

AUFGABE DER BACHELORARBEIT

im Studiengang „International Studies in Engineering“

für : **Steliyan Dinkov**
gestellt von: **Prof. Dr.-Ing. Ingolf Willms**
Thema : Wavenumber Based Radar Imaging Algorithm
for sub-THz FMCW and UWB Radars

Compared to other technologies such as optical or infrared systems wideband radars do not need a visual LOS making it suitable for smoke and dust filled indoor emergency scenarios. Thus, robots with mounted Radar systems are attractive for detection and imaging in emergency situations. In the frames of this bachelor thesis two imaging wavenumber algorithms for a sub-THz FMCW radar and an UWB radar will be provided. Wavenumber radar migration algorithms have been proven to provide a rather accurate and fast image of the area under test. However, a major drawback of these imaging methods is their lower resolution capabilities compared to the more time consuming Kirchhoff migration algorithms. This bachelor thesis will provide a wavenumber imaging method capable of higher resolution images for 60 GHz FMCW imaging radar and 9 GHz M-Sequence UWB radar. The results of the new method will be compared using the imaging methods developed at the department of NTS. Thus, the task of this bachelor thesis can be separated into the following:

- To create a detailed time and work plan.
- Literature research on wavenumber imaging algorithms for radars.
- Design of a measurement test scenario for a sub-THz FMCW and UWB imaging radar.
- Implementation of a new wavenumber imaging method for the given measurement scenario and comparison analysis using the imaging methods developed at the department of NTS.
- Documentation of the bachelor thesis and a presentation of the results.

Zweitgutachter: Prof. Dr.-Ing. Andreas Czylwik

Duisburg, den _____

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ERKLÄRUNG

Hiermit erkläre ich, dass ich die Arbeit bis auf die offizielle Betreuung durch den Aufgabensteller selbständig und ohne fremde Hilfe verfasst habe.

Die verwendeten Quellen sowie verwendete Hilfsmittel sind vollständig angegeben. Wörtlich übernommene Textteile und übernommene Bilder und Zeichnungen sind in jedem Einzelfall kenntlich gemacht.

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