

Electric VTOL News

The Latest in eVTOL Developments

By AHS Staff

Over the past three years, AHS has published more than a dozen articles in *Vertiflite* on transformative electric and hybrid/electric propulsion for vertical flight and led a series of joint workshops. The Fourth Transformative Vertical Flight workshop will be held in June. See the AHS resource page on www.vtol.org/electric-VTOL.

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Serious progress is being made around the world in eVTOL development. Here is a roundup of recent news that has come out since the detailed article in the last issue of *Vertiflite*.

Airbus Decides to Pop Up



The Airbus Pop.Up is a multi-modal, all electric, urban mobility concept. (Airbus graphic)

Airbus XO, the company's innovation group, revealed a concept for "seamless, multi-modal, fully electric urban mobility." The modular Pop.Up concept features a capsule that connects to either a ground or air module. Airbus envisions the system relying on an artificial intelligence system where the "passengers plan their journey and book their trip via an easy-to-use app. The system automatically suggests the best transport solution ... joining either the air or ground module or other means of transportation to the passenger capsule" for the ultimate in on-demand mobility. (The Pop.Up concept is not unlike the Lockheed-Piasecki ARES concept — with a flying ducted fan module to move a pod — being built for the Defense Advanced Research Projects Agency, DARPA.)

Airbus unveiled Pop.Up, which it developed with European design company Italdesign, at the 87th Geneva International Motor Show in early March. Interestingly, Airbus's innovation group revealed its Pop.Up on the same day that Bell Helicopter's innovation group revealed its FCX-001 (see page 46). Like concept cars, both mock-ups are intended to indicate a vision, rather than a product.

The Pop.Up concept mock-up is a new addition to the company's list of urban air mobility projects. Airbus is also building VTOL demonstrators for its CityAirbus program, as well the Vahana tandem tiltwing eVTOL that is being developed by Airbus's California subsidiary A³.



Mathias Thomsen (right), general manager for urban air mobility at Airbus, at the Pop.Up unveiling in Geneva. (Airbus photo)



Aurora's LightningStrike SVD completed transition flights in March. (DARPA video capture)

Aurora's Small Lightning Strike Transitions

Aurora Flight Sciences' XV-24A LightningStrike sub-scale vehicle demonstrator (SVD) aircraft completed its planned flight test program in early March. Funded by DARPA, the SVD successfully demonstrated key technical features that the full-scale XV-24A will perform, including transition flight.

The XV-24A is a tiltwing unmanned aircraft that will be powered by a distributed electric propulsion system. Twenty-four variable-pitch ducted fans driven by electric motors provide thrust for both hover and cruise. The XV-24A is being developed with the goal of achieving a top sustained flight speed of 300–400 kt (550–750 km/h), with a 15% increase in hover efficiency and a two-fold increase in speed over helicopters.

The SVD aircraft is a 325 lb (150 kg) lithium battery-powered scale model of the 12,000 lb (5.4 t), 61 ft (18.6 m) wingspan XV-

24A. As part of the DARPA VTOL X-Plane effort, the sub-scale vehicle demonstrator (SVD) has completed 10 flight tests, over four months of flight testing, including a full transition to and from wing-borne flight. Previously, Aurora also conducted two iterations of half-model wind tunnel tests. The wind tunnel and flight tests validated the full-scale XV-24A configuration, aerodynamics database, control allocation and blending of the over-actuated system, the avionics architecture, and the flight/mission control algorithms and software. The SVD has a single string of the triple-redundant fly-by-wire system of the full scale XV-24A. The SVD will remain in flight status to supplement the full-scale XV-24A flight test program as necessary, currently scheduled to begin in late 2018.



Aurora is studying future applications like an armed escort for the US Marine Corps' MUX requirement (see page 48). (Aurora graphic)

e-volo's 2X Ready for Production



The e-volo 2X is a refined version of the VC200 demonstrator. (e-volo photo)

At the AERO Friedrichshafen trade show in Germany, e-volo GmbH announced its second eVTOL model: "After six years of development, e-volo is presenting the Volocopter 2X ... powered purely by electricity and capable of carrying 2 passengers." The 2X is refined over the previous VC200 demonstrator. In addition to a much greater payload and cabin refinements, it features a raised more elegant multi-copter assembly, and a battery changing system that allows for swapping batteries within minutes.

The full specifications for the 2X were also released, including a maximum speed of 54 kt (100 km/h), and an endurance of "27 min at an optimal 'flight time' cruise speed of 50 km/h (31 mph)" at a maximum takeoff weight of 990 lb (450 kg).

According to e-volo, the 2X has been developed for approval as an ultralight aircraft and should receive a "Multicopter" type certification being created under the new German ultralight category in 2018. With this type certificate, series production of the 2X can start for the German air sports market. The 2X will also demonstrate its use as a flying taxi in pilot projects — several pre-series models will conduct demonstrations later this year.



As of early April, the e-volo VC200 Volocopter had made more than 300 flights, including this tethered unmanned nighttime flight. (e-volo photo)

Zee Z-P1 Spotted Again



In addition to hovering flights, Zee.Aero has been testing its full-scale Z-P1 eVTOL aircraft in forward flight in Hollister, California. (Steve Eggleston photo, used with permission)

Zee Aero continues manned flight-testing of its full-scale eVTOL aircraft in forward flight at Hollister Municipal Airport, about 50 statute miles (80 km) southeast of its offices in Mountain View, California. The company continues its silence, but more details have been leaking out.

According to public US Federal Aviation Administration (FAA) database information, the aircraft has the registration number N101XZ, and is a model "Z-P1." The aircraft is listed as a glider, with (apparently) eight electric motors and a single seat. The prototype aircraft is serial number Z-P101. The company had previously registered five of its QZ unmanned drones; registration information indicates that the QZ weighs less than 55 lb (25 kg) and powered by eight electric motors.

