MUNICH AEROSPACE – NEW HORIZONS IN AVIATION AND SPACE

In 2010, through Munich Aerospace and its pooling of research, graduate programs and teaching an alliance has been formed between the **Technical University Munich** (TUM), the **Bundeswehr University Munich** (UniBwM), the **German Aerospace Center** (DLR), as well as **Bauhaus Luftfahrt** (BHL).

To promote excellent, scientific young academics, Munich Aerospace awards a PhD scholarship on

Intelligent Fault Detection and Fault-tolerant Control

The research group **"Intelligent Control of Highly Over-Actuated Flight Systems"** is led by Dr. Gertjan Looye from the Institute of System Dynamics and Control at DLR and involves the Institute of Flight System Dynamics at TUM (Prof. Florian Holzapfel) and the Professorship of Aircraft Dynamics and Flight Guidance at UniBwM (Prof. Axel Schulte). The research aims at developing new key technologies pushing forward fully autonomous flight, with a focus on the design, validation and certification of intelligent flight guidance and control (G&C) systems. The group explicitly addresses challenges arising in modern flight systems such as air taxis or next generation transport aircraft which feature a large number of control inputs due to, e.g., distributed control surfaces or propulsion systems. Relying on a long-lasting and strong collaboration on several research topics, the researchers from DLR, TUM and UniBwM will bring together their expertise and tightly co-operate within this activity.

Your tasks

The goal of this PhD scholarship is to develop novel fault detection and fault-tolerant control algorithms to improve reliability and safety of modern flight systems. While current approaches largely focus on single-point or point-wise designs of detectors and controllers, additional research is still needed to systematically consider parameter variations and uncertain system dynamics. In a first step, advanced methods from robust control theory are exploited in different ways to handle the effects caused by faults. In a second step, these methods are extended using learning-based techniques aiming at filling the gap between purely deterministic and stochastic design approaches. The different approaches are carefully evaluated in simulations and tested on real hardware platforms like DLR's Faser UAV or robotic motion simulator.

Your profile

- M.Sc. in Aerospace Engineering, Mechanical Engineering, Electrical Engineering, or a related field.
- Excellent knowledge about flight dynamics, simulation, and control.
- Excellent knowledge in Matlab/Simulink.
- Keen interest in artificial intelligence.
- Experience with version control such as GIT is a plus.
- Strong motivation to contribute and lead in development of future air mobility industry.
- Self-dependent, autonomous, and target-driven workstyle with the ability to work in a team is required.
- A strong mindset of analytical problem solving.
- Fluent English skills including both speaking and technical writing is essential.

An additional requirement of the promoted PhD position is a close collaboration with the other partners of the research group UniBW and TUM, fostering mutual learning with other experts of the field.

der Bundeswehr Universität München

Technical University of Munich

DLR Deutsches Zentrum für Luft- und Raumfahrt German Aerospace Center

The Institute of System Dynamics and Control at the German Aerospace Center

The PhD position will be at the Institute of System Dynamics and Control at DLR, which offers an excellent research environment with up-to-date laboratory equipment to realize your ideas. The Institute has extensive expertise in the field of modeling and control of aircraft (from UAV to CS-25 and highly agile configurations; from design to flight tests), robust control methods and dealing with dynamically occurring disturbances. The group consists of a highly motivated and interdisciplinary team that will support you during your personal and scientific development.

The Scholarship

The Munich Aerospace scholarship amount is 1.575 € per month granted for a minimum of 12 months and limited to a maximum of 3 years. Munich Aerospace scholarship holders are entitled to attend the Munich Aerospace Graduate School, formed by the TUM Graduate School and the DLR_Graduate_Program, and have access to special events and trainings. An additional grant of up to € 6.100 per year will be available to cover expenses that are directly related to the PhD project (e.g. textbooks, laptop, conference travels, public transport, housing subsidy). The scholarship holder is part of a Munich Aerospace research group and receives additional technical support from the research group head. The candidates receive their PHD from TUM or UniBwM.

Interested?

Please send us your application including relevant documents (cover letter, CV, diplomas, transcript of records) in PDF format to gertjan.looye@dlr.de. The application deadline is April 14, 2021.

We are looking forward to your application!