Exploring Space – towards high-capacity inter-vehicular communications

Geert Heijenk, University of Twente

Dagstuhl Seminar on Inter-Vehicular Communications – Quo Vadis
September 24, 2013

This presentation discusses the question “Are there still research challenges in inter-vehicular communications”. The premise is that these may come from autonomous, or rather coordinated driving. I will start with a few results from an earlier project, Connect & Drive, where a system for cooperative adaptive cruise control was researched, designed, and prototyped. We project that for coordinated driving, important challenges are in the area of reliable consensus for coordinated manoeuvres, and high-rate beaconing for increased situational awareness of vehicles. I show that current systems do not suffice for these challenges. In order to increase the scalability of inter-vehicular communications, I propose to explore spatial reuse, by using cheap large-scale antenna arrays and beamforming receivers. This way, a vehicle can be equipped with a large number of receivers, each receiving from a specific (dynamically reconfigurable) direction. Given this idea, I point at important research questions, and argue that for a good understanding, the use of good analytical performance models is of paramount importance.