Introduction

The System and Circuit Technology group in collaboration with the Distributed Embedded Systems group offer a Project Group on the topic of visible light communication (VLC) for vehicular networking.

Vehicular VLC offers a new communication opportunity for vehicular networking applications. The majority of the proposed vehicular networking applications have been based on RF communication, namely WLAN or cellular technologies. However due to the scarce RF spectrum, VLC has been considered as an access technology too.

Besides the huge and license-free spectrum, VLC has other advantages. It allows secure communication since the communication link is directional and any interception cannot go unnoticed. On the other hand in an outdoor scenario, such as car-to-car communication, VLC is susceptible to ambient light and weather conditions.

The objective of this project group is to develop a VLC prototype consisting of a transmitter (Tx) and receiver (Rx). The end-goal is to have a low-latency robust communication system with a minimum range of 25 m, that potentially can support platooning.

Tasks

- Circuit Design:
  - developing Tx PCB for matrix LED headlight
  - developing Tx PCB for LED taillight
  - developing of control circuit for Spatial Multiplexing
- Signal Processing:
  - investigating and implementing direct spread-spectrum sequencing (DSSS) modulation/demodulation scheme for this communication system using software defined radio (SDR)
Administrative Details

- Duration: 6 months (potentially extended to 12)
- Name in PAUL: L.048.28032 Mixed-Signal Entwurf; L.079.07000 Project Group: Vehicular-VLC
- Time & location of the initial meeting: N/A

Contact

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