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# QUEST



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<p>Congratulations and Good Luck from the Prime Launch Team</p>	<p>Earthbound Pioneer <i>(Explorer 6)</i></p>
<p>Rockets and the Red Scare</p>	<p><b>Bumper 8:</b> First Launch on Cape Canaveral</p>
<p>How General Dynamics Integrated the Cape</p>	<p>Gemini Memories</p>

# ROCKETS AND THE RED SCARE

## Frank Malina and American Missile Development 1936–1954

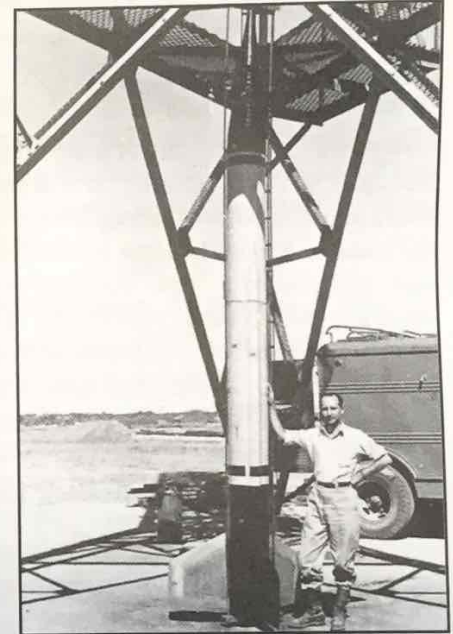
By James L. Johnson

From 1944 to 1946, Frank Malina was the director of Caltech's Jet Propulsion Laboratory (JPL) and the U.S.'s top missile designer at a time when that expertise was just beginning to be seen as critically important to national security. At the end of 1946, despite being at the top of his field and much in demand by the War Department, Malina left the field to work for the United Nations Educational, Scientific and Cultural Organization (UNESCO) in Paris. How can this sudden career change be explained? Malina always claimed he left because he was unenthusiastic about weapons development and was more generally against the military taking such a prominent role in directing university research. He spent his two years as director of JPL, which he co-founded, trying unsuccessfully to shift a portion of the lab's efforts toward more scientific projects, such as sounding rockets and satellites. While Malina's private correspondence suggests that his anti-military sentiments were genuine, there was in all likelihood another contributing motivation for his departure. Although he was virtually silent on the subject, Malina was certainly aware that the FBI had been investigating him for several years. During the 1930s, like many academics, Malina developed leftist political views and at the very least flirted with communism. Based on information from confidential informants, the FBI began surveillance of him in 1942 and raided his home in 1946. Although Malina departed for Paris at the end of 1946, his troubles with the FBI did not end. They continued surveillance of him, and he was indicted in 1952 for failing to report his alleged former Communist Party membership on a security form.

Although Malina was the U.S.'s top rocket expert during and immediate-

ly after World War II and the principal founder of the Jet Propulsion Laboratory, he has received surprisingly little attention in the scholarly literature. He receives a few paragraphs here and there, but the literature fails to capture the degree to which Malina was seen as a figure of great importance by the War Department, Congress, the FBI, and even the press at the close of World War II. Malina receives the most attention in Clayton Koppes' *JPL and the American Space Program*, but Koppes' focus is mainly on the much longer period after Malina left, and his treatment of Malina's departure, the most important part of the story for this article, is cursory. Furthermore, while Malina's problems with the FBI have been mentioned briefly here and there, as JPL historian Erik Conway has stated regarding Malina's alleged connections to the Communist Party, "the magnitude of his involvement has never been clear."<sup>1</sup> The aim of this article is to investigate the reasons for Malina's departure. This article will be based on little studied sources from the period, including Malina's FBI file, obtained through the Freedom of Information Act, and his personal correspondence, obtained from The Frank J. Malina Papers at the Library of Congress.

Frank Malina arrived at Caltech in 1934 to undertake graduate work in mechanical engineering and shortly thereafter began working at the Guggenheim Aeronautical Laboratory at the California Institute of Technology (GALCIT) to support himself. GALCIT, one of the premier centers of aeronautical research in the U.S., was run by the renowned aerodynamicist Theodore von Kármán. Malina completed master's degrees in both mechanical and aeronautical engineering by 1936 and then proposed to von Kármán that his PhD research consist of "a program of work whose objective was the design of a



Frank J. Malina and the WAC Corporal at White Sands, circa 1946.

Courtesy of NASA

high-altitude sounding rocket."<sup>2</sup> He was fortunate that in von Kármán he found a mentor with the "unorthodox attitude" required to support such a project since rocketry was at the time in its infancy and was not taken seriously by most in the science and engineering community. Von Kármán could not secure funding for the research, however, and Malina spent the next three years working on the project without pay and with whatever equipment he and his team could scrounge. Malina was joined in these efforts at various times by William Bollay, John Parsons, Edward Forman, A.M.O. Smith, and Hsue Shen Tsien, all of whom made significant contributions. Parsons, a self-taught chemist with a gift for developing explosives, originally conceived the idea of castable solid rocket fuels. Tsien, who had his own troubles with the U.S. government over suspected ties to the Communist Party, went on to found the missile program in the People's Republic of China.

After several years of hard work and many setbacks, the group achieved enough success to attract Army funding and by 1939 the group became the Air Corps Jet Propulsion Research Project. The main objective of this group was to produce JATO (Jet-Assisted Take-Off) rockets, which would be mounted on the wings of airplanes to allow them to take off on short runways. This project was successful and the group aligned with former Federal Communications Commission counsel Andrew G. Haley to form the Aerojet Engineering Corporation, which manufactured the rockets for the U.S. Army. Aerojet became a major manufacturer of rocket engines and continues to be to this day. In 1940, Malina received his PhD for his theoretical work on rocket propulsion.<sup>3</sup> In 1943, their group was renamed the Jet Propulsion Laboratory (JPL), with von Kármán as its first director. The word “jet” was used rather than “rocket” because the latter term still had a negative connotation among both scientists and the military.<sup>4</sup> In 1944, Malina became the second director of JPL when von Kármán left to establish the Air Force Scientific Advisory Board.<sup>5</sup> Also in 1944, JPL began development of guided missiles for the Army.

At this point, Malina was firmly established as the U.S. Army’s, and arguably the country’s, foremost rocket expert. There was Robert Goddard, of course, who had achieved some important “firsts” and had since done some valuable development work for the Navy. In his essay “The Enigma of Robert H. Goddard,” former NASA historian J.D. Hunley summed up the legacy of Goddard when he stated “Goddard deserves, arguably, to be acknowledged as in some sense the progenitor of modern rocketry,” but “he failed to have more than an inspirational influence on most specific developments in modern rocketry” because of his excessive secrecy. Most significantly, Goddard ultimately failed to put his innovations into a working rocket that reached the “extreme altitudes” to which he aspired.<sup>6</sup> In October, 1945, JPL successfully launched the WAC Corporal to an American record altitude of 70 kilometers.<sup>7</sup>

This success brought an uncomfortable fact to the foreground, however. Malina’s work was being paid for by the Army and they of course wanted to develop the rocket as a weapon. Malina had always been uncomfortable with weapons research, but had justified his participation as being a necessary part of the effort to defeat fascism. With the war now over, Malina was “caught up in the wave at the end of the war of hate for war, and fear of the development of the atom bomb, and seeing the things we had been developing for space exploration being used for military purposes.”<sup>8</sup> Malina had proposed to the Caltech board of directors earlier in 1945 that JPL begin a program of “unclassified high-altitude scientific research group built around the WAC Corporal rocket,” but the board had rejected the proposal.<sup>9</sup> Much to his dismay, after the war Malina became more involved with the military: “I found that I was getting caught up more and more in trips to Washington in meetings with the Army, Navy, and Air Force, planning the next war.” This was difficult for Malina to square with his hope that “through something like the United Nations” the industrialized world could “put a stop to war.”<sup>10</sup>

In 1946, Malina was sent “by the War Department...to snoop around Western Europe to see what was going on in the domain of interest to JPL.” He was also given the freedom to “do anything that was in the domain of science and technology,” perhaps because they knew his interest in military research was waning. While in London, Malina attended a meeting of the UNESCO Preparatory Commission and was intrigued enough to inquire of Joseph Needham, the first head of the natural science division, “Is there any way I might get into something like this?” Shortly thereafter, Malina “received a firm offer to join them” as the deputy head of the Natural Sciences Department of UNESCO, and he agreed.<sup>11</sup> Neither the Army nor Caltech wanted to lose its rocket expert, however, so they tried desperately to dissuade him. Caltech eventually agreed to a two-year leave of absence, but the Army was more persistent—the day before Malina left for

France in December 1946, he received “another call from a general in Washington, trying to get me to change my mind.”<sup>12</sup> Two months later, he wrote home to his parents that the War Department “was disappointed that I accepted the appointment. They say they really had a good offer for me. Evidently I could have done and gone wherever I would have liked—of course the work would be secret and be connected with warfare—which is not for me in my present frame of mind.”<sup>13</sup>

Although Malina never cites it as a reason for leaving Caltech for UNESCO, the FBI had been investigating him on suspicion of being a member of the Communist Party, and perhaps even a communist spy, since 1942. This was based on information from at least five unnamed informants, who claimed among other things that Malina “held Communist meetings at his home and passed out Communist literature on the Army project to fellow workers” and “that the loyalty of the subject would be questionable if he had to decide between our form of government and that of Russia.”<sup>14</sup> Activity in the case then virtually ceased until 1946, when Malina’s home was raided by the FBI in connection with a security breach described below. They found nothing to incriminate Malina, however, and the investigation virtually ceased again until 1949.

In 1949 the FBI again became concerned about Malina’s possible connection with several security breaches that occurred during Malina’s tenure at JPL. One of these was “the loss of certain documents and blueprints” in 1946 relating to the Corporal missile, which later surfaced in France.<sup>15</sup> The Corporal later became the U.S.’s first operational ballistic missile.<sup>16</sup> The FBI became particularly concerned in 1949 because in Malina’s “position with UNESCO he is in an extremely good position to engage in espionage activity should he so desire.” In the same report, they also tout Malina’s credentials by stating that he was “generally credited with being the one who originally conceived the idea of the military application of the theory of jet propulsion.”<sup>17</sup> This is an exaggeration to be sure, but Malina was certainly one of the top rocket propulsion experts

1938 Book # None 1939 Book # 1020 ✓

Real Name Frank J. Malina Party Name Frank Parnas

Address 1671 So Catalina St GA

Section Pasadena Branch Prof - N.W

Joined Nov 1938 Male  Female  Negro  White  Age 26

Country of Birth U.S. National Origin Czech

Occupation Student Employed  Unemployed

Name of Union None Local \_\_\_\_\_

Paid Official in Union? Yes  No

Workers Alliance  IWO  ILD  FSU  Amer. League  LNPL

Other Mass Organization None

Was disciplinary action ever taken against you? \_\_\_\_\_

Place of employment Cal Tech

Address of shop or job location \_\_\_\_\_

Number of workers: Under 100  100-200  200-500  500-1000

How many Party members in your shop? \_\_\_\_\_

Party Schooling \_\_\_\_\_

Function \_\_\_\_\_

Frank Malina's Communist Party application form from 1939. From Malina's FBI file, which was obtained by the author from the Freedom of Information Act.

in the world and in possession of knowledge that many governments, not least of which the Soviet Union, desperately wanted.

In a 1982 interview former Malina coworker and Caltech Professor of Aeronautics (1942-1980) Homer J. Stewart shed light on two other security breaches that occurred at Caltech during Malina's tenure. He recalled that in 1940:

our counterintelligence people had run into some classified information that had been stolen. They thought

the theft had occurred at Caltech. It was information that indicated a connection with the wind tunnel...I had quite a similar experience that happened in 1945. In this case, I know a little more about it. Our counterintelligence people in Paris had intercepted a Russian courier, and found a lot of secret documents that had been stolen from Caltech, including a number that I had written.

Stewart also intimated that he considered Malina as a possible source of the security breaches: "We shared offices

for years ... That's a pretty awful feeling—that someone you know, a friend, may have done something that's really very bad."<sup>18</sup>

In August 1949 the FBI intensified their investigation of Malina in order to establish whether or not he had been a member of the Communist Party. In September an unnamed informant claimed he had been involved in discussions during which Malina "gave every indication of closely adhering to the Communist Party line as it existed at that time." The report goes on to state that:

It has been fairly well established that he has been a member of Professional Unit 122 of the Los Angeles County Communist Party during the year 1939. Moreover, it does appear that his knowledge of and interest in, the aims and purposes of the Communist Party have extended far beyond this date.<sup>19</sup>

In November 1950 a government official whose name was redacted from Malina's FBI file attempted to interview Malina regarding the Communist Party affiliations of another individual and Malina "refused outright to make any statement with regard to [redacted] on the grounds that such a statement might tend to incriminate him."<sup>20</sup> The FBI then proceeded to conduct interviews of the unnamed informants they had earlier questioned regarding Malina as well as new ones. They obtained a witness statement in March 1951 in which the informant stated:

I was a member of the Communist Party at Pasadena, California, and was assigned to Professional Unit No. 122 at Pasadena...I recall Frank Malina as being a member of this unit, and he attended meetings regularly from the time I joined until shortly before the unit was disbanded in the latter part of 1941.<sup>21</sup>

Around that same time, Malina attempted to renew his passport, which was due to expire in April 1951. The renewal was refused by the Department of State on the grounds that "his further travel would be contrary to the best interest of the United States." Malina surrendered his passport to the American consul in Paris shortly thereafter.<sup>22</sup>

In February 1952, J. Edgar Hoover wrote Assistant Attorney General James M. McInerney laying out the case for prosecution of Malina under statute 18 U.S.C. 1001, which covers making false statements to the government. In the letter, Hoover lists a variety of documents on which Malina should have declared his past Communist Party membership, but did not.<sup>23</sup> McInerney responded in April of that year "that there is a possible

violation of 18 U.S.C. 1001" and that "in order that the Department may be immediately apprised of Malina's return to this country, it is requested that your Bureau place appropriate stop notices."<sup>24</sup> In August, after a more thorough review of the case, Assistant United States Attorney Angus D. McEachen advised the FBI they were declining to prosecute Malina because there was "insufficient available documentary evidence regarding Malina's membership in the Communist Party" and "an omission to state membership in the Communist Party in a Personnel Security Questionnaire is not a sufficient basis to conduct a successful prosecution for perjury, or in this case, fraud against the government."<sup>25</sup>

In September 1952 Hoover wrote Assistant Attorney General Charles B. Murray to protest McEachen's decision. In the letter he referenced the statements of four informants who all declared that Malina was a member of "Professional Unit 122 of the Los Angeles County Communist Party." Hoover also asked for prompt attention to the matter since "the Statute of Limitations will run out on December 31, 1952."<sup>26</sup> The U.S. Attorneys declined yet again, stating that the evidence the FBI presented "would be inadmissible as hearsay evidence" and that "the possibility of securing a conviction is doubtful because of the nature and quality of the evidence available and the prominence of the subject in the scientific world."<sup>27</sup>

Still not willing to accept the opinion of the U.S. Attorneys, the FBI went back and interviewed two additional informants who both signed statements that Malina was a "card carrying member of the Communist Party." Perhaps out of exhaustion, McEachen finally "indicated he would authorize prosecution in this matter and would proceed to secure indictment against subject in immediate future."<sup>28</sup> A sealed indictment was returned against Malina on 30 December 1952 for violation of statute 18 U.S.C. 1001, the day before the statute of limitations ran out. A warrant was also issued for Malina's arrest, but since he was then living in France, he was "considered a fugitive by the U.S.

Attorney's Office."<sup>29</sup> The possibility of extradition was then discussed over the next few months. It was determined that the case was governed by the "extradition treaty of 1909" between the United States and France. The State Department gave the opinion that "a similar treaty was in effect with Britain" in the Gerhardt Eisler case and that in that instance extradition was not successful.<sup>30</sup> It was therefore decided that there was no hope of the French agreeing to extradite Malina and that a failed effort would inform him of the indictment, in which case "there would be little likelihood of his returning to the United States voluntarily."<sup>31</sup>

Beginning in 1949, a person identified only as "Confidential Informant T-2" began to object to Malina's employment with UNESCO. No indication is ever given as to this person's identity, but they were obviously well-placed because they managed to have Malina removed from doing "technical assistance work" for UNESCO "on the grounds that he was a security risk."<sup>32</sup> In the latter part of 1952 and the first few months of 1953 an effort was then undertaken by the U.S. Department of State to get Malina and other UNESCO employees with alleged former connections to the Communist Party removed from their positions.<sup>33</sup> T-2 continued to press the issue over the next two years as well. According to an FBI report, in late 1952 T-2 warned UNESCO "that continued employment by these persons jeopardizes U.S. participation" in the organization.<sup>34</sup> Malina resigned his UNESCO position on 10 February 1953, presumably as a result of these efforts.

In February 1953, upset over what they saw as delaying on the part of the U.S. Attorneys, the FBI "instructed all field offices to review pending cases in all classifications in order to locate instances where the office of the United States Attorney has delayed in rendering a prosecutive opinion or where issuance of an information or complaint."<sup>35</sup> For their part, the U.S. Attorneys "indicated that the Government's case against the subject is not a strong one." In response to this, Hoover sent a letter to the Los Angeles field office stating that "the

investigation of the subject must be immediately intensified and handled on a continuous basis in an effort to obtain additional evidence...this case should be assigned to an experienced agent who has the desire, the willingness, the aggressiveness and the ability to get out and 'dig' for additional evidence of the subject's past Communist Party membership." He goes on to suggest that they dig through the evidence for additional people to interview and also advised them to consider re-interviewing people who had been uncooperative in the past.<sup>36</sup> In July 1953 they interviewed Frank Oppenheimer, who had previously admitted being a member of the Los Angeles County Communist Party and had been a colleague of Malina's at Caltech. Oppenheimer "stated that he remembers the name of the subject but cannot recall what field subject was in nor could he recall anything regarding the subject."<sup>37</sup> In an oral interview conducted by Caltech in 1984, Oppenheimer said "I knew Frank Malina very well," so he was clearly protecting him in 1953.<sup>38</sup> Other witnesses the FBI interviewed in 1953 were equally uncooperative.

In April 1954, the indictment of Malina was dismissed based on the opinion in the Harry Renton Bridges case in which the Supreme Court overturned an earlier conviction of Bridges for having lied about past Communist Party membership. U.S. Attorneys advised the FBI that "although you may wish to continue your investigation in this matter for counterintelligence purposes, you are being so advised in order that you may discontinue any investigation now being conducted with a view towards prosecution of Malina."<sup>39</sup> The FBI continued to follow Malina's activities through officials at the U.S. Embassy in Paris throughout the 1950s.

After his resignation from UNESCO, wealthy from his stock in Aerojet, Malina "cut loose from everything and became an artist."<sup>40</sup> He was quite successful and gained a reputation as an innovator working with electric light in producing kinetic art and paintings that explored scientific concepts. An FBI report from August 1954 stated that "a public showing of subject's paintings was held recently. According to this

informant, subject employs a new technique in his paintings and has enjoyed considerable success as a painter. Recently, subject was elated at having sold a painting to the city of Paris."<sup>41</sup>

In 1956, the FBI learned through an unnamed source that Malina was "remaining in France because he is afraid if he returned to the United States he and his family might be embarrassed from the publicity which would result from a public investigation," but that he was "very desirous of discussing his past activities with a representative of the United States Government" in order to clear up that matter and regain his passport.<sup>42</sup> In November 1956 Malina was interviewed by officials at the U.S. Embassy in Paris "in connection with another security investigation,"<sup>43</sup> but "declined to furnish any information concerning himself or the subject of this investigation." Despite the FBI's continued interest in Malina and his refusal to furnish any information, Malina regained his passport in August 1958. The FBI continued to follow Malina's activities until late 1960, but no further attempts were made to interview him or to interview others concerning him.

Was Malina a member of the Communist Party? There are numerous examples from Malina's personal correspondence that indicate he did hold political views that were compatible with the Communist Party line. In a 1936 letter to his parents, Malina wrote: "Events in Europe are certainly leading to another war. There seems to be only one hope, overthrowing of the capitalist system in all countries and an economic union of all nations."<sup>44</sup> In a 1938 letter, he wrote:

Something must eventually be done to correct the chaotic economic situation. Russia's economic experiment seems to be working satisfactorily. The Russian political situation is difficult to understand and certainly unfortunate as people will be pumped full of this episode in an attempt to keep from them the basic correctness of socialized production. Another factor to keep in mind is that any action which tends to increase nationalism and thus deviate from an eventual world state is

an undesirable action.<sup>45</sup>

Malina's comments gradually become more cryptic over the ensuing years, especially after 1942 when the FBI began investigating him, but he gives some indication that his political views did not change drastically. In late 1943, when Aerojet was beginning to have success, he wrote to his parents: "We are getting to be more and more like capitalists, at least on the surface."<sup>46</sup> In 1945 he wrote: "I understand there is a good chance for a return on our stock this summer, and that there are some interesting prospects for post-war business...The whole affair gives me a lot of laughs for reasons that you know."<sup>47</sup> It seems probable that Malina is referring to his anti-capitalist views. In late 1946, when he was preparing to leave for Paris, Malina wrote to his parents that the "U.S. doesn't appear to have changed, the economic system is just as confused and the newspapers just as hysterical."<sup>48</sup>

Another piece of evidence that indicates Malina was a member of the Communist Party is a copy of what appears to be his Communist Party application form from 1939. No information is given in his FBI file as to how it was obtained, however, it does appear to be Malina's handwriting when compared to other writing samples from his papers. Given this, coupled with Malina's expressed political views and the sworn statements of multiple informants, it seems more than likely that Malina was a member of the Communist Party.

Did Malina ever commit espionage? In determining guilt or innocence in U.S. criminal law, it is common for the prosecution to attempt to demonstrate that the defendant had means, motive, and opportunity to commit the crime. Malina certainly had the means and opportunity to commit espionage. He had the knowledge and access to all the documents during his time at JPL. Later, when he was working for UNESCO and traveling around Europe, he had the expertise to offer help in missile development to foreign governments if he so desired. Whether or not one had the motive to commit a crime is usually the most difficult of the three to demon-

strate, and that is the case here. Malina's own writings demonstrate that he had passionate anti-capitalist views (although they perhaps moderated over time) and that he was a great admirer of Russian culture and the Soviet experiment. This could certainly be the basis for a motive to pass missile secrets to the Soviets. It is also clear from his writings, however, that Malina was a pacifist who was uncomfortable with weapons development. His sole justification for being involved in it was to defeat fascism. After that was achieved, Malina turned his attention toward increasing international scientific cooperation at UNESCO. Malina's private correspondence also shows that he was deathly concerned about the possible combination of ballistic missiles and nuclear weapons. This does not paint the picture of a spy passing missile secrets to the Soviets. Finally, although Malina was under FBI surveillance beginning in 1942, had his home raided in 1946, and was the subject of intense investigation from 1949 to 1953, no evidence ever surfaced that implicated him in any way.

A separate question that should be asked is whether it was reasonable to investigate Malina. Unlike many others persecuted during the post-World War II red scare, Malina was indeed a plausible security threat. First, technical documents of great value to anyone with a nascent missile program were stolen by someone during Malina's tenure at JPL. Second, Malina did have the means, the opportunity, and a possible motive to commit the crime, as shown above. This line of reasoning is supported by a trend in historiography of post-World War II anti-communism begun two decades ago. While before 1990 "historical scholarship almost universally condemned domestic anticommunism as a harshly repressive response to vastly overinflated fears of Soviet-sponsored subversion," some scholars have recently argued that "the red scare, while often excessive, was to a significant degree a rational response to a real threat." Recent scholarship has also uncovered "detailed evidence of the Soviet Union's use of the American Communist Party as a conduit for espionage."<sup>49</sup> This is not

to say that Malina was guilty of espionage—no hard evidence has ever been found to implicate him. This episode does demonstrate, however, that in the post World War II period, when the United States and the Soviet Union were in a desperate struggle for technological superiority, a top-level missile expert with Malina's background, whose work at UNESCO led him to travel on both sides of the Iron Curtain, represented a real security threat.

### About the Author

James Johnson is working on his PhD dissertation at Case Western Reserve University in Cleveland, Ohio.

### Notes

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- 11 Malina, interview.
- 12 Malina, interview.
- 13 Frank J. Malina, Letter to parents on 27 February 1947. Frank J. Malina Papers, Manuscript Division, Library of Congress, Washington, D.C. Box 21, Section X.
- 14 Frank J. Malina's FBI file. Obtained by the author through the Freedom of Information Act. Report dated 28 November 1942.
- 15 Malina's FBI file. Report dated 8 June 1949.
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- 19 Malina's FBI file. Report dated 14 September 1949.
- 20 Malina's FBI file. Witness statement dated 13 December 1950.
- 21 Malina's FBI file. Report dated 9 March 1951.
- 22 Malina's FBI file. Report dated 31 January 1952.
- 23 Malina's FBI file. Letter dated 25 February 1952.
- 24 Malina's FBI file. Letter dated 18 April 1952.
- 25 Malina's FBI file. Report dated 19 August 1952.

26 Malina's FBI file. Letter dated 12 September 1952.

27 Malina's FBI file. Office memorandum dated 3 October 1952.

28 Malina's FBI file. Report dated 28 October 1952 and Memorandum dated 10 October 1952.

29 Malina's FBI file. Memorandum dated 12 January 1953.

30 Malina's FBI file. Report dated 29 January 1953.

31 Malina's FBI file. Letter from Warren Olney III, Assistant Attorney General, Criminal Division to Director, Federal Bureau of Investigation dated 10 March 1953.

32 Malina's FBI file. Report dated 29 January 1953.

33 Malina's FBI file. Letter from Legat, Paris in the American Embassy to the Director, FBI dated 24 November 1952.

34 Malina's FBI file. Report dated 29

January 1953.

35 Malina's FBI file. Letter dated 10 February 1953.

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45 Malina, Letter to parents dated 13 March 1938. Malina Papers, Box 21.

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47 Malina, Letter to parents dated 28 May 1945. Malina Papers, Box 22.

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## THOUGHTS ON THE SPACE SHUTTLE'S FINAL FLIGHT

### John Glenn

#### First American in Orbit (1962), flew on the Space Shuttle (1988)

When we look back on it, I think it was the perfect vehicle for its time.<sup>1</sup>

### Robert Crippen

#### Pilot, STS-1

Those vehicles, in my opinion, could fly for another 30 years and could be flown safely.<sup>1</sup>

### Michael Griffin

#### Former NASA administrator

It's a strategic mistake for the United States...to replace the Space Shuttle for nothing.<sup>1</sup>

The main legacy of the Space Shuttle is that, while it did not make spaceflight as its designers intended, it made spaceflight far more accessible than any vehicle, Russian or American, to date...I think a due amount of respect has to be paid to that.<sup>2</sup>

The regret in retiring the Shuttle is not that we're retiring a 30-year-old system. That's to be expected...The regret is that we're not moving on to something that can do more for us. We're not moving on to anything...I was in favor of retiring the Shuttle if that was the price of building a system that could take us back to the Moon and beyond. I'm not in favor of retiring the Shuttle and replacing it with nothing...That is what is going to happen.<sup>2</sup>

### Christopher Kraft

People wanted to get rid of the Space Shuttle and so they have done so. They have done so in condemning it in my different ways, all of which in my opinion were false.<sup>3</sup>

### Howard McCurdy

#### American University

Let's not forget why the president and Congress originally approved the Space Shuttle: to cut the cost of

spaceflight...Humans are not going far in space so long as it costs \$1 billion every time we light the candle.<sup>2</sup>

### George Mueller

#### Former NASA official, called the father of the Space Shuttle program

It's the end of a career, not the beginning of a new one. What we lack is the beginning of a new one.<sup>1</sup>

### President Barack Obama

#### White House statement after the launch

Behind *Atlantis* and her crew of brave astronauts stand thousands of dedicated workers who have poured their hearts and souls into America's Space Shuttle program over the past three decades. To them and all of NASA's incredible workforce, I want to express my sincere gratitude. You helped our country lead the space age, and you continue to inspire us each day.



1938 Book # None 1939 Book # 1020 ✓

Real Name Frank J Malina Party Name Frank Parma

Address 1671 So Catalina St

Section Pasadena Branch Prof - N.W.

Joined Nov 1938 Male  Female  Negro  White  Age 26

Country of Birth U.S. National Origin Czech

Occupation Student Employed  Unemployed

Name of Union No Local

Paid Official in Union? Yes  No

Workers Alliance  IWO  ILD  FSU  Amer. League  LNPL

Other Mass Organization No

Was disciplinary action ever taken against you? \_\_\_\_\_

Place of employment Cal Tech

Address of shop or job location \_\_\_\_\_

Number of workers: Under 100  100-200  200-500  500-1000

How many Party members in your shop? \_\_\_\_\_

Party Schooling \_\_\_\_\_

Function \_\_\_\_\_

Frank Malina's Communist Party application form from 1939. From Malina's FBI file, which was obtained by the author from the Freedom of Information Act.

world and in possession of knowledge—many governments, not least of the Soviet Union, desperately

a 1982 interview former Malina

the theft had occurred at Caltech. It was information that indicated a connection with the wind tunnel...I had quite a similar experience that happened in 1945. In this case, I know a

for years ... That's a pretty awful thing—that someone you know, a friend, may have done something that's really very bad."18

In August 1949 the FBI intensif