

# Master's Thesis

## « Reliable Wireless Emergency Shutdown in Large Industrial Plants »

### 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.

Today's wireless technologies, such as wireless mesh networks, are able to transmit large amounts of bidirectional traffic, while inducing low investment cost. Although, they still have weaknesses in the aforementioned parameters. However, many time-critical applications, for instance an emergency shutdown, neither require a return channel nor large data rates. Therefore, it is advised to combine different wireless technologies.

### Work Description

The purpose of the advertised thesis is to build a prototype of a radio link for unidirectional transmission of small amounts of data over large distances. This includes the assessment of existing technologies in terms of reliability, range, cost-efficiency, and feasibility for the scenario presented above. The radio link is to be implemented by using microcontrollers. This implies selection of suitable hardware, development of an electronic circuitry, and implementation of a software to control the hardware.

### Prerequisites

- Experience with programming of microcontrollers
- Solid knowledge of the C programming language
- Knowledge of coding theory and/or circuit design is helpful, but not mandatory.

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