

In Memoriam

Glidden S. Doman (1921-2016) Last American Helicopter Pioneer

Glidden (Glid) Sweet Doman, 95, a pioneer in the American helicopter industry, died Monday, June 6, 2016. He was an Emeritus Member of AHS International, having joined the then-American Helicopter Society in 1945. He was very active in the early days of AHS, with Doman Helicopters sponsoring many AHS dinners in Connecticut in the 1950s.

Doman was born in Syracuse, New York, on January 28, 1921, and grew up in nearby Elbridge. In his teens, he built motorized go-carts and an aerodynamically streamlined Soap Box Derby racer; when he was 15, he was the winner of the 1936 Syracuse Regional Soap Box Derby race, and competed in the third annual national race in Akron, Ohio.

After he graduated from the University of Michigan in 1942 with a degree in aeronautical engineering, his brother invited him to attend a Society of Automotive Engineers (now SAE International) meeting where Igor I. Sikorsky was speaking. When the 22-year-old Doman heard that a Sikorsky helicopter had broken a blade during a delivery flight, it sparked an interest in the burgeoning field of helicopters and rotor systems. Helicopters were needed for the War effort, but blade life was unsatisfactory: the infant helicopter industry barely understood rotor dynamics.

In 1943, Doman took a job at Sikorsky (then the Vought-Sikorsky Division of United Aircraft) in Bridgeport, Connecticut, testing and adjusting all their helicopter rotor blades before delivery to achieve static and dynamic balance, and minimize vibrations. He also participated in intensive experimentation and flight testing, and made considerable improvements in blade life. It was during World War II, and his contributions were so vital that Igor Sikorsky himself appealed to the draft board to keep him on the test program.

In August 1945, Glid Doman founded what would become known



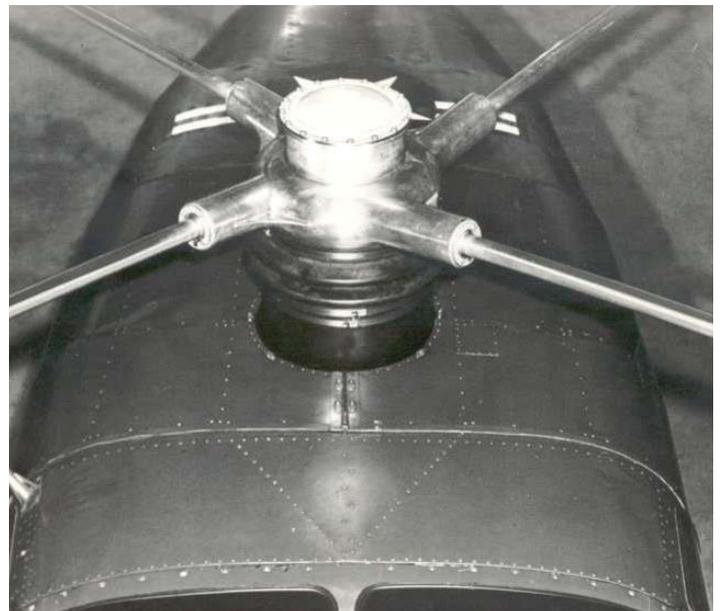
Glid Doman was one of the six original American helicopter pioneers of the 1940s.

as Doman Helicopters, Inc. to develop helicopters featuring a unique hingeless rotor system with a self-lubricating hub. Although not finding production success, Doman developed many innovative solutions decades earlier than larger competitors; some of these ideas are now standard in today's helicopter technology. The driving force behind Doman's engineering was a sharp focus on understanding how the helicopter — and especially its rotor blades — were behaving. The resulting insights produced the firm's hallmark trait: aerodynamic design with almost elegant simplicity. The Doman logo with "Always Balanced All Ways" was used to explain the rotor fundamentals.

The unique rotor system, which appeared like a conventional variable-pitch propeller hub, eliminated blade-flapping hinges, drag hinges and dampers, and was completely self-contained, with all moving parts within the hub. The four rotor blades were rigidly mounted to the hub, but the entire gimbal head was tilted to control direction, with the transmission powering the rotor through a constant-velocity drive system. The swashplate and control rods were contained within the fuselage, below the rotor hub.

Doman's first design was a very small aircraft, the LZ-1, dubbed the "Little Zipper." The US Army/Air Force provided a Sikorsky R-6 in 1946 to test the rotor system. The modified aircraft (referred to as both the LZ-1A and LZ-2) first flew in 1947. Reportedly, the aircraft "flew for forty minutes without the pilot needing even to touch the cyclic pitch control."

With Curtiss-Wright Corp., Doman built the eight-seat LZ-4, which first flew in 1950. This served as the prototype of what would be the pinnacle of Doman's helicopter development: the LZ-5 "Air Taxi." The LZ-5 went through a series of design



Compared to other rotors of the day, the Doman rotor head was incredibly clean.

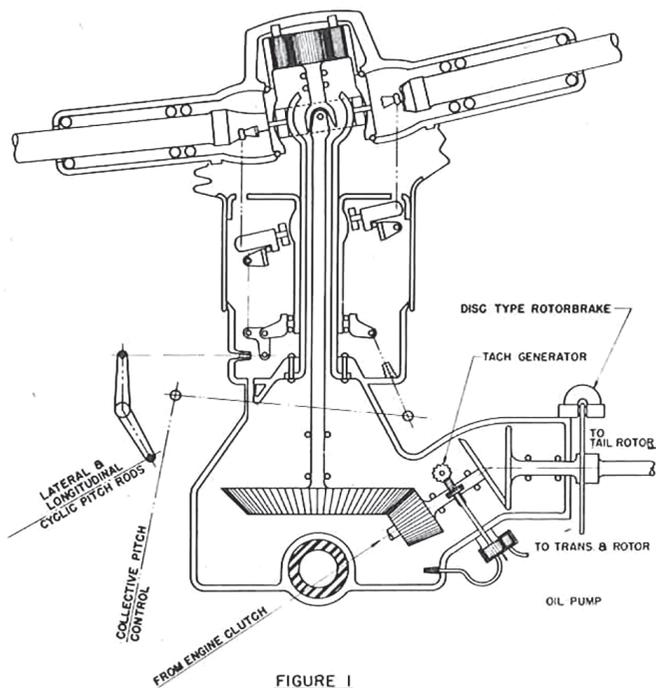


FIGURE 1

The Doman rotor used a unique four-bladed gimbaled head.

refinements and the third aircraft, the Doman-Fleet LZ-5 (built by Fleet Aircraft in Fort Erie, Ontario), was only the second helicopter developed in Canada. The LZ-5 received its FAA certification in 1955.

The company won development contracts from the US Army and Navy, and submitted proposals for many

— though they were ultimately unsuccessful.

Sadly, no Doman helicopters were ever sold, and the company closed its doors in December 1969, after having peaked at a maximum of 130 employees. Two Doman helicopters are now on display at the New England Air Museum in Windsor Locks, the LZ-1A

production contracts — including the Light Observation Helicopter (LOH), XH-40/Huey Tanker Helicopter competition, Canadian ASW helicopter competition, Flying Crane competition, US Navy HSL antisubmarine helicopter competition, USAF Arctic Rescue Helicopter (H-21) competition, and the USAF Local Base Rescue competition

and an LZ-5. After his company went out of business, Mr. Doman spent the next few years with Boeing Vertol, designing the rotor blades for its XCH-62 heavy-lift helicopter, contributing to the Boeing UH-61 UTTAS proposal (the competitor for the UH-60 Black Hawk), and performing other rotor research. In 1975, he became the principal investigator for a Boeing contract on very large wind turbines.

When Boeing declined to continue into the wind energy business, Doman left to become chief systems engineer of the wind energy program at United Technologies' Hamilton Standard — developing very large wind turbines (which have some common technology with helicopters) — for nine years. He was instrumental in the design of the 3 MW WTS-3 and 4 MW WTS-4 (with a blade diameter of 257 ft / 78.3 m) wind turbines.

He continued working in wind energy even in his later years, designing wind turbines for Aeritalia (a legacy Leonardo-Finmeccanica company) in Rome, Italy. In 2003, he formed a new company, Gamma Ventures, Inc. to market production rights for the Gamma turbines he helped design in Italy. He held some two dozen patents for helicopter and wind turbine-related technologies.

Mr. Doman, who lived in Granby, Connecticut, remained active well into his 90s and was the last living founder of one of the original half-dozen companies in the American helicopter industry, which also included Igor I. Sikorsky, Frank Piasecki (Boeing), Arthur Young (Bell), Stanley Hiller and Charles Kaman.

Links to more information on Glid Doman and Doman Helicopters can be found at www.vtol.org/doman.



The LZ-5 was the pinnacle of Doman's helicopter development. Despite several close production deals, only three were ever built.

AHS International is now accepting donations for a Vertical Flight Foundation scholarship award in Doman's name. Contributions may be made at www.vtol.org/vff.