



Technische
Universität
Braunschweig



DLR

Deutsches Zentrum
für Luft- und Raumfahrt
German Aerospace Center



PhD-Researcher Position (m/f/d) within the SE²A Research Cluster

***Methodologies for the Design and the Validation of
Advanced Flutter and Load Control Function***

Temporary Position (3 years), Salary Level TVöD-Bund E13

Background:

The Cluster of Excellence SE²A - *Sustainable and Energy-Efficient Aviation* is a DFG-funded interdisciplinary research center investigating technologies for a sustainable and eco-friendly air transport system. Scientists from aerospace, electrical, energy and chemical engineering as well as economics and social science are working on the reduction of drag, emissions and noise, life-cycle concepts for airframes, improvements in air traffic management and new technologies for energy storage and conversion. Technische Universität Braunschweig, the German Aerospace Center (DLR), Leibniz University Hannover (LUH), the Braunschweig University of Art (HBK) and the National Metrology Institute of Germany (PTB) have joined forces in this extraordinary scientific undertaking. The overall project is structured into the three core research areas “Assessment of the Air Transport System”, “Flight Physics and Vehicle Systems” and “Energy Storage & Conversion”.

(www.tu-braunschweig.de/en/se2a)

Employment:

The position is located at the DLR Institute of Flight Systems (<https://www.dlr.de/ft/en/>), in the department Flight Dynamics and Simulation. This department investigates all topics related to the flight mechanics, flight control, and assessment of existing and novel aircraft configurations. In the framework of the SE²A cluster, a research group has investigated since 2019 a series of technologies aiming at enabling significant structural weight reductions for future aircraft. These technologies encompass new structural designs, fluidic actuators for lift redistribution, as well as sensing and control techniques.

Task:

The PhD candidate will investigate novel methodologies for the design and the validation of active flutter control functions and investigate the interplay between flutter control technologies and other flexible and “rigid-body” flight control functions (e.g. gust load alleviation, maneuver load alleviation, flight augmentation laws). The control design methodologies to be investigated in this framework will include approaches based on robust and modal control techniques. The work will use a mid-range aircraft configuration which was designed and modeled during the last years in the SE²A cluster as well as the gust load alleviation controllers and control design tools already available at the DLR department Flight

Dynamics and Simulation. The work is focused on the controller design and analysis, but some understanding of aeroelasticity may be required, e.g. to adapt the flexible structure such as flutter behavior occurs already at lower airspeeds.

The research group from the SE²A cluster as well as the department Flight Dynamics and Simulation, which the PhD candidate will be part of, strongly rely on the close cooperation, exchange, and support between the employees from different background and disciplines. This contributes to a particularly attractive and interesting work environment in which young scientists can thrive.

Who we are looking for:

- MSc. in aeronautics, mechanical engineering, electrical engineering, or similar
- Good knowledge in control/system theory and in the simulation of dynamic systems
- Experience in at least one programming language
- High English proficiency
- Some knowledge in flight mechanics and flight control

Desired qualification:

- Experience with at least one object-oriented or functional programming language
- Prior experience with MATLAB/Simulink desirable
- Some understanding in aeroelasticity
- High German proficiency

Application Process:

Applications will have to be made on the DLR website: direct link can be obtained upon request via e-mail to Nicolas Fezans (project investigator) Nicolas.Fezans@dlr.de. The following documents will be required:

- Motivation Letter
- Curriculum Vitae including complete address, phone number, email address, educational background, language skills, and work experience
- Copies of bachelor and master diploma and transcript of grades in original language and in English or German translation
- Additional Documents must be provided on request

Please note that application costs cannot be refunded. For the purpose of carrying out the application process, personal data will be stored.

For more information, please call Nicolas Fezans on +49 (0) 531 295 2653.