MEDALIST FOR 2001

For seminal contributions in aeronautics, including the development of the Area Rule, Supercritical airfoil, and Winglet concept, which are the basis for modern aerodynamic design.

RICHARD T. WHITCOMB

Richard Travis Whitcomb will best be remembered as a tireless researcher who spent his entire career at NASA working to develop practical means to improve the aerodynamic efficiency of airplanes.

Born in Illinois in 1921, Whitcomb moved early in his life to Massachusetts, where he graduated from Worcester Polytechnic Institute in 1943. Shortly afterwards, Whitcomb began his 37-year tenure with the National Advisory Committee for Aeronautics (NACA) at the Langley Flight Research Center. He was named Chief of the Transonic Aerodynamics Branch in 1958, the same year that NACA became the National Aeronautics and Space Administration (NASA).

Three breakthrough aerodynamic technologies have been attributed to Whitcomb: The concept of Area Ruling, the Supercritical Wing, and Winglets, all of which have contributed to greater flight efficiencies in the high subsonic, transonic, and supersonic flight regimes.

In 1952, in response to the difficulties being experienced in the design of high subsonic and supersonic flight, Whitcomb conceived and experimentally verified the “area rule.” This concept enabled aircraft designs to effect a reduction of drag in the transonic drag regime and facilitate the attainment of supersonic speeds. The Convair YF-102A and the Grumman Flll-F dramatically demonstrated supersonic capability with their revolutionary “Coke bottle” fuselage shapes mandated by the area rule formulations. In the commercial aviation sector, the Convair 880 transport was able to benefit from area rule through the incorporation of “speed pods” that otherwise would have prevented successful attainment of cruise speed guarantees.

Whitcomb’s second significant aerodynamic contribution came in 1965 with the development of the supercritical wing. This design innovation produced an airfoil with less drag as the shock wave was moved aft before it weakened, allowing for increased speed and efficiency at high subsonic speeds. This breakthrough led to further refinements in efficient airfoil design, and every wing produced within the past twenty years has embodied the aft-loaded, delayed-shock supercritical wing concept.

A further refinement in wing design was conceived by Whitcomb in the 1970s with the introduction of "winglets." These small, near-vertical wing-like surfaces on the tips of an airplane's wings allow for an effective decrease in vortex drag without an increase in wing span or bending loads. Winglets have become familiar additions to a number of new aircraft designs, as well as retrofit installations on older models, where fuel savings up to 4 percent have been consistently demonstrated.

Richard Whitcomb retired in 1980 and served as a consultant to NASA and the aircraft industry. In recognition of his contributions, he was unanimously selected to receive the Collier Trophy for 1954. He received the American Institute of Aeronautics and Astronautics (AIAA) Wright Brothers Memorial Trophy Award in 1974, and was elected an Honorary Fellow of AIAA in 1980.

Whitcomb died in Newport News, Virginia, on October 13, 2009.