

Group 5. Flying through urban turbulence: A Weather Rugged Vehicle for Urban Air Mobility

Problem

A network of surface road and rail connections is a characteristic of any metropolis, and enables the movement of hundreds of millions of people every day. Unfortunately, the transport veins and arteries of any large city are congested with cars, trams and busses. Over the last decades, this problem has only grown more severe in the modern world, and little has been done to address this. Solutions that do utilize the freedom of exploring the urban airspace unfortunately do not offer the performance to fly through the urban turbulence safely.

Solution

We present to you the VEATLE - an accessible electric vehicle, capable of vertical flight, which would operate in harmony with the urban environment. Through a two-stage trade-off, a multirotor concept was chosen. The developed control system not only allows for autonomous flight, expanding the scope of use, but also allows for effective and safe operation in the realm of urban turbulence, providing the passengers with unprecedented cabin comfort even in rough weather conditions. An electric propulsion system comprised of 8 large rotors allows for zero-emission, low-noise operation and enhanced efficiency for flights of up to 20 km range with 250 kg payload. Three control rotors distributed on the vehicle allow it to repel a 20 m/s wind gust and stay within a meter from its trajectory. The modular structural design of the vehicle uses lightweight aerospace materials.

In the last weeks of the design process, operational analysis and the cost/mass budget will be iterated. An acoustic footprint during operation, as well as a lifecycle impact assessment of the vehicle, will be executed. The CAD drawing of the complete assembly will be made, and CFD runs will be performed in order to validate the aerodynamic receptivity to the urban environment.

The vehicle will premiere in the City of London, where it will pioneer the public transport market with its low travel time and great weather flexibility. After 50 years of small innovations within the public transport sector, the next big innovation, the VEATLE, has finally arrived.



VEATLE - Vertical Electric Air Taxi Looking Excellent