During its operational life, the VZ-4DA wore several paint schemes. The small size of the aircraft is evident.

**THIS UNIQUE DESIGN ATTEMPTED TO COMBINE THE BEST ATTRIBUTES OF THE HELICOPTER AND FIXED-WING AIRCRAFT**

**Mr. Doak’s VTOL**

**BY HOWARD CARTER**

In America, the decade comprising the 1950s was an incredibly progressive time for aviation. From the rapidly growing Experimental Aircraft Association under the leadership of Paul Poberezny to the aviation giants such as Boeing, Lockheed, and North American, things were happening and they were happening at a rapid rate. In a hangar at Torrance Airport in southern California, an unusual flying machine was undergoing final assembly and it was the brainchild of one Edmund Rufus Doak, Jr.

Doak was a self-taught aviation engineer (and in 1930s’ America, such things were possible) who had risen to vice-president rank at Douglas Aircraft Company in Downey, California, and became acquainted with the aviation greats of the time including Martin, Donald Douglas, Lawrence Bell, Jack Northrop, Dutch Kindleberger, and others — it was a very small community of incredible aeronautical talent. At Douglas, he became the company’s purchasing agent until 1935 when he moved to North American as Factory Manager. By 1937, he was back at Douglas and headed development of the DC-5. However, Doak dreamed of bigger horizons and he could clearly see that war would soon engulf the world. He left Douglas in 1938 and during 1939 he formed the Doak Aircraft Company with headquarters in Torrance. Doak found some very large factory buildings that housed the Torrance Flat Glass Company. That company had gone out of business and the facility had been vandalized so Doak was able to get a great deal. He hired a crew to sweep out the broken glass windows and immediately went to work. Doak had the intention of becoming a major component supplier to the rapidly expanding aircraft industry.

After America entered the war, Doak’s workforce quickly grew to 2000 employees and the company was soon engaged in a variety of component work for the major manufacturers. Doak received contracts to construct molded plywood fuselage panels for North American Aviation in Inglewood and for Vultee Aircraft in nearby Downey. This was at a time when the industry feared a shortage of aluminum and a great deal of effort and design went into making aircraft parts from non-strategic materials — especially for non-combat aircraft. The company was able to produce thousands of these panels for AT-6 Texans and BT-13 Valiants but only a portion were utilized on the production aircraft. The company would also go on to supply aircraft doors, hatches, and rotor frames along with many other associated components (the company even built the DRD-1 training aircraft prototype — another Odd Bird). Doak would win the coveted Army-Navy “E” for Excellence Award and he proudly flew that banner under the American flag on the Doak flag pole. However, today the company is basically forgotten.

Later, the company greatly downsized after the end of the war, but Doak’s engineers got busy with detail design work (we wonder if the earlier numbers were variations that led to the final design) and the Army assigned it the designation VZ-4 with serial 56-9642.

Even though the prototype would be a small aircraft, it would be complex. Initially, power was to come from a Lycoming YT53 turbine of 940-shp and interestingly this power-plant was created by Doak’s engineers with a somewhat radical proposal. Located at Fort Eustis in Newport News, Virginia, this command examined all forms of new transportation research.

Doak’s proposal was for a VTOL aircraft (Vertical Takeoff and Landing) that would be able to lift off and land in small spaces and be able to operate like a helicopter, but it would have a unique difference. Doak’s design mated the best characteristics of the helicopter with the greater capabilities (at the time) of a fixed-wing design. The lifting rotors (or fans) would be in pod-like devices at the end of a short wing and they could be transitioned from lifting and hovering into forward flight thus giving the craft the capabilities of a fixed-wing strike platform. During this time, there was a great deal of fear that a Soviet bomber strike on the continental USA could destroy or damage the majority of the country’s military runways so the appeal of such a design was significant.

After a lot of back and forth dealing, the Army awarded Doak a 1956 contract to design, construct, and fly a single prototype that could be utilized for research work.

Doak’s engineers got busy with detail design work on what was designated Doak Model 16 (we wonder if the earlier numbers were variations that led to the final design) and the Army assigned it the designation VZ-4 with serial 56-9642.

The Doak on the cover of the 8 June 1959 issue of Aviation Week.

The Doak under going testing with the rotor fans in transition.