In recent years, FPGAs have become an important alternative to classical control hardware in the field of robotics. Due to their great variability and their parallel structure, several new control architectures have emerged. They are used as custom co-processors, special peripheral units as well as a full replacement of the classical, processor-based control unit.

To test and further research these architectures, a hardware platform is currently built in the RRLab. It is a tracked, mobile robot, equipped with a 6-DOF arm as well as several sensors, similar to the SUGV.

Within this process, several thesis topics emerge on various abstraction layers, including hardware design as well as more software related tasks.

Tasks:

- Implementation of behaviour-based control approaches in VHDL
- Investigations on the Communication of Processor and FPGA in a SoPC-System
- Investigation and Testing of suitable algorithmic approaches
- Integration of electric/electronic components
- . . .

Requirements:

- Interest in robotics
- Knowledge of VHDL and/or C++

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