

The Chair of Rotorcraft and Vertical Flight at the TUM is looking for a

## PhD student (m/f/d) within the LuFo VI-3 project BIG-ROHU for physically based prognosis and health management of helicopter components.

As part of the BIG-ROHU research project funded by the Federal Ministry of Economics and Climate Protection (BMWK), we are looking for a highly motivated doctoral student **at the earliest possible date**.

In the project “BIG-ROHU” (BIG Data - Rotor Health and Usage Monitoring), a system is being developed in cooperation with Kopter Germany GmbH and the Engineering Risk Analysis Group of Prof. Straub, which provides information on both the health and the actual stress of helicopter components. For this so-called “Health and Usage Monitoring System” (HUMS), a data-based as well as a physics-based approach is being investigated using the example of rotor components of the Leonardo AW169 helicopter. Experimental certification flights and flight data from operators of the ten-seater, twin-engine helicopter with a maximum take-off weight of up to 4,800 kg, together with statistics on maintenance events, provide the data basis for the investigations in this project.

The overall aim of the project is to minimize extraordinary maintenance activities which ensure sufficient lead time for maintenance planning, increased customer confidence and improved availability of the fleet/aircraft for the operators. In addition, the project's extended HUMS system is intended to promote increased product life cycle, material and resource efficiency.



A physics-based model for monitoring the condition of helicopter components is being developed as part of this project. With the help of flight test data, this model is to be calibrated and used to predict the development of damage. Based on this, a new maintenance strategy is to be developed that is based on the physical relationships and thus enables better consideration of critical failure mechanisms. The performance of the developed methods will be evaluated using real operating data. In addition, it will be investigated how reliability and safety conditions can be taken into account. This is particularly important with regard to the extension of regulatory maintenance intervals.

The position is explicitly intended for the completion of a doctorate.

**Your tasks will include:**

- Development, application and validation of innovative methods for condition monitoring and prediction of failures in aircraft and helicopter components.
- Processing and analyzing large data sets.
- Simulation of the behavior of machine elements
- Development and validation of physically based models for the prediction of wear and damage
- Publications at international conferences and in scientific publications.

**Your profile:**

- Very good degree (Master or Diploma) in aerospace engineering, mechanical engineering, computer science or a comparable field.
- Experience in machine elements, structural analysis, fault diagnosis, and knowledge of the operation of helicopter systems.
- Confident handling of Python and common data science tools.
- Knowledge of high-performance computing and machine learning.
- Fluency in written and spoken German and English.
- High level of initiative, analytical thinking, teamwork and communication skills.

**How to apply:**

- Applications should include a CV, electronic copies of your academic transcripts and a short cover letter (max. one page) explaining your interest in the position and your relevant skills and experience.
- Applications should be sent as a single PDF file to [office.ht@ed.tum.de](mailto:office.ht@ed.tum.de).
- Preference will be given to people with disabilities with essentially equal aptitude and qualifications.
- By submitting your application to the Technical University of Munich (TUM), you also confirm that you have taken note of TUM's data protection information in accordance with Art. 13 of the General Data Protection Regulation (GDPR) on the collection and processing of personal data in connection with your application.