PADERBORN UNIVERSITY

Jun.-Prof. Dr.-Ing. Christoph Sommer
Cooperative Mobile Systems – CCS Labs

CCS

Bachelor / Master's Thesis
Drone Supported Urban Vehicular Networks

A key enabler for future cooperative autonomous vehicles is wireless networking between these vehicles. Applications range from simple cooperative awareness to full maneuver assistance on road intersections. These networks, however, suffer from communication outages brought about by radio obstacles. Such radio obstacles are particularly prevalent in cities, in the form of buildings.

Future smart cities will not just host smart vehicles (such as autonomous cars or trucks) on the road, but (in the shape of unmanned aerial vehicles, drones) also in the air. It is therefore a straightforward extension to connect both networks wirelessly and to employ (wireless) networks of drones as supporting networks for (wireless) networks of cars [1].

■ Goals of the thesis

This thesis will investigate the potential of supporting (wireless) networks of cars on the road by (wireless) networks of drones in the air. For this, a simple cooperative awareness application will be investigated: at regular intervals, cars send a wireless broadcast that allows other cars to know about their presence. Building on Veins,[1] an open source vehicular network simulation framework that can already simulate wireless networks of cars, the thesis will investigate the performance improvement that can be gained from: one hop (two hop) relaying of cooperative awareness messages by other cars as well as adding one hop (two hop) relaying that also includes drones.

■ Keywords

C++, Network Simulation

■ Literature

[1]   W. Shi, H. Zhou, J. Li, W. Xu, N. Zhang, and X. Shen, "Drone Assisted Vehicular Networks: Architecture, Challenges and Opportunities," *IEEE Network,* vol. 32, no. 3, pp. 130–137, May 2018. DOI: 10.1109/MNET.2017.1700206.

---

[1]http://veins.car2x.org

Contact:
Tobias Hardes <hardes@ccs-labs.org>

Website:
http://www.ccs-labs.org/cms/