



*W. B. McLean*

# William Burdette McLean

## 1914-1976

By David S. Potter

William B. Mclean, a pioneer in the development of air-launched guided missiles and advanced torpedoes, died in San Diego, California, on August 25, 1976, after a long illness.

A talented engineer, inventor, and research physicist, Dr. McLean probably is best known for his original concept of the successful *SIDEWINDER* air-to-air missile, which, at the time of its development, represented an unsurpassed level of reliability, simplicity and low cost, and which provided his guidelines for future missile systems engineering.

Dr. McLean was born on May 21, 1914, in Portland, Oregon. He received a Bachelor of Science degree from the California Institute of Technology in 1935. He then served as a physics instructor at that institution, while pursuing graduate studies in nuclear physics in the Kellogg Radiation Laboratory under Charles Lauritsen and William Fowler. Dr. McLean received a Master of Science degree (1937) and a Doctor of Philosophy degree (1939) in physics from California Institute of Technology before accepting a postdoctoral fellowship in nuclear physics at the University of Iowa from 1939 to 1941.

As a young graduate student, Dr. McLean displayed the inventive design and engineering abilities that would characterize his career. He designed and built a half-million volt Van de Graff generator as a pilot project for a larger, one-Mev generator later built at Kellogg. He then used the generator, coupled with a cloud

chamber built by his fellow student and lifelong friend and colleague, Robert A. Becker, to complete his doctoral studies of short-range alpha particles.

During his fellowship at the University of Iowa, Dr. McLean continued his research into the physics of subatomic particles, concentrating on the angular distribution of protons from the D-D reaction as a Research Associate under Alexander Ellett.

Dr. McLean entered Government service in 1941 as a Research Physicist designing weapons fuses for the National Bureau of Standards. In 1945 he moved to the Naval Ordnance Test Station (now the Naval Weapons Center) at China Lake, California. During his twenty-two years at China Lake, he rose to national prominence in the development of air-launched guided missiles and advanced torpedoes. He was Technical Director at China Lake for thirteen years. He then became Technical Director of the Naval Undersea Center when it was established in 1967, for seven years before his retirement in 1974.

Dr. McLean was a staunch supporter of a strong Government program in oceanography. He predicted that significant advances in underwater detection and surveillance would be made in the areas of improved acoustical signal processing and display. He also made notable contributions to the advancement of science and national defense and to the field of public service in his thirty-three years of Federal service.

McLean was a superb engineer. His personal hallmark was artistic engineering design, wherein the parts fit and work together in a most natural and economical manner. He possessed a facile and profound synthetic and spatial imagination. As a result, he customarily invented and perfected complex electronic circuits and electro-pneumo-mechanical devices on the bench and in the shop without using diagrams or drawings of any kind. His only use of such aids, typically, was in trying to communicate his ideas to machinists, technicians, patent attorneys, or other people.

Since Dr. McLean was educated as a physicist and was by nature a systems thinker, he paid little attention to the traditional boundaries between such disciplines as mechanical, electrical, and fluidic engineering. And even though he had an excellent ability to use the

mathematics of all those fields, he put little trust in the analyses or deductions of such mathematics. His preferred working mode was to place himself mentally in the position of each element of the device under consideration in order to "feel" whatever forces or current flows the element would be required to generate or respond to. Then he would quickly build an example of what he was thinking about and observe its behavior under various conditions. Next, he would upgrade his thoughts and the device he was working with, and then he would test it again—it was a highly dynamic and fluid process.

In addition to his achievements in developing the *SIDEWINDER* guided missile, Dr. McLean was busy inventing and developing hundreds of other systems and devices both great and small. At the time of his death, he was actively pursuing, as best as he could under the conditions of his illness, the development of a wave-powered upwelling pump for application to the vast oceanic seaweed production farms that many believe will be a striking feature of the world of the next century.

In recognition of his outstanding achievement, special awards included the maximum Federal Government Award of \$25,000 for the development of the *SIDEWINDER* missile (1956), Naval Ordnance Test Station's L. T. E. Thompson Award (1956), Resolution of Commendation by the California State Legislature for *SIDEWINDER* development (1957), the President's Award for Distinguished Federal Civilian Service (1958), the American Ordnance Association's Blandy Gold Medal (1960), the Rockefeller Public Service Award for Science, Technology, and Engineering (1965), the Secretary of the Navy Certificate of Commendation (1966), California Institute of Technology Alumni Distinguished Service Award (1969), and the IEEE Harry Diamond Award for outstanding leadership of development in guided missiles and undersea exploration and transport (1972).

Dr. McLean served on various committees and boards of national prominence, including the National Inventors Council, American Physical Society, and American Association for Advancement of Science. He was a member of Tau Beta Pi and Sigma Xi and served as a Fellow of the New York Academy of Sciences and of the

Institute of Electrical and Electronics Engineers. He was elected to the National Academy of Engineering in 1965 and to the National Academy of Sciences in 1973 and served on various Academy committees, panels, and boards. He authored numerous publications, and there are more than thirty-five patents to his credit.

William McLean is survived by his wife, Laverne (née Jones); his three sons, William Robert, Daniel Malcolm, and Mark Alan; and two grandchildren.

