

<https://www.aviationtoday.com/2019/10/03/winner-pitchrevolution-aero-ballistic-parachutes-vtol-aircraft/#>
downloaded 10 July 2021



[Air Taxi \(/category/air-taxi\)](#), [Unmanned \(/category/unmanned\)](#)

The Winner of 'Pitch@Revolution.Aero': Ballistic Parachutes for VTOL Aircraft

By **Brian Garrett-Glaser (/author/bgarrettglaseraccessintel-com)** | October 3, 2019

[Send Feedback \(/contact-us/\)](#)

[air taxis \(/s=&facets\[taxonomy_post_tag\]=air+taxis\)](#), [Airbus \(/s=&facets\[taxonomy_post_tag\]=airbus\)](#), [Bell \(/s=&facets\[taxonomy_post_tag\]=bell\)](#), [parachute \(/s=&facets\[taxonomy_post_tag\]=parachute\)](#), [recovery system \(/s=&facets\[taxonomy_post_tag\]=recovery+system\)](#), [Uber \(/s=&facets\[taxonomy_post_tag\]=uber\)](#), [urban air mobility \(/s=&facets\[taxonomy_post_tag\]=urban+air+mobility\)](#)



A depiction of Aviation Safety Resources' 'Xtreme Rapid Deployment' system., designed for use for VTOL aircraft. (ASR)

At a “shark tank”-style aerospace pitch competition during Revolution.Aero last week, Aviation Safety Resources (ASR) won both the audience and judges’ vote for their patent-pending parachute system that slows the descent of a vertical takeoff and landing (VTOL) aircraft without relying on altitude loss.

Most VTOL aircraft, such as traditional helicopters, have the ability to autorotate to the ground in the event of power loss, and typically do not feature parachute systems. Larry Williams, president and CEO of ASR, pitched his parachute system, called Xtreme Rapid Deployment, as ideal for the 200+ electric and hybrid VTOL designs under development for urban air mobility (UAM) missions, where aircraft will be operating at very low altitudes.

"If you take a current recovery system like you would find on a Cirrus ... those recovery systems are basically dependent on forward speed to inflate the canopy," Williams told *Avionics International*. "If you take a 65-foot canopy, which is what you find on a Cirrus, and you had no forward speed, the only way to fill that canopy is with altitude loss. It would take 920 feet of altitude loss to inflate that canopy before [the aircraft] would slow down.

ASR's parachute system uses rockets and three separate chutes to begin decelerating an aircraft within two and a half seconds, according to Williams.

"We looked very carefully at ejection seat technology and what SpaceX is doing to recover their boosters," Williams said, describing a system that fires a retro rocket to slow the aircraft's descent and then deploys its three parachutes in such a way that the deployment itself inflates the chutes.

ASR hopes to work with OEMs to construct a recovery system that matches the dimensions of their unique vehicle and then build it into the design of the vehicle, which would mean the device is included on the vehicle's FAA type certification, according to Williams.

"If you take a very lightweight vehicle, let's say a 600-pound single-person vehicle, that [parachute] system is probably going to weigh somewhere around 20 to 30 pounds," Williams said. "But when you get up into the size that Uber is looking at, for example, they were looking at a 4,500-pound vehicle, and the recovery system would be less than a hundred pounds ... we're anticipating that the UAM market is going to go upwards of 6,500 pounds, and we still think we can probably keep it at close to a hundred pounds for that size vehicle."

Every pound is crucial, however, and not all vehicle OEMs think parachutes are worth the weight — or are the best way to improve vehicle safety. Bell Flight, which is currently developing its Nexus (<http://interactive.aviationtoday.com/avionicsmagazine/july-2019/behind-the-screens-developing-flight-controls-for-bells-nexus-air-taxi/>) for air taxi missions and the scalable Autonomous Pod Transport (APT) system for aerial cargo transport, doesn't currently plan to include parachutes on either aircraft, according to Scott Drennan, the company's vice president of innovation.

"We've been studying ballistic parachutes and whatnot, and any increase in performance in those chutes in order to compensate for the low altitude that on-demand mobility vehicles fly at usually comes with a weight penalty that we would rather manage with available power and energy on the aircraft or performance capabilities in other areas," Drennan told *Avionics*.

Drennan is confident the APT-70, a 315-pound tail-sitting eVTOL drone (<https://www.aviationtoday.com/2019/08/29/bell-yamatos-autonomous-aerial-logistics-solution-apt-takes-flight/>) with four propellers powered by individual electric motors, will be able to survive the loss of a single prop rotor without the need for a parachute by using gimbals to "cone" the three remaining rotors and bring the vehicle to the ground in a controlled fashion.



Bell Flight's APT-70 autonomous logistics drone, equipped with Yamato's PUPA-70XG pod, flies above Texas. (Bell Flight)

Drennan also views parachutes as “too random” to provide an effective solution for Bell's next-generation aircraft.

“Without a full control capability, it just feels too random to me in so many ways,” Drennan said. “I'd rather try to understand and control all the states that are out there — meaning the states on the aircraft, the states in the environment, etc — and then make good decisions from that knowledge rather than knowing that the vehicle is going to come to the ground with less velocity than it had when it was flying. But then what answers do I have after that about when, and how? That's the part that really concerns me.”

The jury is still out at Airbus, too, which is working on two new VTOL aircraft designs: the smaller Vahana (<https://www.aviationtoday.com/2019/05/21/airbus-a%C2%B3s-vahana-electric-air-taxi-single-screen-pilotless-cockpit/>) that fits just one passenger, and the larger CityAirbus intended to carry four.

“Parachutes in eVTOL aircraft are hotly debated,” Zach Lovering, vice president of urban air mobility systems at Airbus, said in an emailed statement to *Avionics*. “On one hand, they potentially add a layer of safety so there's a natural urge to include them in a design. That said, depending on the context of a given aircraft's mission, a parachute could actually have negative knock-on effects.”



Airbus A3 Vahana. Photo courtesy of Airbus

These negative knock-on effects are far greater in a dense urban core than when flying over an open field with no people or buildings nearby, Lovering explained, which is why the intended mission of an aircraft is central to the question of whether to include a parachute system.

“Interestingly, parachutes are also not an item that aircraft manufacturers get ‘credit’ for in their safety case with regulators,” he added. “Our ambition is to build the safest product we can. In our current Vahana demonstrator, we have a parachute on board, but that decision is yet to be made for our next vehicle design.”

Many surveys on public willingness to board “flying taxis,” whether autonomous or professionally piloted, indicate a strong preference (<https://qz.com/962505/survey-finds-most-americans-are-ready-to-use-flying-cars-but-prefer-autonomous-vehicles-that-drive-themselves/>) for parachute systems as a fail-safe. The public also has very high standards for aerospace safety compared to two-dimensional travel; meeting those standards while scaling to the envisions hundreds of thousands of air taxis will require levels of safety that match commercial airliners across vehicle design, operations and maintenance, as Bell’s Drennan emphasized to *Avionics*.

Uber’s Mark Moore, engineering director of aviation at the ride-sharing giant which has six announced vehicle partners for its future Uber Air product, said the company encourages its partners to consider ballistic parachutes.

“Uber Elevate is focused on achieving a multi-layered safety approach,” Moore told *Avionics*. “This leverages the ability of eVTOL aircraft to be designed with thrust and control redundancy so as to not be vulnerable to single part criticality like helicopters. Additional layers that utilize emergency systems such as full aircraft ballistic parachutes are encouraged. In fact, we’re actively working with industry and the FAA for manufacturers to receive certification credit for advanced safety systems.”

Meanwhile, Aviation Safety Resources has opened a manufacturing facility in Kentucky. The company has customers lined up for its first product, a parachute system called ‘Soteria’ intended for sport or experimental general aviation aircraft, which it announced at Oshkosh back in July.



Want more eVTOL and air taxi news? Sign up for our brand new e-letter (<https://www.aviationtoday.com/the-skyport/>), “**The Skyport**,” where every other week you’ll find the most important analysis and insider scoops from the urban air mobility world.

Deliveries of that product will begin by the end of the year, Williams said, and ASR has received interest in its eVTOL-focused Xtreme Rapid Deployment product from a number of next-generation OEMs, ranging from experimental aircraft to VTOL aircraft and even flying car designers. Williams is currently raising money to manufacture and sell that product – hence his successful appearance at Pitch@Revolution in September.

“There was quite a bit of resistance to parachutes in part of the aerospace world,” Williams said. “But the truth is, there has been a paradigm shift where now I think every manufacturer really has to look at putting a parachute recovery system on a vehicle ... I think you wouldn’t get in a car today if it didn’t have airbags in it, and I think the same is going to be true for urban air mobility.”

“We can’t prevent the failure, but we might be able to prevent the fatality,” Williams added. “If I were running the company that had a \$150-200 million invested in one of these vehicles, it looks like a pretty good insurance policy to me.”

Williams said the immediate prize from Revolution.Aero’s pitch contest was a bottle of champagne, but the trip opened doors for ASR and sparked ongoing conversations with potential investors. Thirty percent of the company’s next funding round has been raised from local investors.

Receive the latest avionics news right to your inbox

SIGN UP

(/)

More On This Topic



14 New Partners Added to NASA's Advanced Air Mobility Project
(<https://www.aviationtoday.com/2021/07/09/14-new-partners-added-nasas-advanced-air-mobility-project/>)



Drone Pilots Now Need FAA's TRUST to Fly in the NAS
(<https://www.aviationtoday.com/2021/06/29/drone-pilots-now-need-faas-trust-fly-nas/>)



LaunchPoint Debuts New Hybrid Power Solution to Extend Drone Ranges
(<https://www.aviationtoday.com/2021/06/28/launchpoint-debuts-new-hybrid-power-solution-to-extend-drone-ranges/>)



Insitu Forms Partnership for Drone Operations in the Arctic
(<https://www.aviationtoday.com/2021/06/10/insitu-forms-partnership-drone-operations-arctic/>)

0 Comments **Aviation Today** **Disqus' Privacy Policy**

Login ▾

Recommend **Tweet** **Share**

Sort by Best ▾



Start the discussion...

LOG IN WITH

OR SIGN UP WITH DISQUS

Name

Be the first to comment.

Subscribe **Add Disqus to your site** **Add Disqus** **Do Not Sell My Data**

Also On Avionics



Thales, Safran to Create Optronics Joint Venture
(<https://www.aviationtoday.com/2011/12/22/thales-safran-to-create-optronics-joint-venture/>)



Aegean Airlines to Use CabinVu System
(<https://www.aviationtoday.com/2009/12/09/aegean-airlines-to-use-cabinvu-system/>)



Honeywell Aerospace Names New CEO
(<https://www.aviationtoday.com/2009/09/03/honeywell-aerospace-names-new-ceo/>)



Five Universities Researching, Developing Innovative New Aerospace Technology
(<https://www.aviationtoday.com/2021/02/01/five-universities-researching-developing-innovative-new-aerospace-technology/>)

AVIATION TODAY

(<https://www.aviationtoday.com/>)



(<https://www.facebook.com/avionicsmagazine/>)

(<https://twitter.com/avionicsmag>)

(<https://www.linkedin.com/company/avionics-magazine>)

(<https://www.youtube.com/channel/UCVPZSvlx-8JErIWezRBleOQ>)

Quick Links

- Commercial (<https://www.aviationtoday.com/category/commercial/>)
- Business & GA (<https://www.aviationtoday.com/category/business-ga/>)
- Military (<https://www.aviationtoday.com/category/military/>)
- Embedded Avionics (<https://www.aviationtoday.com/category/embedded-avionics/>)
- ATM Modernization (<https://www.aviationtoday.com/category/atm-modernization/>)
- Connectivity (<https://www.aviationtoday.com/category/connectivity/>)
- Advertise (</advertising/>)
- Podcasts (<https://www.gcasummit.com/podcasts/>)
- Webinars (<https://www.aviationtoday.com/webinars/>)
- Subscribe to Avionics (</subscribe/>)
- Contact Us (</contact-us/>)
- Job Center (<http://jobs.aviationtoday.com/>)