For our **Institute of Communications and Navigation** in **Oberpfaffenhofen**, we wish to recruit a qualified

Master Student

Design of a Vertical Positioning Augmentation Architecture for Unmanned Aerial Vehicles (UAVs)

Background:

Accurate vertical positioning of air vehicles is fundamental for their safe vertical separation and for obstacles avoidance. This will be of even greater importance in the next future, when Unmanned Aerial Vehicles (UAVs) are foreseen to operate in cities, within the context of Urban Air Mobility (UAM). The coexistence of UAVs and conventional civil aviation will also require the adoption of common altitude references for safe operations and optimal exploitation of air space. The combination of Global Navigation Satellite System (GNSS) with altitude obtained from barometric altimeters and additional systems like Inertial Navigation Systems (INS) is under investigation at the DLR Navigation Department to improve the accuracy of vertical positioning for air vehicles. In order to obtain accurate altitude information from barometric altimeters and to rigorously fuse this altitude with GNSS and INS measurements, weather parameter measurements at the ground and transformations between different altitude definitions need to be considered within the altitude computation algorithm.

Your Mission:

This thesis will design the ground and airborne interfaces between several systems to derive accurate vertical positioning of UAVs from barometric and GNSS measurements. This will include:

- develop the interfaces to transmit weather parameter measurements from ground to the UAV,
- program the software to implement the correction of the barometric altitude of the UAV,
- design the algorithm for fusing barometric altitude with GNSS (and potentially INS) measurements,
- evaluate the designed architecture with real UAV flight data

Theory: 25%, Development: 50%, Experimental: 25%

Your qualifications:

We offer a **master's thesis** opportunity to a student in electrical, communications, aerospace, computer science or related field engineering. Desired skills are:

- Experience with MATLAB &/or C++
- Interest in programming as well as operating experimental setups
- Fluent English

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