20, 1969 as one of their finest hours, and when the surviving old-timers of this event proudly share in the jubilation of their American-born colleagues and friends, there are some dissonant voices of reawakened criticism that strike a strange discord in this memorial to a "mission accomplished."

Beginning in the 1980s, essays, books, letters to the editor, and other literary products appeared whose authors try to vilify men or women who had accomplished great things in their past. Those who chose Wernher von Braun and Peenemünde as their target give free rein to their fantasy, ignoring or denying well-established historical facts and pointing instead to unrealistic and questionable "documents" or documents which they thoroughly misinterpret or misunderstand.

In the following text, Stuhlinger sketched the history of the V-2 rocket development and the attitudes of von Braun and the others involved. He noted that: "Wernher von Braun went to jail rather than submit to the wishes of the SS." In his final paragraph, Stuhlinger related:

When von Braun and a number of his Peenemünde co-workers had already settled in Huntsville, accusations were again brought up against von Braun. An American court in New Orleans took up the case and subpoenaed von Braun. After three or four days of testifying, the court found that none of the accusations could be substantiated; all of them turned out to be based on unconfirmed rumors, or on "documents" that were not trustworthy or had been misinterpreted. Again, von Braun was fully acquitted.

Answering published attacks on the Peenemünde team was not a task that Stuhlinger liked, but as an unofficial historian of the team, he felt obligated to do it objectively and accurately.

## **Fifty Years of Rockets and Spacecraft**

When the NASA–MSFC Retiree Association assembled a historical book, *50 Years of Rockets and Spacecraft in the Rocket City, Huntsville, Alabama*, published in 2002, many retirees wrote various parts of the book. Stuhlinger had a key role, writing the section “A Tribute to Wernher von Braun.”<sup>18</sup> Dr. von Braun had, of course, been the undisputed leader of the rocket team that eventually became the association of retirees who were producing the book. Stuhlinger was always a careful and thoughtful writer. This is well illustrated by a paragraph from the “Tribute”:

How do those old-timers who had the privilege of being close to von Braun for many years remember the features that made him so extraordinary? There are many: his superior intelligence, supported by a phenomenal memory; his almost unlimited interest in all kinds of human activities; his capability to define the technical projects he wanted to bring to life very exactly, and then to work tirelessly until they were accomplished; his almost magic ability to form a team, to make it grow and to keep it together, even for years after his death; his way of conducting joint technical discussions so that all participants could understand what the problem was, and of continuing such discussions until a reasonable solution had been found; his ability to make every one of his team feel proud and privileged to work for him; his intent to make sure that a counterpart in a technical dispute did not feel to be the loser, but just the second winner; his gift of feeling equally at ease whether he conversed with his driver or with the President of the United States; his proverbial carefulness as a practicing engineer; his way of giving presentations to Congress that always had standing room only attendance; and his fabulous success as an ardent communicator and public relations man for the idea of space exploration.

The old-timer retirees embraced this memorable and accurate characterization of their leader. Stuhlinger spoke for all of them. No one could have said it better.

In the *50 Years* book, the 21 pages that immediately follow the “Tribute,” reproduce 21 large, hanging wall displays in von Braun Research Hall at University of Alabama in Huntsville. Each individual panel highlights the accomplishments of the von Braun team in the years from 1950 to 1970. These display panels are an informative, succinct illustrated summary of a remarkable two decades in the history of humankind’s reach to space.<sup>19</sup> Stuhlinger was an essential member of the committee that defined and prepared the displays.

The *50 Years* book also included a long section titled “Stories from the Insiders” that had many short notes contributed by participants in the various events of the half-century. To this section, Stuhlinger provided an insider’s account of “Skylab, America’s First Station in Space.”<sup>20</sup>

## Video Records

As the Space Age matured, organizations in Huntsville held public symposia, panel discussions and “fireside chats” commemorating various space events. Many of Stuhlinger’s remarks at these events, with fascinating historical insight, are preserved on video recordings. In December 1984, he was interviewed by UAH Professor Donald Tater and Konrad Dannenberg as part of an oral history video series. His hour-long review of space experiences is a rich source of facts about the early space program.<sup>21</sup>

## A Final Conjecture

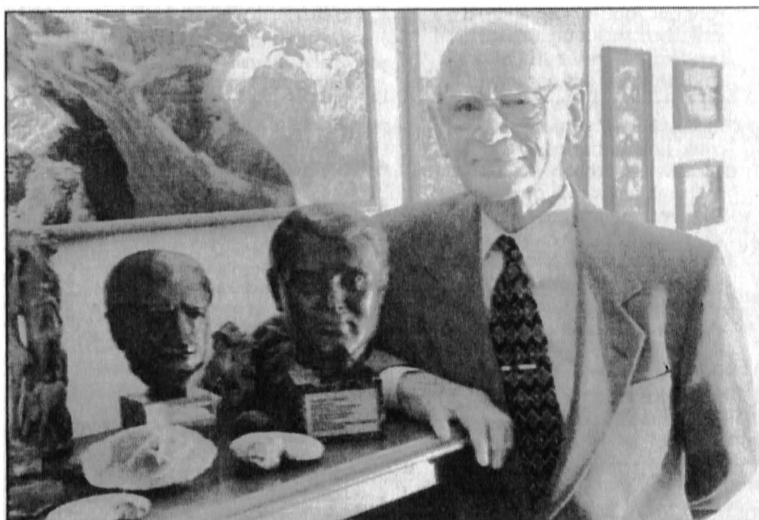
A natural question to ask is “What will be remembered about Ernst Stuhlinger several, or many, decades in the future?” As noted previously, those individuals who knew him remember him first as a compassionate, generous, gentleman. Regrettably, that judgment, based on personal contact, is not easily passed from generation to generation.

Surely, for example, Ernst is recognized for his formulation and advocacy of electric propulsion. That recognition should continue as the use of electric propulsion becomes more prevalent.

However, there is no doubt that the Apollo–lunar landing era will stand out as a milestone in human history. Stuhlinger was an active participant in that era. His co-authored, firsthand exposition of Wernher von Braun’s essential role in the Apollo success will certainly have lasting significance, as will Stuhlinger’s other accounts of the early Space Age.

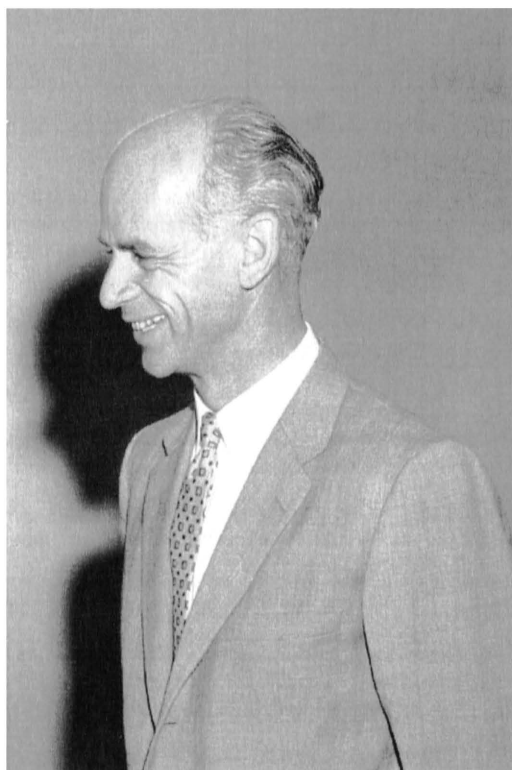
Only time will tell what happens in the future, but it is a reasonable conjecture that the impact of Stuhlinger’s contributions to space history will last as long, or longer, than the impacts of his technical contributions.

In Figure 5–1, taken in 1997, Stuhlinger is standing in his home next to some of his awards, including presented busts of Wernher von Braun and Hermann Oberth. Figure 5–2 is a photograph of Stuhlinger taken in 1958, the year he was instrumental in the launch of Explorer 1, the first U.S. satellite.



Times file photo by Mike Mercier

**Figure 5–1:** Ernst Stuhlinger in 1997 with busts of his space pioneer friends, Wernher von Braun and Hermann Oberth. Credit: *Huntsville Times*.



**Figure 5–2:** Ernst Stuhlinger in 1958. Credit: ABMA.

## Acknowledgements

Access to the “Ernst Stuhlinger Recognition Collection” in the Archives and Special Collections Division of the Salmon Library at University of Alabama in Huntsville was essential to the preparation of this chapter. Discussions and written communication with Frederick I. Ordway III provided valuable information and advice.

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- <sup>1</sup> Al Reisz, “Ernst Stuhlinger’s Legacy,” *The Huntsville Times* (1 June 2008).
- <sup>2</sup> See, for example, MSFC Public Affairs Office personnel press release, “Dr. Ernst Stuhlinger,” September, 1963; and *The Huntsville Times*, “Von Braun Rocket Team Member Wins Award,” (11 April 2002).
- <sup>3</sup> Online, search for UAHuntsville|Library|Archives Collections, click on Stuhlinger Recognition Collection, on bottom of page click on video of presentations. The collection includes a bibliography of Ernst Stuhlinger’s published works.
- <sup>4</sup> Ernst Stuhlinger, “Electrical Propulsion Systems for Spaceships with a Nuclear Power Source,” *Journal of Astronautics* 2 (1955), continued in 1956.
- <sup>5</sup> Frederick I. Ordway III and Mitchell R. Sharpe, *The Rocket Team* (London: Heinemann, 1979).
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- <sup>8</sup> Ernst Stuhlinger and Frederick I. Ordway III, *Wernher von Braun Aufbuch in den Weltraum Die Biographie* (Esslingen and Munich: Bechtle Verlag, 1992).
- <sup>9</sup> Ordway, “Co-authoring,” 27 August 2010.
- <sup>10</sup> Ernst Stuhlinger, and Frederick I. Ordway III, *Wernher von Braun: Crusader for Space, A Biographical Memoir* (Malabar, Florida: Krieger Publishing Company, 1994).
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- <sup>12</sup> Ernst Stuhlinger, and Frederick I. Ordway III, *Wernher von Braun: Crusader for Space, Combined Edition* (Malabar, Florida: Krieger Publishing Company, 1994).
- <sup>13</sup> Frederick I. Ordway III, “New York to Huntsville in the 1950s,” *50 Years of Rockets and Spacecraft in the Rocket City, Huntsville, Alabama*, NASA-MSFC Retiree Association (Paducah, Kentucky: Turner Publishing Company, 2002), pp. 104–105.
- <sup>14</sup> Interview with Frederick I. Ordway III in Huntsville, Alabama, 19 August 2010.

- <sup>15</sup> Ernst Stuhlinger, "Russia—Winter 1942–1943," manuscript in German, translated to English by Gertrud and Max Nein, June 2008; <http://libguides.uah.edu/content.php?pid=272087&sid=2243548#7603292>.
- <sup>16</sup> Ernst Stuhlinger, "Letter to Sister Mary Jucunda," in Ed Buckbee, editor, *50 Years of Rockets and Spacecraft: NASA Marshall Space Flight Center* (Morley, Missouri: Acclaim Press, 2009), pp. 14–16.
- <sup>17</sup> Ernst Stuhlinger, "Rocket Team's Critics Misrepresent the Facts," *The Huntsville Times* (26 July 1999): p. B5.
- <sup>18</sup> Ernst Stuhlinger, "A Tribute to Wernher von Braun," *50 Years of Rockets and Spacecraft in the Rocket City, Huntsville, Alabama*, p. 95.
- <sup>19</sup> "Twenty-one Wall Displays, 1950 through 1970," *50 Years of Rockets and Spacecraft in the Rocket City, Huntsville, Alabama*, pp. 56–76.
- <sup>20</sup> Ernst Stuhlinger, "Skylab, America's First Station in Space," *50 Years of Rockets and Spacecraft in the Rocket City, Huntsville, Alabama*, pp. 148–150.
- <sup>21</sup> Online, search for UAHuntsville|Library|Archives Collections, click on Oral History Collection, in list of names click on Stuhlinger. Interview on 14 December 1984.