E-Mobility: New Models for Planning Traffic

Federation Funds KIT Project under the Electric Mobility Showcase Program: "e-Traffic Space Stuttgart" Starts in January

"e-Traffic Space Stuttgart" cooperates closely with other projects in the Baden-Württemberg electric mobility showcase. (Graphics: IfV)

How can electric mobility be embedded in modern traffic concepts, which importance will it have for the users? In the project "eVerkehrsraum Stuttgart" (e-traffic space Stuttgart), the Institute for Transport Studies of Karlsruhe Institute of Technology (KIT) will design a model for future traffic planning that analyzes both framework conditions, such as the range and charging infrastructure, and the effects of electric mobility on the mobility behavior. Funding of the project in the "LivingLabBW^{e} mobil" electric mobility showcase by the Federal Ministry of Transport, Building, and Urban Development started on January 01, 2013 and will total nearly EUR 460,000 over a duration of three years.

The project is aimed at embedding electric mobility in modern mobility and traffic concepts. "Marketing of electric mobility requires extended planning models considering the properties of electric vehicles, such as limited range, possibilities of charging, and charge cycles. At the same time, these models are to simulate the mobility behavior of users that will change as well," says Professor Peter Vortisch, Head of the Institute for Transport Studies (IfV) of KIT. The

KIT Mobility Systems Center: Solutions for tomorrow's mobility

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project will focus on the region of Stuttgart with its high population and traffic density. Here, KIT scientists will study the effects of electric vehicles on traffic volume, traffic flows, and traffic means as well as on use patterns and acceptance by citizens.

The scientists will develop a software for the future planning of electric mobility offers and their framework conditions, which will then be transferred to other locations. “We will complement data from existing traffic models without electric mobility by movement profiles of electric vehicles and charge infrastructures obtained from other projects in the electric mobility showcase”, says Dr. Martin Kagerbauer from the IfV. “Moreover, we will ask the users for changes of their behavior in order to integrate these data in the model structures.”

Modeling will be based on the “mobiTopp” microscopic multi-agent simulation program. This model reproduces the traffic behavior of all persons in the region of Stuttgart for a period of a week. It shows the traffic means used for various activities or paths. In this way, individual use patterns and changes can be modeled. “This is highly important, as traffic behavior in the future will become more variable and differentiated,” Kargerbauer says. “Use of various transport means on various paths (*multi-modal behavior*) and use of various transport means on a single path (*inter-modal behavior*) will be increased by electric mobility.” The data for modeling traffic are collected by the KIT team in polls relating to the paths covered.

“e-traffic space Stuttgart” cooperates closely with other projects in the Baden-Württemberg “LivingLabBW^{e} mobil” electric mobility showcase, analyzes their results, and processes them in order to identify impacts of electric mobility on planning, infrastructure, and traffic behavior.

“LivingLabBW^{e} mobil” is one of four concepts funded by the federal government under the electric mobility showcase program. The Federal Ministry of Economics and Technology (BMWi), the Federal Ministry of Transport, Building, and Urban Development (BMVBS), the Federal Ministry of the Environment, Nature Protection, and Reactor Safety (BMU), and the Federal Ministry of Education and Research (BMBF) will provide funds in the total amount of EUR 180 million for the complete program until the end of 2015.

In the Baden-Württemberg “LivingLabBW^{e} mobil“ showcase, more than 100 partners from industry, science, and public institutions are studying electric mobility in practice. The about 40 projects concentrate on the region of Stuttgart and the city of Karlsruhe and ensure high international visibility. “LivingLabBW^{e} mobil“ stands for a systematic approach based on coordinated projects for everybody to

experience electric mobility from the electric bike to the electric car to the electric van and plug-in shuttle buses. The projects address aspects of intermodality, fleets, commercial transport, infrastructure and energy, urban and traffic planning, vehicle technology, communication and participation as well as training and qualification. ”LivingLabBW^{e} mobil“ is coordinated by the State Agency for Electric Mobility and Fuel Cell Technology e-mobil GW GmbH and the Stuttgart regional economic development corporation (WRS).

The Mobility Systems Center pools KIT activities relating to mobility. Presently, 40 KIT institutes with about 800 employees are working on methodological and technical fundamentals for tomorrow’s vehicles. It is their objective to develop concepts, technologies, methods, and processes for future mobility considering the complex interactions of vehicle, driver, traffic, infrastructure, and society.

Karlsruhe Institute of Technology (KIT) is a public corporation according to the legislation of the state of Baden-Württemberg. It fulfills the mission of a university and the mission of a national research center of the Helmholtz Association. KIT focuses on a knowledge triangle that links the tasks of research, teaching, and innovation.

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