Research for Future Vehicles

New Building Will Accommodate Infrastructure for Interdisciplinary Research

Start of construction on the site of the Mackensen barracks: Excavation of an area of about 1500 square meters. (Photo by: Thorsten Dreher)

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A new building for "interdisciplinary vehicle systems technology" with innovative test rigs is presently under construction on the site of the former Mackensen barracks in Karlsruhe. The project with a total investment volume of about 14 million Euros will provide the infrastructure needed for the research conducted by the KIT Institute for Vehicle Science and Mobile Machines (IFFMA) and the KIT-CART competence center. Work will be aimed at developing methodological and technological bases for future vehicles.

It is light and affordable, it runs safely, generates low noise, and it is emission-neutral, it rapidly finds its way to its destination, and can be operated easily – the vehicle of the year 2050. Research conducted by the Institute for Vehicle Science and Mobile Machines (IFFMA) and KIT-CART, the Center of Automotive Research and Technology, an interfaculty competence center coordinated by IFFMA, is aimed at making this vision come true. KIT-CART, the nucleus of the KIT Mobility Systems Focus, develops methodological and technological bases for future vehicles and focuses on land-bound vehicles, such as cars, trucks, mobile machines, and railcars. Particular attention is paid to energy efficiency and emission reduction, driving and industrial safety, usability, and costs.

The infrastructure facilities required for this research is now being established by the construction of the new IFFMA building “Interdisciplinary Vehicle Systems Technology” on the site of the former Mackensen barracks in Karlsruhe. “This building will offer best prerequisites to design the current change in vehicle technology”, says Professor Frank Gauterin, spokesman of the IFFMA management.

The builder, Vermögen und Bau Baden-Württemberg, Amt Karlsruhe (Karlsruhe Office for Assets and Construction Management in Baden-Wuerttemberg), and KIT are constructing a highly functional infrastructure facility accommodating innovative technology, among others a unique type of four-wheel acoustic roller dynamometer.

The investment volume for the building is eight million Euros and allocated in budget of the state of Baden-Wuerttemberg. In 2007, the Bund-Länder Kommission (BLK) agreed to the project being included in the funding of research installations, such that the Federal Republic of Germany will bear half of the costs. The other half will be taken over by KIT. Another six million Euros will be incurred for large devices. Of these, 2.4 millions will be funded from the Excellence Initiative. Vermögen und Bau Baden-Württemberg, Amt Karlsruhe, is responsible for the project management and controlling of construction work. Work has already started. It will presumably take 15 months.

Construction site on the premises of the Mackensen barracks. (Photo by: Michael Frey)

The plans for the new research building were drafted by Amt Karlsruhe, planning and implementation are accomplished by the Dömges architects office in Regensburg. “Economic efficiency, sustainability, and a high functionality characterize the solution found, without design requirements being neglected”, underlines the construction director in charge, Günter Bachmann. For functional reasons, the hall with the four-wheel acoustic roller dynamometer will be located directly near the existing hall with the engine test rigs. For the remaining test facilities, including the vibration test field, machine beds, the vehicle test rig x-dynodrive, and a workshop area, another new building with a usable area of about 2100 square meters will be constructed. In the middle of these halls, a free utility area will be located.

The rectangular hall made of reinforced concrete and pre-fabricated steel-concrete parts will be about ten meters high and provided with an optimal thermal insulation and a green covering of the roof to sustainably fulfil energy and ecological requirements. Its straight shape and the combination of steel, glass, and colored sheeting will provide for the functionality and aesthetics of the building.

Highly complex test installations will allow for IFFMA mobility research. Work requires both controlled driving operation at the laboratory on a roller dynamometer and experimental simulation of static and dynamic loads by servohydraulic and electrodynamic actuators. Not only the vehicle, also the driver and the passengers shall be exposed to defined conditions. The cognition, emotion, and actions of the persons will be analyzed in interaction with the vehicle.

The planned four-wheel acoustic roller dynamometer will be unique. It is designed for testing various land-bound vehicles, including cars, light and heavy trucks as well as agricultural and construction vehicles with a total weight of up to 40 tons, additionally rail-bound vehicles can be studied. In this type of test rig, the wheels of the tested vehicle roll on large, individually adjustable drums to simulate driving on a road or on rails. Among others the dynamometer is used for energy flow studies during various driving and work cycles and for acoustic investigations. For this, the test room shall be provided with an acoustic lining.

Further information on the new building can be found under www.vbv.baden-wuerttemberg.de, www.vba-karlsruhe.de, and www.iffma.kit.edu .

The state company of Vermögen und Bau Baden-Württemberg performs all tasks related to the management of real estates, buildings, and constructions of state-owned buildings. Amt Karlsruhe is responsible for construction projects of KIT.

Karlsruhe Institute of Technology (KIT) is a public corporation and state institution 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.

This press release is available on the internet at www.kit.edu.