Deutsches Zentrum
DLR für Luft- und Raumfahrt

Master's Thesis: Flight Control Law Development and Testing for a Tilt-Wing eVTOL UAV

Req ID: 3308
Place of work: Oberpfaffenhofen
Starting date: immediately
Career level: Student research project and final thesis
Type of employment: Part time
Duration of contract: by arrangement, 6 - 9 months
Remuneration: Remuneration is in accordance with the Collective Agreement for the Public Sector - Federal Government (TVöD-Bund)

Enter the fascinating world of the German Aerospace Center (Deutsches Zentrum für Luft- und Raumfahrt e. V.; DLR) and help shape the future through research and innovation! We offer an exciting and inspiring working environment driven by the expertise and curiosity of our 11,000 employees from 100 nations and our unique infrastructure. Together, we develop sustainable technologies and thus contribute to finding solutions to global challenges. Would you like to join us in addressing this major future challenge? Then this is your place!

Welcome to the Institute of Flight Systems. Our work focuses on the interaction between aircraft configuration, pilots and modern flight system technology. From flight dynamics to unmanned aerial vehicles, from simulation to real flight tests - we analyse, test and develop innovations that will shape the flying of the future. The Flight Control and Simulation department combines skills in system dynamics and control engineering to develop advanced flight control methods and realistic flight simulators.

What to expect
At the Institute of Flight Systems, we develop new flight control methods for unconventional aircraft configurations. A focus area of our research is transformational aircraft, which are characterized by a large flight envelope, a high degree of overactuation, and a complex transition maneuver between hover and cruise flight states. While historical aircraft concepts suffered especially from poor flight and handling qualities, today's level of automation and control augmentation allows for a seamless control and simplified vehicle operations, as well as easy integrations of higher-level functions. As these control functions are experimental and the flight dynamic models used for the validation cannot cover all (aero)dynamic phenomena occurring in the real world, it is indispensable to test these functions in flight tests on subscale demonstrators.
Your task is to build on previous flight dynamics and control research for tilt-wing aircraft and transfer and implement novel flight control functions on a new subscale demonstrator configuration. After familiarizing with the flight dynamics and implementing a suitable flight control law, thorough testing and clearance needs to be done. Then, the preparations for the flight tests, where both the on-hardware implementation and in-the-loop tests take place. If time allows, you will also support us with upcoming flight test campaigns and help us with any work that arises there.

Your tasks

- Literature research (VTOL flight control, flight testing)
- Familiarizing and analyzing the flight dynamics of the new configuration
- Implementation of a flight control law for this configuration
- Testing, validating and verifying the implemented control law
- Building up a workflow for flight control implementation and testing on the subscale demonstrator
- Test of the resulting setup (using HIL)
- Accompany flight testing
- Documentation of the workflow and results

Your profile

- Above average enrolled master student in aerospace engineering or similar
- Good knowledge in Matlab/Simulink and Python
- Good knowledge in flight mechanics and dynamics
- Good knowledge in control theory and flight control
- Knowledge on nonlinear (flight) control methods and concepts
- Preferably initial knowledge on eVTOLs
- Preferably hands-on knowledge with flight hardware and flight testing
- Independent, autonomous work approach
- Interest to work scientifically

We offer

DLR stands for diversity, appreciation and equality for all people. We promote independent work and the individual development of our employees both personally and professionally. To this end, we offer numerous training and development opportunities. Equal opportunities are of particular importance to us, which is why we want to increase the proportion of women in science and management in particular. Applicants with severe disabilities will be given preference if they are qualified.

We look forward to getting to know you!

If you have any questions about this position (**Vacancy-ID 3308**) please contact:

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Follow the QR code and apply directly!