



Abraham Hertzog

ABRAHAM HERTZBERG

1922–2003

Elected in 1976

“For contributions to heat engine, shock tube, and laser technology.”

BY ROBERT G. LOEWY

ABRAMHAM HERTZBERG, a highly creative and gifted aerospace engineer, died on March 27, 2003, at the age of 80. An industry and government practitioner, academician, researcher, and consultant, he had devoted 60 years to his chosen field of aeronautics and astronautics.

Abe’s interest in aerodynamics was evident at an early age. As a teenager, he spent many hours building and flying model airplanes and trying to replicate Robert Goddard’s experiments with rockets. He earned his pilot’s license at 16 and often entertained his friends and family with stories of his adventures as a pilot.

Abe earned a B.S. from Virginia Polytechnic Institute in 1943 and went to work thereafter as an aerodynamicist for the Curtis-Wright Corporation. In 1944, with World War II still raging, he became a flight-test engineer for the U.S. Army. After the war, he left the Army and returned to school, this time as a graduate student of Arthur Kantrowitz at Cornell University. While at Cornell, Abe had a bout with polio, which left him with a weakness in one leg that required him to wear a brace. Although this condition slowed him down a bit, it never stopped him. He earned an M.S. from Cornell in 1949, and immediately went to work at the Cornell Aeronautical Laboratory (CAL) in Buffalo, New York, later known as CALSPAN.

At his farewell party at Cornell, he met his future wife Ruth (Cohen) who had just arrived to work as a mathematician in the Aeronautical Engineering Department. They courted long distance and married in September 1950. She then joined him at CAL where they worked together on the development of the shock tube, laying the groundwork for advanced hypersonic technology that is still used today.

From 1949 through 1965, Abe took on positions of increasing responsibility at CAL. He began as an engineer, was appointed assistant head of the Aerodynamics Research Department in 1957, and became head of that group in 1959. During that time, he published some 35 papers dealing, for the most part, with the use of shock tubes and their instrumentation for the study of hypersonic flows, wave engines, and high-temperature gas dynamics and related chemical reactions. By this time, Abe was well known internationally for his research in high-energy gas dynamics and spacecraft reentry physics, for the development of shock tubes and shock tunnels, and for his active, influential participation in the National Aeronautics and Space Administration's (NASA) Research Advisory Committee on Fluid Mechanics (1959–1967).

When academia called in 1966, Abe responded, accepting the position of professor of aeronautics and astronautics and director, Aerospace Research Laboratory (ARL), at the University of Washington (ARL was later renamed by him to Aerospace and Energetics Research Program [AERP]). Initially Abe continued the work he had initiated in his later years at CALSPAN in Buffalo, but as time went on, his research broadened to include gasdynamic lasers, controlled thermonuclear fusion, engine-cycle improvements, thermal management of spacecraft (the liquid droplet radiator), a new hypervelocity launcher concept (the ram accelerator), cryogenic automobile propulsion, and the shock-wave chemical reactor for petrochemical pyrolysis, among other topics. He quickly developed into the most prolific researcher in his department and built a legendary following among his students. His work resulted in another 80 journal papers, reports, and papers in proceedings of national and international conferences. In the

process, Abe also guided 14 students to their master's degrees and seven to their doctorates. In addition he played a key role in hiring and mentoring new faculty; three of the faculty he attracted to the Aeronautics & Astronautics department went on to become chairs of the department.

Abe's enthusiasm for teaching extended beyond the professional setting. He loved to explain the workings of machines and natural phenomena to everyone around him. When his children were very young, a favorite family activity was to have a picnic dinner behind the Buffalo airport and watch the planes. Abe passed on his love of flight to his children through those early lessons in aerodynamics, inspiring two of them to get pilots licenses. His lessons on airplanes and auto mechanics inspired his son Paul and daughter Biz to become engineers. Biz has followed in her father's footsteps with her research in fluid dynamics as a professor of engineering at the University of Colorado.

Abe Hertzberg's intellect, creativity, insatiable curiosity, and aptitude for matters technological, as well as his straightforward, often forceful way of expressing himself made him a highly sought-after committee man, consultant, and advisor to federal agencies, industry, and professional societies. Abe always gave unselfishly of his time and energy in providing the desired services. As a full-time faculty member at the University of Washington, he somehow found time—over the years—to serve as a member of 13 NASA committees (and chair of two), six of them associated with the NASA Research and Technology Advisory Council (RTAC) and seven associated with the NASA Space Systems and Technology Advisory Committee (SSTAC); a member of the Air Force Scientific Advisory Board (1966–1978), including membership on seven panels/committees (and chair of two); a member of the U.S. Air Force Aeronautical Systems Division Advisory Group (1970–1973), including membership on eight panels/committees (and chair of one); and membership on technical and award selection committees of the American Institute of Aeronautics and Astronautics (AIAA) and other national service activities, such as membership on the advisory committees of the Defense Intelligence Agency,

National Science Foundation, Los Alamos National Laboratory, and the National Academy of Sciences Government-University-Industry Research Roundtable Working Group.

With his always affable, intense personality, Abe was fun to be around. He had a grasp of fundamentals and inventive insights into their practical applications that are so valuable in an engineer. He held no fewer than 21 patents, dating from 1958 through 1994.

His honors and awards, in addition to membership in the National Academy of Engineering, include Fellow of the AIAA and recipient of that organization's Plasmadynamics and Lasers Award and Dryden Lecture Medal; Fellow of the International Astronautical Federation; Honored Speaker / Keynote Lecturer for the Chinese Academy of Sciences (1983) and Citizens of Sendai, Japan (1991); Minta Martin Lecturer, University of Maryland (1975); the Laser Institute of America (1975); and he was twice named Paul Vielle Lecturer, the opening invited talk at the biennial International Shock Wave Symposium.

Ruth joined him on his international travels and their home was filled with evidence of those travels. They enjoyed entertaining guests to the Seattle area, many of them friends they met on their overseas travels. Abe and Ruth particularly enjoyed taking their guests deep-sea salmon fishing, even though they frequently said they were philosophically opposed to any activities that took place before noon.

The long-term importance of Abe Hertzberg's contributions can be inferred from a passage published in 2004, in "A History of the University of Washington Department of Aeronautics and Astronautics 1917-2003," by J. Lee, D. S. Eberhard, R. E. Breidenthal, and A. P. Bruckner.¹ In describing the Aerospace Research Laboratory (ARL), "devoted to advanced, multidisciplinary aerospace engineering research," they wrote

¹ Lee, J. S., Eberhardt, D. S., Breidenthal, R. E., and Bruckner, A. P., "A History of the University of Washington Department of Aeronautics and Astronautics 1917-2003," in *Aerospace Engineering Education in the First Century of Flight*, McCormick, B., Newberry, C., and Jumper, E., eds., AIAA, 2004, pp. 151-167.

that Hertzberg “and collaborators John M. Dawson of Princeton University and R. E. Kidder of Lawrence Livermore, and their colleagues, presented a paper titled, ‘Controlled Fusion Using Long-Wavelength Laser Heating with Magnetic Confinement,’ at the Esfahan Symposium on Fundamental and Applied Laser Physics in Esfahan, Iran, in late summer 1971. This seminal paper established the firm foundation of the fusion program at ARL, which continues to this day.” Virtually everything Abe Hertzberg did in his professional life had that kind of visionary interest.

Mr. Hertzberg was preceded in death by his wife. In her memory, he established a fund at the University of Washington to support and encourage engineering graduate students, especially women. He is survived by daughters Ellie Hertzberg, of Acton, Massachusetts, and Jean (Biz) Hertzberg of Boulder, Colorado; son Paul Hertzberg of Baltimore, Maryland; sister Bella Jacobs of Chevy Chase, Maryland; and two grandchildren, Allison and Samuel.

Abe is deeply missed by those who knew him and remember him for his enthusiasm for life and his work, his humor, and his ability to dominate a room with the power of his ideas and intellect.