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Editorial

Wireless Communications in Transportation Systems

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Wireless technologies have been widely developed in the last years and now are ready to meet the increasing demand of communications services of smart transportations systems like high speed railways, metropolitan railways, buses, and any other public transportation system.

Nowadays there is a large variety of standard radio technologies suitable for smart transportation: Wi-Fi (IEEE 802.11xx) and WiMAX 4G-LTE. These technologies can be used for wireless ad hoc networks, wireless sensor networks, and particularly future G technology that will highly focus on the development of terrestrial smart and autonomous transportation system. These emerging technologies can significantly improve the operation, efficiency, reliability, and passenger's experience; nevertheless each transportation system demands a wireless communication system specially designed and configured to meet their special requirements.

The main applications of communications in transportation systems can be divided into two parts:

(i) Critical communications between vehicles and infrastructure to increase efficiency, safety, and reliability

(ii) Wideband communications for payload or passengers services

On each case, it is necessary to accurately model and design the communications network, considering node architecture, handover schemas, relay configuration, MIMO, and diversity. In all cases it is necessary to accurately design the physical interface for each special environment, vehicle characteristics, and passengers or payload requirements. It includes propagation modeling, waveform selection, and antenna design for current communications bands (0.5–6 GHz) and for future mmW bands (20–40 GHz and 60 GHz).

Another important technology issue is the use of wireless sensors and ad hoc networks for security and monitoring of vehicles and infrastructure. These networks can also provide supplementary services to vehicles improving efficiency, security, and reliability of transportation.

Passengers services like internet or entertainments are important to improve the competitiveness of railway and public transportation versus other transportation systems. On this case 5G communications play an important role for the development of new communications systems with high capacity and mobility. For this application, millimeter waves play also an important role to provide the bandwidth needed for this applications.

Finally there is a group of technologies that are now under development that can be very relevant in the future. We can talk about vehicle-to-vehicle communications, radar sensors, and onboard communications for different vehicle applications. These short-range applications also focused on the use of high mmW and THz frequency bands.

This special issue tries to cover most of the application of wireless communications for public transportation: network design, critical communications, passengers communications, propagation, mobility, spectrum usage, 5G applications, and sensor and special applications of communications for public transportation.

Acknowledgments

We would like to thank all the authors for choosing this special issue to publish their new research results and insights and all the reviewers for their valuable review comments which help to improve the technical quality and presentation of this special issue. We are sure this special issue will again be quite informative and a pleasure for you to browse through and read in depth.

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