

The Role of Car Connectivity in Future Mobility

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The goal of this tutorial speech is to provide a detailed overview of the use of car connectivity technologies in future mobility and a closer understanding of its benefits and consequences.

Future mobility and transportation services develop towards increasing road safety, improving traffic efficiency (e.g. less congestion, reduced travel time), automation of driving and making transportation greener (e.g. reduced carbon emission) as well as enjoyable. Car connectivity delivers its contribution to achieving these goals. Vehicle-To-Everything (V2X) communication, as key element of Intelligent Transportation Systems (ITS), enables newer use cases, like e.g. navigation provisioning, parking slot discovery, intersection collision warning or cooperative driving (based on on-vehicle sensor data including brake usage, accelerating, etc.). However innovative use cases (like e.g. platooning, cooperative maneuver, cooperative perception and autonomous navigation) imply strict constraints on V2X and consequently, V2X put new requirements against the cellular technology, including the emerging 5G. Such requirements are among others low latency in the range of milliseconds, high data rate in the magnitude of 50 Mbps, very high connection density (thousands of vehicles/km²) and ultra high packet reliability (99.999 %). The reaction as answer for the above requirements is to incorporate appropriate technology solutions in 5G, which resulted in 5G-V2X.

This tutorial focuses on 5G-V2X including requirements, technology, organizations, standardizations, use cases, brief overview of several recent European 5G trials for mobility and open research topics. It turns out that deploying car connectivity in innovative use cases has far-reaching consequences also on related business, liability and the role of the driver.