

Failure is not an Option is the memoirs of Gene Kranz, a pioneer of mission control in the Mercury, Gemini, and Apollo space programs. Writing almost forty years later, Kranz offers his account of mission control from its beginnings at Cape Canaveral during the Mercury missions, to its growing pains and move to Houston during the Gemini missions, through its maturation and Kranz's flight controller equivalent of "passing of the torch" during the Apollo missions. In his memoirs, Kranz incorporates personal recollections of conversations, meetings, and decision-making events, and he adds intimate details about his marriage, family, and hobbies during the 1960s.

Kranz's main purpose is to promote the space program by esteeming the experiences of the author and his peers involved in the Mercury, Gemini, and Apollo programs. Kranz explicitly states this intention at the end of the epilogue, "My wish as I close this book is that one day soon, a new generation of Americans will find the national leadership, the spirit, and the courage to go boldly forward and complete what we started" (p. 384). The author hopes to inspire the public with his memoirs, and in fact, his epilogue is a call-to-action, comparing the "new and bold space achievements" of the past with the current "nation of spectators, unwilling to take risks or act on strong beliefs" (pp. 381-382). The author's call shows his belief that in contrast to today, men's dedication and passion for the space program during his tenure in mission control led to great accomplishments in space.

Certainly, the author has a handful of secondary objectives in writing his book. Most memoirs are written partly out of the human desire to be remembered and partly to offer a certain perspective on a historical event to be integrated with other accounts. However, Kranz was approached to write his book by his agent, who managed his career in public-speaking to promote space (p. 388), so his memoirs are clearly shaped with a similar objective as his career.

Kranz's desire to demonstrate the dedication and passion of his generation for space is given substantial support when qualified as the dedication and passion of mission controllers. Essentially, every mission that Kranz describes includes some important contribution of a mission controller; a classic example is the Apollo 12 navigational system failure, which was solved when the mission controller John Aaron remembered a similar instrumentation failure that occurred in a previous year (p. 300). The author

explains the struggles and triumphs of the controllers and makes the story engaging on a personal level. Kranz appeals to the reader's patriotic, relational, and spiritual sentiments with such reflections as, "I pray that my children will someday feel the triumph, the joy, and the shiver I felt the day we painted the Moon with our Star-Spangled Banner" (p. 295). The evidence is quite strong because Kranz's experiences show that he is highly qualified to speak on the space program, and it is nearly impossible to argue with personal anecdotes relating directly to the events discussed.

The author cites the well-known failures of the Apollo Project but always recasts them into inspiration for the future. A key example is Kranz's rally of the mission controllers after the Apollo 1 fire; he created the motto "tough and competent" to "remind you of the price paid by [Apollo 1 astronauts] Grissom, White, and Chaffee" (p. 204). He also uses this opportunity to exult the leadership of the Apollo era: "the miracle of the NASA rebirth after the fire was due to four of the best leaders the program ever had" (p. 211). Kranz does not mention or discuss post-Apollo objectives, except in mentioning his frustration with the cancellation of the Apollo program. Overall, Kranz is able to demonstrate the passion and dedication of the mission controllers, and the fact that his book became a New York Times Bestseller showed that it partially accomplished its goal of promoting space to the general public.

Kranz's argument focuses on the role of men like himself in the successes of mission control, so in terms of the man-machine debate, Kranz constantly emphasizes the triumph of the "human factor". For example, Kranz's response to the Apollo 13 mission was "the human factor had carried the day" (p.337). In fact, Kranz is so confident about the role of the human in space that after Apollo 14 he states, "In the three Moon landings, the crews and controllers had become masters of improvisation...feeling that there was no emergency we could not handle..." (p. 351). While he notes the importance of technology, he clearly emphasizes the role of men.

Kranz's memoirs are peripheral because while the content directly discusses the Apollo project, this piece presents a single point-of-view of the project from the eyes of a flight director. Launius categorizes Kranz's book under Apollo Technology for its role in discussing "high-technology management and systems engineering." Indeed, Kranz offers an insider's view of the management of missions control; however, this

categorization does not seem to fit with Kranz's overall purposes. Actually, Kranz's book shares the same purpose of promoting the space program as memoirs of astronauts that are under the category Apollo Missions and the Cult of the Astronaut. Like the role of 'nosecone history', this book contributes to our deeper understanding of Apollo by opening up the world of the flight controller. It adds details to our knowledge of the role of mission control and insight into their decision-making processes.

An example of this decision making occurred during the Apollo 13 flight, when a cryogenic tank exploded during the translunar coast. It became clear that the lunar mission would be aborted, and the controllers would focus on returning the crew safely to earth (p. 314). The flight directors had to make an engineering decision, deciding on the best trajectory for the return flight. At the time of the explosion, Apollo 13 was "entering the lunar sphere of influence," or the phase of the mission where the lunar gravity becomes stronger than Earth's gravity. Thus, the decision had to be made before the point of ignition in three hours (p. 316).

The technical considerations involved the quantitative differences between two basic options: a direct abort or going around the moon. The direct abort was the shortest and fastest, returning the astronauts to earth in 34 hours, but would require jettisoning the lunar module (LM) and using all the main engine fuel. Of the several options for going around the moon, the best option at the time of decision would take 82 hours but would keep the LM and not use the main engine. While the LM provided extra life support resources, it was only designed to support two astronauts for two days, and in addition, the path around the Moon left power concerns.

The flight directors did not immediately agree on the correct course of action. However, keeping the LM added time and options to the controllers' repertoire, especially since the cause of the explosion and the extent of the damage were still unknowns. Kranz drew from his experiences to argue that the controllers needed more time to write the return procedures than the direct abort allowed. In addition, the trajectory controllers were nervous about performing a direct abort so close to the Moon (p. 317).

The non-technical factors included a feeling against using the main engine and the CSM service propulsion system. Kranz notes that the system was located on same side of

the spacecraft as the explosion and cannot be tested until needed. His logic reflected an unstated sentiment that many felt, described as “through some miracle, a burst of intuition, something we had all seen, heard or felt now told us, ‘Don’t use the main engine.’ To this day I [Kranz] still can’t explain why I felt so strongly about this option” (p. 317). Kranz’s Catholic faith is reflected throughout the book, from his continual prayers for his team and crews, to thoughtful notes about the reading from Genesis on Apollo 8, to thankful expressions for the special pre-mission church services given by his local church. It seems that God was once again supplying Kranz and his team with the blessing of inexplicable knowledge; the crew later discovered that the explosion had rendered the main engine unusable. Kranz himself notes, “At a certain point the human factor has accomplished all it can. Then things rest in the hands of a higher power.”

Kranz reflects that the danger of leaving a decision open on a large project like Apollo occurred on Gemini 9 when the upper management made a poor operational decision that the crew eventually vetoed (p. 317). Thus, the nature of engineering on Apollo involved the integration of many knowledgeable opinions and contributions, cumulating in reliance on experienced leaders to make the final decision. The analysis also points to leaders using wisdom and knowledge to make their decision and then trusting their best was sufficient.

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