



Modeling and simulation of flight of drones in the city

(project of Internship at Association Léonard de Vinci, Paris La Défense, France)

A. Biancalani

Lecturer and researcher at the Engineering School Léonard de Vinci, Paris

in collaboration with A. Rabia (responsible for CFD simulations), S. Yahiaoui, D. Gossard, F. Salvarani, and D. Yakoubi.



Project description.

Planning a “smart city” is becoming a feasible task, with the recent developments mainly of information technology and communication technology. A possible method of data acquisition has been proposed in the form of a network of drones.

A comprehensive model of the flight of drones in the city is important when one wants to properly predict and control their trajectories, even in the presence of a wind. The dynamics of a wind in the presence of obstacles (the buildings) is studied with the aim of investigating the change of trajectories which can be more or less important. An example of strong modification of the trajectory is given when a turbulence zone is created, especially when the wind flows past a building.

In this project of Internship, the student will face the problem of modeling and simulating the flight of drones in the city. Firstly, the dynamics of a wind stream in the presence of an obstacle will be studied by means of computational fluid dynamics (CFD). This will show the modification of the trajectories and the zones of formation of turbulence. Secondly, the flight of a drone will be modeled and simulated in the original and modified trajectories.

Possible applications include the comparison of the numerical results with experimental measurements (in the laboratory or in the city), and with reduced models (for example of artificial intelligence).

Starting date: February-March 2022.

Duration: 6 months.

Applicant requirements: The student who wishes to apply should be in the M2 year, and should have a basic knowledge of programming languages (Matlab and/or Python), and CFD.