

# Project Pioneer: Dr. E. Eugene Callens

In the last 40 years, the U.S. has worked to develop hypersonic technologies which would permit sustained atmospheric flight. At AEDC, engineers like Dr. E. Eugene Callens have played a key role in the development of state-of-the-art test techniques and facilities for ground hypervelocity testing under extreme aerothermal conditions.

Virtually every high-speed flight vehicle has required testing in AEDC's Tunnels A, B and C, from reentry and tactical vehicles and space capsules, to the X-planes and winged vehicles. Dr. Callens, who was a key player in integrating advanced technologies into operational test capabilities, had early involvement in specific projects ranging from the unique AEDC's Hypervelocity Track G Guided Rail Facility to the design of Electromagnetic Launchers (EML).

While at the center, he was responsible for all research and development and test programs in the Aeroballistics Branch of the von Karman Gas Dynamics Facility. He managed engineering and support personnel for approximately 150 test and technology projects during 1978-83. He worked on test programs that include work for MX Impactor Technology Program (ITP) and Miniature Vehicle (MV) for the Air Force; Homing Overlay Experiment (HOE) and Hypervelocity Penetrator for the Army; Improved Accuracy Program (IAP) and Materials Spallation Study for the Navy; Galileo Probe for NASA; and Advanced Materials Screening for the Defense Nuclear Agency.

Dr. Callens worked in aerothermodynamics, hypersonic flow, wake phenomenology and hypervelocity erosion. He was recognized for his ability to design and implement research programs with the goal of providing new technology, including mathematical and experimental modeling of physical processes as well as development of test procedures and methods of data acquisition, reduction and analysis. He was responsible for accurately forecasting future technology needs, obtaining support for proposed research programs to satisfy these needs and managing developmental program to an operational capability.

Dr. Callens has more than 35 years experience in aerospace test and technology project management, 17 of those years at AEDC. He was an engineering manager with Calspan Field Services, Inc. (1981-83) and ARO, Inc. (1968-81) at AEDC.

He earned Bachelor of Science and Master of Science degrees in aeronautical engineering from Georgia Institute of Technology in 1962 and 1964, respectively. He earned a doctorate in aerospace engineering from the University of Tennessee Space Institute in 1976 and a diploma with honors from the von Karman Institute for Fluid Dynamics, Rhode-Saint-Genese, Belgium, in 1967.

He was awarded the von Karman Prize for outstanding research in hypersonic, separated flow phenomena by the von Karman Institute for Fluid Dynamics, Rhode-Saint-Genese, Belgium in 1967. He was recognized for his outstanding research achievements when he won the General H. H. Arnold Award from the Tennessee Section of the American Institute of Aeronautics and Astronautics (AIAA) in 1974 for outstanding contributions to aerospace sciences and development of snow erosion testing techniques.

Additionally, as chairman of the Tennessee Section of AIAA, he received the Outstanding Section Award in 1984.

He left AEDC in 1983 for Louisiana Tech University where he taught courses that included fluid mechanics, gas dynamics, heat transfer, aerothermodynamics and many other engineering courses for the last 23 years. In 1983, his first position at Tech was an associate professor of mechanical engineering. In 1994, he was appointed the interim

department head of mechanical and Industrial Engineering. He became the Academic Director for Mechanical Engineering, industrial engineering and biomedical engineering programs in 1996.

In 1997, he obtained the position as the academic director for mathematics and statistics and was appointed to be the associate director of the Institute for Micromanufacturing from 1998-2001.

From 2004-2006, he was the James F. Naylor Jr. Professor of Mechanical Engineering. During this time in academia, he continued his association with the Department of Defense and NASA, conducting research at the NASA Stennis Space Center in the area of gas sampling and particle characterization techniques for rocket engine exhaust plume measurements and conducting research at the Air Force Armament Directorate at Eglin AFB, Fla., in the area of terminal ballistics phenomenology.

He served as the principal investigator for an Air Force Office of Scientific Research-sponsored research project to investigate the effects of penetrator and target material properties on impact crater characteristics and as project director and principal investigator in the development of an automated, internal thread gaging system for Morton Thiokol, Inc. during 1984-1991. This state-of-the-art system satisfies a critical need in industry for on-line, real-time internal thread gaging. For this work, he received U.S. and Canadian patents for this system as first inventor.

Furthermore, he served as the project director and principal investigator in the design of an overpressure and ballistic impact protection system for the NASA Radioisotope Thermoelectric Generator (RTG) during 1986 to 1990. This design incorporates state-of-the-art lightweight, high performance ceramic/composite armor in the protection of the nuclear power generators used on deep space probes.

He is the author or co-author of 44 technical reports.

Upon his retirement from the university in June 2006, Dr. Callens was appointed Professor Emeritus.



Dr. Eugene Callens, and Capt. Tom Horn watch indoor snow fall. Dr. Callens headed the development of the snow-generating equipment in G-Range. In 1974, Dr. Callens was recognized with the General H. H. Arnold Award from the Tennessee Section of AIAA for his outstanding contributions to aerospace sciences and and the development of snow erosion testing techniques.