

Editorial

Confronted with the climate change and with the limitation of fossil resources, innovative propulsion systems and clean fuels reach the top of the car industry's agenda. The automotive sectors seem to be at the edge of a "change of paradigms". Electric drive, fuel cells, hydrogen, bio fuels, natural gas are key words of public debates and expert discussions.

The Berlin-Brandenburg region has a promising position to cope with the future challenges: The Clean Energy Partnership (CEP) Berlin is looking to gain experiences with hydrogen and fuel cells, three field tests on e-mobility are going to be launched in 2009 and a number of past activities paved the way for alternative fuels such as natural gas.

In order to bundle the regional capabilities of companies and universities, the association INFABB e. V. – Innovative Vehicle Propulsion Berlin-Brandenburg – has been founded in January 2009. The INFABB approach mainly bases on the regional engineering competencies, i.e. the IAV GmbH and further partners. TSB-FAV is coordinating the INFABB activities.

The conference „Tag der Verkehrswirtschaft“, commonly organized by TSB-FAV and IHK Berlin on 22 April 2009, is dedicated to sharpen the unique position of the region in terms of innovative new road vehicle propulsion systems.



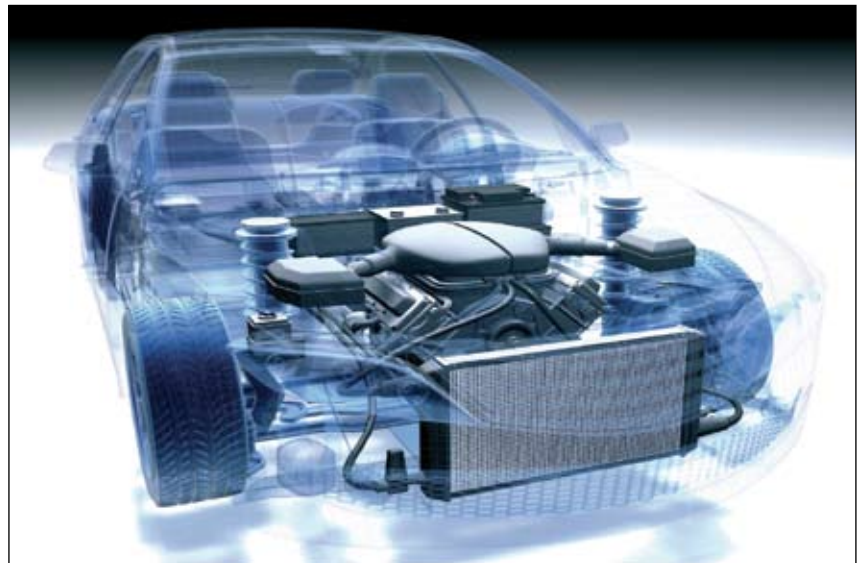
Thomas Meissner
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INFABB Innovative Vehicle Drives Berlin-Brandenburg

INFABB

Innovative vehicle drives – A rising issue in the German capital region.



Innovative vehicle drives are a rising issue in the German capital region. To strengthen its technological competence, "Innovative Vehicle Drives Berlin-Brandenburg" (INFABB e.V.) was founded by IAV GmbH and TSB-FAV as registered association on 21 January 2009. The initiative will promote the exchange between industry and scientific institutions and assembles the regional potential in the field of Research and Technology Development (RTD) for the vehicles of tomorrow. Common actions to build-up know-how on alternative vehicle drives including optimisation of the entire power train are intended to be coordinated by INFABB.

The activities of INFABB are embedded in measures to enhance the cluster "Transport and Mobility" of Berlin-Brandenburg which brings together companies and scientists interested to improve their individual strengths in project and system networks.

Technically, the initiative focuses on the further development of combustion engines (new combustion processes and new fuels including hydrogen), different types of hybrid drives (mild, full, plug-in hybrid and related components) up to electric drives (including batteries, range extenders, fuel cells, wheel hub motors and integration into power grids).

The main task of INFABB is to establish related project partnerships in Berlin-Brandenburg targeted to conduct industrial RTD

for a serial production vehicle (Mercedes S 400 Hybrid). New platforms for electromobility and hybrid vehicles (passenger cars and commercial vehicles) are already on test track and further systems are under development for the future electric vehicle programs.

Continental is employing a block building concept for Battery Systems, which allows efficiently covering a wide range of power applications by similar parts for HEV and EV (zero emission vehicles). The use of a modular kit concept allows effective coverage of a wide range of performance classes with a high utilization of common parts.

This concept delivers high integration levels and can be at the same time very flexible depending on vehicle requirements. This design-in aspect is especially essential for future energy storage systems for electrical powered vehicles in order to be able to fit into different installation spaces without serious changes to the cell production line. The indirect cell cooling

can be setup to use air or liquid media.

Future electric cars or plug-in hybrid vehicles may essentially differ from first generation vehicles in one major area. To reach the required drive range with the appropriate weight, it is maybe not enough, to continuously optimize battery technologies; rather it could be necessary to change the vehicle concepts to effectively utilize current battery technologies. This means that the vehicle could be designed around the battery, instead of integrating the battery in the available installation space.



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Division of Automotive Engineering of TU Berlin More than a century of Automotive Research

Research

The Division of Automotive Engineering of the Technical University of Berlin can look back on more than a century of automotive research. The Division of Automotive Engineering is part of the Institute of Land and Sea Transport Systems and the Innovation Center Energy and is led by Professor Volker Schindler. In addition to the permanent staff, about ten distinguished external lecturers give courses where they combine theory with topics from their daily practice. A modern crash test facility and established simulation software are ideal prerequisites for research and students' topical education.



A crash test performed by the Division of Automotive Engineering

In recent years, passive safety has been the main research topic with special emphasis on the safety of small cars, the protection of pedestrians and cyclists as well as the protection of children as car occupants. Further main points of research are in the field of alternative propulsion principles and driver assistance systems, whereby the vehicle is always regarded as an overall system. Due to the increased interest on concepts for energy efficient vehicle propulsion in the region Berlin/Brandenburg, in the last years the Division of Automotive Engineering continued to expand its expert knowledge in this

field and now participates in several projects dealing with questions of electromobility. One of the current projects, NET-ELAN, is presented below.

Project: NET-ELAN **Grid integration of electrified propulsion systems into existing and future energy supply structures**

This project aims to answer the question whether and how a defined fleet of vehicles equipped with electrified drive components can be usefully deployed

at a pre-competitive stage, demonstration projects and field trials using vehicle fleets.

Public relation and marketing measures shall be applied to reach representatives of industry, scientific institutions, public administrations and politics in order to make them aware of the actual research issues and needs.

Platform E-Mobility

In a first step INFABB is establishing a regional platform "electro-mobility". E-mobility is a dominating subject in the discussion of the tomorrow's traffic and several related field tests will start in Berlin very soon. For instance Daimler and RWE as well as BMW and Vattenfall are preparing field trials in Berlin using a significant fleet of electric vehicles and setting up corresponding charging infrastructure. Aim is to establish a lead market for e-mobility in Germany and to concentrate the research activities in a corresponding manner. Having these activities in mind, companies and research institutions of the Berlin-Brandenburg



region shall be empowered to create added value in the area of e-mobility.

On 26 January 2009, the kick-off of the e-mobility platform has taken place and more than 70 experts from companies, research institutions and public administrations have attended the meeting; many more participants than initially expected. This shows clearly the deep interest of the regional players in e-mobility.

The kick-off meeting was intended to bring the interested parties together, establish first contacts among the attendants and to exchange ideas and interests. Several presentations were held to give the audience an overview over actual activities and plans. In addition, it was the first event to inform the professional public about the INFABB initiative.

The e-mobility platform activities will be continued in smaller working groups which should identify concrete potential of cooperation, main areas of interest and ideas for projects.



www.infabb.de

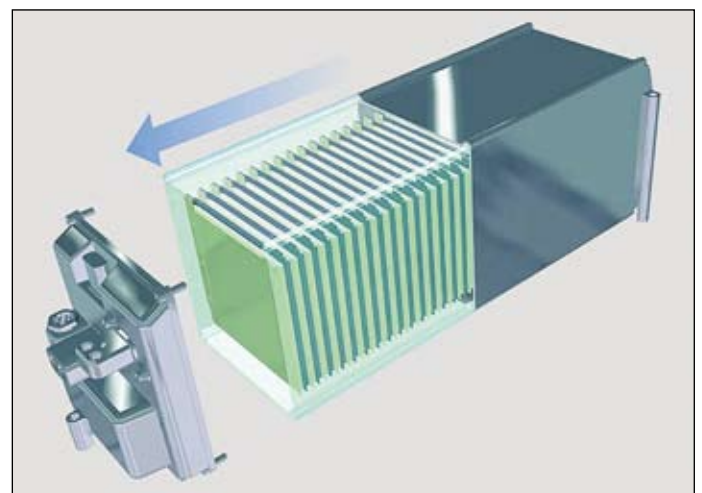
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Continental Li-Ion Battery Systems for zero emission vehicles

Battery Systems

The Kyoto conference and the declaration of the IPCC climate report show that a change in mind is necessary in various fields of energy conversion. Automobiles cause some major part of the CO₂ emissions especially taking in mind that the number of cars is growing distinctly in Asian regions and that there is a general desire of mobility in all developing countries. This makes new concepts for reducing fuel consumption indispensable. Combinations of electric and fuel power improve total system efficiency allow downsizing of combustion engines. But also pure battery powered vehicles are a possible solution to reduce the CO₂ emissions.

The bottleneck for Hybrids and Zero Emission Vehicles are reliable and safe batteries. Recent progress in Lithium-Ion batteries is a key milestone for successful implementation and commercialization. Tests of the Li-Ion technology on cell and system level have been verified the safety and power capability for the demands in automotive applications. Continental has



A recently developed Lithium-Ion Battery System

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successfully developed battery systems basing on the newest available progress in Li-Ion cell developments in Berlin. As first company worldwide Continental starts in June 2009 to produce Lithium-ion batteries

as energy storage in the electrical grid as well as for customers' demand management. Technical feasibility and potential barriers will be investigated. The project will clarify possibilities and limitations regarding the integration of e-vehicles in the power grid and the potential for the efficient integration of fluctuating electricity (eg. generated by wind turbines).



Furthermore it will show the impact the use of e-vehicles would have on power consumption and which emissions (environmental impacts) are caused.

Within this project the Division of Automotive Engineering develops a roadmap for market penetration of vehicles equipped with electrified propulsion systems of different sophistications.



Another Project: **CLEVER – Compact Low Emission Vehicle for Clean Urban Transport**

Moreover, typical user behaviour patterns are investigated, which are the basis for developing a model approach for the simulation of the spatial and temporal distribution of vehicles. Based on this pre-knowledge estimates about possible market shares of hybrid and pure electric vehicles in the annual motor vehicle registrations are made and possible development paths for the stock of vehicles for the future are assessed. Concluding, the extent of additional use of electricity from the grid for vehicles analysed by individual use patterns is assessed. This should allow to predict which contribution electricity can make to meet the demand of energy consumption in transport.



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Upcoming Events

- ▶ Arbeitskreis Bahnsystemtechnik
 4 May 2009
 Contact: cheinrich@fav.de
- ▶ 7th IAA Symposium on Small Satellites for Earth Observation
 4 – 8 May 2009
 Info: www.dlr.de/iaa.symp
- ▶ Arbeitskreis Verkehrstelematik
 14 May 2009
 Contact: mpodbregar@fav.de