

## AVANTI for an intelligent factory.

### The Magdeburg Institut für Automation und Kommunikation e.V. (ifak) and the realisation of the Industrie 4.0 vision

Changeover times are standstill times and cost the automotive industry lots of money. A new test system that automatically and systematically processes all sequences and the behaviour of all components during the preceding 3D simulations shall further shorten the commissioning times of production lines for new vehicle types.

The Magdeburg Institute for Automation and Communication (ifak) is involved in this international AVANTI project with the Daimler automotive group as well as in the SME project autoAPSint with regional partners that link the information from the equipment and machinery level with the software for personnel planning and resource scheduling. The vision of Industry 4.0, the continuous communication of all involved machines and systems, their integration into the control and regulation right up to integration into the management, is implemented in the interaction of old and new technologies.

Which machines are handling which orders at the moment? For which wearing parts is the end of useful life approaching? And how can maintenance and the deployment of personnel and machines be smoothly organised? This information shall be available to decision makers in real time with the digitalisation of production, without the view of the nameplate on the machine and in the file, without misunderstandings between colleagues and without loss of time when completing Excel spreadsheets or in e-mail correspondence. "The automotive industry is very far advanced in this field, so it manages to combine the continuous production of a vehicle type with the respective individual customer requests at high tempo on the production lines", says Dr. Thomas Bangemann, deputy head of ifak. "Smaller supplier companies as well as other small and medium-sized enterprises now want to follow suit." Planning processes shall be converted from the rather static manual input into a continuous flow of data and thus more effectively structured.

In collaborative project autoAPSint (the acronym stands for "model-driven **integration** of shop floor **automation** into a SME-relevant ERP solution with **Advanced Planning and Scheduling**"), three regional partners are developing a solution which enables real time communication from the equipment level via control technology right up to the administrative level. The Magdeburg component manufacturer ifak system GmbH is taking care of the recording of information from the sensors and actuators, and making it available by means of a fieldbus system. The *Institut für Automation und Kommunikation e.V.* mediates between the levels of automation and production planning, merges data and processes it. Located before the gates of the state capital Magdeburg, integral systemtechnik GmbH (isM) in Barleben utilises the volumes of data for planning processes – for instance for production, distribution, service and procurement of materials. The basis is the ERP (enterprise resource planning) software utilised by many medium-sized enterprises for planning and organisation of economic resources in the company as well as equipment or personnel. In a given case the software is adapted to the respective needs of the company. "The requirements of business administration, maintenance and automation technology are linked with each other, and the data will be translated into a language that is clear to the users. We have proven the feasibility by means of a demonstration model with real control technology", says Mario Thron, research associate at the ifak institute.

In addition to ifak, companies such as FESTO AG, IKS-InTec GmbH, TWT GmbH Science & Innovation and the Magdeburg company tarakos GmbH are also integrated in the AVANTI project with the Daimler group and partners from Finland and Turkey. Tarakos develops software for 3D visualisation and simulation, with which errors in the control system or with system components can be corrected before the commissioning of real systems. Together the project partners are pressing ahead with the automation of the virtual commissioning of production lines. A new test system shall automatically and systematically process all sequences one after the other and further shorten the changeover times for new vehicle types. The ifak is contributing its expertise in the formal behavioural description of system parts as well as for formalised exchange of data to the project. These basic prerequisites are necessary for seamless engineering of production facilities and for the development of the abovementioned test system.

A variety of incompatible industrial communication systems with different language use and partially company-specific designations has emerged in recent years. Language barriers can subsequently arise when using machines from different manufacturers in a company. That is why the next major challenges on the path towards an intelligent factory and Industry 4.0 lie in the standardisation of technologies and concepts as well as in the development of a standardised means of description. The ifak is also involved in this process.

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**Caption:** Mario Thron, ifak research associate and isM managing director Peter Schreiber show their demonstration model provided with real control technology. Photo: ifak

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