

# Digitize and control processes with Smart Objects

Wide variety, small batch sizes and high flexibility: Current market demands on manufacturing companies increase the requirements of production and require transparent and flexible processes.

Particularly in complex assembly work processes, it is necessary to provide and transport the material as required, as well as information about the work pieces together with other process and product data. This task is becoming increasingly complex as production becomes more individualized.

## **Smart Objects - Intelligent objects control production**

Fraunhofer IIS is already developing solutions for the digitization and networking of these individualized and flexible production processes. For this purpose, assembly objects are equipped with electronic tags, which thus become smart objects. From networking with the environment, positioning information or additional sensors, the smart object can gain process-relevant context information. Based on this context information and the individual product data, the intelligent assembly object can independently recognize process steps, report to the control system, provide information to the worker or autonomously control the production for small lot sizes.

**Fraunhofer IIS**  
Area Positioning and Networking

Nordostpark 84  
90411 Nürnberg

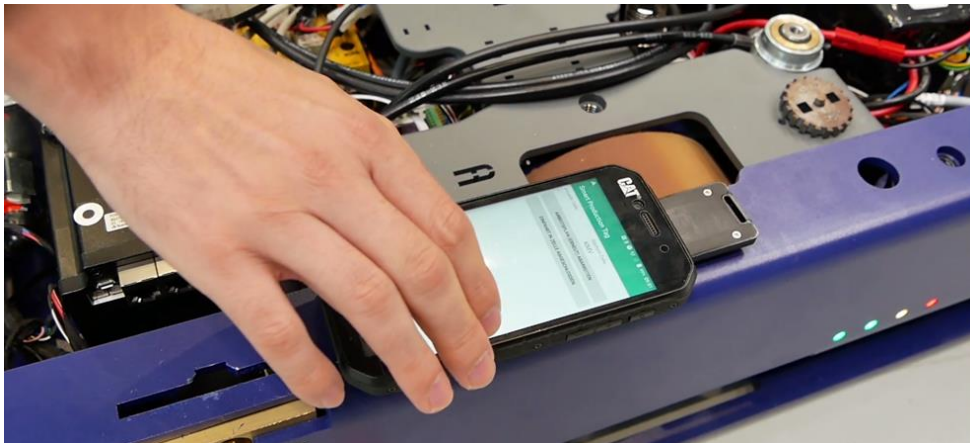
Hanna Herger  
Contact Networking and Identification  
Phone: +49 (0) 911/58061-9414  
E-Mail: [s-net-info@iis.fraunhofer.de](mailto:s-net-info@iis.fraunhofer.de)

### **Our expertise in designing processes with Smart Objects**

- Model-based methods for describing environments and processes
- Use of gained context knowledge and rules for process control
- Integration of Smart Objects in backend systems
- Positioning and power-saving networking technologies

### **R2D - Smart Objects control production for lot size 1**

In the research project "R2D Road to Digital Production" for the digitization of industrial production, Fraunhofer IIS/SCS is working with Siemens, Itizzimo and Ki-nexon to develop a Cyber-Physical Production System (CPPS) for large electric motors. Special emphasis is placed on cell-based production for batch size 1, which is controlled and monitored by the "smart" product itself with decentralized decision making. For this purpose, the motors are equipped with a Smart Production Tag, which controls the product to be manufactured throughout the entire production process.



Smart product controls the production process and can independently recognize and log process steps and control production for small batch sizes.

Picture: ©Fraunhofer IIS

### **INWIPRO - Process control of small parts manufacturing through Smart Objects**

KUM's usual small-scale manual production processes involve many spatially distributed process steps and place high demands on the material flow control for the provision and transport of goods. In the INWIPRO project, the progress of production is monitored in real time with the help of smart objects in the form of electronic goods carriers, which means that subsequent production planning is controlled flexibly and efficiently. The accompanying goods are intended to accompany the production items through the entire production process, which takes several weeks, to collect current local, environmental and, above all, process status information and to make this available to the ERP system. This enables optimized production planning to be carried out, the processes to be adapted to changed circumstances, such as machine failures, and the later traceability of the production conditions to be logged. Fraunhofer IIS and its SCS working group, as well as Rauschert Heinersdorf-Pressig GmbH and Business Systemhaus AG are involved in the INWIPRO research project.