

Fachbereich Ingenieurwissenschaften  
Abteilung Elektrotechnik und Informationstechnik  
Institut für Nachrichten- und Kommunikationstechnik

Prof. Dr.-Ing. K. Solbach  
Prof. Dr.-Ing. A. Beyer

## Diplomarbeit / Masterarbeit

### AUFGABE DER DIPLOMARBEIT im Hauptstudium II

**für:** Herrn Ihsan Zainul  
**gestellt von:** Herrn Prof. Dr.-Ing. K. Solbach  
Fakultät für Ingenieurwissenschaften - Hochfrequenztechnik

**Thema:** **Planar High-Gain Array Antenna for a 24 GHz-Band CW-Radar**

#### Descripton:

For the measurement of velocity of, e.g., cars on the street or objects in industrial fabrication scenarios we use microwave radiation from so-called CW-Radar systems. The CW-Radar measures the Doppler-frequency of the microwave radiation: A wave of fixed frequency (Continuous Wave, CW) is radiated through a high-gain antenna onto a moving target where it is reflected and the reflected wave is received by the radar antenna again. The reflected wave exhibits a frequency shift (Doppler-frequency) which is proportional to the radial velocity of the target and proportional to the frequency of the transmitted wave.

The CW-Radar-project aims at the design of a Radar-demonstrator, which can measure the movement of pedestrians, make the Doppler-frequency audible and show the velocity on a display.

#### Thesis task:

The thesis task is the design and test of a planar high-gain antenna for the Radar- demonstrator. The antenna requirements are

- Frequency 21.2 GHz Aperture area ca. 100 X 100 mm<sup>2</sup>
- Uniform distribution
- Minimum loss / optimum gain
- Planar monolithic patch array
- Coaxial input connector SMA
- Input match (reflection coefficient) better than -10 dB

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The task is to be divided into the following steps:

- Literature research of applicable design concepts
- Selection of suitable concept and preliminary design
- Design and test of partial structures
- Simulation and optimization using software tools (ADS and HFFS, etc.)
- Generation of layout and fabrication
- Antenna test and comparison with predictions

**Über das Thema ist am Ende der Arbeit im Fachgebiet ein Vortrag zu halten. Weitere Informationen erhalten Sie im Fachgebiet!**

