

By Data Hive

MONITORING DRONE SYSTEM FOR TURBULENCE AND NOISE IN THE URBAN ENVIRONMENT

Group 03: Jury Summary

The applications of Unmanned Air Vehicles have increased exponentially in the latest years. It will not take long before tasks, such as merchandise delivery, building inspection and traffic management are taken over by flying vehicles. Currently there is no system in place collecting data on interactions between air vehicles and the urban environment. With the growth of Urban Air Mobility, monitoring information such as noise pollution and turbulence in cities becomes a major need.

The solution proposed is a system of at least 3 drones capable of measuring noise emissions and wind turbulence in cities and monitored from 2 ground stations via an intermediate cloud server. The main advantage is that the platforms can collect measurements dynamically and at user-defined locations in 3D space, as well as stream the data in real time to the ground stations. Additionally, temperature, pressure and several types of air quality sensors were incorporated in the final vehicle, to expand the system capabilities and provide a larger variety of data.



Designing this system posed many challenges in different engineering fields. When measuring noise from the environment using a drone, the noise coming from the drone itself needs to be isolated from the measurement. This is partially achieved with the use of a bidirectional microphone. To ensure that the drone would not interfere with the measurements, a lightweight structure was designed with optimal placement of the turbulence and noise sensors. Moreover, reducing the weight was required to maximize the flight time and therefore the data collected per mission.

The components are all integrated, so the system is capable of operating in windy and rainy weather. The drones operate in a coordinated fashion with the use of the 5G network which enables dynamic communication between drones and the ground stations to collect data more efficiently in an urban environment.

In conclusion, the team can be considered satisfied about the designed system. The numerous challenges helped to enrich knowledge and practical experience as well as teamwork skills. Furthermore, the design still presents margin for improvement, which could be achieved in the future with the help of experimental facilities and additional time resources. At this moment in time many requirements are complied with and the team is working hard to verify that the remaining requirements are met in the near future. We will be glad to present our project to the jury.