

Research Internship / Master Thesis

Joint Communications and Sensing Using Software-Defined Radios

Joint Communication and Sensing (JCAS) is a promising enabling technology for 6G, where communication signals are simultaneously leveraged for sensing tasks. This thesis focuses on the use of software-defined radios (SDRs), such as the USRP X440, in combination with various RF frontends and antenna configurations to realize mono-static and multistatic sensing architectures.

Real-time signal processing requirements are addressed by implementing the signal processing chain on the integrated FPGA. The proposed algorithms can be realized either directly in Vivado or through MATLAB Simulink using HDL Coder, enabling an efficient and flexible development workflow.

Description:

- Implement an OFDM-conform flexible channel estimation using SDRs on the integrated FPGA
- Integration and testing of different frontends and antennas
- Apply signal processing techniques methods to process the data for Joint Communications and Sensing (JCAS) tasks

Your qualifications:

- Knowledge of mobile communications, signal processing
- Experience with software defined radios and RFNoC
- Programming experience in MATLAB, Python, or LabVIEW
- Goal-oriented and structured work style
- Verilog/VHDL skills are a plus

To apply:

Please send your application by e-mail to Peter Gu (peter.gu@tum.de with the subject "Thesis: JCAS SDR"), including the following documents:

- Curriculum vitae
- Academic transcript
- Short motivation (0.5 - 1 page)