

Master Thesis:

High-Speed Data-Acquisition for FlockLab

A wireless sensor network (WSN) is a distributed system consisting of tiny devices (sensor nodes) that communicate using a wireless radio. Inherent constraints of the employed devices in terms of energy, radio bandwidth, memory, and processing power present significant challenges to the realization of WSN applications. To support the application development process, over the past three years our group has thus been setting up a cutting-edge WSN testbed, called FlockLab. Using FlockLab, developers can test-drive their applications and protocols on real hardware and, for example, debug the resulting behavior through detailed power measurements and event traces, recorded with high precision at all devices.

The FlockLab testbed consists of several observer nodes that monitor the attached sensor nodes. The core of the observer is a Gumstix embedded Linux computer. Currently the processor of the Gumstix directly acquires measurement data from the analog digital converter and signals from general purpose pins.

The goal of this thesis is to separate the measurement task from the rest of the system in order to increase timing accuracy and speed of measurements. You will design a new hardware board that takes over the data acquisition part and also integrates nicely into the current observer architecture. Starting with the evaluation of possible processing components like FPGA or DSP, going over to PCB design and low level software implementation, this thesis covers many aspects of practical system design.

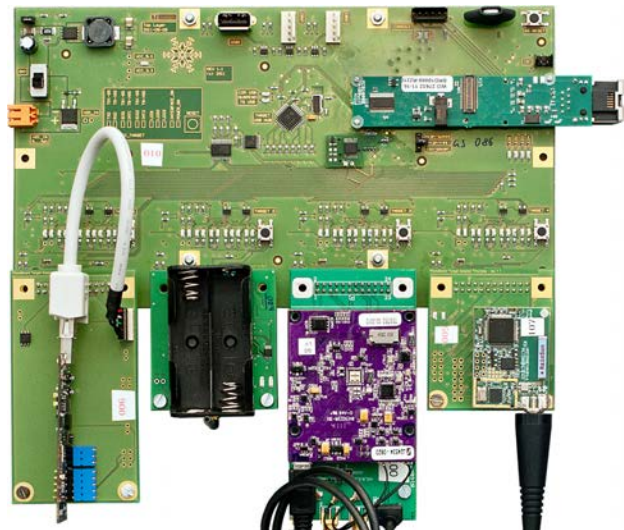


Figure 1: The current observer platform of FlockLab.

Requirements: For this thesis you should have good C-programming skills and interest in hardware design.

Project web page: <http://www.flocklab.ethz.ch/>

Interested? Please contact us for more details!

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