



Traffic Telematics

Verkehrstelematik

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Vehicular traffic kills and injures people, congests a significant percentage of all roads all the time, impacts environment and imposes high costs of operation on individual and community level due to fuel consumption and roadside infrastructure maintenance. Still, mobility represents a fundamental element of our personal freedom and economic well-being that can hardly be overestimated, thus, there is a strong desire to guarantee personal mobility but to improve on the negative aspects of vehicular traffic.

The challenges of making vehicular traffic safer and more efficient by the use of information and communication technology have been addressed by various communities for many years. Within the Intelligent Transportation Systems community, the efficient use of the transportation infrastructure has been pursued for several decades, the automotive industry has introduced passive safety features and is now heading for "active safety", i. e., accident prevention, and within the field of wireless networking new concepts for information exchange between vehicles have emerged, to name some important players in the field.

Technological advances like the availability of powerful but low-cost GPS-receivers and Wireless LAN transceivers significantly stimulated research and development in traffic telematics for the last 10 years. The concept of vehicles directly exchanging information with each other and with infrastructure via short-range radio communication allows for low-latency warnings, up-to-date and localized traffic status information, and individualized assistance. Therefore, Vehicular Ad Hoc Networks or Car-to-X Communication, where X stands typically for either other vehicles or some roadside infrastructure, represent highly active fields of research, development and standardization.

Working on traffic telematics solutions is rewarding since it "makes sense" to save or to improve quality of lives. At the same time, it is a scientifically fascinating subject: from the use of the radio channel up to the operation and management aspects it builds on the principle of cooperation. Furthermore, highest dependability requirements meet the challenges of unreliable radio channels, heterogeneous networks, and multi-actor businesses.

In this special issue, we collected views on the current state and future

perspective of traffic telematics from both the transportation engineering and the communication communities. In the spirit of "it – Information Technology" in covering innovative applications of information technology that are about to be deployed, not only technical aspects, but also operational and business aspects as well as results of field operational tests are discussed.

Fritz Busch, Technical University of Munich, describes in his contribution the opportunities and challenges of Intelligent Transportation Systems. The article presents the "big picture" for integrated mobility and traffic management by sketching the various elements and facets of an upcoming ITS system architecture.

Organization, operation and financing of innovative telematics services are the topics of the contribution by *Hans Hubschneider* and *Michael Ortgiese* of PTV AG. In their article "Operational aspects of cooperative systems" they outline aspects of cooperation on physical, network, and stakeholder levels as well as corresponding business challenges. Examples of traffic information and traffic management pilots show the "state-of-the-art" in Germany.



While the first two articles are based on a transportation engineering background, the following two articles are based on a data networks background.

Direct vehicle-to-vehicle communication is one of the new features of next generation traffic telematics. *Felix Schmidt-Eisenlohr* and *Moritz Killat*, University of Karlsruhe, analyze how well direct vehicle-to-vehicle communication works and how many data packets “get lost” due to packet collisions. They point to simulation pitfalls and provide appropriate packet reception models.

Christian Lochert, *Jedrzej Rybicki*, *Björn Scheuermann* and *Martin Mauve* from Heinrich Heine Universität Düsseldorf address the issue of scalable data dissemination for traffic information systems. They compare approaches based on ad hoc networking, on classical client-server architecture, and on peer-to-peer networking ideas and outline a possible evolution of those approaches.

Last, but definitely not least, the fifth and final article of this special issue deals with set-up and experiences of an ongoing field operational test. *Susan Dickey* and *Joel VanderWerf* of California PATH present insights to the Californian Vehicle Infrastructure Integration testbed in Palo Alto.

We would like to thank all the authors for their contributions and the anonymous reviewers for their helpful suggestions. We are grateful to the editors *Paul Molitor* and *Martina Zitterbart* for their advice throughout the preparation of this special issue. We hope that you, the reader, will consider the “snapshots” presented in this special issue interesting and of value for your research, development or deployment activities. For the interested reader we provide some references below for further reading.

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References

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