# *Virginia Aviation History Project*

By: Norm Crabill

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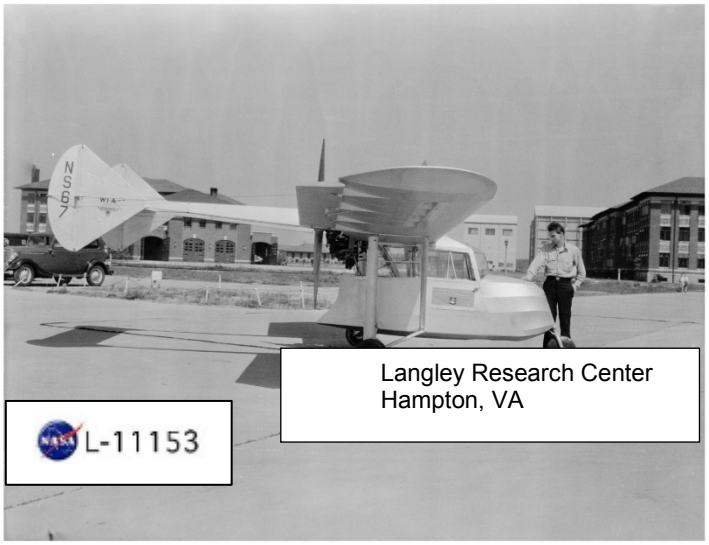
## Aviation Pioneer, Fred E. Weick

*This article is based on Norman Crabill's notes from Fred Weick's autobiography "From the Ground Up", with contributions from Raymond Gill, Vice President, VAHS.*

*Mr. Crabill's notes were shared with Ray Gill and Hall of Fame member (1998) Ray Tyson at a recent meeting in the Robin's Nest Café on Fredericksburg's Shannon Airport campus. Norm Crabill is a Life Member of the Virginia Aeronautical Historical Society and a member of the VAHS Hall of Fame (2008). He generously agreed to allow us to share his notes with our membership.*

Fred Weick came to the National Advisory Committee for Aeronautics (NACA) in the 1920s and contributed to significant changes in aircraft design worldwide, including:

1. Improvement in propeller design. One report for the US Naval Bureau of Aeronautics (1925) and two reports for NACA, TN212 (January 1925) and TN225 (September 1925).
2. Development of a propeller testing facility at NACA Langley in 1923.
3. Development of the NACA cowling for engines. In 1929, the first Collier Trophy was awarded for development of the cowling in the Propeller Research Tunnel. The NACA cowling drastically reduced aircraft drag, improved cylinder cooling and is being used world-wide today. Responding to a growing interest for an easy-to-fly airplane, Fred put together a team of six NACA engineers to design and build a single engine, easy-to-fly, aircraft that would not stall nor spin; that would also be easy to land due to its steering wheel at the nose and remaining two wheels behind the center of gravity. Each of the two main wheels also had large-travel shock absorbers. The team worked at Fred's house on Cherokee Road in Hampton on weekends to produce the Weick W-1, shown below. They flew it at a local field near the road into NACA, found that it would not stall, and was as easy to land as they had expected. NACA tested the W-1 in the Full-Scale Wind Tunnel and corroborated its aerodynamic



features. In addition, the Douglas Aircraft Company in California heard about the plane and sent two engineers to see the tricycle landing gear. The engineers were so impressed they went back to Douglas and changed the design of their DC-4 to have the tri-gear arrangement. Aviation history was made, since all large, and many small, aircraft went to the tri-gear design…thanks to Fred Weick!

As interest in such easy-to-fly airplanes for the general public continued into the 1930s, Fred was invited to work with Henry Berliner of College Park, Maryland, on the development of a commercial version of the W-1. They formed the Engineering and Research Corporation located in Riverdale, Maryland, and produced the Ercoupe. With an aluminum structure, low-wing, two-place, the tricycle gear airplane was certified by the CAA as non-spinnable. It was so easy to fly that the CAA reduced the number of hours of flight instruction for first solo from 8 hours to 5 hours and Private Pilot license requirements from 35 to 25 hours. Although the Ercoupe had no rudder pedals, the rudder controls were interconnected with the aileron controls to provide proper control for turning flight. Turning was accomplished by the pilot's control wheel, which also steered the nose wheel while maneuvering on the ground. An Ercoupe could be special ordered by a customer who wished to have rudder pedals installed. A single foot pedal was provided for the brakes. The hydraulic landing gear shock struts had a generous 12 inches of travel.

Only 112 Ercoupes were produced before World War II, but ERCO produced gun turrets and other similar items for military aircraft during the war. After the war, ERCO resumed production of the 'Coupe, turning out 5573 models before ceasing production in 1947 due to market saturation. Ercoupes were even sold by automobile dealers nationwide. In the 1960s, the design was again produced by ALON, Inc. and Mooney. There are more than 2000 Ercoupes registered with the FAA today.

There are many stories about how easy this aircraft was to fly. Once, two kids, about 10 or 12 years of age, took off, flew around, and landed safely with NO prior flight instructions. In 1942, the wife of one Ercoupe owner successfully flew the plane after it started during hand propping. The plane roamed around on the ground until it took off. She had no previous instruction but was able to teach herself to handle the aircraft and to land it with only minor damage. Norm stated "I found out that I could land it with my hands in my lap, in a wings-level attitude, even in crosswinds. I flew them out of the Riverdale factory in 1947 when there were always about 100 Ercoupes at the ERCO airport on the weekends."

Fred received several awards for the design of the Ercoupe, including the Sylvanus Albert Reed Award in 1944 and the W. H. Fawcett Award in 1946 "for the greatest scientific contribution to the advancement of aviation as a public service." The Fawcett Award was presented to Mr. Weick by WW1 flying ace Eddie Rickenbacker. Donald Douglas received the award the previous year for the tri-gear DC-4.

After ERCO closed in 1947, Fred went to Texas A&M College and developed a modern agricultural airplane. That research extended to the design of the spraying system so that it could deliver the prescribed amount of material on the crops. The first version was the Ag1, built at Texas A&M with help from the CAA and Piper Aircraft. The production version, the PA-25 Pawnee, was later built by Piper Aircraft at Vero Beach, Florida. Still used today, it is also a popular tow plane for launching gliders.

Fred, not done yet, had moved to Vero Beach, Florida as chief engineer of Piper Aircraft, where he was responsible for the Pawnee and various versions of the Cherokee. The Cherokee was a two, four and six place low-wing with tricycle landing gear. That aircraft, and versions of it, became extremely popular general aviation personal aircraft. Norm flew the 140, and later the 180, with his family on trips they had once taken by car.

Fred's influence on the aviation industry was not limited to the previous projects, as important as they are. He did many other things, as described in the book, *"From the Ground Up"*, coauthored with James Hansen and published by the Smithsonian in 1998. No longer in print, copies are available on Amazon. Fred was a major influence on aircraft design while at the NACA, as he was for the rest of his life in industry. (NACA dissolved, Oct. 1, 1958) In 1992, NASA Langley had a celebration of his life. Norm attended along with hundreds of others. During that visit, Fred had an opportunity to fly in an Ercoupe owned by Charlie Drummond and based at the Williamsburg-Jamestown Airport. That was to be the last Ercoupe Fred flew. It is also the very same airplane on display at Shannon Air Museum in Fredericksburg, Virginia. Fred Weick passed away on July 8, 1993. A total of nine patents were issued to him during his lifetime. Fred E. Weick was elected to the VAHS Hall of Fame in 2002.

Norm Crabill revisits the Charlie Drummond Ercoupe at Shannon Air Museum

*photo by Ray Gill*

Ray Tyson and Norm Crabill, standing in front of the Honor Wall of the VAHS Hall of Fame in the Shannon Air Museum

*photo by Ray Gill*

A 1/5 scale display model of the Weick W-1 is currently being constructed by Dan Rodgers, docent at the Udvar-Hazy Center in Chantilly. This 6-foot wingspan replica uses Bill Hadden's detailed drawings of the aircraft.

This marvelous work of art, when finished, is slated for display in the Shannon Air Museum along with other Fred Weick memorabilia.

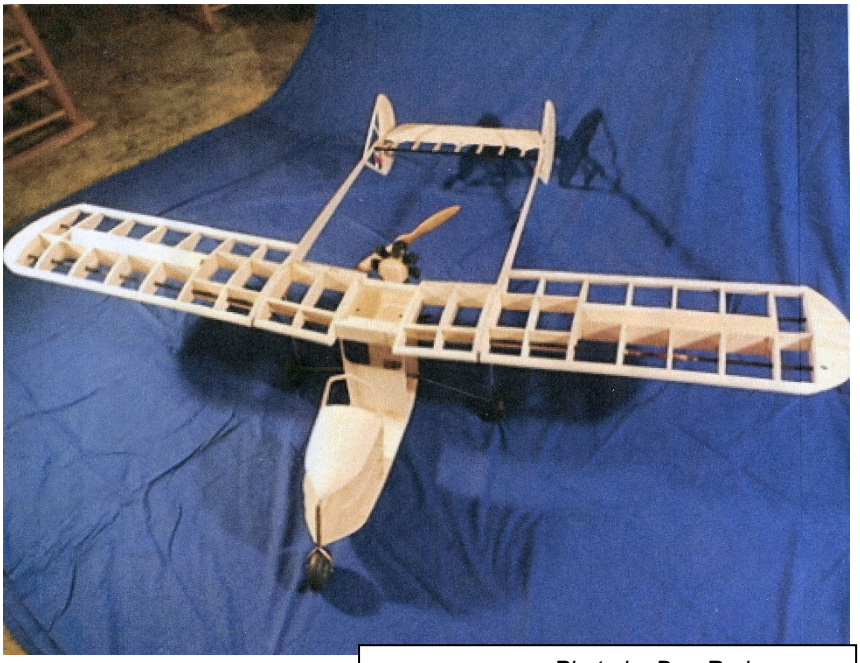
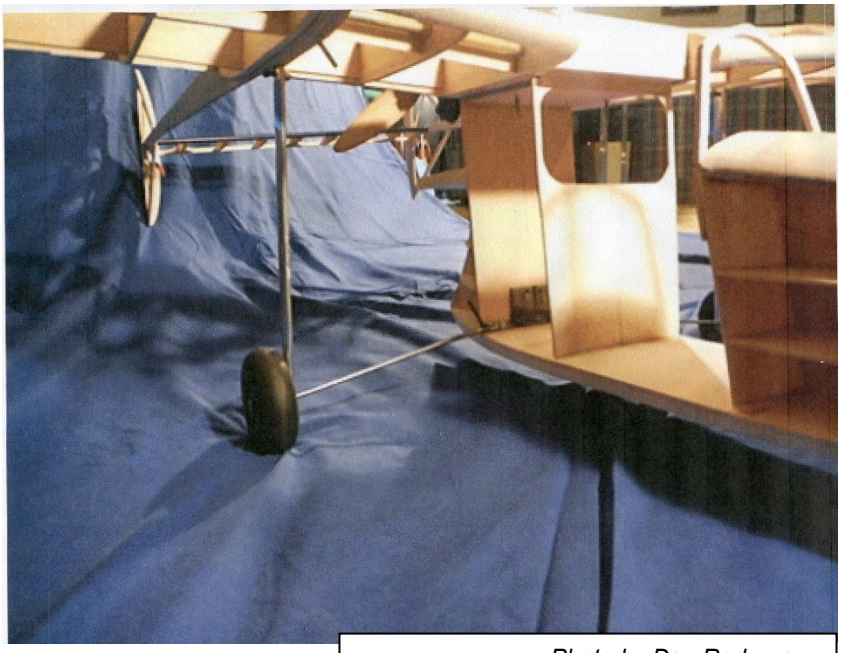


*Photo by Dan Rodgers*



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