Vehicle-to-Vehicle and Vehicle-to-Infrastructure Communication
Recent Developments, Opportunities and Challenges

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Abstract
Vehicle-to-vehicle communication has been the focus of automotive and non-automotive research organizations for a number of years now. Proposed use cases range from various infotainment applications such as ad-hoc networking for information exchange, chat applications or gaming all the way to advanced active safety applications such as inter-vehicle hazard warning or at the very end of the spectrum intersection collision avoidance systems. So far none of those applications have made it into production due to partly technical and partly non-technical i.e. business related issues. In the area of vehicle-to-infrastructure communication one application, namely electronic toll collection, is established in many countries and therefore slightly further in terms of deployment. However, the full potential of interactive vehicle-to-infrastructure communication has also not been uncovered as of yet.

Keywords: Dedicated Short Range Communication, DSRC, Vehicle-to-Vehicle Communication, Vehicle-to-Infrastructure Communication, IEEE 802.11, Wireless LAN, WiFi

Introduction
Recent advances in the area of short-range wireless communication technology, the provisioning of a dedicated spectrum for vehicle-to-vehicle and vehicle-to-infrastructure communication by the Federal Communication Commission as well as some encouraging developments in various standards bodies have changed the way we should think about future vehicles and their interaction among each other and the infrastructure. Many new opportunities will open up and the rewards for the society as a whole, for the individuals and for the automakers can be very attractive. This paper will describe some of the recent developments in this area and the opportunities they provide as well as address some of the challenges we face on the way there.