



L. E. Fook

L. Eugene Root

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L. EUGENE ROOT, who helped design Douglas aircraft of the 1930s and 1940s and later led Lockheed Missiles and Space Company (LMSC) to maturity, died January 23, 1992, in Menlo Park, California. He was eighty-one.

He was a charter member of the RAND "think tank" and a cofounder of the American Institute of Aeronautics and Astronautics. He was elected to the National Academy of Engineering (NAE) in 1965 and was a councilor from 1968 to 1969.

Gene Root was born on July 4, 1910, in Lewiston, Idaho, one of five children. His family moved to the San Joaquin Valley of California—he often called himself "just a country boy"—and he entered the University of the Pacific (UOP) in 1928.

He augmented academic and athletic scholarships by a loan (which he repaid in seven years) from a hometown woman whose newspapers he had delivered. While at the university, Gene was a rushing guard on the football varsity, a member of Delta Upsilon fraternity, president of the honor society, freshman handbook editor, and a student government leader. He earned a bachelor's degree in engineering and mathematics in 1932. Then he was named outstanding alumnus in 1957 and received an honorary doctor of science in 1958. He was also a regent of UOP in the 1960s.

He received master's degrees in mechanical engineering (1933) and aeronautical engineering (1934) from the Califor

nia Institute of Technology, plus the Alumni Distinguished Service Award (1966). He was a registered professional engineer in California.

The legendary aircraft designer Arthur E. Raymond hired Gene from Caltech to be assistant chief of aerodynamics at the Douglas Aircraft Company in 1934. Gene improved the flying qualities of Douglas's DC-3 transport and Dauntless dive bomber. He helped design and test DC-4E, DC-5, and C-54 passenger planes; A-20, A-26, and AD Skyraider bombers; the Skyrocket research aircraft; and the F4D-1 Skyray fighter.

In 1945 he went to Europe with the Navy Technical Mission to determine how German scientists achieved supersonic flight. Their data, which he compiled into five thousand feet of microfilm, showed swept wings, advanced jet engines, and air intakes. This information saved U.S. designers up to five years of development.

In 1946 Gene Root was one of four charter members of Douglas Aircraft's RAND Project—formed at the request of the U.S. Air Force to study strategic bombing needs—which evolved into the nonprofit RAND Corporation for studying national security problems. Secretary of Defense James Forrestal assigned Gene and then-Colonel Donald Putt to write *Standard Aircraft Characteristics*, the basic text for quoting aircraft performance. After that he produced similar key references.

Gene helped launch the U.S. Air Force's development planning office in the Pentagon from 1951 until he joined Lockheed Aircraft Corporation in Burbank, California, in 1953 as Lockheed's first director of corporate development planning. The company, an aircraft builder, had done research with X-7 rockets, but Gene's group convinced Lockheed's executives to thrust vigorously into the fledgling area of missiles and space. As a result, Lockheed created its Missile Systems Division (MSD, which is today's LMSC) in Van Nuys, California, in 1954.

Gene's unabashed vigor ensured MSD's first win, the prime contract for the U.S. Navy's Polaris Fleet Ballistic Missiles. At a contractor briefing on December 27, 1955, in Washington, attendees were asked to commit to the program. First to reach the chalkboard, Gene wrote "LOCKHEED," then turned and said, "We're ready. Who's next?"

That big Polaris contract meant MSD needed a bigger site. Gene helped influence the choice. It was to be in the agrarian Santa Clara Valley, where he'd picked apricots to help pay his way through college. There were major universities nearby—California, Stanford, Santa Clara, and San Jose State—plus a ready pool of employees. So in 1956 MSD moved from Van Nuys, building its main plant in Sunnyvale and laboratories in Palo Alto, a true Silicon Valley pioneer.

To head MSD, the corporation named Gene Root corporate vice-president and MSD general manager and named Herschel Brown MSD assistant general manager. Gene shepherded the development not only of Polaris, the world's first submarine-launched strategic missile, but of Agena, the workhorse spacecraft for the U.S. Air Force. Under him the company branched into ocean, ground, and information systems.

Gene went to broader corporate duties in Burbank in August 1959, and Herschel Brown ran the Sunnyvale operation. In June 1961 the division was upgraded to Lockheed Missiles and Space Company, and simultaneously Gene returned as its president.

Open heart surgery forced him to retire in September 1969, by which time the Fleet Ballistic Missile program was producing its fourth version (Poseidon), and the Lockheed Agena had been part of the first linkup of vehicles in space.

Gene served on the scientific advisory board to the Air Force chief of staff from 1948 to 1956, was a member of the Defense Science Board from 1957 through 1966 (except for 1963), and was active in many steering and advisory panels for the director of defense for research and engineering.

His honors included the U.S. Air Force's Exceptional Service Award (1957), the Navy's Distinguished Public Service Award for personal contributions to the Polaris missile team (1960), and the NASA Public Service Award for Lockheed's part in the Gemini program (1966).

Another achievement occurred when Gene, as president of the Institute of Aeronautical Sciences, and William Pickering of NASA's Jet Propulsion Laboratory and president of the American Rocket Society, merged their organizations in 1962 to form the major U.S. aerospace society, the American Institute of

Aeronautics and Astronautics (AIAA). Gene was a fellow of the AIAA, the American Astronautical Society, the Royal Aeronautical Society, and the British Interplanetary Society.

Besides NAE, his memberships included the Operations Research Society of America, Society of Automotive Engineers, American Ordnance Association, Electronics Industries Association, California Society of Professional Engineers, and National Society of Professional Engineers. He was a 1987 inductee of the Santa Clara County Hall of Fame.

In retirement he qualified as a licensed amateur radio operator and was a life member of the American Radio Relay League. His call letters, WB6000 (Oscar, Oscar, Oscar), honored his support of Project OSCAR (Orbiting Satellite Carrying Amateur Radio), representing a happy combination of his interests in space research and ham radio.

Gene and Laura Beryl Mount, a UOP graduate, were married in 1935 and celebrated their fiftieth anniversary just before she died in 1985. They are survived by two sons, Kirby Root and Brian Root. The Roots' daughter, Karen King, died in 1977.

