William B Bergen

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1915–1987

By Rene H. Miller

William B. Bergen, aerospace engineer and executive, died on October 9, 1987, of cancer at the age of seventy-two in his home at St. Michaels, Maryland. His entire career was spent in the aerospace industry, first at Martin Marietta where he was president of the Martin Company Division at the time of his leaving to join the Rockwell Company in 1967. There he served as president of the Space Division and was the principal executive responsible for the command and service module for Apollo during the crucial period of its development. After his retirement in 1975, he served as a consultant, including a year with Rolls-Royce in England.

Bill Bergen was born at Floral Park, Long Island, New York, a descendant in a direct male line from the Dutch colonists who settled in America prior to 1675. He graduated from the Massachusetts Institute of Technology (MIT) in 1937 with a B.S. in aeronautical engineering and in the same year joined the Glenn L. Martin (GLM) Company (now Martin Marietta Corporation) as a structures engineer. He became interested in the emerging problem of aeroelasticity, a problem that soon proved to be of critical importance to the company. At the time, GLM was developing the PBM-1 flying boat, using the then new concept of large extrusions in an innovative wing design in which all bending loads were taken by the spar caps with a thin skin acting mainly as a torsion box. The intent was to avoid the weight

penalties of shear lag. However, the result was a wing highly flexible in torsion. Literature on the subject of wing flutter had just become available (National Advisory Committee on Aeronautics, NACA TR 496) and calculations of torsion-flexure flutter indicated a critical speed well below design dive speed. The company was understandably skeptical of these complex analyses but authorized the construction of a dynamically similar flutter model after Bergen had demonstrated the phenomenon of flutter with a simple tabletop wind tunnel driven by a cooling fan. A dynamically similar model of the PBM-1 was quickly constructed, probably the first scaled flutter model ever built, and tested at NACA, Langley. The model exhibited a perfect example of the equally new and poorly understood problem of wing torsional divergence, well below the computed flutter speed.

By this time the PBM-1 was nearing rollout and there was no possibility of design changes. It was decided to conduct a cautious flight-test program with primary emphasis on flutter prediction. Accordingly, Bergen designed a wing vibrator in order to excite the wing in flight, hopefully well away from flutter, with the intent of measuring the reduction of damping with speed and extrapolating to the critical flutter speed. Since this involved extensive real-time computations during flight, the flutter analysts joined the flight test crew. Similar tests had just been conducted in Germany, resulting in the crash of a JU90 for reasons that at the time were not well understood. A similar fate was probably spared the PBM-1 because other problems associated with the highly flexible wing quickly surfaced.

The aircraft was equipped with retractable wing floats and the first attempt to retract and then extend these in flight resulted in the starboard float jamming in the retracted position due to wing flexibility. Bergen was asked if he would climb out on the port wing during the approach to landing and crawl out to the tip in order to keep the wings reasonably level during landing, a successfully executed maneuver. His reputation was further enhanced when a redesigned, now fixed, float exhibited a steady vibration that grew alarmingly with speed. Bergen designed a damper that cured the problem. By this time it was concluded

that the battle with wing vibration had been lost and the aircraft was returned to the shop for a complete wing redesign using the corrugated skin and cover previously standard at GLM.

The abilities he had exhibited during this very difficult development program helped to establish Bergen's reputation as a highly capable and dynamic young engineer. He advanced rapidly in the company thereafter. Always ready to tackle new technology, he became interested in pilotless aircraft at a time when the guided missile was a new and promising weapon system, and developed early automated flight-test equipment for these systems. In 1945 he became chief of the Guided Missile Section and paved the way for Martin's entry into the missile and electronics fields. He had the prime engineering role in the development of the first U.S. tactical missile, the Air Force Matador, and the U.S. Navy's Viking high-altitude research rocket. From 1948 to 1961 he was successively director, Special Weapons; chief engineer; and vice-president engineering. In 1953 he was appointed vice-president operations, then executive vice-president, followed by his appointment as president of the company in 1959. Under his guiding hand, a management concept evolved giving Martin the capabilities to handle many major programs at one time, efficiently. Bergen was the father of this. It was called "systems management" and has been employed by many companies the world over. In 1961 the Martin Marietta Corporation was formed, and Bergen became corporate vice-president, remaining as president of the Aerospace Division. He was responsible for the development of Titan I, II, and III, and Pershing, Sprint, and Gemini. Aircraft developed during this period included the Martin 404, the XB-51, and the XP6M-1.

Bill Bergen left Martin Marietta early in 1967 and joined North American/ Rockwell shortly afterward. Very difficult work on the Apollo was in progress then, following the disastrous Apollo fire. He was appointed president of the Space Division and was instrumental in bringing Apollo and the Saturn V Stage II programs to a successful conclusion. In 1970 he became president of the North American Aerospace Group. During his eight years at Rockwell, he directed, in addition to the Apollo program, the Space Shuttle development and the B-1 Bomber

program. He also had responsibility over the Rocketdyne Engines and Atomics International divisions. One of his major contributions at Rockwell was to emphasize equal opportunity programs for minorities.

In 1975 he retired to his home in St. Michaels, Maryland, where he continued to act as a consultant, including an enjoyable period in England as director of the Commercial Engine Division of Rolls-Royce.

Bergen received several honors during his eventful career. In 1943 he received the Lawrence Sperry Award of the Institute of Aeronautical Sciences for his pioneering work on aircraft structures. In 1963 he was awarded an honorary doctorate of engineering degree from Drexel University. He received three Public Service awards from NASA, in 1966 for his contributions to the success of the Gemini program; in 1969 for his contributions to the Apollo 8 program, the first manned lunar orbit mission; and again in 1969 for his contributions to the exceptionally successful flight of Apollo 11. The National Academy of Engineering elected him a member in 1974.

One of Bergen's major personal and professional motivations was to advance the cause of engineering in the public sector by means of his frequent speeches and public appearances, and to bring his enthusiasm and knowledge, and that of his company associates, to bear on pressing technological issues. His dedication to public service is evidenced by his willingness to serve actively on innumerable boards and associations. He was a member of the board of governors and a fellow of the American Institute of Aeronautics and Astronautics and a fellow of the American Astronautical Society. He was also a member of the Association of the U.S. Army (Industrial Advisory Group); Armed Forces Association; Air Force Association; Society of Automotive Engineers; Delta Tau Delta, of which he was a member at MIT; the National Space Club; and the Conquistadore del Cielo. He served on the board of directors of the California Chamber of Commerce and was a member of MIT's Aeronautics and Astronautics Visiting Committee and its Corporation and Executive Committee.

An active sportsman throughout his career, Bergen was an enthusiastic oarsman at MIT and continued this hobby through his early days at GLM. He enjoyed horseback riding, golf, tennis, hunting, particularly duck hunting on the Chesapeake, and fishing. He held both single and multiengine pilot certificates.

Bill Bergen was an inspired engineer and a skillful and driving manager, fair but demanding. He drove himself as hard as he drove his colleagues, but his sense of humor always served to lighten the work load and establish a spirit of camaraderie that helped to carry his endeavors to their usual successful conclusion. He was warm and kind, and a delightful friend, companion, and colleague.