Paul Merritt

The directed energy community mourns the loss of Dr. Paul Merritt, who passed away on June 6, 2026, at the age of 88. Dr. Merritt was a central figure in the development of modern beam control and atmospheric propagation understanding, contributing to nearly every major U.S. high-energy laser program from the 1970s through the 2010s. His technical leadership, analytical methods, experimental work, and instruction shaped the field's progress and helped define many of the practices used in directed energy system engineering today.

Over a career spanning more than four decades, Dr. Merritt established himself as one of the foremost experts in line-of-sight control, pointing and tracking, adaptive optics stability analysis, and inertial reference technology. He began working on laser beam control in 1974 at the Air Force Weapons Lab, where he advanced to Section Chief of Systems Engineering Analysis for the Airborne Laser Laboratory. There he developed test plans, conducted laboratory evaluations, and made significant contributions to the final performance report. His early work on frequency-domain analysis and control-system stability provided techniques that were later adopted broadly in high-energy laser programs.

During his time at Hughes Aircraft in the 1980s, Dr. Merritt served as Controls and Structures Department Manager and contributed heavily to laboratory pointing and tracking technical support. He served as Lead Engineer for performance analysis of the SeaLite Beam Director at White Sands Missile Range. This work included test planning, system checkout, and generation of key performance reports. In the late 1980s and early 1990s, as a senior scientist in Phillips Laboratory's Optical Surveillance Division, he led Air Force acquisition, tracking, and pointing performance evaluations, to assess state-of-the-art tracking capabilities.

In 1992, Dr. Merritt became Technical Advisor for the Airborne Laser Technology Division. In that role, he had major responsibility for one of the most significant directed energy demonstrations of the era: the first active laser tracking of a boosting missile. Working with Air Force civilians, Navy technical personnel, and industry partners from Boeing, Lockheed Martin, and TRW, he helped execute multiple successful active-track missions at White Sands Missile Range. Subsequently, the ABL Technology Division was awarded the Material Command Science and Technology Award for this work in 1997.

Dr. Merritt's later career included extensive contributions at Boeing-SVS. He was selected as a Boeing Senior Technical Fellow and supported major programs including Space Based Laser, Tactical High Energy Laser, and aircraft vibration and inertial reference unit studies. He collaborated closely with Lincoln Laboratory on turbulence-related pointing and tracking research, including identification of the v/D upper limit on tracking bandwidth. This result was

documented in Air Force SBIR studies and revisited during later HEL-JTO efforts, where further simulation campaigns confirmed the phenomenon and investigated underlying physics.

At the Air Force Research Laboratory from 2004 to 2007, Dr. Merritt contributed to tactical beam control modeling, aero-optical testing, and new system conceptualization. He concurrently served as a Research Professor at the University of New Mexico, where he taught graduate engineering courses from 1977 through 2010. His teaching covered dynamics, control system analysis and design, spectral analysis, random vibrations, and signal processing. He also co-developed the Laser Beam Control course presented at Boeing and DEPS events, helping standardize the instructional approach for the discipline.

Beginning in 2009, DEPS supported Dr. Merritt in developing a comprehensive textbook, “Beam Control for Laser Systems,” published in 2012. The text synthesized material from his Boeing coursework, UNM classes, and decades of field testing and analysis. It remains one of the most widely referenced documents in the community. A second edition, co-authored with Mark Spencer, was published in 2018.

In addition to his technical roles, Dr. Merritt provided support to the Navy PMS-405 office, AFRL divisions, and Schafer Corporation projects involving beam control analyses, the testing and modeling of a precision reference for a laser pointing system, and documenting vibration data from various aircraft and ground vehicles. He authored numerous papers on inertial reference units, vibration studies, tracking bandwidth limitations, and adaptive optics. He also contributed chapters to several notable reference volumes, including works on adaptive optics, shock and vibration, aero-optical phenomena, and beam control theory.

Dr. Merritt was named a DEPS Fellow in 2018 based on decades of technical contributions and leadership across multiple high-energy laser programs. He was frequently sought out by program offices and industry partners to assist with test design, algorithm evaluation, control-system interpretation, and assessment of inertial reference technology. Many groups relied on his expertise to understand complex dynamic environments, jitter sources, and bandwidth limitations affecting high-energy laser performance.

The directed energy community remembers Dr. Merritt for his sustained technical impact, his rigorous and methodical approach to problem-solving, and his long commitment to advancing the field. His work directly influenced numerous laser systems, early tactical laser studies, inertial reference unit development, and modern tracking research. His publications and courses helped train generations of engineers who continue to build on the foundations he established. Visit the **MEMORIAL PAGE**.