


Technologies and Applications of Communications in Road Transport

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1. Introduction

The use of communications for the transmission of information in the field of transport allows the introduction of services that increase safety and efficiency, both at the vehicle and mobility levels. At present, there are already several initiatives of cooperative services and cooperative corridors. In addition, various technologies coexist, where each one provides different and complementary properties, such as DSRC-based communication modules and cellular technology with 3, 4, and 5G.

On the other hand, services that are in a state of greater maturity are designed as C-ITS Day-1 and Day-1.5. Demonstrations are presented in small-scale trials, concept tests, and Field Operational Tests. These tests allow one to obtain information on the main limitations and opportunities of these services, as well as the viability of the technologies and information flow architectures that are proposed.

On the other hand, aspects such as the standardization of communications and information transmitted, as well as solutions to guarantee security, are relevant.

This Special Issue aims to cover the most recent advances in connected vehicles, C-ITS, and the technologies involved.

2. Papers in the Special Issue

This Special Issue includes five papers: the first one is a review paper, and the other four include results of novel research work.

The review paper [1] presents the two main V2X technologies: dedicated short-range communications (DSRC) and cellular vehicle-to-everything (C-V2X); their core parameters, shortcomings and limitations; and explores the need for integration of IoT-based technologies into modern ITS solutions.

The analysis of technologies shortcomings would provide solutions to cover every possible situation in road scenarios. 5G technology promises several advantages, but it could have some operation failures which could isolate the vehicle from the rest of the infrastructure. So, a solution is required which can improve communication reliability. A solution with a short/middle range is proposed in [2].

For platooning and highly congested scenarios, Ref. [3] proposes a novel channel access scheme, Distributed Triggered Access, for distributed V2V Basic Safety Message dissemination. The extensive simulation results corroborate that the scheme improves the transmission success rate.

An important issue in vehicular communications is security, and much work is in progress to guarantee this essential property. More specifically, in vehicle networking, unicast communications between vehicles must be encrypted, so ref. [4] propose a method of negotiation-free encryption for securing vehicular unicasting communications to improve the efficiency of vehicle ad hoc network transmissions.

Finally, Ref. [5] proposes a V2X communication system integrating the probabilistic shaping bitloading multi-input–multi-output visible light communication and the millimeter wave radar.



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