

Working – and playing – out of the box



By Debby Arkell

Michael Friend is used to working outside the box. As a Product Development Chief at Boeing Commercial Airplanes in Everett, Wash., his job is to dream up the next wave of commercial aircraft that could become "real, for-sale products." So it comes as no surprise that he has taken his lifelong fascination with flight and airplane design a step further by building an airplane himself – straight out of a box.

"I've been a member of the Experimental Aircraft Association since I was 12 years old," Friend said. "One thing I've always done in my spare time is to attend 'little airplane' shows to get inspiration for what we might apply here at Boeing."

It was at one of those shows – AERO 2001 in Friedrichshafen, Germany – where Friend met brothers Thomas and Matthias Strieker. They, like Friend, had a passion for "really cool airplanes" and innovative design. At that time, the Striekers were working on some concepts for the use of honeycomb composites for light-airplane structures. This piqued Friend's interest, and the relationship continued.

Two years later, at AERO 2003, Friend saw the Striekers' third prototype of what would eventually become the composite-based Twister aircraft. Friend said the combination of its "sleek airframe and efficient Jabiru 2200 motor was so compelling, I bought a kit on the spot.

"I was lucky enough to have the Strieker brothers – Thomas, Matthias and their older brother Norbert – join me [in the U.S.] for an intensive two-week session of airplane building," Friend added. "Between noon Tuesday and the following Friday, we essentially completed the airframe of what has turned into a very fast-build kit."

The single-seat Twister is a state-of-the-art light aircraft with structures made primarily of honeycomb composites – very unusual for kit airplanes. Most kit-built aircraft are made of foam core.

The innovations do not stop there. The Twister's cockpit also has its share of stand-out features: a "safety cell" for the pilot, and what Friend cites as a "roomy cockpit" for a home-built aircraft.

"The roomy dimensions of the Twister cockpit are a relief for me," Friend said, because at 6 feet 4 inches tall and 235 pounds, he tends to find light-plane pilot's seats uncomfortable, seemingly "designed by engineers who are all 5-foot-6 and 140 pounds," he joked.

The safety cell is a Kevlar pod bonded to the inside of the fuselage monocoque (a structure in which the outer skin carries most of the stress), providing extra strength around the pilot in the event of a crash. The Kevlar cell also has a ballistic parachute recovery system, similar to those used in ultralight aircraft, attached as an added safety measure.

"I've been a believer in these systems for years," Friend said. "A decade ago, I installed one in my Russia 12.6 glider," perhaps one of the first times such a system was installed on a full-sized glider in the United States.

Friend said working on and flying his Twister is primarily something he does for fun, but it also is educational. Building a light aircraft from kit to first flight in just 90 days taught him the value of persistence, which undoubtedly carries over to his work life as well.

"There are many times when you look at an operation that has taken several hours to perform, say to yourself, 'I could have done that better,' and do the whole thing over," Friend said. "It can be discouraging, but ultimately leads to a finished product you can be proud of."

In addition to persistence, the Twister's state-of-the-art construction has helped Friend approach product design with fresh eyes. There are elements of the Twister design that have provided him some "food for thought," such as the way the wing is mounted to the fuselage.

"Typically, a Boeing airplane wing is held to the fuselage by many hundreds of fasteners; the

Twister Technical Data

Wingspan:	24.6 feet
Length:	18.7 feet
Wing area:	93.9 square feet
Vne:	186 miles per hour
Cruising speed:	146 miles per hour
Stalling speed:	55 miles per hour
Horizontal tail span:	9.2 feet
G limits:	6 g positive, 4 g negative
Landing gear:	Electric retracting
Engine:	80 horsepower Jabiru
Range (approx.):	800 nautical miles
Empty weight:	560 pounds
Max. takeoff weight:	880 pounds
Payload:	330 pounds
Fuel capacity:	20 U.S. Gallons
Rate of climb:	1,275 feet per minute at 880 pounds takeoff weight
Kit price:	Approximately US\$35,000

Twister's wing is held in place by one single fastener," Friend said, then suggested, "Why not attach our wing tips the same way?"

No one knows yet if the idea is possible, but one thing is certain: With Friend at the helm of a group in New Airplane Product Development, you can bet that the next generation of Boeing commercial airplanes may just have their roots in an "out of the box" experience.



After a recent presentation to about 150 employees in Everett, Wash., about his experiences building and flying the Twister, Michael Friend (in red jacket) explains a few of the airplane's features to some of the attendees. One of the observers is Dan Mooney (far right), Commercial Airplanes vice president of Product Development. (Marian Lockhart photo)

[Back to top](#)

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