Dubai Pushes for Unmanned Aviation Leadership

Aviation week

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It has long been a technology leader, but the United Arab Emirates - and Dubai in particular - is racing ahead of the global pack when it comes to deploying unmanned aircraft. The city-state is involved in a number of ambitious programs that will - if they transition successfully from aspiration to reality in the timescales envisaged - see it become the world's leading center for unmanned aircraft technologies.

The spate of recently announced programs is more credible from Dubai than it might have been had the announcements been made elsewhere, given the emirate's long-standing interest in, and support of, other UAS applications and initiatives.

At the time it was launched, in 2014, the UAE's Drones for Good Award was an outlier. To the extent that unmanned aircraft technologies were discussed at all by the wider public, the perception was negative: media coverage was dominated by lethal drone strikes and privacy worries. Today, the narrative has shifted decisively. Curiosity has replaced concern. Drone tech is cool.

Drones for Good was designed to highlight positive uses of UAS by inviting entrants to showcase socially progressive applications for UAS, with large cash prizes on offer. It has since expanded into two separate categories: the first is open, as it has been since 2014, to entrants from around the world, while the second, introduced in 2016, is only for entrants based in the UAE - a reflection of the growing diversity and maturity of the Gulf's UAS industry.

Entrants to Drones for Good have shown how unmanned air technologies have few limits when applied to problem sets that would pose a considerable challenge to manned aviation. Competitors have showcased systems that clear fog from airport runways and plant tree seedlings, as well as an aircraft optimized for construction inspection roles which can stabilize itself during high winds by attaching cords to nearby surfaces.

The UAE's embrace of unmanned transportation systems does not begin and end with Drones for Good. The first line of Dubai's driverless Metro system opened in 2009. Dubai's tram system is also driverless, and last year saw the first journey by a self-driving car between Abu Dhabi and Dubai. But it is in aviation where the unmanned challenges remain greatest, and where Dubai looks to establish a lead over the rest of the world.

In 2014, the Zephyr UAS - a solar-powered, lightweight, large-wingspan aircraft manufactured in the UK by Airbus - successfully conducted a flight trial in Dubai that resulted in a number of significant firsts for the integration of unmanned air traffic alongside traditional manned aviation. The aircraft, which takes several hours of circling in a column of airspace to reach its operating altitude of around 70,000ft, was launched in close proximity to Dubai International Airport, in a flight run by Airbus but performed under both the permission and

the observation of the Dubai Civil Aviation Authority. This proved the concept of operations for the Zephyr, under some of the most exacting deconfliction conditions it is likely to encounter; three years later, it remains the only flight by the platform as close to a major airport.

The ultimate in unmanned aircraft operations may well be the use of autonomously piloted systems to carry people. It is perhaps little surprise that this application is on Dubai's wish-list. Here, *ShowNews* looks at some of the programs currently in place in the emirate that are seeking to push the boundaries surrounding unmanned flying.

Dubai Air Taxi

Towards the end of September, the Dubai Road and Transport Authority (RTA) announced that a maiden concept flight had taken place near Jumeriah Beach Park by an 18-rotor, nine-battery aircraft developed by the German company Volocopter. This was the first practical step taken towards a stated goal of performing a quarter of all individual journeys taken in Dubai by autonomous transport systems.

Volocopter flew in Dubai in sight of the Burj Khalifa.

The Volocopter 2X was selected for the flight trial, though the RTA is also in discussions with a Chinese firm, Ehang, whose Ehang 184 has been flown in test conditions in the region for several months. The apparent decision to favor the German aircraft is likely because it conforms to more stringent German safety standards. The other key difference between the two platforms is payload capacity: the eight-rotor Ehang 184 can carry only one person, while the Volocopter 2X is designed to carry two.

The aspiration for the program as a whole is that the air taxis would be hailed using a smartphone app, and availability of the system will be integrated into the rest of the emirate's public transport infrastructure. Work to integrate the flights will involve the Dubai CAA and the UAE's General Civil Aviation Authority, and is being overseen by the U.S. consultancy JDA Aviation Company.

Issues to be addressed are numerous, from deconflicting the autonomously piloted Air Taxi from helicopters, enabling the system to navigate around unmapped or temporary obstacles such as cranes and powerlines, to ensuring that journeys - which may be unplanned until the moment the customer enters the aircraft and selects their desired destination on the onboard touchscreen - are transparent to, and flown in conjunction with, extant air-traffic control procedures. The project has been given a five-year timeframe to take the concept from the initial flight trial to a daily operational capability.

Volocopter CEO Florian Reuter has said that the aircraft will eventually feature a sense-and-avoid capability, though it is unclear when this will be available - the company's website simply lists this feature as "possible," while noting that "available UAV technology can be integrated into the Volocopter". As yet, no full sense-and-avoid solution for a UAS has been brought to market. However, it is possible that there may not be a need for a fully featured sense-and-avoid system: much will depend on what the emergent regulations will require such a system to do - and drafting of these regulations forms part of the work that the Dubai air taxi program has been established to carry out.

Flying police motorbike

Given their track record in eye-catching vehicles - this is, after all, a police force whose patrol-car fleet includes models from Ferrari, Lamborghini and a 430kp/h Bugatti Veyron, and which in May announced that it was deploying a robot officer to undisclosed "high-density areas" of the city - it is perhaps little surprise to find the Dubai Police Force embracing the concept of a hoverbike. The force has tested the Hoversurf Scorpion3, and released video of trials flights of the machine during the GITEX show in Dubai last month.

Dubai Police tested the Hoversurf Scorpion 3.

Hoversurf is headquartered in San Francisco but the company's website says its R&D center is in Moscow while its eventual production facility will be in Dubai. It is selling the electrically powered Scorpion 3 - which is available in both hoverbike and cargo-carrying unmanned variants - as buyer-assembled kits. Prices start at $55,000 for the cargo version and $59,900 for the hoverbike, with final prices dependent on the individual customer's specification and requirements. Delivery time is estimated as between six and 18 months. An aircraft can be reserved with a $2,000 down-payment.

The Dubai Police Force appears to be considering the Hoversurf for emergency response roles. It is able to fly at up to 5m and has a range of around 6km, making it potentially suitable for getting a police officer - or, in cargo configuration, some emergency equipment - to the site of an accident that has caused gridlock for road traffic.