Bachelor/Research/Master Thesis – Bachelor-/Forschung/Master-Arbeit

Project:
In the framework of the EIVE Project the Institute of Robust Power Semiconductor Systems (ILH) is developing a 6-Unit CubeSat, flying in the Low Earth Orbit (LEO). Data acquisition algorithms have to be efficiently implemented in Programming Logic (FPGA) and Programming Software (CPU)

Scientific Mission:
• (1) PRBS transmission with various modulation schemes (QPSK, n-QAM, ...) and different data rates for in-depth data-link analysis;
• (2) E-Band Link Budget calculation, considering all the atmospheric effects;
• (3) Download high resolution images stored on-board for Earth observation applications.

Your Tasks:
1. Investigate possible flexible data rate changing algorithms for encoding and packetizing the data;
2. Implement on the FPGA and on the CPU the selected algorithms and draw the conclusion about the energy efficiency and feasibility;
3. Adapt the algorithm for different data acquisition sources: BRAM (PRBS sequences for the continuously changing modulation formats) and Flash/RAM for the stored images.

Your Qualifications:
• Hands-on experience in developing FPGA algorithms;
• Familiar with software development: VHDL and/or Verilog, Xilinx Vivado;
• Passionate for producing high-quality, space-ready and well-tested code;
• Knowledge of RF circuit design is advantageous;
• Knowledge of communication protocols is an asset;
• Availability for team working is required.