



*George M. Low*

## George Michael Low

1926–1984

By James C. Fletcher

George Michael Low, a long-term pioneer in the nation's space program and a key figure in the success of the Apollo lunar landing, died of cancer at age fifty-eight on July 17, 1984. During the previous eight years, George Low was president of Rensselaer Polytechnic Institute and, in addition to developing the institute into one of the nation's finest, played a leading role in formulating the nation's science and technology policy.

In fact, in recent years, whenever strong leadership was needed to resolve a new problem or to pursue a new opportunity in any branch of science or technology, George Low's name was always at the top of the list. His contributions covered a broad span of disciplines: aviation, education, manufacturing technology, research, space automation—almost anything on the "cutting edge" of technology.

George Low was born in a small town just outside of Vienna, Austria, in 1926. His family emigrated to America when George was only fourteen, by which time his obsession with engineering and technical matters was already well established. After graduating from high school in only two years, he entered Rensselaer Polytechnic Institute in Troy, New York, but was drafted into the army at the age of eighteen.

During his army service, he became a naturalized citizen

(in 1945) and received his pilot's license. He was discharged in 1946 and returned to Rensselaer, earning a B.S. (1948) and an M.S. (1950) in aeronautical engineering. While at Rensselaer he married Mary R. McNamara, of Troy, New York, a wonderful lady who supported George fully in all his later endeavors.

In 1949 George Low joined NASA's predecessor organization, the National Advisory Committee for Aeronautics (NACA), and began work as a research scientist at Lewis Research Laboratory in Cleveland, Ohio. He remained there until 1958, publishing many reports on his research. He soon demonstrated leadership qualities at the Lewis lab in several capacities, the last of which was chief of the Special Projects Branch, a position he held until NASA was formed in 1958. At that time he was brought to Washington as chief of manned space flight for the newly formed agency.

In his new capacity, he helped prepare the material for President John F. Kennedy that led to the president's announcement in 1961 that the country would embark on a program to land men on the moon before the end of the decade. As the new Apollo program got under way in 1964, the Manned Spacecraft Center (now called the Johnson Space Center) was established in Houston, Texas, and George Low was appointed deputy director. In this capacity, he had overall responsibility for the Gemini and Apollo spacecraft development, as well as for future program development and flight and astronaut operations—in fact, for all activities related to manned space.

In April 1967, after the disastrous Apollo fire that killed three astronauts, NASA administrator James Webb agreed that Low should work fulltime on Apollo spacecraft development as manager of the Apollo spacecraft program. In this capacity, Low worked a grueling ninety-hour week for more than a year and a half. In 1968 he declared that the Apollo spacecraft was flight-worthy and persuaded deputy administrator Thomas Paine to move the first flight to the moon ahead of schedule to December 1968, thus leading to

the historic *Apollo 8* flight around the moon during the Christmas season with astronauts Frank Borman, Bill Andrews, and Jim Lovell aboard.

The moon landing soon followed on July 20, 1969, with Neil Armstrong setting the first human foot on the moon—a step that completed the program that George Low had recommended and President Kennedy had approved eight years previously. A plaque in the Smithsonian Air and Space Museum placed less than a month after his death attests to this fact.

In December 1969 Low was again summoned to Washington, this time by President Richard Nixon, to become deputy administrator of NASA. He served in that capacity until all the Apollo flights were completed, including the Sky Lab and the Apollo-Soyuz programs. The latter had been initiated by President Nixon and Premier Brezhnev during the historic summit conference of 1972. (At the suggestion of Dr. Henry Kissinger, however, Low had been sent on several secret missions to the Soviet Union to determine with absolute certainty that the program was feasible, both technically and politically, before the president agreed to place it on the agenda for the summit conference.) The entire program, from start to finish, was completed in three years—another near miracle, especially considering the requirement of joint development by two countries with completely different cultures and political systems.

At the conclusion of the Apollo program and after twenty-seven years of government service—not withstanding NASA's embarkation, under his leadership, on the new space shuttle program—Low began to consider the many offers he received of positions outside the federal government. The choice was easy. Even during his NASA days, he had enjoyed being with young people, and his vision of the future included the education of the next generation of leaders in the world of technology—the follow-on, so to speak, of the Apollo heritage. Thus, when he was invited in 1976 to become the fourteenth president of his old alma mater, Rensselaer

Polytechnic Institute (RPI), he accepted readily and began his second career.

RPI had always had an exceptional student body, most of which was drawn from the top five to ten percent of students taking college admission tests. Low proceeded to broaden its earlier reputation as a first-class undergraduate school to that of a national research university and a pioneer in several areas of new technology. This program involved a number of activities on Low's part, many of which required new skills that had not been apparent during NASA days—for example, raising money. Low's mastering of such skills was soon evident as new buildings were constructed, an industrial park was developed, prestigious faculty were added, and RPI established new programs in manufacturing technology, computer graphics, and integrated electronics that were among the first in the nation.

Recognizing that the national visibility of RPI depended partly on his own contributions, George began to accept assignments on the national level that he felt were sufficiently important to require leadership from someone of his stature. Perhaps the assignment with greatest visibility was his chairing of the commission established under the National Research Council to examine in detail the operation and maintenance procedures of the Federal Aviation Administration after the disastrous DC-10 crash in Chicago in 1979.

Within the National Academies of Science and Engineering, his contribution was most outstanding in his role, in 1981, as the first chairman of COSEPUP (Committee on Science, Engineering, and Public Policy). Studies ranging from a broad consideration of security restrictions on university research to the technical competitiveness of U.S. industry were conducted under COSEPUPs' jurisdiction; all such studies involved the nation's top scientists and engineers. National policy in science and engineering has, to a large extent, been derived from the studies sponsored by COSEPUP, which Low chaired.

George Low had many talents and used them well to serve

the nation and to educate future world leaders. His writing and speaking skills were well known and were used effectively in managerial positions, in many of his published speeches, and in his numerous committee assignments (and, occasionally, as an outlet for his quiet humor, as the author of this tribute can testify).

Another talent was his keen sense of institutional mechanisms and how they aided or hindered whatever program he might be implementing at the time. This ability was especially apparent at NASA headquarters in dealing with the White House and Congress, but it was also noticeable in his public speaking engagements at RPI and in his dealings with the governor and the state legislature of New York.

He was a relentless program manager with an enormous capacity for absorbing details—to the wonder of everyone who worked for him. At one point, during the period following the Apollo fire, he said, "I probably know as much about toggle switches as anyone else does in the world." Toggle switches had been one of the flaws in the Apollo spacecraft. As a program manager, he had little tolerance for sloppy work, excuses for errors, or general incompetence. One did not remain for long on Low's team if any of these characteristics was apparent. On the other hand, he never failed to praise those who did measure up. In fact, many of Low's protégés are now in charge of significant portions of the NASA program and active in other parts of government. It is to be expected that more recent graduates of RPI will be equally successful.

George Low rarely commented on his many accomplishments, but once when asked, he stated: "A career isn't a plan, it's a series of opportunities." For him, that statement was, indeed, true. He could have remained a skilled, successful researcher and enjoyed it, or he could have been an exacting designer-engineer. Yet the combination of his talents and his capacity for hard work when the occasion required it pushed him into more and more responsible positions—a progression that ended only with his death—as president of RPI,

chairman of COSEPUP, and a director of the General Electric Company.

His clear-sighted perception of future trends led him to a firm, positive belief in progress and, although his vision was always on "the future," his contributions, both at NASA and at RPI, were practical, well thought out, and completed in "the present." His interest in the future was reflected in an interest in youth, not only at NASA and RPI but also in his devotion to his five children, Mark, Diane, David, John, and Nancy.

Low received many honors, medals, and honorary degrees throughout his career, beginning, perhaps, in 1963 with the Arthur Flemming Award for the ten outstanding young men in government and continuing with the National Academy of Engineering's Founders Award in 1978—the highest award given by the academy. On July 20, 1984, the fifteenth anniversary of the landing on the moon and three days after George Low's passing, President Reagan announced that Low would receive the Medal of Freedom, the nation's highest award to a civilian.

George Low was impressive as an associate, awesome as a boss, but kindly and gentle as a friend. As the president said on July 20, "We're grateful for what George Low has done and the ideals he stood for, and we'll miss him very much."

