

MUNICH AEROSPACE – NEW HORIZONS IN AVIATION AND SPACE

In 2010, through Munich Aerospace and its pooling of research, graduate programmes 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

Galileo High Accuracy Service

Test and analysis for R&D in user-specific application areas

Two new services are currently being implemented for the Galileo satellite navigation system. The High Accuracy Service (HAS) will provide decimeter-accuracy and the Open Service Navigation Message Authentication Service (OS-NMA) will enable the verification of the calculated position in certain time intervals. Both services follow general principles, e.g. Precise Point Positioning (PPP) and standard cryptographic methods, but are highly complex in their specific implementation. Especially the combination of both services is very interesting for many safety related applications like autonomous driving/flying, various railway applications, precise farming, etc. A deep understanding of the technologies mentioned, but also of the application-specific requirements and relevant regulations are important prerequisites for a successful exploitation of the Galileo HAS and OS-NMA in the future. For each Galileo service a PhD position will be granted and the two activities will be closely coordinated in order to assess the synergies of HAS and OS-NMA.

Your tasks for the HAS-project

Precise and robust absolute positioning in real-time using satellite navigation signals is essential for a large variety of applications like autonomous driving and flying, precision farming, surveying, location based services, robotics, and many more. To serve these applications the European satellite navigation system Galileo will provide a High Accuracy Service (HAS, <https://galileognss.eu/tag/has>) based on corrections disseminated through the E6-B signal and through internet, free of charge, targeting a precise point positioning accuracy at decimeter level with rapid convergence. Task of this project is the development of optimized user algorithms and the assessment of the provided service under different conditions. This includes the implementation of optimized signal decoders and precise point positioning algorithms in a software-based receiver, including the required precise modelling of the relevant error sources and signal biases as well as of tailored ambiguity resolution schemes. Precision and consistency of HAS corrections shall be compared to alternative precise products, positioning accuracy, availability and convergence time will be assessed under various and adverse environment and multipath conditions.

Your profile for the HAS-project

Your skills should include interests in mathematics, signals processing and programming. A background in geodesy, electrical engineering, aeronautical engineering, information theory or is welcome but not necessarily needed. Interested candidates with a master's in physics or mathematics are highly welcome too. You will receive a full training into GNSS signal processing, data analysis, message decoding and HAS to have kick start for your PhD work.

The Munich Aerospace Research Group

The scholarship is part of the Munich Aerospace Research Group "GNSS Receiver Algorithms for Advanced Galileo Services". It is primarily handled by the professorship of satellite geodesy at the Institute of Astronomical and Physical Geodesy (<https://www.asg.ed.tum.de/iapg>) at the Technical University of Munich, in close cooperation with the Institute of Space Technology and Applications at the University of Armed Forces in Munich (<https://www.unibw.de/lrt9/lrt-9.2>) and with the branch InfoCom of IABG mbH (<https://www.iabg.de>). The Institute offers an excellent research environment with tight connection to the European Space Agency (ESA) leading the development of the Galileo navigation system. 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, with access to the TUM Graduate School, the DLR_Graduate_Program and the IABG training program, and have access to special events and trainings hosted by Munich Aerospace. 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 the Munich Aerospace Research Group "GNSS Receiver Algorithms for Advanced Galileo Services" and receives additional technical support from the research group head. The candidates receive their PhD from TUM or UniBwM.

Application

Please send us your application including relevant documents (cover letter, CV, two recent letters of reference, certified copies of academic degrees) in PDF format to urs.hugentobler@tum.de or upload the documents to the recruitment portal of IABG (<https://www.iabg.de/karriere/stellenangebote>). The application deadline is September 30, 2021.

We are looking forward to your application!