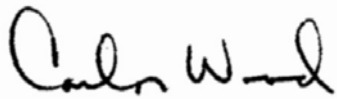

CARLOS C. WOOD

1913-1997

BY WILLIS M. HAWKINS

THE TWENTIETH CENTURY WAS NOTABLE for many major changes in the way that people lived and related to one another. Among these changes were the modes of travel, which included not only the automobile and the railroads but also the airplane and the beginnings of man in space. The airplane was unique in the twentieth century: the time between the first faltering accomplishments of the Wright Brothers and today's global airlines with hundreds of passengers per flight was within the life span of a few creative individuals. One of the most creative of these contributors passed away in October 1997, Carlos C. Wood.

Carlos was born in Turlock, California, on June 19, 1913, early enough to become aware of all the early efforts to fly by those with almost no educational base or established technologies to support sound design concepts or rational development. The promise of innovation and the obvious excitement over a means to fly affected Carlos, and he led many who saw a future in making practical, useful aircraft. He entered the University of the Pacific to learn mechanical engineering, and on graduation in 1933 he enrolled at the California Institute of Technology, a pioneer in establishing a solid foundation of knowledge for flight. In four years at Cal Tech, he obtained a master's degree in both mechanical and aeronautical engineering and acquired the major part of the educational credit to achieve a doctorate.

During the 1920s and 1930s, the fledging aeronautical industry was beginning to form and Carlos joined other pioneers who made up the Douglas Aircraft Company in Santa Monica, California. Douglas founders had already introduced the earliest true airline transports, the DC-2 and DC-3 family, as well as their earlier round-the-world Army Cruisers and the Douglas M-2 pioneering mail planes. The company recognized Carlos for his sound efforts to achieve knowledge about designing modern aircraft, and in 1942 he was made the head of a small group to create future designs for Douglas. This group was called the Preliminary Design Department.

To appreciate the leadership that Carlos provided in this assignment, it is pertinent to recall the "airline transport" environment at that time. Several companies had produced practical transport aircraft with modern features that made obsolete many early transports, the early Fokkers, the big but inefficient biplanes, and the first all-metal Ford Trimotors. The DC-1, DC-2, and especially the Douglas DC-3, had demonstrated to the airlines the advantage of larger passenger capacity and new aluminum structure to lower the cost of carrying each passenger. The DC-3 became the airline standard while the smaller new transports from Lockheed and the large Boeings were not selected because of their higher cost per passenger mile. Carlos recognized the importance of fitting aircraft size to the traffic needs as he took on the task of creating future new concepts of airline transports for Douglas.

To Carlos, this environment suggested the growing need for a bigger airplane, but the power plants available prevented enlargement of the two-engine concept of the DC-3. Eventually a four-engine airplane was selected and the DC-4 design, simple like the DC-3, emerged. Its passenger carrying capacity and its alternate use as a cargo carrier also suited the needs of the military as the United States prepared for World War II. Variations in fuel capacity, cargo doors, and strengthened floors, produced the C-54, used as a military supply carrier and troop transport.

One of these planes became the "Sacred Cow" with an electric elevator for President Roosevelt. The four-engine concept during the war years became an accepted standard for trans

ports for the military and the airlines that supported the military.

Using the C-54 (commercially the DC-4) as a base, Carlos led the design effort to add more power, lengthen the fuselage, redesign the fuselage and systems to pressurize the interior, and ultimately increase the wingspan. The resulting DC-6 became a major player in the postwar airline transport system, worldwide. Like its predecessor, the DC-4, a DC-6 became the presidential airplane "Independence" for President Truman. Although complete airplane designs were rarely the subject of patents, the DC-6 was patented listing Carlos Wood as a cocreator. Similar competitive designs such as the Boeing 337 Stratocruiser and the Lockheed Constellation also emerged using even more powerful engines. This competition led Carlos to use the same large aircraft engines in another upgrade of the DC-6, which became the DC-7, fully competitive with the other airline transports.

The emergence of useful turbine engines, both pure jet and turbo-propellers, created a further challenge to the creators of transport airlines. Carlos and his advanced design team responded with a new larger high wing military transport, the C-133 (the largest cargo aircraft at the time), with four turbine propeller engines. At the same time, an entirely new four-engine pure jet passenger transport, the DC-8, was created. It is still being used for cargo after many years as a competitive commercial passenger transport. On the strength of his performance in creating these successful aircraft, Carlos became chief engineer of Douglas in 1955 and director of advanced engineering planning in 1959, a position reflecting the growing dependence of the military and commercial customers on the creative aircraft industry to forecast future requirements that new aircraft could be expected to meet.

In 1960, responding to his own concerns that future passenger and cargo services needed to be independent of major expensive commercial airports, Carlos moved to Sikorsky Aircraft to share the expanding knowledge of how vertical takeoff and landing aircraft could be used. Within two years he rose to be vice-president of engineering, the year that the Sikorsky Skycrane first flew. It was the most powerful helicopter in the United States

and its unique design, which carried all payloads externally, could carry ten tons. It is still used in many unusual ways such as fire fighting with large water loads in tanks and carrying assembled structural segments of new bridges. During his later years, the beginning analysis of attack helicopters ultimately resulted in the S-69 Black Hawk. Similar "future requirement" approaches brought on the S-65 transport helicopter. He retired from Sikorsky in late 1970.

The experience acquired by Carlos over the years was sought by many. He served the Federal Aviation Administration (1961 to 1965) on its Technical Advisory Board. He also served the Army Mobility Command Scientific Advisory Group and a similar group for the Test and Evaluation Command. This history with its accomplishments supported his election to the National Academy of Engineering in 1967 and his subsequent membership in the Aeronautics and Space Engineering Board under the chairmanships of Dr. Guyford Stever and Dr. Raymond Bisplinghoff.

It has been a true pleasure for me to remember my many early personal discussions with Carlos and my current queries with those who were his peers and bosses at Douglas. His final home was in Napa Valley, California, where he resided with his wife and daughter and enjoyed golfing at the Silverado Country Club. He was a fellow of the American Institute of Aeronautics and Astronautics and a member of the Conquistadors du Ciel, an association of high-level executives in the aerospace industrial community. In all these activities, he was respected as an important, knowledgeable contributor to his industry and the United States, both of which he served well and as a gentleman.