Aviation pioneer Richard Whitcomb has died in Newport News at the age of 89. The NASA Langley Research Center engineer has been called the most significant aerodynamic contributor of the second half of the 20th century.

If you look at almost any large airplane today -- especially those that fly at supersonic speeds -- you can see the genius of Dick Whitcomb.

"Dick Whitcomb's intellectual fingerprints are on virtually every commercial aircraft flying today," said Tom Crouch, noted aviation historian at the Smithsonian Institution. "It's fair to say he was the most important aerodynamic contributor in the second half of the century of flight."

Born in Illinois in 1921, Richard Travis Whitcomb was the son and grandson of engineers. He grew up in Worcester, Mass., building model airplanes, in an era when aviation pioneers such as Charles Lindbergh were household names.

His interest in aeronautics continued into college at Worcester Polytechnic Institute, where he joined the aeronautics club and spent a lot of time in the school's wind tunnel.

Whitcomb came to what is now NASA's Langley Research Center in Hampton, Va., in 1943, during World War II, right after graduating with a Bachelor of Science in mechanical engineering and highest honors.

It was a busy time for aeronautical engineers working to improve America's military air superiority and Whitcomb dived right in. In less than a decade he tackled and solved one of the biggest challenges of the day -- how to achieve practical, efficient transonic and supersonic flight.

In interviews over the years Whitcomb told how he was sitting one day with his feet up on his desk when he had a "Eureka!" moment and came up with what is known as the Whitcomb area rule. He theorized the shape of the fuselage could be changed to reduce the aircraft shock wave drag that occurs near the speed of sound. The basic idea was to ensure a smooth cross sectional area distribution between the front and back of the plane. "We built airplane models with Coke bottle-shaped fuselages and lo and behold the drag of the wing just disappeared," said Whitcomb. "The wind tunnel showed it worked perfectly."
For that innovation the Langley engineer won the 1954 Collier Trophy for the year's greatest achievement in aviation in the U.S.

Whitcomb came up with three important aeronautical innovations while working at NASA Langley, one in each decade of his career. If the area rule was Whitcomb's major accomplishment of the 1950s, his supercritical wing revolutionized the design of jet liners after the 1960s. The key was the development of an airfoil that was flatter on the top and rounder on the bottom with a downward curve on the trailing edge. That shape delayed the onset of drag, increasing the fuel efficiency of aircraft flying close to the speed of sound.

In the 1970s it was an article on birds that led Whitcomb to develop his third significant innovation -- winglets -- refining an idea that had been around for decades. Other engineers had suspected that end plates added to the wing tips could reduce drag. But the Langley engineer proved a simple vertical plate wasn't enough. "It is a little wing. That's why I called them winglets," said Whitcomb. "It's designed with all the care that a wing was designed." Winglets reduce yet another type of drag and further improve aerodynamic efficiency. Many airliners and private jets sport wingtips that are angled up for better fuel performance.

Those who worked with Whitcomb remember him as brilliant, driven and single-minded with aerodynamics dominating his thoughts at work and at home. "I was extremely fortunate to work with Dick Whitcomb from 1974 to 1980, when I was an engineer fresh out of college," said Pete Jacobs, chief engineer for the Ground Facilities and Testing Directorate at NASA Langley. "It was truly an amazing experience to learn from the man who had been referenced in my textbooks. He had an uncanny sense of aerodynamics, unbelievable concentration, and the most phenomenal memory of anyone I've ever met."

The famed aerodynamicist retired from NASA Langley in 1980, but his contributions remain some of the research center's greatest accomplishments. "Dick Whitcomb's three biggest innovations have been judged to be some 30 percent of the most significant innovations produced by NASA Langley through its entire history," said Langley chief scientist Dennis Bushnell, who worked with Whitcomb. "That's from its founding in 1917 to the present. He is without the doubt the most distinguished alumnus of the Langley Research Center."

Whitcomb earned many honors in his life. Besides the Collier Trophy, he received the National Medal of Science (personally conferred by President Richard Nixon) in 1973, the U.S. Air Force Exceptional Service medal in 1955, the first NACA Distinguished Service Medal in 1956, the NASA Exceptional Scientific Achievement Medal in 1959 and the National Aeronautics Association's Wright Brothers Memorial Trophy in 1974. The engineer was also inducted into the National Inventors' Hall of Fame in 2003, the National Academy of Engineering in 1976 for his pioneering research in the aerodynamic design of high performance aircraft and the Paul E. Garber First Flight Shrine at the Wright Brothers National Memorial. Whitcomb's alma mater, Worcester Polytechnic Institute, also awarded him an honorary doctorate and its presidential medal.

Whitcomb requested there be no funeral. Instead his ashes will be spread by plane over the Chesapeake Bay.