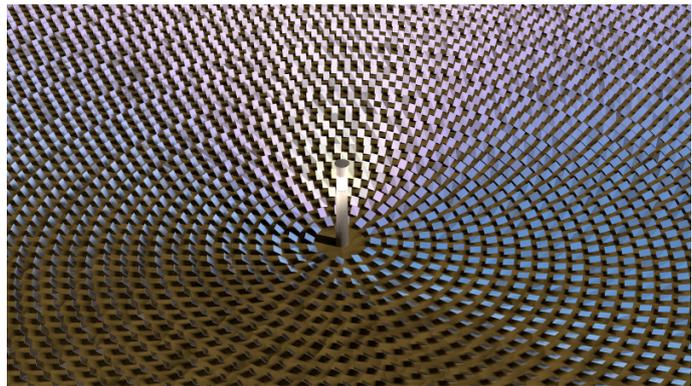


# Bachelor's Thesis or Project Work

## « Scalability of Cellular Networks in Industrial Applications »

### 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, cellular networks are widely used for communication. Our smartphones are connected among each other and to the internet via a world-wide cellular network.

Police forces, fire brigades and public services use their own cellular networks for reliable communication. Originating from speech communication, today's cellular networks are equally suited for data transmission, so they might be a suitable option for the aforementioned application.

### Work Description

The purpose of the advertised thesis is to analyze existing technologies for cellular communication and assess their suitability for industrial applications. Relevant are for example professional mobile radio technologies (TETRAPOL, TETRA...) and standards for mobile phones (UMTS, LTE...). By analyzing the respective documents and running simulations, the thesis should answer questions such as

**How many clients can be distributed in an area of one square kilometer, if we want to collect 100 byte of data every 5 minutes from each client?**

### Prerequisites

- Interest in wireless communication techniques and analyzing the respective documents<sup>1</sup>
- Basic knowledge about communication systems (e.g. knowing the difference between TDMA and FDMA)
- Basic knowledge of the C++ programming language

<sup>1</sup>The specification of many communication techniques are written in English, the thesis itself can be written in English or German.

**Contact: Florian Meier**

florian.meier@tu-harburg.de

Phone: +49 40 / 428 78 – 3746

Room: E 4.085