

Design, Manufacturing and Control of Electric Propulsion Pylon Model with Tilting Propellers

Master's Thesis / Semester Thesis / IDP

Description:

With the increasing demand for efficient transportation in metropolitan areas, much effort is being devoted to the development of innovative aircraft to meet urban needs in what is known as Urban Air Mobility (UAM). To this end, several innovative aircraft configurations have been proposed, with emphasis on electric vertical take-off and landing vehicles (eVTOL). These concepts incorporate elements that in the past were present in traditional fixed-wing aircraft and helicopters, presenting new aerodynamic challenges.

At the Chair of Aerodynamics and Fluid Mechanics, wind tunnel experiments will be carried out to investigate the aerodynamics of such novel designs. For this purpose, a scaled wing model with tilting propellers is currently in development.

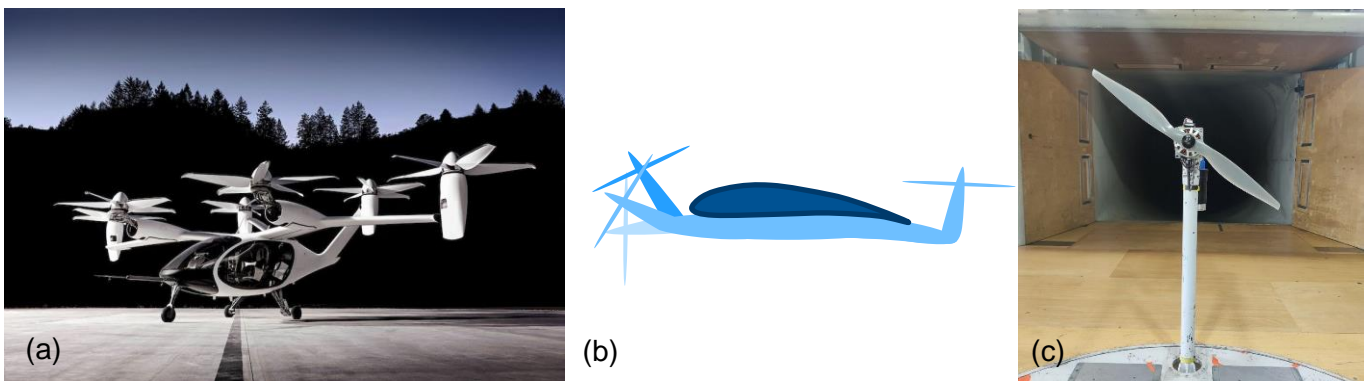


Figure 1: (a) example concept of eVTOL aircraft (Source: [Joby Aviation](#)); (b) Sketch of wind tunnel model cross section; (c) Wind tunnel A at the Chair of Aerodynamics and Fluid Mechanics.

In this context, one Master's Thesis or more Semester Theses / IDPs are available for the design and integration of the propulsion unit of the wind tunnel model. The tasks include the mechanical design and CAD construction of a (scaled) electric propulsion pylon to be integrated with an already existing wing model, including electric actuators to control the angular position of the propellers. Furthermore, the work includes programming and control of actuators and their software integration with other measurement equipment (in LabVIEW environment), as well as assistance tasks during wind tunnel experiments and evaluation of test results.

Requirements:

- Self-organized and independent worker
- Good communication skills
- Willingness to carry out practical work
- Experience with CAD design and manufacturing
- MATLAB and LabVIEW programming experience (preferably)

Possible start: Immediately

Contact: Catharina Moreira, catharina.moreira@tum.de