

Software Integration of Real-Time Systems on a Multi-Core SoC

Revolve NTNU

April 2020

Objective

Revolve NTNU takes pride in its self-developed electronic systems, especially the Vehicular Control Unit (VCU) and Motor Controller, both systems running on Xilinx Zynq 7000 System On Chip (SoC). These systems are developed in both HW and SW to be real-time systems with firm and hard real-time requirements. These systems have traditionally been communicating over the cars internal CAN-FD bus network, however, for reducing the overall size of these systems and increasing the performance, a combined quad-core Zynq Ultrascale+ is being considered as a new platform for running the VCU and four motor controllers on a single SoC.

The candidate will investigate the requirements for the system merge and implement these for the combined system. The combined system will feature requirements within areas as multiprocessor system development, symmetric and asymmetric system development, interprocess communication, firm and hard real time requirements in addition to HW/SW development using Matlab/Simulink and system development using Xilinx development tools. Additionally, Matlab generated VHDL code for the FPGA will be used for the system.

Previous solutions developed in Revolve using symmetric and asymmetric solution can be review and used for inspiration, in addition, Revolve NTNU will provide external resources for supporting the student

The candidate will learn and develop skills and experience using a industry standard platform, in addition to work in an environment with resources to both help and push the student to develop world-class solutions over the span of eight months, following the Revolve NTNU development cycle.

Responsibility

The student is responsible for developing software with real time constraints on a multi core architecture that can contribute to a better performing car. The task is fairly open and it is up the student to further define the master thesis.

Environment

In Revolve you will work closely with an ambitious and goal-oriented team. This is an unique opportunity to meet like-minded and talented students who can help you write a great Master's thesis while developing a world class formula student racing car.

For more information, see: <https://www.revolve.no/ny-link-her-NB-NB>

