

Agile Production System for Electric Motors

Baden-Württemberg Ministry of Economics Funds Research Project at KIT with about EUR 1 Million



*An electric motor for fully electric vehicles, which is adapted to the installation space.
(Photo: Schaeffler)*

Against the backdrop of climate change and energy transition, partly and fully electric vehicles are gaining popularity. In Germany, the number of new vehicle registrations in 2019 increased to more than 63,000, which means that it has tripled since 2015 (source: Statista). Future economically efficient production of electric motors of variable technologies and numbers is the goal of the AgiloDrive project of Karlsruhe Institute of Technology (KIT). Within this project, researchers and industry partners develop novel product kits and production technologies for direct transfer to industry. The Baden-Württemberg State Ministry of Economics, Labor, and Housing funds the pilot phase of the project with about EUR 1 million.

Today, electric motors mostly are produced in small numbers or with low productivity at partly automated workshops, where some processes are carried out manually, or on highly specialized but very inflexible transfer lines. Often, expert teams design and optimize certain steps of industrial development processes of electric motors, with hardly any transfer taking place to other areas.



*KIT Mobility Systems Center:
Solutions for tomorrow's mobility*

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The AgiloDrive research project is aimed at developing a novel, agile production system based on modular product- and production-specific technologies. "In this way, we will enable future flexible, but still economically efficient production of various models and numbers of electric motors based on various technologies. This will allow cost-reducing scaling effects to be used for various product series and manufacturing technologies," says Professor Jürgen Fleischer, Head of the wbk Institute of Production Science of KIT.

AgiloDrive is a cross-institute project of the KIT Mobility Systems Center. The project is managed by wbk, project partners are the Institute of Product Engineering and the Institute of Electrical Engineering of KIT. Industry partners are Schaeffler Automotive Buehl GmbH Co. KG, Gehring Technologies GmbH. The Baden-Württemberg State Agency for Electric Mobility (e-mobil BW GmbH) is an associated partner. All partners will pool their know-how along the complete development process and supply and process chains. The Baden-Württemberg Ministry of Economics, Labor, and Housing funds the pilot phase of the AgiloDrive research project with about EUR 1 million.

Agile Production System Is the Core of the Project

"An agile production system based on an integrated product development process will be decisive for the economic success of our flexible approach," Fleischer explains. The system is capable of change and characterized by modular manufacturing elements, standardized interfaces, and scaling concepts. In this way, it can flexibly respond to changing market and technology requirements. This reduces the entrepreneurial risk, as investments can be adapted dynamically to the actual demand thanks to the modular structure and costs can be reduced over various product series and manufacturing technologies. "This will enable economically efficient integration of electric mobility in the energy and mobility transition in spite of volatile markets," says Professor Thomas Hirth, KIT Vice-President for Innovation and International Affairs.

The AgiloDrive project team works on three parallel partial projects: An integrated product kit based on modular and robust structures and flexible development and design methods. The second partial project covers the necessary structures and technologies of the flexible systems. The third partial project is aimed at commercializing the production system using agile project management methods, such that findings of the research project can be transferred to the industrial scale. In addition, partial solutions as well as the complete system for the agile product development and production process will be validated technically and economically. "Investments in production facilities must be economically efficient. For this purpose, a high



Produced with the help of a new manufacturing technology: Prototype stator with a compact flat wire winding. (Photo: Gehring)

utilization rate must be ensured in the long term, even if the volumes demanded by the customers for individual applications will remain volatile,” says Thomas Pfund, President of the E-Systems Business Unit of Schaeffler Automotive.

The results of the AgiloDrive project will be made available to industry. In this way, solution approaches will be transferred quickly to application in self-funded projects. “This agile production system will particularly enable medium-sized machine and plant engineers as well as suppliers to successfully manage the transformation process towards electric mobility and to participate in the new markets,” says Dr. Sebastian Schöning, CEO of Gehring Technologies. This project contributes to securing Germany and in particular in the state of Baden-Württemberg that is highly affected by the transformation process as a location of automotive and plant engineering, he adds.



AgiloDrive is aimed at developing a novel production system based on product- and production-specific technologies. (Graphics: wbk, KIT)

More about the KIT Mobility Systems Center
<http://www.kit.edu/research/6720.php>

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