

AMAA-Konferenz in Berlin: Schlüsseltechnologien für das Automobil der Zukunft

Automatisiertes Fahren und alternative Antriebe - die zwei großen Zukunftstrends des Automobilbereichs erfordern einen verstärkten Einsatz von Informations- und Kommunikationstechnik (IKT). Das aktuelle Forschungs- und Entwicklungsgeschehen in diesem Bereich stand im Vordergrund des 18. Internationalen Forum on Advanced Microsystems for Automotive Applications (AMAA 2014), zu dem am 23. und 24. Juni in Berlin leitende Ingenieure der Automobil- und Elektronikindustrie sowie Wissenschaftler von führenden Forschungseinrichtungen aus der ganzen Welt in Berlin zusammenkamen.

Das Motto der AMAA-Konferenz lautete: "**Smart Systems for Safe and Green Vehicles**".

Das zweitägige Programm umfasste mehr als 40 Beiträge zu den sogenannten Smart Systems, welche sicheres, umweltfreundliches und automatisiertes Fahren ermöglichen.

Die Schwerpunkte lagen auf folgenden Bereichen:

- ▶ **Driver Assistance & Vehicle Automation,**
- ▶ **Networked Vehicles, ITS & Road Safety,**
- ▶ **Vehicle Efficiency & Green Power Trains,**
- ▶ **Vehicle,**
- ▶ **Components & Systems**

Die Konferenz wurde durch folgende Keynote- Speaker eröffnet:

Stefan Mengel - Head of Unit Electronic Systems and Electric Mobility, Federal Ministry of Education and Research (Germany)

Willy Van Puymbroeck - Head of Unit Components, DG CNECT, European Commission (Belgium)

Hiroshi Shimizu - Professor and Electric Mobility Pioneer, Keiō University, Tokyo (Japan)

Renzo Cicilloni - Head of Vehicle Research & Innovation, Trento Branch, Fiat Research Center (Italy)

AGENDA

Monday, June 23th, 2014

10:00 – 11:30 Opening Session

Welcome Address

Werner Wilke - Managing Director, VDI/VDE Innovation + Technik (Germany)

Keynote Speakers

Stefan Mengel

Head of Unit Electronic Systems and Electric Mobility, Federal Ministry of Education and Research (Germany)

- Electric Mobility in Germany needs a systemic approach
- 3 Phases: (Phase I: 2011-2014 Premarket; Phase II: 2015-2017 Market Ramp up; Phase III: 2018-2020 Early mass market)
- Focus on research and innovation: 1,2 billion Euro for 82 collaborative projects
- European Electronics strategy for Microelectronics launched in 2013

Willy van Puymbroeck

Head of Unit Components, DG CNECT, European Commission (Belgium)

- Goal of the European Commission: increase of Road Safety of +50% till 2020 and zero fatalities in 2050
- Human errors are responsible for 90% of all car accidents
- Europe dominates the market for automotive semiconductors (34% share), Japan & Germany together share 45%
- Japan and Germany focus on CAPS (Combined Active & Passive safety), Examples to highlight: OpenER: new driver assistance systems to increase driving range and safety of vehicles; ECSEL: Electronic components and Systems for European Leadership

Hiroshi Shimizu

Professor and Electric Mobility Pioneer, Keiō University, Tokyo (Japan)

- He talked about innovations for EVs in Japan – Japan is the biggest producer of EVs
- The reason for that: Japan has a big air pollution → oil shock → government decided to come up with a EV development - comparable to Germany
- Key- factors for EVs/ HEVs: usability; efficiency; simplicity
- Pure EV wins the “battle” against FCV in case of efficiency: E- battery efficiency = 95%, FCV: Hydrogen production + Energy generation (overall efficiency of 30%)
- Future: in wheel motors will be the only solution, cause of a 30 % higher efficiency rate (Li-Ion Battery, Ne-Fe- Magnet)

Renzo Cicilloni

Head of Vehicle Research & Innovation, Trento Branch, Fiat Research Center (Italy)

- Smart mobility in combination with automated driving will be the solution of the future
- Huge investments are still necessary but situation must be balanced by means of an integrated approach
- Infrastructure, V2X, Vehicle in the cloud, Integrated Approach and the ethics of autonomous driving are the challenges of tomorrow

11:30 – 12:00 Poster Session, Networking Coffee, and Exhibition

12:00 – 13:00 Round Table Discussion: Vehicle Automation

Moderation: Jochen Langheim, ST Microelectronics/ Gereon Meyer, VDI/VDE-IT

Panelists:

Werner Huber - Head Driver Assistance and Perception, BMW, Germany

Harald Barth - Driving Assistance Product Marketing Manager, Valeo, Germany

Raul Rojas - Professor of Artificial Intelligence, Freie Universität Berlin, Germany

13:00 – 14:00 Lunch Break

14:00 – 15:00 Session A: Vehicle Automation

Chairperson: Wolfgang Dettmann, Infineon

Design of Real-Time Transition from Driving Assistance to Automation, Function: Bayesian Artificial Intelligence Approach

Ata Khan, Carleton University (Canada)

- He pointed out the problem that there are still plans for the future and plans for the near term solution but there are no plans for a seamless overcome
- Presentation of the Bayesian AI Approach: Algorithms that enables driving as well as a human being or even better

Layer- based Multi- Sensor Fusion Architecture for Cooperative and Automated Driving Application Development

Maurice Kwakkernaat, TNO (Netherlands)

- Presentation of a Layer- based- Multisensor, including 5 Layers
- 5 Layers: sensor Layer, communication Layer, information Layer, application Layer, additional application Layer
- TNO plans to operate 2 autonomous driving trucks on Netherlands roads based on the developed sensor

Enhancing Mobility using Innovative Technologies and Highly Flexible Autonomous Vehicles

Timo Birnschein, German Research Center for Artificial Intelligence (Germany)

- New concept for Smart Citys
- Reason: cities are the major source of pollution cause of the amount of private cars
- The so-called first mile and last mile problem is not solved yet
- 40% of all fuel consumption is used for looking for a parking space
- DFKI Robotics Innovation Center is working on wheel hub motors

15:00 – 15:30 Poster Session, Networking Coffee, and Exhibition

15:30 – 17:00 Session B: Vehicle Electrification 1

Chairperson: Emma Briec, Renault

(Cost)-Efficient System Solutions e.g. Integrated Battery Management, Communication and Module Supply for the 48V Power Supply in Passenger Cars

Harald Gall, ams (Austria)

- He presented very detailed the challenges of Automotive Power Supply's and presented the 48 Volt Power Supply Unit by AMS
- Furthermore he explained the technical details of the 14V Integrated Battery management in detail

Safety Simulation in the Concept Phase: Advanced Co-Simulation Tool chain for Conventional, Hybrid & Fully Electric Vehicles

Stephen Jones, AVL List (Austria)

- Need for more simulation – ISO 26262
- Presentation of simulation models with Matlab Simulink

Predictive Optimization of the Operating Strategy in Future Volkswagen Vehicles

Jan Bellin, Volkswagen (Germany)

When do We Get the Electronic Battery Switch?

Werner Rössler, Infineon (Germany)

17:00 – 17:15 Product Presentation**Advantages of Utilizing the OMNEST Simulation Environment in Automotive Research, Testing and Verification**

András Ferencz, OMNEST (Hungary)

Tuesday, June 24th, 2014*09:00 – 09:30 International Trends in Electric Mobility*

Gereon Meyer, VDI/VDE-IT (Germany)

- Trends report in worldwide Automation (www.vdivde-it.de/publications)
- Japan: EVs and Smart Community, use of EVs as emergency power supply; automation on highways and intelligent mobility systems, which are similar to Europe
- Korea: inductive en-route Charging
- US: EV mass production by Tesla
- Europa vs. Japan: both are working on similar fields; need for use of synergies between both parties (e.g. efficient driving, follow me function, robot car,..)

09:30 – 10:30 Session C: Driver Assistance

Chairperson: Mike Babala, TRW

Evolution in Advanced Driver Assistance: From Steering Support in Highway Construction Zones to Assistance in Urban Narrow Road Scenarios

Thomas Gußner; Robert Bosch (Germany)

- Driver Assistance Systems: presentation of a Construction Zone Assistant → on market soon (extending Lane keeping support to highway Construction Zones)
- Urban Narrow Road Assistant → on market in a few years
- He explained the System Architecture: from perception to function

Smart and Green ACC: DAS Applied to a Through the Road Hybrid Electric Vehicle

Sagar Akhegaonkar, Intedis (Germany)

- Presentation of SAGA – Smart & Green Car Concept, System which combines all other autonomous functions (electrification, target, navigation, automation) with Eco Motion Control but it does not communicate with the energy management system itself
- Goal: improvement of the energy consumption

Visualization Functions in Advanced Camera Based Surround View Systems

Markus Friebe, Continental (Germany)

- Presentation of a camera based surround view system – 4 Fisheye camera
- Video data chain in camera based surround view system with a special focus on visualization functions
- Therefor Continental uses cameras which are still on the market and still in use in existing cars to overcome existing problems in visualization

*10:30 – 11:00 Poster Session, Networking Coffee, and Exhibition***11:00 – 12:30 Session D: Vehicle Networks**

Chairperson: Steffen Müller, NXP Semiconductors

Power Saving in Automotive Ethernet

Steffen Müller, NXP Semiconductors (Germany)

- He presented connected mobility
- Chance for power saving in the automotive world by NXP
- Need for Automotive Ethernet: global wakeup via Ethernet fulfills all essential requirements
- Automotive Ethernet enables power saving and increases the performance of the car

Analysis of Cluster Ring Controller/ Area Networks for Enhanced Transmission and Fault-Tolerance in Vehicle Networks

Po-Chieh Chiu, National Tsing Hua University Taiwan (Taiwan)

- Presentation of a CAN- Topology and a Dual- Ring 2 Topology
- Presentation of a theoretical model to analyze the injection rate of a car

Assessing the Evolution of E/E Hardware Modules with Abstract Logical Architectures

Stefan Raue, Daimler (Germany)

- Presentation of a E/E architecture development for power distribution, wiring harness, interfacing structure and the interaction of the networked E/E components
- Conceptual Function Architecture – new modelling Layer → integrating novel functionalities
- Concept is included in the Mercedes Benz S-class

*12:30 – 13:30 Lunch Break***13:30 – 15:00 Session E: Connected Vehicles**

Chairperson: Roland Müller-Fiedler, Robert Bosch GmbH

Context-Based Service Fusion for Personalized On- Board Information Support

Alexander Smirnov, St. Petersburg Institute for Informatics & Automation (Russia)

An Active Vulnerable Road User Protection Based on One 24 GHz Automotive Radar

Michael Heuer, Otto-von-Guericke University of Magdeburg (Germany)

- ARTRAC Advanced Radar Tracking and Classification
 - Active Pedestrian Protection System
 - High Resolution Radar
 - Using Existing Technologies in Series Vehicles
 - Evaluation in Scenarios
 - Actuation Warning – control algorithm for warning and breaking

Increased Consumption in Oversaturated City Traffic Based on Empirical Vehicle Data

Hubert Rehborn, Daimler (Germany)

- Energy efficient navigation based on precise traffic and infrastructure system
- Urban congestions situations have been classified without average speed and number of stops

Compact, Safe and Efficient Wireless and Inductive Charging Plug-In Hybrids and electric Vehicles

Faical Turki, Vahle (Germany)

- Presentation of wireless charging technologies and the necessary requirements for wireless charging
- System overviews of the system transfer
- 3.7 kW demonstration unit

15:00 – 15:30 Poster Session, Networking Coffee, and Exhibition

15:30 – 17:00 *Session F: Vehicle Electrification 2*

Chairperson: Thomas Salbert, Continental

COSIVU – Compact, Smart and Reliable Drive Unit for Commercial Electric Vehicles

Dag Andersson, Swerea IVF (Sweden)

Reliability of New SiC BJT Power Modules for Fully Electric Vehicles

Alexander Otto, Fraunhofer ENAS (Germany)

Development and Testing of Solid-Bourne Sound Sensor for Bearing Faults Based on a Piezo-Electric Foil

Carsten Thun, Hella Fahrzeugkomponenten (Germany)

Jurij Kern, Elaphe Propulsion Technologies (Germany)

17:00 *Final Remarks*

Jan Fischer-Wolfarth, VDI/VDE-IT (Germany)

Gereon Meyer, VDI/VDE-IT (Germany)