

Master's Thesis

Selection, Integration and Testing of a low SWAP SDR for Navigation with Signals of Opportunity

Task:

Due to the current development in the aviation sector with small UAVS, eVTOLS and other new transportation concepts also new requirements for Navigation arises. The classical approach of determining the position and orientation of an aircraft mainly via inertial and satellite navigation does not meet those requirements in all cases. The main challenges are meeting weight and cost limits, as well as operation in GNSS-challenged environments while ensuring an integer navigation solution.

In order to meet those requirements, the selection, integration and test of a Software Defined Radio (SDR) for navigation with SOP such as FM Radio, eLORAN, VOR or NDB shall be carried out. The implementation shall be tested on ground and **in air**. Afterwards, an first evaluation shall be conducted.

The following tasks outline the thesis:

- Evaluate possible sources for Navigational purposes
 - Initial focus on terrestrial passive navigation such as eLORAN, VOR, NDB
 - Non-navigation signals such as AM/FM Radio, DVB-T
 - Relative Navigation with e.g. ADS-B, AIS
- Evaluate suitable SDRs which are able to cover the most promising SOP candidates
- Design and build up the prototype
- Plan and conduct testing in lab, ground and air
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- Evaluate the gathered Data

Requirements:

- Speaking German or English
- You can work independently as well as in a team
- Desired Skills
 - Clean working approach
 - HF / amateur radio experience
 - Programming experience
 - Navigation experience



Start: Now

