

# PRESS RELEASE

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## Ensure quality in assembly with intelligent tools – pilot project with BMW Regensburg

**Nuremberg/Regensburg/Hanover:** At the Hannover Messe, together with the BMW Group, the Fraunhofer Institute IIS is presenting a project for developing and testing an intelligent screwdriver for use in assembly. A special attachment module that is connected directly with the IT system receives the respective order and uses sensor data to check for and then signal order completion. This way, the production employee knows at all times if the order was completely and correctly carried out. The test application is currently in preparation in the production line at BMW in Regensburg, providing a basis for possible extensions of the intelligent tool.



**Intelligent tools increase quality in assembly**  
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The digitization of many work processes in the Industry 4.0 environment provides new opportunities to increase the quality and reliability of procedures in production. Particularly in the assembly of vehicle parts with manually operated tools, this is a challenge that the Fraunhofer Institute for Integrated Circuits IIS is taking on in practical testing, together with the BMW Group in the Regensburg plant, in a pilot application.

### Intelligent tools in the pilot application

Each order requires a great deal of attention on the part of the assembly technician on the production line, e.g. to check if all of the screw connections that must be carried out on a car door were also done correctly and completely. Because production is becoming increasingly specified, this information changes extremely quickly. Thanks to the at-

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## FRAUNHOFER INSTITUTE FOR INTEGRATED CIRCUITS IIS

tachment module developed by Fraunhofer IIS that is installed on the manually operated screwdriver, the tool is connected with the production IT system, and for each new order, it supplies the correct data directly to the assembly technician's screwdriver. The module is not dependent on the tool or manufacturer and can be used with all types of screwdrivers.

"The prototype of the system is now being prepared for a test application in a production line in the BMW Group Plant Regensburg," explains Jonathan Röske, Project Manager at the BMW Group. "This pilot test is also about working together with our production employees to analyze which parameters essential to quality assurance must be added in order to extend the system even further and, in cooperation with Fraunhofer IIS, to transfer it into a product to be used by other production lines."

### Sensor fusion technology makes real-time assistance for assembly technicians possible

In addition to the network connection, the innovative software from Fraunhofer IIS also provides an analysis of the screw procedure, specification of tool motion, and detection of position. "In one sensor fusion process, rotation rates, accelerations, and direction information are combined and calculated together in real time. This tracking information is compared with the specified parameters," says Jochen Seitz, Group Manager of Multisensor Systems at Fraunhofer IIS, explaining the principle. If the values match, a signal can be given directly to the assembly technician on-site via an LED display, indicating if all of the screw connections have been carried out correctly. Currently, it is being used to check if all of the screws have been tightened properly. In the next step, this application can be combined very effectively with a positioning system in order to associate a screw connection with a workpiece or even a screw position. Moreover, if desired, the procedures can be documented with transparency.

The scientists, together with the BMW Group, are demonstrating the project at the Hannover Messe Industrie from April 24–28 at the shared Fraunhofer stand in Hall 2, C22.

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The **Fraunhofer Institute for Integrated Circuits IIS** in Erlangen is one of the world's leading application-oriented research institutions for microelectronic and IT system solutions and services. It ranks first among all Fraunhofer Institutes in size. With the creation of mp3 and the co-development of AAC, Fraunhofer IIS has reached worldwide recognition. In close cooperation with clients, scientists work on top international research in the areas of audio and media technologies, imaging systems, energy management, IC design and design automation, communication systems, positioning, medical engineering, sensor systems, safety and security technologies, supply chains and non-destructive testing. More than 900 employees work in contract research for industry, service providers and public institutions. Founded in 1985 in Erlangen, Fraunhofer IIS now has 13 locations in 10 cities: in Erlangen (headquarters), Nuremberg, Fürth, Dresden, Bamberg, Waischenfeld, Coburg, Würzburg, Ilmenau, and Deggendorf. Except for core funding of 24 percent, the annual budget of 150 million euros is financed by contract research. More information available at [www.iis.fraunhofer.de](http://www.iis.fraunhofer.de)