

## Bachelor / Master's Thesis

# Comparing 5G and 11p for Cooperative Mobile Systems

Two technology stacks are currently competing to realize wireless connectivity between vehicles on roads worldwide. One is 3GPP mobile broadband (in particular the “NR V2X” extensions which will be introduced in 3GPP since release R15, colloquially referred to as 5G [1]). The other is traditional WLAN technology (in particular the 802.11p extensions introduced in IEEE 802.11-2012, colloquially referred to as “11p”).

As a first step towards full quantitative comparability of both technology stacks, simulation models are needed. To date, however, only the 11p technology stack is widely supported in many network simulators; support for the NR V2X stack is still absent in many.



## ■ Goals of the thesis

This thesis will build on Veins,<sup>1</sup> an established Open Source simulation framework which already includes all means to conduct simulations based on the 11p technology stack. Based on this, the following steps will be performed:

- An Open Source simulation model of the NR V2X stack will be created and integrated with Veins.
- A set of “typical” simulation scenarios as well as a comprehensive set of metrics will be provided (if Master's Thesis: developed)
- Then, a quantitative comparison of NR V2X and 11p will be conducted and results interpreted.

## ■ Keywords

Network Simulation, Open Source, C++

## ■ Literature

- [1] R. Molina-Masegosa and J. Gozalvez, “LTE-V for Sidelink 5G V2X Vehicular Communications: A New 5G Technology for Short-Range Vehicle-to-Everything Communications,” *IEEE Vehicular Technology Magazine*, vol. 12, no. 4, pp. 30–39, Dec. 2017. DOI: 10.1109/MVT.2017.2752798.

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<sup>1</sup><http://veins.car2x.org>