Master Thesis starting May 2023

Topic:

Design, construction and experimental investigation of a louver system for a generic wing-integrated lift-propulsion system for a novel eVTOL aircraft

Abstract:

Background

Urban and Regional Air Mobility (UAM & RAM) seek to relocate passenger and cargo transport for domestic and regional traffic to the third dimension. VTOLs are expected to fill a need in this market with their vertical take-off and landing capabilities while being sustainable by implementing for example electric or hydrogen-electric propulsion. Many different concepts are in various stages of development worldwide. The rotors of the investigated VTOL configuration will be integrated within the wings of the aircraft. This is meant to improve aerodynamic performance, but results in new challenges, especially when considering complex flow phenomena in transition flight.

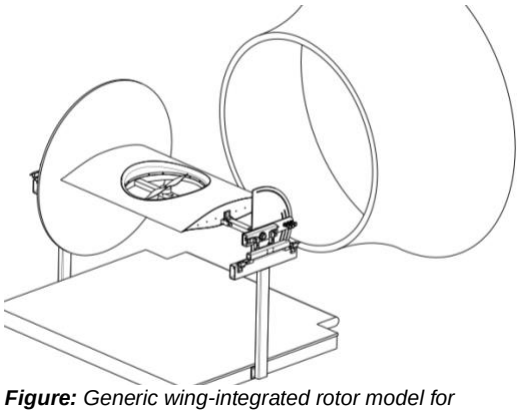

Figure: *Generic wing-integrated rotor model for wind tunnel measurements*

Primary Objective

To benefit from the concept of wing-integrated rotors, a so-called louver system has to be designed to close the rotors in the wing during cruise flight.

Building on the already developed fundamentals on the subject of wing-integrated rotors (both experimental and numerical), the louvers will be designed and built in the course of this Master Thesis.

This will be followed by the installation in an already existing generic wing model for the wind tunnel and the subsequent execution of wind tunnel experiments and data analysis in the *Medium Wind Tunnel* of the IAG.

The work is carried out in a cooperation between the company Odonata GmbH and the Institute of Aerodynamics and Gas Dynamics at the University of Stuttgart.

Targeted Milestones:

- Literature review for VTOL wing-integrated propulsion system
- Review of the already existing considerations for the mechanical implementation of the wing-integrated rotor closing mechanism
- Detailed louvers design incl load assumptions
- Construction of the louvers mechanism
- Implementation in the generic wind tunnel wing model
- Wind tunnel experiments and data analysis
- Documentation of results

Your Profile:

- Course of study: Aerospace Engineering
- German or English speaker
- Interest in the fields of aerodynamics, CAD design, mechanics, measuring techniques and VTOLs is an advantage
- Desirable: No aversion to hands-on work, e.g., laminating fiber-reinforced components
- Soft skills: Independent work and hands-on mentality

Supervisor: Prof Dr. rer., nat. Manuel Keßler (IAG)
John Griesbacher (Odonata GmbH)

The position will be available beginning May 2023.
Are you interested in working on this exciting topic? Then send us your complete application documents (CV and transcript of records) to the following address: john.griesbacher@odonata.aero