Rutan's Sedan

Connecticut *Defiant*

AFTER A CATASTROPHIC engine failure in my Long-EZ in 1993, I was no longer happy to accept the risk of another major cause of general aviation accidents — system/component failure or malfunction. The engine failure hit home as to why there are no single-engine commercial aircraft. I continued to fly the Long-EZ with a new engine but decided that a Defiant would be the plane that could make flying truly safe and enjoyable.

At the time my building partner Richard Marr and I were building our Long-EZ, Rutan was looking into certifying the Defiant for production. Unable to find investors for certification, Rutan changed his position on making it a homebuilt when Fred Keller agreed to help produce the plans. Defiant plans were first offered in mid-1984, and 176 sets of Defiant plans were purchased before Rutan Aircraft Factory discontinued selling all aircraft plans in 1985. There are only about 25 Rutan Defiants currently flying in part due to the massive amount of time it takes to build one. Since Rutan no longer sold the plans and I didn't have the time or energy to start from scratch, my only option was to find a project that someone had started.

We found the ideal project in Oak Ridge, Tennessee. Dr. Timothy Crawford, a highly trained engineer with NOAA, had built several aircraft, including a Long-EZ. He'd started the Defiant thinking it may provide a better platform for his research, but then decided the turbulence of a front engine caused too many issues. Richard and I were excited to find such a high-quality project. It took us 10 years of working every Saturday and Wednesday evening to finish the project, N17DR.

The Defiant was Burt's vision of the ultimate four-place, twin-engine aircraft. Burt held a "name the plane" contest, and it was Curtis Barry of Port Jervis, New Jersey, who suggested Defiant, saying that "...the aircraft defies all the common assumptions about current production twin-engine aircraft — in pilot skill required, safety, performance, construction, and handling." All Defiants share the following safety features:

- The Defiant has no procedure for engine failure on takeoff. The pilot does nothing and just climbs out as if nothing happened. There are no prop controls to identify and feather, no cowl flaps to open, no flaps to raise, no minimum control speed to monitor, and no gear to raise.

- The tandem wings allow natural aerodynamic angle-of-attack limiting; thus, the airplane cannot be stalled in the conventional sense. This eliminates loss of control/stall-spin, the leading cause of general aviation accidents.

- The Defiant has very good flight characteristics at minimum speed. It is a docile, controllable aircraft with full aft stick at its minimum airspeed of 60 to 65 knots.

- The Defiant has two separate electrical systems, each with its own battery and alternator. IFR avionics are split to both systems so that no single failure can affect essential equipment. The two systems can be run from one alternator in the event of a failure.

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The fuel system consists of a 58-gallon tank with a large sump for each engine. The two systems are independent and require no pilot action for normal operations. Our Defiant went further with fuel safety by adding a fuel flow metering system with low fuel warnings.

The aircraft is very basic in its systems. It will never require maintenance nor have an AD issued on its flaps, retractable gear, cowl flaps, governors, hydraulic system, stall warning, or emergency gear extension system, since these were eliminated in the basic design.

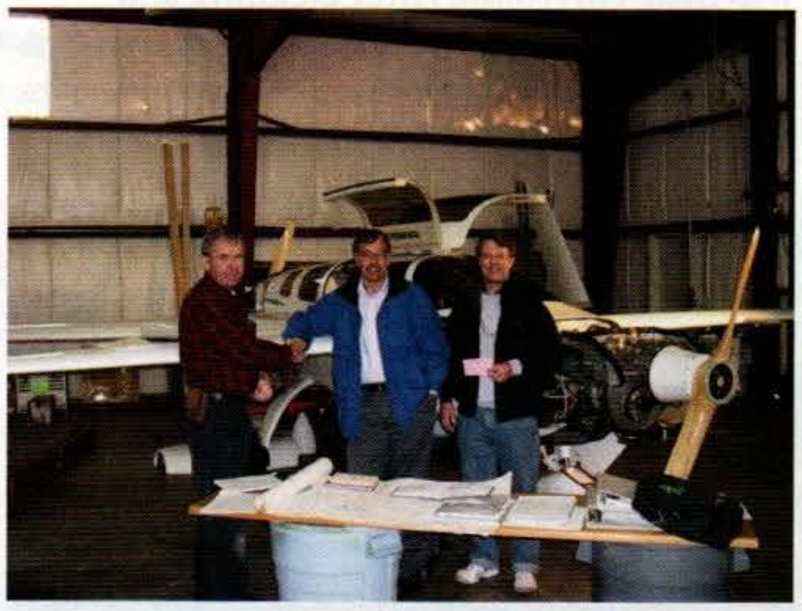
Visibility, particularly in the pattern, is superior to current light twins. The absence of a wing above or below the cockpit area results in a welcome improvement in visibility over conventional aircraft.

N17DR addresses some of the pilot-error ues that have resulted in accidents. The ost common accident in NTSB reports is a se wheel gear-up landing. N17DR is the ly Defiant to have a fixed nose wheel, nich further adds to the simplicity and fety of the aircraft. N17DR's 165-knot uise speed at 2350 rpm and 15 gph for the o 160-hp Lycoming O-320's is in line with ner Defiants with a retractable nose wheel. I believe having a steerable nose wheel is o a safety issue. The one issue I really dis- ed about the Long-EZ was the castering se wheel, which requires lots of differen- l braking during taxing and takeoff. 7DR also has pedals and brakes on both e pilot and copilot sides, while the plans ly call for them on the pilot side, which o enhances safety and training.

There have been two accidents, one fatal, where the "clam shell" side-opening canopy has opened in flight. N17DR has a fixed windshield with gull wing doors. A warning light on the instrument panel indicates when either door is not fully latched. There are additional warning lights for alternator output, low fuel, and landing brake extended.

The Defiant is a heavy wing-loading, multiengine aircraft, and while it is as easy to fly as the average light single, it does require larger airports. Landing a Defiant is easy provided you have lots of runway. Follow the numbers and the landing ground roll is 1,500 feet at sea level or 3,100 feet total distance over a 50-foot obstacle. You can double the runway length required if you're 15 knots fast on approach. N17DR is the only Defiant to have a Long-EZ style landing brake, and at lighter weights, it's comfortable to land and depart from 2,000-foot runways.

N17DR has both vacuum and electric artificial horizons. We also fly using ForeFlight with Stratus 2S, which adds a third artificial horizon backup. The dual vacuum system is one of the only systems that has created issues over the 12 years of flying N17DR. We had a very expensive Parker Hannifin Airborne Division vacuum regulator fall apart — an inlet fitting separated from the regulator body.



Tim's project had modified Rutan's pitot-static system to use a very expensive Rosemont boom-mounted heated pitot static tube. Since it was Tim's job with NOAA to design and build extremely sophisticated air sampling systems, it seemed this must be a great modification. Over time, however, we started to see the effects of a partially blocked static source likely from moisture in the static line.

An internet search led to a Kollsman heated pitot-static tube. Paul Kollsman invented this pitot-static tube for World War II Navy aircraft that were crashing at a high rate due to water blockage in the pitot-static system. It precisely fit our canard mount and only cost $85. N17DR hasn't had issues since we installed our new pitot-static tube that was manufactured in 1944.

In conclusion, the Defiant is a remarkable aircraft, and I consider it as safe to travel in as the family sedan. It's a stable IFR platform, and I'm confident that N17DR will be flying 100 years from now and will still be state of the art. I am most grateful that Burt Rutan offered the detailed construction plans so we could share in his vision.

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