The Institute of Flight System Dynamics has developed a system for testing Ultra-Wideband (UWB) positioning. Based on a Raspberry Pi Zero and the UWB-Chip DW1000, different positioning principles can be researched at low effort and costs. Here, multiple modules placed at a known position act as an “anchor”. The moveable “tag” determines the distance to every anchor from the run-time measurements of UWB-pulses between the tag and the anchors. From these measurements the tag is able to calculate its position.

Within this project work the existing system shall be extended and the usability shall be improved. The interface to the UWB-module shall be revised to increase the measurement rate and to allow the transmission of payload data together with the measurements. In addition, a GNSS module shall be integrated in the system to research different combination of UWB and GNSS. The handling of the system shall be improved by creating a web-based user interface that allows the setup and control of the different modules. Finally, the system’s improvements shall be validated for indoor and outdoor applications, e.g. for a drone.

**Possible tasks:**

- Extension of the python code to interface the DW1000 module,
- Integration of a GNSS-module and implementation of combined positioning solutions,
- Development of a strategy for self-configuration and self-setup of the anchor modules,
- Development of a web-based user interface for configuration of the modules, e.g. in Django

The actual tasks can be arranged in accordance to the student’s interests and knowledge, own ideas are welcome. **The project can be performed in a team of two or three students.**

**Requirements:**

- Knowledge in Python,
- Experience with Linux, Raspberry Pi and the Django Framework is a plus but not required,
- Interest in working with embedded systems

**Recommended lectures:**

- Flight Guidance 1 (5 ECTS)
- Seminar “Navigation and Data Fusion” recommended but not mandatory

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