Setting the airways for urban air mobility

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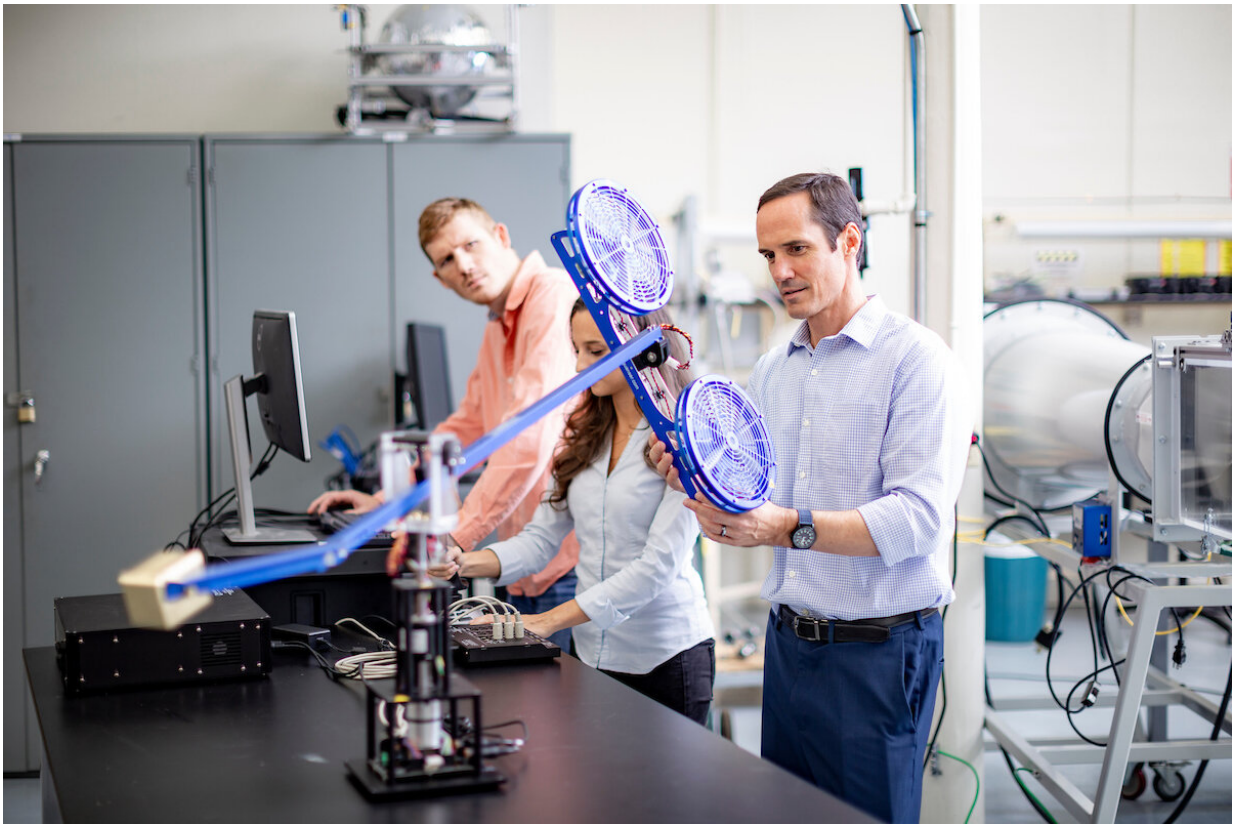

Dr. Brian Kish with students in the Aerospace Experiments Lab. Credit: Florida Institute of Technology

Flying drones are doing great things today, from powerline inspection to security surveillance to precision agriculture (fertilizer and pesticide application).

These drones have evolved from remotely piloted to fully autonomous, where the user programs waypoints and hits the "go" button.

So far, operating drones over populated areas has been limited. But that's about to get tested.

On the immediate horizon is drone package delivery. We have Florida Tech alumni at Amazon today running the flight test certification program for their drone package delivery system.

If fielded, this will determine the public's appetite (in terms of privacy, noise, visual disruption of the sky, security and safety) for drones flying over populated areas.

Just like delivery trucks sometimes break down or crash, it's only a matter of time until a package-delivery drone crashes into a house or flies into a crowd of people.

Assuming the public accepts this (on rare occasion), the technology will grow to enable bigger and bigger packages to be delivered.

If the payload grows to hundreds of pounds, why can't the payload be a human? This question spawned the renewal of the quest for "flying cars," which have been a feature in many sci-fi movies and television series like "The Jetsons." This new quest has been promoted under the name "urban air mobility."

The latest FAA-funded program has aerospace, physics and space sciences assistant professor Markus Wilde and I helping the FAA develop means of compliance for the urban air mobility market, which includes electric vertical takeoff and landing aircraft.

These future concepts are neither traditional fixed-wing aircraft nor

helicopters. Just like the automotive industry had to figure out certification of electric cars, the FAA will need to do the same for electric aircraft.

The FAA flight and pilot training rules will also need to be redefined.

For example, having 45 minutes of reserve fuel in case an aircraft needs to divert for poor weather was easy to define in terms of gallons of fuel. Translating flight time to battery charge remaining is not as straightforward. This especially gets tricky for vertical landing or vertical missed approach, where the aircraft requires an additional burst of power rather than a power reduction as seen by fixed-wing aircraft on final glideslope.

The key technologies required to make urban air mobility vehicles possible are the same requirements for package-delivery drones: low emissions, low noise, vertical takeoff and landing, and precise trajectory control.

Helicopters have been providing urban air mobility for years, but they require pilots and don't meet the emissions or noise requirements. They also are quite expensive and thus used mainly by wealthy people.

The prototype urban air mobility vehicles of the future vary from multi-copters (similar to package-delivery drones) to tilt-rotor aircraft (similar to the military's V-22) to other vehicles that incorporate distributed propulsion and vectored thrust.

The variety of these designs has challenged government regulators to produce certification and operation rules. Florida Tech has FAA contracts to help them define new rules.

Autonomous cars and Amazon drones are blazing the technology and

regulatory paths. Neither will see widespread use in the near future. But as the public gains confidence, the use of both will grow. And the dream of Jetsons-like urban air mobility might just be here sooner than you think.

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