

## TOPIC FOR A BACHELOR OR MASTER'S THESIS

### C-V2X FOR URBAN PLATOONING

#### PROF. DR. GREGOR ENGELS, SOFTWARE INNOVATION CAMPUS (SICP)

##### MOTIVATION

Platooning is often considered as the example application for cooperative driving in literature. The idea of platooning is to have several vehicles driving in a convoy while being connected using a wireless channel. This channel is used to exchange information about the current position, speed, or desired acceleration. By exploiting especially the information from the vehicle in front, vehicles can maintain a constant inter-vehicle gap of only a few meters at highway speed.

Communication is usually based on IEEE 802.11p and information is transmitted with a frequency of 10 Hz. Various papers have already shown that the use of 11p (besides many advantages) also has disadvantages [1]. In this work, we want to investigate other communication technologies from the field of mobile communications, especially LTE and 5G networks in an urban environment.

##### GOALS OF THIS THESIS

Building on Veins (an open-source vehicular network simulation framework that can simulate wireless networks of cars), Plexe (the platooning extension for Veins), and INET (an open-source model suite for the OMNeT++ discrete event simulator), the thesis will analyze communication within a platoon based on different communication technologies in an urban area. SimuLTE [2] and SIMU5G [3] provide simulation models for LTE and 5G based communication that shall be used.

##### REFERENCES

Tobias Harges and Christoph Sommer, "Towards Heterogeneous Communication Strategies for Urban Platooning at Intersections," Proceedings of 11th IEEE Vehicular Networking Conference (VNC 2019), Los Angeles, CA, December 2019, pp. 322–329.

Brian McCarthy, Andres Burbano-Abril, Victor Rangel Licea, Aisling O'Driscoll, "OpenCV2X: Modelling of the V2X Cellular Sidelink and Performance Evaluation for Aperiodic Traffic", arXiv preprint arXiv:2103.13212. 2021 Mar 24

##### CONTACT

##### UNIVERSITÄT PADERBORN

##### s-lab – Universität Paderborn

Tobias, Harges

Room: A.03.08

Phone: +49 (0) 5251 / 60-6492

Email: [Tobias.Harges@upb.de](mailto:Tobias.Harges@upb.de)