Industrie 4.0

M. Arnold
Managing Director
PEER Group GmbH, Dresden, Germany

Biography
Dr. Michael Arnold, Managing Director PEER Group GmbH, has over 25 years industrial experiences in high-technology areas.
From 1981 - 1986 he studied Physics at the Friedrich-Schiller-University in Jena, Germany, where he obtained his PhD in 1994.
Based on his history in different industrial sectors, Michael gained broad experiences in system simulations, software design and development, optical inspection systems, and device development for aerospace technology.
Michael has been involved with factory automation software solutions for the semiconductor and solar industry since 2001 when he became Operations Manager of TRW and later in 2003 Managing Director of PEER Group GmbH in Dresden.

Organization and Goals of the Industry 4.0 Platform

T. Schulz
Channel Manager Central and Eastern Europe
GE Intelligent Platforms GmbH, Frankfurt am Main, Germany

Abstract
The term 'Industry 4.0' was introduced the first time in Germany at the Hanover fair in 2011 and is a central focus of the Federal Government's Digital Agenda. It is supporting and promoting the digitization of industry and has the potential to bring about profound transformation to efficient factory manufacturing.

The implementation strategy forms the basis for all future work. It not only records the research agenda that has been pursued to date, but also lays out core components of 'Industry 4.0'. Given the complex and broad starting point of the platform work nowadays, a framework is to be established that allows for 'Industry 4.0' reference architecture to developed - a set of parameters that can be used in order to press ahead with digitization and comprehensive networking in production.

The substantive work of the platform is initially being undertaken in five working groups (reference architecture, standardisation / research and innovation / security of networked systems / legal framework / labour, training). The platform's governing body includes Economic Affairs Minister and Research Minister as well as representatives from business, science, and trade unions. This presentation is intended to provide an introduction to the platform 'Industry 4.0', its potential, on opportunity and restrictions.

Biography

Thomas Schulz has a Master of Science degree in engineering technology. He has many years' experience in manufacturing organization and process automation with a number of printed publications and presentations. He is currently employed by GE (General Electric) Intelligent Platforms division and is responsible for GE Partner business covering Central and Eastern Europe.

Since 2013 he has been a member of the Working Group covering reference architecture and standardization of the platform 'Industry 4.0' - the strategic initiative and high-tech strategy of the Federal Republic of Germany. He has been actively participating, as part of a team of authors, working on Chapter 6: Reference architecture, standardization and standardization of the implementation of the strategy for the 'Industry 4.0' results report.

Cyber-Physical-Production-Systems at the BTU Model Factory

O. Stecklina
Project leader of the Innovation Centre Modern Industrie Brandenburg
Brandenburg Technical University of Cottbus-Senftenberg, Cottbus, Germany

Abstract
Recently, significant efforts are under way in the development and implementation of Cyber Physical Production Systems (CPPS) by exploiting fast and highly connected production systems and combining them with novel industrial communication and control strategies. This paper addresses the need for reconfigurable approaches in production planning, logistics as well as in Manufacturing Execution Control (MES) to address induced complexities under the umbrella of Open Innovation and Industry 4.0. A fast reconfigurable and adaptive production monitoring and control approach has therefore been proposed in several industrial application sectors. It encompasses the configuration of manufacturing setups to enable co-development in a distributed production environment, exploiting ICT technologies to produce mass customized products and eventually presents advanced human-robot-collaboration systems. The methodology and physical building blocks and components are being tested and validated in several research and development projects related to open innovation and factories of the future.

Biography
Oliver Stecklina received his Diploma of Computer Science in 2003 from the Brandenburg Technical University of Cottbus. He presented the results of his Diploma Thesis on the 8th IT Security conference of the BSI and received the Best Student Award. After his study he worked as a consultant and later a senior consultant at the secunet Security Network AG. During his time there he was involved in research and development projects in IT network and operating system security, and high security hardware. He was also part of the SINA development team. In 2009 he was employed at the IHP Microelectronics research institute. He became part of the "Sensor networks and middleware group" and worked on national and internal research projects. During his time there he published about 20 conference and journal papers. He was part of the GI section Security Management. In 2015 he started working at the BTU Cottbus-Senftenberg and is project leader of the Innovation centre of Modern Industry Brandenburg.

The Right Security for the Internet of Things

J. Spaenkuch
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Abstract
Data Security and system integrity are prerequisite for successful implementation of Industry 4.0, the application of "Internet of Things" (IoT) concepts and technologies in industrial settings. Especially, as with smart factories and connected industrial production, economical assets such as machinery, Intellectual Property as well as product and service quality are at stake and hence the overall competitive ability of the business itself. For example, advanced factory automation uses networking to integrate the entire supply chain from supplier to customer to enabling Lot-Size-1 or customized production. In such a connected environment, identity of machines and personnel must be verified and communications must be protected end-to-end to make sure that system integrity is maintained. Therefore, all elements of the system from customer to supplier must be identified and secured adequately to protect systems and components from unauthorized access, attacks, fraud and sabotage.

Several attempts have been made in the past to apply purely software-based security solutions. Unfortunately, software - due to its nature - bears several significant weaknesses. Software is written code, and code can be read and analyzed. And once it is analyzed, it can be modified to the requirements of an attacker and system integrity can be broken.

However, software can be protected by hardware: hardware protects the processing and storage of code by using encryption, fault and manipulation detection, and by providing secure data storage. This has been proven by extensive experience from the areas of trusted computing and the use of secure elements in mobile phones. Following the same principles, hardware-based security tailored to industry-specific requirements provides a trust anchor for digitized and connected industrial production and helps to secure physical as well as intellectual property.

Biography
Juergen Spaenkuch
Division Vice President
Chip Card & Security (CCS)
Infineon Technologies AG

- born on April 22, 1969
- in Rastatt, Germany
- married, 2 children

Juergen Spaenkuch studied at the University of Applied Sciences in Karlsruhe from 1991 to 1997 and holds a Master degree in informatics.

He started his professional career at Siemens AG in the Memory Products division of the semiconductors business unit, which later became Infineon Technologies AG.

In the years thereafter, Mr. Spaenkuch held various positions in logistics, technical marketing and product management and also had managerial responsibilities for the Automotive and Chip Card Divisions of Infineon.

In 2008, Juergen Spaenkuch became the head of the Embedded Security product segment of the Chip Card Division.

Since July 1, 2011, he is the Vice President and General Manager of the business line Platform Security

within the Chip Card & Security (CCS) Division.

Technical Visions of Industry 4.0

J. Seidelmann
Head of Competence Center "DigITools"
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Abstract
With the introduction of IoT (Internet of Things) technologies and CPS (Cyber-Physical Systems) to the manufacturing domain, the integration of real and virtual worlds along the whole value chain will reach the next level. In order to seamlessly support and integrate innovative business processes on the shopfloor, as well as to enable new, possibly disruptive business models, highly agile manufacturing infrastructures have to be developed and implemented. This will affect all involved stakeholders such as equipment manufacturers, software vendors, and manufacturers.
Several generic use cases are already implemented in the context of Industrie 4.0, but it has to be discussed how the semiconductor industry can benefit from the Industrie 4.0 initiative, and how it can maintain its role as innovation driver in the area of manufacturing technologies.

Biography
Joachim Seidelmann obtained his diploma degree in mechanical engineering at the University of Stuttgart in 1996. Subsequently he worked as research assistant in the area of IT-Systems for High-Tech manufacturing industry at the Fraunhofer IPA.
Since 2000 he was in charge of the research team "Logistics and Production-IT for the semiconductor industry".
In 2012 he started additionally building up the Competence Center "Digital Tools in production" with a strong focus on Industry 4.0 concepts and solutions.
He is co-author of the "Recommendations for implementing the strategic initiative INDUSTRY 4.0 - Final report of the Industry 4.0 Working Group" and responsible for several large Industry 4.0- projects.

Connecting things and services. How Industrie4.0 increases the benefit of automation at the Bosch 200mm-Waferfab

T. Schuler
project manager
Robert Bosch GmbH, RtP1/MFI5, Reutlingen, Germany

Abstract
After a brief overview over the Bosch-RtP1-Plant in Reutlingen the presentation will show how highly automated production areas benefit from Industrie4.0 methods. An example will be shown how connection of things and services enables highest throughput of production tools as well as an extended usage of a transport system. A second example will highlight a modular automation concept that has been developed by using local intelligence instead of global logistics-management. Modularity ensures a simple rollout of high-automation in an existing fab-environment.

Biography
Dr.Thomas Schuler started his industrial career in 1998 at Robert Bosch GmbH after he recieved a doctorate degree in Physics from University of Stuttgart. Several years later after working on different positions in wafer production he entered the field of high automation in the 200mm Wafer Fab, where he is in charge of many automation solutions implemented at the Bosch-Wafer-Manufacturing site.

InterfaceA: Candidate for Industry 4.0? Adoption and Challenges in Semiconductor Industry

I. Kuehn
MTS Design Engineer
GLOBALFOUNDRIES, Dresden, Germany

Abstract
Interface A: Candidate for Industry 4.0? Adoption and Challenges in Semiconductor Industry.

Smart communications between production equipment and factory IT solutions is a key element of Industry 4.0. Starting in the 1980's, the semiconductor industry developed SECS (SEMI Equipment Communications Standards) and related E-Standards which are widely implemented in semiconductor front end production factories and in the solar industry. A subset of the standards categorized as Interface A (IFA) is a relatively new SEMI Equipment Data Acquisition (EDA) set of standards built on non-proprietary Web technologies. It provides a more flexible interface between production equipment and factory IT solutions and improves some data collection limitations of the existing SECS/GEM (Generic Model for Equipment & Control of Manufacturing Equipment) interface.

This presentation introduces IFA featuring a comprehensive self-descriptive capability. Major differences compared to SECS/GEM communication will be highlighted. As with many other new technologies, IFA has not been spared from its own challenges which last even until today. At GLOBALFOUNDRIES selected IFA Vendor deliverables lag behind expectations for meeting factories full production ramp capability, to include IFA reliability. In part, this may be due to the fact that a comprehensive and widely accepted IFA test suite has not been available - at least not in a comparable scope as to what was available when SECS/GEM and 300mm automation standards was ramping in the Semiconductor Industry. Consequently we will touch on GLOBALFOUNDRIES' IFA test methodology and associated test software with examples of common problems found.

A discussion of current data collection and equipment control challenges in semiconductor industry and an outlook on a broader application will summarize the presentation.

Biography
Authors:
Ingo Kühn
Olaf Zimmerhackl

Mr. Ingo Kuehn studied Technical Cybernetics and Automation at TU Chemnitz, receiving a Master degree in 1991. He continued his studies at Tampere Technical University, Finland in the Digital Signal Processing Lab at Prof. Yrjö Neuvo. He worked in the Telecommunication area, developing DSP software for the first UMTS mobile network at NOKIA Telecommunication, Oulu. From 2000, he works for AMD Dresden, later Globalfoundries Inc. first in the field of Digital Design Verification. From 2010 he started working in the Automation department. Currently, he is responsible for development of Equipment Interfaces and supports the ACM team. Mr. Kuehn holds three patents in the Digital design and verification area.

Olaf Zimmerhackl received his Diplom-Ingenieur in electrical engineering from Dresden University of Technology in 1997. He is member of the Technical Staff Factory Automation Engineer and is Program Lead for Automation Capabilities Management (ACM) at GLOBALFOUNDRIES Fab 1 in Dresden.