

SmartF-IT

Cyber-physical Systems Manage the Complexities of Next Generation Multiadaptive Factories

INDUSTRIE 4.0 brings the Internet of Things into the factory. By integrating the INDUSTRIE 4.0 production technologies with real time information systems they become cyber-physical production systems (CPPS), which will enable future “Smart Factories” to achieve the profitable manufacture of products with many options in low volumes.

The SmartF-IT project is sponsored by the Federal Ministry of Education and Research (BMBF) and focuses on the individual production units and exploits IT processes in order to implement agility and multi-adaptivity as major components of the “Smart Factory”. The aim is to achieve a highly adaptable manufacturing process at all levels of the production system – from planning and control to operation while interacting with processes, products, production resources, and employees. The focus is on versatile, reconfigurable production units for the optimized production of customized products (in the sense of “high-mix, low-volume manufacturing”) – up to lot size 1 – in a hybrid composition of resources and human labor supported by new individualized industrial assistance systems. SmartF-IT studies two typical application areas for the latest technologies: 1) the migration of existing production and 2) the re-planning and subsequent operation of a production line.

A control component for the transport of work pieces is assembled in a example of a multi-lane INDUSTRIE 4.0 production line at the future talk area of the CeBIT. In a variety of different industrial application scenarios, workers, plant operators, and team leaders are assisted in the execution of specific tasks like assembly planning, integrated dynamic detailed planning of the production processes, employee scheduling, fault management, quality assurance and workplace adaptations by specific assistance systems and IT tools. SmartF-IT plans the flexible use of production resources, which include the automated production assistant APAS, a lightweight robot from Bosch. The INDUSTRIE 4.0 production line shown at CeBIT is a joint development of Bosch Rexroth, the Centre for Mechatronics and Automatisations Systems (ZeMA), and DFKI.

In SmartF-IT, nine partners contribute to the project under the lead management of DFKI. Close cooperation between representatives of the business and research communities ensures that the intended results and solutions meet the immediate requirements

of the industry. The findings will be used to create generic models, methods, and tools that can be used and exploited in areas beyond the individual cases studied, for example, in the national “INDUSTRIE 4.0 platform”. Best practice recommendations stemming from the migration and new planning situations as well as the human centered, cyber-physical system perspective will have a major influence on the further development of cyber-physical production systems in multiadaptive agile factories well beyond the framework of this project.

Project duration: 06/2013 – 05/2016

Consortium leader: DFKI GmbH

SPONSORED BY THE



Federal Ministry
of Education
and Research



Partners:

BMW Group
Bosch Rexroth AG
Fortiss GmbH
imperial-werke oHG
PLATOS GmbH
Robert Bosch GmbH
TU Darmstadt
ZeMA gGmbH

With the friendly support of:

Bison Group
LAP GmbH Laser Applikationen
Sarissa GmbH
Ubisense Group plc.



Contact:

DFKI Saarbrücken

Cognitive Assistants Department

Dr. Dietmar Dengler / Dr. Anselm Blocher

Telefon: 0681 85775 5259

E-Mail: sfit-info@dfki.de

Internet: <http://www.smartf-it-projekt.de/>

SmartF-IT CeBIT-Demonstrator 2015

Adaptive Assistance Systems in a Realistic Production Scenario for Greater Flexibility and Individuality in the Industrie 4.0 Production



The SmartF-IT demonstrator implements a modular self-organizing production line of realistic Industrie 4.0 production which realizes the multi-variety production of real CPS control modules in lot size 1. Thereby workers, plant supervisors, team leaders and planners are supported by specific human-centered assistance systems and IT tools in specific tasks, such as production planning, staff planning, fault management, quality assurance and workplace accommodation in a variety of industrial applications. The basis for the IT integration here is a cross-application semantic factory memory linking the latest information about products, processes, facilities and employees. It can provide an integrated, dynamic detailed planning of the production process, individual support of staff as well as a self-regulating CPS-based networking of processes and control systems.

SmartF-IT shows with a variety of assistance systems, how flexibility and individuality in cooperation with a lightweight robot is achieved in the production context of Industrie 4.0.

