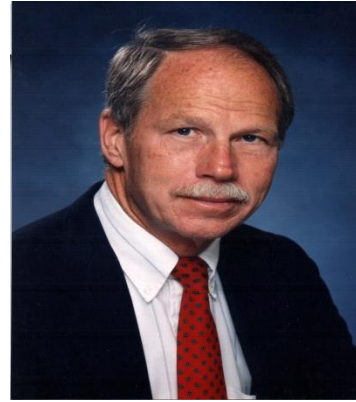


MEDALIST FOR 2010

For distinguished engineering as evidenced by the conception and development of Liebeck airfoils and Blended Wing Body aircraft.



ROBERT LIEBECK

Robert Liebeck's name is synonymous with innovation in aeronautics. His PhD thesis at the University of Illinois under the direction of Professor Allen Ormsbee was motivated by a query from the late A. M. O. Smith regarding the maximum lift an airfoil could generate. Liebeck's research provided the answer. The key insight came from using the Stratford empirical formula for the maximum pressure gradient a turbulent boundary layer could sustain without separating. Combining this with other aerodynamic reasoning, Liebeck developed a design method that produces an airfoil shape with the maximum lift for specified conditions. Like the famous Carnot Cycle of Thermodynamics, Liebeck airfoils represent the limit of achievable performance. The resulting geometries found applications in high altitude long duration aircraft, cooling fans and racecar wings.

Following his PhD studies, Liebeck returned to Douglas Aircraft where he made many contributions to aerodynamic design and analysis of commercial jet transport and high altitude reconnaissance aircraft. When NASA posed a question in the 1990s whether there is a more efficient jet transport configuration than the familiar swept wing and tube fuselage, Liebeck's creative insights led to the Blended Wing Body (BWB) configuration. The BWB represents a new architecture for a family of aircraft integrating a number of structural, propulsion and aerodynamic concepts, together with manufacturing strategies. The estimated performance benefits are substantial. It is also a "green" aircraft with reduced fuel burn, emissions and noise. With the subscale X-48B in flight testing at the time Liebeck was awarded the Guggenheim Medal, the BWB awaits the right market opportunity to enter full scale development.

Liebeck's affinity for aircraft started as a boy growing up in Illinois. Upon receipt of his BS in Aeronautical Engineering from University of Illinois in 1961, he was employed by Douglas Aircraft Company in Long Beach, CA. Leaves of absence from Douglas led to a MS in 1962 and PhD in 1968, both from his alma mater. Although Liebeck never changed employers, he worked successively for the McDonnell Douglas Corporation and The Boeing Company as the aircraft industry consolidated with mergers and acquisitions. Currently he is a Senior Technical Fellow of the Boeing Company.

Daniel Guggenheim Medal

Liebeck has always had a passion for teaching and mentoring young people, and since 1977 has been an active faculty member at several universities in addition to his full time industry employment: Adjunct Professor of Aerospace Engineering at USC (1977 - 2000); Professor of the Practice of Aeronautics and Astronautics at MIT (1998 – present); Adjunct Professor of Mechanical and Aerospace Engineering at UC Irvine (2000 – present). He has taught courses in aerodynamics and aircraft design as well as advised numerous design-build-fly teams. He has encouraged and advised numerous young people interested in aeronautical engineering to pursue their dreams.

Liebeck's engineering contributions extend beyond Boeing designs to include parts of aerobatic aircraft, America's Cup yachts and Formula 1 and Indianapolis 500 racecars. In collaboration with Dan Gurney, Liebeck airfoils have been utilized for racecar aerodynamic control surfaces. And in an interesting example reverse technology flow from racecars to aircraft, through wind tunnel testing Liebeck identified the aerodynamic principles of the blunt edge Gurney airfoil flap that was subsequently employed on the MD-11 and other aircraft. Besides the engineering aspects, he is a fan of high performance racing as well as riding motorcycles – sometimes behind Formula 1 drivers (Gurney) for observational purposes.

Liebeck's honors and awards are numerous and include: AIAA Honorary Fellow; National Academy of Engineering member; Royal Aeronautical Society Fellow; ASME Spirit of St. Louis Medal; ICAS Innovation in Aerodynamics Award; AIAA Wright Brothers Lecture; AIAA Aircraft Design Award; AIAA Aerodynamics Award; University of Illinois Distinguished Alumni Award.