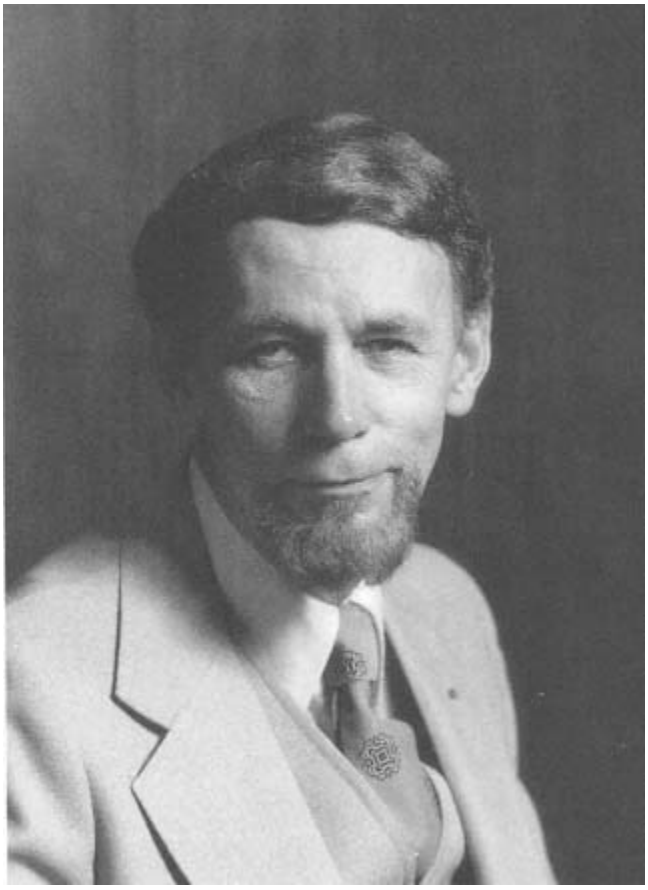

Allen F. Donovan

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1914-1995

By Alexander Flax and Ivan Getting

Allen F. Donovan began his engineering career in 1936 by working as a structures engineer at the Curtiss Aeroplane Division of the Curtiss-Wright Corporation in Buffalo, New York, after receiving his master's degree in aeronautical engineering from the University of Michigan. His first task was redesigning the wire bracing of the wings for the last production run of the Curtiss Hawk biplane fighter. Subsequently, he worked on a number of Curtiss fighters, including the Curtiss P-40 Warhawk, which saw extensive service in World War II with more than 15,000 produced. During the war, he played a key role in creating the Curtiss-Wright Research Laboratory, where, as head of structural and flight research, he pioneered in instrumented structural and flutter flight testing. Programs he conducted on the Curtiss Helldiver dive bomber and the Vought Corsair fighter made important contributions to these airplanes' operational capabilities. Working for the Manhattan Project, his structural design group ran structural and altitude tests on the Nagasaki atomic bomb design and developed bomb releases used in the drops on Japan.

After World War II, Curtiss-Wright donated its research laboratory to Cornell University, which renamed it the Cornell Aeronautical Laboratory and operated it as a nonprofit corporation with Donovan as head of the Aeromechanics Department. Here he directed the design and, in May 1947,

the flight test of the unmanned rocket-propelled STV-1, the United States' first supersonic and transonic, aerodynamically stabilized and controlled vehicle (five months before the X-1 airplane flew supersonically). In 1948 he and two associates published a landmark paper on the stability and control of supersonic aircraft. He also had a strong interest in helicopter technology, and a group under his leadership developed, built, and test flew the first fiberglass composite helicopter blades. For the Army, he led the development of the Lacrosse missile —a system designed to enable a soldier in the front lines to guide a missile launched from approximately ten miles behind him to a precise strike with a warhead that would penetrate a heavily fortified target.

In 1955 he moved to Los Angeles to join the Guided Missile Research Division of the Ramo-Wooldridge Corporation (later a part of TRW), which had just been assigned the task of performing the "System Engineering and Technical Direction" for the Air Force Intercontinental Ballistic Missile (ICBM) Program. As head of the Aeronautics Laboratory, he guided the efforts on the rocket engines, the aerodynamics, the structural design and dynamics, and on the reentry vehicles of the Atlas, Titan, and Thor missiles. He also served as program director of the Titan system in its initial phase. Studies he led on the potential use of solid rockets for the ICBMs resulted in the Minuteman missile concept. Early in 1958, he convinced the Advanced Research Projects Agency of the Department of Defense to attempt the world's first lunar mission using the Thor missile with two additional rocket stages. This program of three launches, which was transferred to the newly created National Aeronautics and Space Administration (NASA) in October 1958, resulted in Pioneer I, the first of a long series of scientific space missions designated "Pioneer." The systems did not achieve their ambitious objective of returning a picture of the back of the moon; but Pioneer I, the second launch, did send back the first measurements of the earth's radiation field out to 80,000 miles.

In 1960, after the Air Force determined that its system engineering for the future space and missile systems should be

provided by a nonprofit organization created specifically for that purpose, Donovan was elected by the founding board of trustees to be the senior vice-president, technical, and second in the line of command of The Aerospace Corporation, headquartered in El Segundo, California. Working with Ivan Getting, Aerospace's president, he built the staff up to two thousand engineers and scientists. In his eighteen years at Aerospace, he guided the engineering efforts in the entire Air Force space program—and in some areas supporting NASA. In the space launch vehicle field, this included the Atlas and Titan II families as well as the Agena rendezvous vehicles supplied to NASA and launched for NASA by the Air Force for the Mercury and Gemini astronaut programs, the development and use of the Titan III family of space launch vehicles, and studies for the Air Force and NASA that were of major importance in creating and defining the Space Shuttle Program. He personally initiated and guided a critical engineering effort for the Mercury space launch vehicle and produced an empirical solution to the problem of combustion instability in liquid rocket engines. For the Titan II vehicles, he formulated, initiated, and guided a program that produced both a theoretical analysis and its engineering application that solved the so-called Pogo problem of longitudinal oscillations of liquid rocket launch vehicles. These concepts were later used to solve the "Pogo" problem of Apollo's Saturn V launch vehicle's second stage and are in use today in the space shuttle.

In the spacecraft field, his responsibilities included the Vela nuclear detection satellites, the infrared launch surveillance satellite systems, several generations of military communication satellite systems, the defense meteorological satellite program, and a number of highly classified satellite programs in the category referred to in arms control treaties as "national technical means of verification" managed and operated by the National Reconaissance Office for the President.

Al Donovan se red on the Air Force Scientific Advisory Board from 1948 to 1968 and was chairman of its Propulsion Panel from 1959 to 1968. The Air Force awarded him the

Civilian Exceptional Service Medal in 1968. In the mid-1950s he served as principal adviser for the air vehicle in President Eisenhower's panel studies leading to the development of the U-2 high-altitude reconnaissance aircraft. Between 1957 and 1978, he served as a consultant and member of panels of the President's Science Advisory Committee under five presidents.

In 1964 the University of Michigan conferred on him an honorary doctor of science degree in aeronautical and astronautical engineering. He was elected to membership in the National Academy of Engineering in 1969 and served on a number of committees, including the National Research Council's Assembly of Engineering Ad Hoc Committee for Review of the Space Shuttle Main Engine Development Program (1978). He became a member of the American Institute of Aeronautics and Astronautics in 1943, and was elected a fellow in 1963 and an honorary fellow in 1983.

Born in Onondaga, New York, on April 22, 1914, Allen Donovan earned his B.S.E. and M.S. degrees at the University of Michigan. During his lifetime, he participated in activities closely related to his scientific and engineering interests: in sailplanes, as a free balloonist, and as an airplane pilot prior to World War II. As he matured, he turned to sailing and was very proud of his 40-foot ketch. On retirement from active work and in failing health, he and his wife, June, moved to Corona del Mar where he died on March 11, 1995.