

EAA AirVenture 2021's Vertical Flight & Electric Aviation Trajectory

By Rex Alexander

While it may not have been readily apparent to some, there was in fact a strong presence from the vertical flight and electric aviation community at this year's AirVenture in Oshkosh, Wisconsin, organized by the Experimental Aircraft Association (EAA) on July 26–Aug. 1. Representative organizations included electric vertical, short and conventional takeoff and landing (eVTOL, eSTOL and eCTOL) were present. Not having a designated forum area on the grounds at AirVenture to gather and collaborate meant that these groups were somewhat scattered to the four winds that is the vast space of Oshkosh, therefore you had to be on the lookout for them and be willing to do a little walking.

In speaking with EAA CEO and Chairman of the Board Jack Pelton, he indicated that they have been working to attract more stakeholders from the electric and hybrid-electric aviation community to AirVenture, especially those in the eVTOL arena, but it has been a slow process. Pelton indicated that he believes some in the eVTOL community see the word “experimental” and shy away from the event, but would offer that AirVenture is about all forms of aviation and aviation technology. Last year's cancellation due to COVID-19 and this year's uncertainty doubtlessly dampened the enthusiasm for some to attend the event, but 600,000 people and more than 16,000 airplanes made the trek.

This year's AirVenture proved to be a successful springboard for two eVTOL organizations in advancing “public acceptance” of their aircraft designs, a key barrier to any group looking to be successful in the eVTOL market. During AirVenture, and in front of thousands of avid aviation enthusiasts, both Opener and Volocopter successfully displayed each of their demonstration aircraft's capabilities. This, in turn, translated into significant interest from those in attendance, as evident by the number of people who visited their booths and displays.



USHST speakers (L-R) Hill, Viola, Boughton and Webb presented the new “56 Seconds to Live” training program. (All author photos except where noted)

While helicopter manufacturers Airbus, Bell and Enstrom had their light single-engine helicopters on display, there were several smaller companies from the vertical and electric aviation communities in attendance at AirVenture 2021, as well. They represented some of the cutting edge of developments of both safety and technology in vertical lift. Vertiflite spoke with the following organizations.

Opener provided attendees with four great piloted demonstrations of its entry into the eVTOL market with its BlackFly aircraft. With a 30-mile (48-km) range, Opener's BlackFly design is a single-seat, all-electric aircraft, which will initially be offered under the US Federal Aviation Administration (FAA) Part 103 ultralight vehicle rules. This means no pilot's license would be required. The company said that it had flown a total of 35,500 miles (57,100 km) in more than 4,300 flights (for an average of about 8.25 miles, or 13.3 km, per flight).



Opener plant manager Eleanor Li flying the BlackFly at AirVenture on July 27. (Opener video)



Model of NFT's ASKA eVTOL flying car, which folds its four arms and two wings, each supporting an electric propeller.



The interior of the two-seat Curti Zefhir light turbine kit helicopter.



The award-winning Composite-FX all-composite XE 290 ultralight helicopter.



Rotor X continues the legacy of 2,500 kit helicopters built by RotorWay over the past half century with its Phoenix A600 Turbo.



Who's on First?

The two eVTOL companies had carefully worded statements about how they were the “first.” Opener flew first on July 27, saying it had “made history by the first public human-operated eVTOL fixed-wing aircraft demonstration” — emphasis on “fixed wing.” None of the other eVTOL aircraft that have flown in public, e.g. EHang, Volocopter and Kitty Hawk, have wings, as they were all multicopters.

Volocopter made its first flight later that afternoon with the 2X, calling it “the first ever public crewed test flight of a fully electric vertical take-off and landing (eVTOL) air taxi in the US.” Here the emphasis is on “air taxi,” as it has two seats and is intended as an air taxi aircraft, rather than a single-seat ultralight, primarily intended for personal use.

Of course, the first eVTOL flight (with no qualifiers) flown in public in the US and the first in the world outside of China was four years ago — the Kitty Hawk Flyer prototype was flown at Oshkosh in 2017. It was covered extensively by VFS at the time, with a video production, extensive photographs and articles (see “Back to Kitty Hawk: Exploring the Secrets of the Kitty Hawk Flyer,” *Vertiflite*, Nov/Dec 2017).

Volocopter's team, which had the largest footprint of the eVTOL segment at AirVenture, was out in force wowing the crowd with piloted flights of its 2X demonstrator, as well as a full-scale mockup of its VoloCity production vehicle. Volocopter was also actively engaged with the attendees, introducing the public to the next generation of aviation that is eVTOL.

Members of the US Helicopter Safety Team (USHST), which included Helicopter Association International (HAI) CEO and President Jim Viola and HAI Director of Safety Chris Hill, along with Scott Boughton, owner of Palisade Aviation, and Bruce Webb, Director of Aviation Education and Community Outreach at Airbus Helicopters, Inc., presented the USHST's new “56 Seconds to Live” training program.

NFT, Inc.'s CEO and Founder Guy Kaplinsky and his team introduced attendees to its ASKA “Drive & Fly” concept, which



Luminati displayed an electric gyrocopter testbed used to demonstrate its twin 40-kW nacelle electric fans.



Volocopter Test Pilot Damian Hischier flew its 2X eVTOL at Oshkosh. (Volocopter video)



Volocopter displayed a full-scale model of the Volocity production design.



Tokyo-based teTra displayed its Mk-4 eVTOL with 32 lift propellers as a follow-on to its Mk-3 entry in the GoFly Prize competition.

they intended to be the first consumer roadable eVTOL aircraft/flying car. Prior to AirVenture, the company had already taken \$5,000 deposits from nearly 100 potential customers.

Italian manufacturer Curti showcased its two-place, light turbine kit helicopter, the “Zefhir,” which is the only helicopter that comes equipped with an emergency ballistic parachute (see “European Innovation at AERO Friedrichshafen 2019,” *Vertiflite*, July/Aug 2021). Curti has agreements with three US dealers that will provide builder support as well as flight training assistance.

Composite-FX took home the grand champion prize and bragging rights at AirVenture for the best kit-built helicopter for 2021 with


its newest model, the XE 290 (tail number N753MX) — based on the original Mosquito ultralight — designed around an all-composite airframe. With this proven platform as a foundation, the company is now actively moving into the fully autonomous unmanned aircraft systems (UAS) world, focusing on applications for the military, commercial delivery, agriculture, communications, inspection and surveillance.

VoltAero introduced its four-seat Cassio 330 eCTOL — the first Cassio version of the VoltAero’s hybrid-electric aircraft family to enter production. Building on its validation effort on its hybrid-electric powertrain through flight trials with the company’s Cassio 1 demonstrator aircraft, VoltAero is advancing the Cassio family design phase for the future. Production is set to begin with the four-seat Cassio 330, featuring a combined hybrid-electric power of 330 kW, with a targeted delivery date for the fourth quarter of 2023. The company displayed a sub-scale model of the Cassio 330 and videos of the Cassio 1 flying.

Rotor X Aircraft Manufacturing Company — who purchased the assets of 53-year-old helicopter company RotorWay International Helicopter Manufacturing Company’s factory Chandler, Arizona, earlier this year — exhibited two of its recent helicopters. Rotor X, like many other rotorcraft companies, is now looking towards the future of eVTOL and is actively developing a new quad-rotor multicopter design with up to 1,600 lb (726 kg) of cargo.

Luminati Aerospace, which acquired assets from such companies as Gyrodyne and Rotor Flight Dynamics over the years, introduced the AirVenture crowd to some of its latest interesting concepts (see also “Oshkosh e-AirVenture,” *Vertiflite*, Sept/Oct 2019). One of which included an electric gyrocopter testbed used to demonstrate its twin 40-kW nacelle electric fans capable of producing 174 lb (775 N) of thrust each at 30 kW continuous power, equating to a 216-lb (98-kg) aircraft capable of 340 lb (1,500 N) of thrust.

Tokyo-based start-up teTra — winner of the Pratt & Whitney Disruptor Award in the GoFly Prize Final Fly Off competition for its teTra-3 personal eVTOL aircraft at Moffett Federal Airfield at the NASA Ames Research Center last year (see “GoFly Inspires Innovation,” *Vertiflite*, May/June 2020) — showcased its Mk-5 personal eVTOL aircraft. The Mk-5 is equipped with 32 vertical propellers and one horizontal thruster at the rear of the aircraft.

As to what future events may hold for the electric and hybrid-electric eVTOL, eSTOL and eCTOL aviation markets, VFS is looking forward to more companies taking the plunge and help create an even bigger, more “electrifying” presence at EAA AirVenture in the future. Next year, VFS and the Comparative Aircraft Flight Efficiency (CAFE) Foundation plan to return to Oshkosh for the 16th Annual Electric Aircraft Symposium (see “15th Annual Electric Aircraft Symposium Is Another Great Success,” pg. 80) and continue to support the burgeoning electric flight industry. 

About the Author

A 40-year aviation entrepreneur and industry leader in powered lift infrastructure, Rex Alexander is the founder of Five-Alpha and serves as the Infrastructure Advisor to the Vertical Flight Society.