



Technische
Universität
Braunschweig

Institut für Flugzeugbau und
Leichtbau



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

Improvement and verification of aircraft wing load mitigation technologies through sub-scale flight testing

Temporary Position (up to 3 years), up to Salary Level EG 13 TV-L, 100%

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)

The project:

Energy-efficient aircraft require lightweight wings with a high aspect ratio. Load reduction and flutter suppression can contribute to this goal. These areas have been the subject of active research for decades. However, in recent years, smaller, unmanned aircraft or downscaled aircraft have been studied as demonstrators of new technologies in subscale flight tests. In a new research project, the Institute's strongly numerically oriented preliminary work in the area of load mitigation of next-generation sustainable aircraft wings will be complemented by subscale flight tests to verify and improve various load mitigation technologies. Based on similarity approaches, subscale models focusing on passive load mitigation by flexible wings especially with nonlinear behaviour will be derived, built and flight tested from the full-scale models. Active load mitigation is achieved by feedback from distributed sensors and active control of distributed fast moving flaps, also in combination with the passive approach. Valuable insights into the feasibility and limitations of the load mitigation systems are expected from the realistic flight operational conditions to develop and rapidly test improvements and to draw conclusions about the full-scale structure.

Employment:

The position is located at the Institute of Aircraft Design and Lightweight Structures (IFL) (<https://www.tu-braunschweig.de/en/ifl>) in Braunschweig. The entry date is 01.01.2023, and the duration is initially limited to 3 years with a possible extension up to 6 years. The position is part-time suitable, but should be occupied 100%. For all doctoral researchers of the cluster, an active participation in SE²A's own qualification

programme is mandatory, the time effort for this training measure entails 10% of the working time. The payment is made according to task assignment and fulfilment of personal requirements up to salary group EG 13 TV-L. International applicants may have to successfully complete a visa process before hiring can take place. Applications from international scientist are welcome. The Cluster SE²A aims to increase the share of women in academic positions. Applications from female candidates are very welcome. Where candidates have equal qualifications, preference will be given to female applicants. Candidates with handicaps will be preferred if equally qualified. Please enclose a proof.

Task:

- Definition of the reference configuration and the test conditions, definition of the flight tests as well as modelling and design of the aircraft wings, design of the flight control and the data acquisition system.
- Production of the hardware and integration of the data acquisition system into the aircraft
- Structural testing of wings, static and dynamic ground testing of complete sub-scale aircraft
- Commissioning of the aircraft and flight control software
- Conduct flight test campaign, data analysis to verify and validate load mitigation, scale-up considerations to a full aircraft, flight characteristics evaluation
- Publishing research results in scientific journals and at international conferences
- Support the institute's teaching activities (supervision of lectures and student theses)
- Support research project acquisition and administrative tasks of the institute

Who we are looking for:

- You are passionate about aircraft structures, lightweight materials, aircraft design, structural mechanics, and flight controls
- You have experience in building and flying model airplanes
- You are enthusiastic about experimental test campaigns including manufacturing activities and measurement data analysis
- You have a university degree in engineering with above-average grades
- You are a team player and independent, solution-oriented and structured
- You are proficient in the English language for work in an international research environment
- You are proficient in the German language to support the teaching activities of the institute

Application Process:

Applications should be sent by e-mail to s.heimbs@tu-braunschweig.de or in printed form to

Technische Universität Braunschweig
Institut für Flugzeugbau und Leichtbau
Prof. Dr.-Ing. Sebastian Heimbs
Hermann-Blenk-Straße 35, D 38108 Braunschweig

until 16.12.2022 and must contain the following documents:

- 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

All documents should be in PDF format, preferably in a single file. Personal data and documents relating to the application process will be stored electronically.

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 Prof. Dr.-Ing. Sebastian Heimbs on +49 (0) 531 391-9903.