

RESEARCH NEWS

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Hannover Messe 2017: fit for Industrie 4.0 by PLUGandWORK™

PLUGandWORK™ connects existing machines and systems to Industrial Internet-of-Things (IIoT)

Fraunhofer solutions integrate existing machines into modern production systems such as MES and SCADA. PLUGandWORK™ automatically generates a communication server for data exchange with other systems or IT systems. This means that medium-sized companies are also taking the leap into the age of Industry 4.0. The technology is market-ready and is currently being used by several pilot customers. The researchers will be presenting a demo at the Hanover Trade Fair (Hall 2, Booth C22, April 24-28).

PLUGandWORK™ helps you connect your legacy plant floor equipment into all the major Industrie 4.0 and Industrial Internet-of-Things players such as IBM Watson, GE PREDIX, Rockwell Automation, PTC Thing Worx and others. Today, the consistent implementation of Industrie 4.0 still often fails because older devices that do not yet have the necessary interfaces are still in use. In the worst case, the machines then work in isolation in the production hall.

The Fraunhofer Institute for Optronics, Systems Technologies and Image Exploitation (IOSB) in Karlsruhe has developed a solution to this problem. PLUGandWORK™ ensures that existing machines and systems can be integrated into the production system. If you don't already have gateway systems on your plant floor, our inconspicuous cube houses a standard industrial PC with Windows as the operating system. Your machine provides all information about itself and its capabilities via network cable to the cube. The machine is integrated into the production system, it can communicate with other systems and it is accessible via the network. "In principle, this is very similar to the installation of a USB device, such as a printer, on your office PC," explains Project Manager Dr. Olaf Sauer. "You simply plug your device in, the device describes itself to the computer, the computer goes on line if required to find the right driver, and then the computer can fully interact with and pass information back and forth to control the device to do things (like print, copy files...)"

In the first step, our solution creates the self-description of the machine on the basis of the XML data format AutomationM™ (Automation Markup Language). An assistance tool facilitates the structure of the self description by means of an intuitive, graphical user interface. With this model, the cube or gateway PC automatically generates the communication server in the second step for exchanging information with other machines and the superordinate production control. However, the tools also register

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changes to the machine, such as an updated configuration. A change manager records the new configuration and forwards it to the communication server.

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The Fraunhofer PLUGandWORK™ solution eliminates the need for complicated configuration and setup when a system is integrated manually into production. This process may take several days or even weeks, and PLUGandWORK™ is often finished after a few hours.

Maximum transparency, compatibility and data security

Use of a cube or gateway PC not only frees individual machines from their isolation. It offers a further, decisive advantage: "Data from the connected machines can also be stored on the PLUGandWORK™ Cube", explains Sauer. "The employees in plant management always see what is happening on the machine and immediately recognize any problems occurring. In this way, transparency prevails in the production hall." The server in the cube uses the OPC UA (Open Platform Communications Unified Architecture) communication protocol and therefore adopts an internationally accepted standard that ensures the greatest possible compatibility in machine-to-machine communication. Data security is also ensured: All data is transmitted in encrypted form, and only authorized devices can connect with the system. In the process, industrial partners such as Wibu Systems AG from Karlsruhe contribute their expertise to the field of safety technology.

Depending on the complexity of the machine data and parameters, up to twenty machines can be connected to a single cube. The retrofit technology is by no means only designed for large manufacturers, such as from the automotive sector. "Even medium-sized companies with only twenty machines can integrate them into the production control," says Fraunhofer expert Sauer. System integrators that create complete systems and pass them on to their customers ready for use also benefit from the cube.

Cooperation with industry standards

For many years, the IOSB has been working on digital technologies that make companies fit for Industrie 4.0. The experts develop the necessary standardized interfaces, software modules and data transmission protocols. In addition, the Fraunhofer experts, together with national and international partners, actively participate in the further development of AutomationML and are involved in various standardization committees. It will surely take a few years until the vision of Industrie 4.0 is fully implemented and manufacturers have brought their complete machine park up to date. Until then, the PLUGandWORK™ Cube ensures that even older machines are fit for the digital era.

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The **PLUGandWORK™** Cube by Fraunhofer integrates existing machines into modern production systems. This means that medium-sized companies are also taking the leap into the age of Industrie 4.0. © Fraunhofer IOSB | Picture in color and printing quality: www.fraunhofer.de/en/press

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