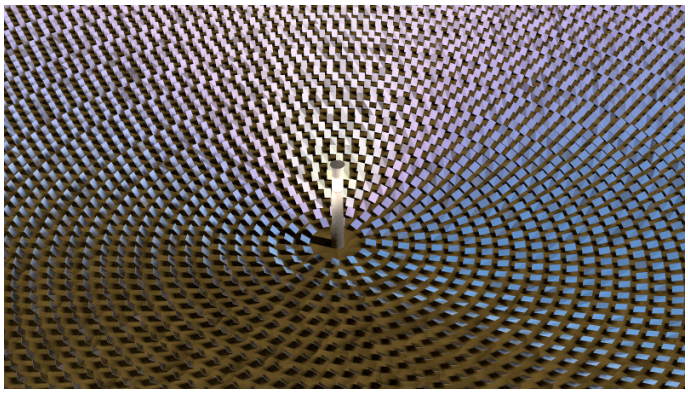
Bachelor's or Master's Thesis

« Reliable Over-the-Air Programming in Large-Scale Wireless Mesh Networks »

Background



The deployment of wired fieldbuses substantially contributes to the costs of large industrial plants, for example concentrated solar power plants with diameters of several hundred meters. In order to reduce these costs, efforts are being made to replace wired fieldbuses by wireless solutions. Thereby, it is essential to maintain reliability and real-time capabilities to prevent damage and retain efficiency.

State-of-the-art wireless mesh networks induce low investment, setup and maintenance costs. They are perfectly suitable for small datagrams and applications with low traffic demands. However, occasional transmission of large chunks of data is usually unavoidable, even in those applications. An example is the transfer of new firmware to the clients, calling for sophisticated methodologies and algorithms.

Work Description

The purpose of the advertised work is to implement and analyze techniques for data dissemination of large files to enable reliable over-the-air programming in a real world scenario. Many important algorithms and other building blocks are already implemented, so the work can focus on assembling and optimizing the overall system. Thereby, the main focus is scalability to large networks as in the presented application. The target platforms are the OMNeT++ simulation framework as well as microcontroller-based radio hardware developed at our institute.

The work can be done as bachelor's or master's thesis or in the context of a research project[1]. The actual task and the work load will be specified accordingly.

Prerequisites

- Solid knowledge of the C++ programming language
- Experience in the programming of microcontrollers is helpful, but not mandatory

[1] Research project and seminar / Forschungsprojekt und Seminar

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