Master's Thesis

« Adaptive channel selection in multi-gateway wireless sensor network »

Background

The goal of the project Airport2030 is the optimization of the ground processes at the airport by integrating the passenger directly into the data processing in the terminal. The Institute of Telematics develops a mobile proof of concept device for the localization and interaction with the passenger. This device is based on on the IRIS sensor node and *TinyOS*. The requirements of the system are to inform the passenger by sending messages, the acknowledgment of received messages and localization of the passenger. A back-end of multiple gateway nodes forwards the data of the wireless network to a central server.

Concurrent wireless transmissions on the same channel cause collisions and data loss by interference at the receiving devices. As one wireless channel has a limited throughput, too many users produce data traffic that exceeds the data processing capabilities of the system. Adaptive channel selection increases the throughput of the system in different ways:

- Gateway nodes select the channel with the best quality
- Mobile nodes in range of different gateway nodes select the gateway with the lowest working load
- Neighboring gateway nodes use different channels to reduce / avoid interference
- Redundant gateway nodes are added to the system in areas of high data traffic

Work Description

In this thesis a protocol for adaptive channel selection is developed and implemented. The development of a MAC-protocol is not in the scope of this work. The following requirements of the protocol have to be considered:

- Parameterized protocol
- Convergence of the protocol
- Robustness and flexibility

Requirements

- interest in sensor networks
- programming in C and *TinyOS*

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