

Advanced Microsystems
for Automotive Applications 2012

Gereon Meyer (Ed.)

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Smart Systems for Safe, Sustainable
and Networked Vehicles

 Springer

Editor

Dr. Gereon Meyer
VDI/VDE Innovation + Technik GmbH
Berlin
Germany
E-mail: gereon.meyer@vdivde-it.de

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Preface

Road transport is facing a multitude of challenges, ranging from the need to increase fuel efficiency and to reduce greenhouse gas emissions to the goal of accident-free traffic. Intensive automotive research and development efforts of recent decades lead to major innovations such as efficient engines and electronic stability control, technologies which are widely deployed in today's cars. Nonetheless, further and even more revolutionary progress will be required for the automobile of the future to provide mobility solutions which are sustainable in view of the global issues of societal, economic and environmental development. It can be foreseen that this implies a paradigm shift in the concept of the car regarding its propulsion technology, materials, and architecture, and calls for an intelligent integration into the systems of transportation and power.

Information and communication technologies (ICT) like smart components and systems have been essential for a multitude of recent innovations. They will be key enabling technologies for the changes ahead, both inside the vehicle and at its interfaces for the exchange of data and power with the outside world. Data from sensors, cameras, transmitters and road maps can be combined to warn the driver of imminent threads like lane departures or collisions. Such advanced driver assistance systems, subject to a multitude of recent research projects, are now available to contribute to the safety and comfort of contemporary cars. They pave the way to more automated and maybe even autonomous driving. At the same time, electronic circuits, digital controls and wired or wireless communication can replace mechanical systems to enable greater precision and adaptivity of vehicle steering and power train control. Hybrid and electric vehicles are particularly qualified to benefit from the application of smart systems which may lead to substantial gains in energy efficiency and driving range. A complete redesign of architecture of the car may thus be needed to make electrified vehicles mature for mass deployment. Synergies from combining innovations in different technology fields, like e.g. driver assistance and electrification, will potentially accelerate such developments.

It has been the objective of the International Forum on Advanced Microsystems for Automotive Applications (AMAA) for almost two decades to detect such novel trends and to discuss their implications for the innovation of road transport and for securing the leadership of the involved industries from day one on. The topic of the 16th AMAA conference, held on 30 and 31 May 2012 in Berlin, is "Smart Systems for Safe, Sustainable and Networked Vehicles". Organizers of the AMAA are VDI/VDE Innovation + Technik GmbH and the European Technology Platform on Smart Systems Integration (EPoSS),

supported by the two EU-funded Coordination Actions of the Public Private Partnership European Green Cars Initiative, ICT4FEV and CAPIRE.

As AMAA editor and conference chair I would like to express my gratitude to all authors for the time and efforts they spent on their contributions. The conference papers published worldwide in this book summarize the excellent results and findings of most recent research and development in the fields of ICT, components and systems and other key enabling technologies for the automobile and road transport of the future. The application fields considered include electrification, power train and vehicle efficiency, safety and driver assistance, networked vehicles, as well as components and systems.

I feel very fortunate to have had the great help of the members of the AMAA Steering Committee in selecting the contributions for the conference programme. Furthermore, funding by the European Commission and continuous support by a multitude of industrial partners is greatly acknowledged.

It should be pointed out that the AMAA 2012 conference and the book at hand result from the tireless efforts of a team of highly committed colleagues at VDI/VDE-IT. Great appreciations should be given to Iohanna Gonzalez for running the AMAA office in an efficient, reliable and proactive manner, as well as to Anita Theel and René Stein for the brilliant work of preparing the master copy of this book. Special thanks also go to Beate Müller and Jan-Henrik Fischer-Wolfarth for their big help with regards to content. Last but not least, I am particularly grateful to Wolfgang Gessner and Jürgen Valldorf for continuous encouragement and inspiring discussions.

Berlin, May 2012

Dr. Gereon Meyer

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