1.–5.3.2021

DIGITAL

embeddedworld2021

Exhibition&Conference

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CONFERENCE PROGRAM

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Overview
Conference Program

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DAY 1

	1. Internet of Things – Platforms & Applications		2. Connectivity Solutions		3. Embedded OS	4. Safety & Security		5. Board Level Hardware Engineering	6. Software & Systems Engineering	
morning	IoT Architectures & Platforms 1		Wired Fieldbus 1		OS Basics 1	Safety Processes and Standards 1		Hardware Basics	Languages & Standards	
afternoon	IoT Architectures & Platforms 2	Class 1.1 The Power of APIs and Containers on Embedded Switching	TSN 1	Class 3.1 Build Your Own Embedded Linux CI/CD Pipeline Using the Cloud	OS Basics 2	Safety Processes and Standards 2	Class 4.1 Security Beyond Cryptography: Security Enclave for Asymmetric Multi-processing	Hardware Development	Languages & Standards: MISRA	Class 6.1 Effective Use Cases, User Stories, and Scenarios
	Localisation		Conformance Testing		OS Virtualization	Safety Processes and Standards 3		Hardware Power	Development Process	

DAY 2

	1. Internet of Things – Platforms & Applications	2. Connectivity Solutions	3. Embedded OS	4. Safety & Security	5. Board Level Hardware Engineering	6. Software & Systems Engineering			10. System-on-Chip (SoC) Design	
morning	Software for IoT 1	Wired Fieldbus 2	OS Automotive, Android, AutoSAR	Security Processes and Standards	Class 5.1 Ultra Low Power Hands-on Workshop	Development Process			Embedded AI 1	Class 10.1 FPGA-Design Using C/C++ and High-Level Synthesis
afternoon	Software for IoT 2	Bluetooth 1	OS Open Source	Safety Architectures 1		Measures & Metrics	Class 6.2 Agile for Embedded Systems	Class 6.3 The Greg Davis Class – Advanced C/C++ Coding and Debugging Techniques	Embedded AI 2	
	Data Management	TSN 2	ROS	Safety Architectures 2		Requirements Engineering			Embedded AI 3	

DAY 3

	1. Internet of Things – Platforms & Applications	2. Connectivity Solutions		4. Safety & Security	5. Board Level Hardware Engineering	6. Software & Systems Engineering				8. Autonomous & Intelligent Systems	9. Embedded Human-Machine-Interface
morning	OTA Firmware Updates	Wired Fieldbus 3	Class 3.2 Embedded Android Workshop	Safe AI		DevOps	Class 6.4 Creating Domain-Specific Modeling Languages: Hands-on			AI Hardware	HMI Libraries
afternoon	Low Energy Devices	Bluetooth 2		Security Hardware	Class 5.2 Easy Design of IoT Wireless Devices Embedding Antennas	DevOps / MBD		Class 6.5 Advanced Behavioral Modeling with UML/SysML: Activities	Class 6.6 Modern C++ for Embedded Development	AI Use Cases	HMI Design Methods 1
	Edge Computing	Wired Fieldbus 4		Security Use Cases		Software & System Quality					HMI Design Methods 2

DAY 4

	1. Internet of Things – Platforms & Applications	2. Connectivity Solutions		4. Safety & Security	5. Board Level Hardware Engineering	6. Software & Systems Engineering			7. Embedded Vision	8. Autonomous & Intelligent Systems	10. System-on-Chip (SoC) Design
morning	Security im IoT 1	Class 3.3 Introduction to Embedded Linux in Theory and Practice – Short Crash Course	Class 3.4 Fast Track to Yocto Project	Security Architectures 1		Software Quality	Class 6.7 How to Improve Software Quality Through Test Automation		Application Case Studies		Complex IC & System Solutions
afternoon	Security im IoT 2			Security Architectures 2	Class 5.3 Production Optimized Hardware Design	Software Quality: Static Analysis		Class 6.8 Advanced Behavioral Modeling with UML/SysML: State Machines	Systems Integration 1	Class 8.1 Developing Artificial Intelligence Using Machine Learning at the Edge with Embedded µSoC FPGAs	IP Core Design & Integration
	IoT Use Cases 1			Hacking		Software Quality: Coding			Systems Integration 2		Mixed Signal & Energy Optimization

DAY 5

	1. Internet of Things – Platforms & Applications	4. Safety & Security	6. Software & Systems Engineering	7. Embedded Vision	10. System-on-Chip (SoC) Design
morning	Security im IoT 3	Security Architectures 3	Testing & Debugging 1	SW Tools & Tooling AI & Tool Chains	Core Integration & Tools 1
afternoon	IoT Use Cases 2	Long Term and Security	Testing & Debugging 2	Embedded Vision	Core Integration & Tools 2

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Prof. Dr.-Ing. Axel Sikora
Chairman of embedded world Conference

embedded world Conference 2021 DIGITAL

embedded.intelligent.systems – the innovators' place to be

The world has been changing rapidly during the last year. The embedded world Exhibition & Conference in 2020 will certainly be remembered by a lot of us, as it was the last big event in the last year that allowed physical presence with personal interaction discussions, smalltalk, professional meetings and much more.

In these months, however, a lot of experience showed that digital platforms have improved significantly and that – with thoughtful preparation – excellent events can be performed. Even though they cannot replace all aspects of an intense human interaction, they can enable excellent background learning and knowledge transfer, can foster lively discussions with partners that you might not access in the physical world, and can allow new and yet unknown formats of exchange of ideas.

For a thorough preparation of the 19th thrilling edition of the embedded world, we decided already in November to go for embedded world 2021 DIGITAL. Together with this digital format, embedded world will be held during five full days. Ten tracks will feature 78 sessions with 234 presentations. They will be garnished with additional elements to help a maximum interaction and liveliness.

- We will have five first-class keynotes from top notch industry leaders, including Dr. Reinhard Ploss, CEO Infineon Technologies, Kevin Dallas, CEO Wind River, Randall Restle, Restle LLC, Strategic Advisor to Digi-Key, Prof. Dr. Peter Liggesmeyer, Director Fraunhofer Institute for Experimental Software Engineering (IESE), and Paul Gray, Senior Research Manager Omdia.
- Also, we will feature four plenary panel discussions on hot topics, like Embedded AI, Embedded Vision, Safety & Security, and Connectivity in the IoT.
- All sessions will not only include the presentations, but also discussions and Q&A in each session amongst the speakers and the participants.
- 19 half- or full day classes will cover in-depth knowledge transfer and actual topics.

We see more and more Artificial Intelligence (AI) and Machine Learning (ML) in real applications using embedded and Internet of Things (IoT) architectures: from autonomous vehicles to image recognition and embedded vision systems to preventive and demand-driven maintenance in Industrial IoT systems, from small edge computers to high-performance cloud servers. And increasingly, these applications are interconnected, balancing edge, cloud, and fog computing – with all its challenges for software, hardware and system design, device and application management, security, safety, connectivity, verification and testing, and more. These developments do not only continue to promise immense possibilities and extensive business opportunities, but are also closely associated with many technical, economic, social and ethical issues.

The embedded world Conference 2021 DIGITAL is clearly structured along 10 tracks, which are represented in different colors throughout the program: 1. Internet of Things, 2. Connected Systems, 3. Embedded OS, 4. Safety & Security, 5. Hardware Engineering, 6. Software & Systems Engineering, 7. Embedded Vision, 8. Autonomous & Intelligent Systems, 9. Embedded GUI & HMI, and 10. System-on-Chip.

The embedded world 2021 DIGITAL will cover all aspects of the development and application of embedded systems, from fundamental technologies to development processes and special fields of applications. It is one of the central strengths of the event to be cross-sectoral and interdisciplinary. The conference provides a platform to bring together experts from different domains and application areas of embedded systems in order to promote a holistic system design approach, to identify synergies and commonalities, and to strengthen the exchange of knowledge and experience.

The steering board of the embedded world 2021 DIGITAL wishes you and all participants stimulating discussions about new ideas and solutions enabling you to cope more easily and efficiently with the immense challenges that lie ahead. You are welcome to gain great insights in a pulsating atmosphere.

Best wishes & stay safe

Sign-up & Registration:
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The Conference Keynotes

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The Conference Keynotes feature prominent speakers on major trends in the industry. These highlight presentations have an exclusive time slot within the busy event schedule.

Monday, 01 March, 10:15

How to Build Embedded Intelligent Systems for a Post-Pandemic World

Dr. Reinhard Ploss, CEO, Infineon Technologies

COVID-19 has accelerated the digitalization process. While large-scale cloud-based systems are already very advanced, embedded intelligence systems are just about beginning to gain traction. Embedded intelligent solutions combine the best of both cloud and edge. The edge keeps personal data local, enables real-time responses, and provides cost-efficiencies by not requiring centralization of all data. Meanwhile, the cloud provides device access to an infinite amount of information allowing for better decision-making. This keynote will focus on three challenges, that IoT edge developers will face and how to address them.

Tuesday, 02 March, 10:15

Engineering Smart Ecosystems

Prof. Dr. Peter Liggesmeyer, Director Fraunhofer IESE

On the one hand, many standards in software and systems engineering are based on assumptions that are currently no longer fulfilled: Systems are treated as closed, static artefacts, with no autonomy and typically the underlying development process is assumed to be traditional and phase-oriented. On the other hand, systems in many domains – e.g. Industry 4.0, autonomous driving, energy management – are different: They are open, they do dynamic adaption in an autonomous way and they are large and heterogenous. This influences the systems engineering solutions that are to be applied in order to master these challenges

Wednesday, March 03, 10:15

Display Disruption: How New Display Technologies are Changing the Industry

Paul Gray, Senior Research Manager, Omdia

Paul Grey is Speaker of the electronic display Conference and will share his thoughts with the entire embedded community in this keynote. 2020 saw seismic changes in the display industry as 2019 plans came to fruition from some companies, while the overall display industry rode the waves of COVID-19. As a result, the industry has evolved rapidly through the year and a new form is beginning to take shape. The talk will examine the new realities, investigate why the surge in R&D especially on new display technologies and offer a viewpoint on future commercial and technical developments

Wednesday, 03 March, 15:30

Modern Embedded Engineering: Where we Are and our Exciting Future

Randall Restle, former Vice President of Applications Engineering at Digi-Key Electronics, now Strategic Advisor at Restle, LLC

Nearly anyone today can feel like an embedded engineer. A plethora of new electronic systems are being developed by individuals outside of our profession. Though initially this trend could be viewed as concerning to professionals, Randall is excited by the prospects for the professional engineer. He predicts embedded engineering will increase in importance as it continues to create leverage for all developers. Electronic systems will become even more important as the backbone of modern economies. In this keynote, he aims to describe the technical details which enabled this change to occur and explains the role of the modern embedded engineer in reducing integration complexity to attract new customers and traditional ones alike.

Thursday, 04 March, 15:30

Challenges of Digital Transformation for the New Intelligent Edge

Kevin Dallas, CEO, Wind River

Edge computing comes with challenges. Edge devices have vast variations between devices, many of them having been tailor-made for a specific purpose. Another example is security. While access to physical data centers can be limited, edge devices are located in disparate locations, where they can be accessed and dismantled. To combat all of these issues, digital frameworks and architectures have to be examined and restructured to adapt to the new workspace. This requires new skills. Combining skills, toolchains, methods from both cloud environments and embedded domains becomes increasingly important. We need to rethink how these systems are built and retool ourselves to prepare for them.

The presentations of the embedded world Conference are running in ten tracks. Each track represents one of the main conference topics. Track keynotes have been chosen based on their high innovation and relevance for the selected track.

Monday, 01 March, 13:30
TRACK KEYNOTE Internet of Things
Get More Productivity with Cloud Services
Reinhard Keil, Arm

Today most embedded applications are still created on desktop computers. For other applications cloud computing is well established. During this talk you will learn how cloud-based tools can help to improve the development flow for embedded. It starts during product evaluation, includes model- or simulation-based validation with continuous integration flows, model optimization for machine learning, up to device provisioning for deployment.

Monday, 01 March, 13:30
TRACK KEYNOTE Connectivity
TSN as the Key Enabler for Converged Networks: Current Status and Challenges
Florian Frick, University Stuttgart

Time Sensitive Networking (TSN) is the key enabling technology for future converged real-time networks across industries. But real-world deployments are still rare. A key reason for this is that TSN itself can only be a part of a solution and further standards are required to create an interoperable eco-system up to the application layer. While reviewing these aspect, the presentation will also help to understand where opportunities are.

Monday, 01 March, 11:00
TRACK KEYNOTE Embedded OS
Using Future Proofed Microcontroller Designs with FreeRTOS
Richard Barry, Amazon Web Services

There is an amazing dynamic between the edge and the cloud. Many applications rely on the physical world around us where microcontrollers are dominating. This talk will discover how to overcome challenges in development acceleration while ensuring firmware integrity and longevity and what that means for an open source project that has been in development for more than 15 years.

Monday, 01 March, 16:15
TRACK KEYNOTE Hardware Engineering
Power Management in Embedded Systems
Colin Walls, Mentor, a Siemens Business

We will discuss design considerations that should be made when starting a new power sensitive embedded design, which include choosing the hardware with desired capabilities, defining appropriate power usage profiles, choosing an appropriate operating system and drivers, and providing power goals to the software development team to track throughout the development process.

Monday, 01 March, 16:15
TRACK KEYNOTE Software & Systems Engineering
The Application of Open Source Technologies to Embedded Systems
Mike Milinkovic, Eclipse Foundation, Inc.

IoT developers expect many technologies to be open source. While businesses appreciate the cost savings of the model, what they value about it is the control and flexibility it gives them. This presentation will examine the application of open source technologies to embedded systems across a host of industries, from smart manufacturing, automotive, cyber-physical systems and smart cities.

Tuesday, 02 March, 16:15
TRACK KEYNOTE Safety & Security
Taming Timing - Combining Static Analysis with non-intrusive Tracing to Compute WCET Bounds on Multicore Processors
Daniel Kästner, AbsInt Angewandte Informatik GmbH

For safety-relevant real-time applications, worst-case execution time (WCET) bounds have to be determined in order to demonstrate deadline adherence. We present a hybrid method that combines static analysis with non-intrusive instruction-level tracing to automatically compute WCET bounds - including interference effects. This will be show using the Infineon AURIX as a reference architecture.

Wednesday, 03 March, 11:00
TRACK KEYNOTE Autonomous & Intelligent Systems
Dependable Neural Networks through Redundancy - Comparing Architectures
Hans Dermot Doran, ZHAW

The speaker examines the computational cost of a common ML classification task, based on substantial experimental evidence on both standard GPU and FPGA platforms. We will look at the real-time characteristics of the task, and how this is handled by the platform. Coordination/synchronisation issues between the redundant components will be mentioned and we clearly enumerate the dependability considerations that need to be taken into account in this area as well.

Wednesday, 03 March, 13:30
TRACK KEYNOTE Embedded HMI
Human Factors and User Interface Technology for Embedded Systems
Prof. Robert Oshana, NXP Semiconductors

From a human factors perspective, we must shift the design perspective away from technology as the end all and more towards usability for embedded devices. Topics of this session include the evaluation of an interface and its interaction quality, the study of human characteristics affected by interface design, requirements data collection and analysis, and more. We will use several industry examples to demonstrate these concepts.

Thursday, 04 March, 13:30
TRACK KEYNOTE System-on-Chip Design
Architecture Trends for Sensing and Computing to enable Automated Driving
Robert Schweiger, Cadence Design Systems

The level of automation of a vehicle is the key driver for E/E architectures, sensor architectures and System-on-Chip architectures. Radar, Lidar and Camera sensors still need to be significantly improved but will also evolve to address new compute architectures. A new class of high-performance System-on-Chip (SoC) and/or System-in-Package (SiP) is needed to process all sensor data and fuse them together to enable vehicles to become "aware" of their surroundings.

Thursday, 04 March, 16:15
TRACK KEYNOTE Embedded Vision
The State of Khronos Standards Powering the Future of Embedded Vision & Inferencing
Neil Trevett, The Khronos Group

This presentation will provide a state-of-the-industry update on the family of Khronos open standards for programming and deploying accelerated inferencing and embedded vision including OpenCL, Vulkan, OpenVX, SYCL and NNEF. The talk will include future directions for these standards and provide attendees insights into which of these standards may be relevant to their embedded vision and inferencing projects.

Monday, 01 March
Conference Program

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	Internet of Things – Platforms & Applications	Connectivity Solutions	Embedded OS
10:00	**Welcome**		Prof. Dr.-Ing. Axel Sikora, Conference Chair
10:15	**Conference Keynote: How to Build Embedded Intelligent Systems for a Post-Pandemic World**		Dr. Reinhard Ploss, Infineon Technologies
	IoT Architectures & Platforms 1	**Wired Fieldbus 1**	**OS Basics 1**
11:00	**The Automotive Paradigm Shift: Connectivity at the Core** Pedro Lopez Estepa, Real-Time Innovations (RTI)	**CAN XL – the Next Generation of CAN** Holger Zeltwanger, CAN in Automation (CiA)	**Track Keynote: Using Future Proofed Microcontroller Designs With FreeRTOS** Richard Barry, Amazon Web Services
11:30	**ACRN: Bridging Orchestrator and Hard Realtime Workload Consolidation** Peter Fang, Intel	**10BASE-T1L Based Connection for Field Devices in Cyber-Physical Systems: A Proof of Concept** Victor Chavez, FH Aachen	**Operating Systems for Embedded Applications** Colin Walls, Mentor, a Siemens Business
12:00	**Architecting Scalable Real-time Systems With Embedded Devices: Connecting the Edge to the Cloud** Thijs Brouwer, Real-Time Innovations (RTI)	**IO-Link as the Catalyst for Industrial IoT** Florian Bader, AIT, Dominik Deschner, Stego	**Increasing Resilience to Cyberattacks Through Advanced Use of Static Code Analysis** Dr. Martin Becker, The MathWorks
12:30	Discussion/Q&A	Discussion/Q&A	Discussion/Q&A
12:45	Networking		
	IoT Architectures & Platforms 2	**TSN 1**	**OS Basics 2**
13:30	**Track Keynote: Get More Productivity With Cloud Services** Reinhard Keil, Arm	**Track Keynote: TSN as the Key Enabler for Converged Networks: Current Status and Challenges** Florian Frick, ISW Universität Stuttgart	**How Does an IoT OS Differ to a Traditional RTOS?** Stefano Cadario, Arm
14:00	**Cloud-enabled IoT Device Made Simple!** Stefan Vaillant, Software AG	**Bridging Wired and Wireless Time Sensitive Networking: Opportunities and Challenges** Dr. Dave Cavalcanti, Intel	**Building Secured, Connected, Real-Time Devices, With Micorsoft Azure Sphere and Azure RTOS** Sylvain Ekel, Mike Hall, Microsoft
14:30	**Curl is the Internet Data Transfer Engine** Daniel Stenberg, wolfSSL	**Open Source Software Technology for TSN Resource Management** Boon Leong Ong, Intel	**Design Patterns in RTOS Based Applications** Jacob Beningo, Beningo Embedded Group
15:00	Discussion/Q&A	Discussion/Q&A	Discussion/Q&A
15:15	Networking		
15:30	**Panel Discussion: Embedded Artificial Intelligence**		Chair: Prof. Dr.-Ing. Axel Sikora
	Localisation	**Conformance Testing**	**OS Virtualization**
16:15	**Sub-meter Localization Precision Based on Bluetooth** Clement Chaduc, Texas Intruments Norway	**A Versatile Measurement and Debug Tool for NFC Interoperability Testing** Martin Erb, Graz University of Technology	**Achieving Optimum System Performance With Embedded Virtualization** Leo Hendrawan, Randy Martin, BlackBerry QNX
16:45	**Smart Proximity Detection and Data Monitoring Using Bluetooth Low Energy Interface** Saurabh Rawat, STMicroelectronics	**5G Industry Automation – What is Required for Conformance Certification?** Thami Elidrissi, Bureau Veritas- 7Layers	**Comparing Methodologies to Improve Security and Reliability of Untrusted Embedded Systems** Dr. Carmelo Loiacono, Green Hills Software
17:15	**Evolution of Location Solutions With Bluetooth LE** Srividya Sundar, Texas Instruments	**UWB Reloaded – Test & Certification Based on IEEE802.15.4z** Joerg Koepp, Rohde & Schwarz	**Hypervisor or Multicore Framework: Which is Best?** Colin Walls, Mentor, a Siemens Business
17:45	Discussion/Q&A	Discussion/Q&A	Discussion/Q&A

Safety & Security	Board Level Hardware Engineering	Software & Systems Engineering	
Welcome		Prof. Dr.-Ing. Axel Sikora, Conference Chair	10:00
Conference Keynote: How to Build Embedded Intelligent Systems for a Post-Pandemic World		Dr. Reinhard Ploss, Infineon Technologies	10:15
Safety Processes and Standards 1	**Hardware Basics**	**Languages & Standards**	
Impact of the 3rd Edition of IEC 61508-1/-2 on Your Development Stephan Aschenbrenner, exida.com	**Interfacing to Current Transformers** George Slama, Wurth Elektronik eiSos	**Selecting a Coding Standard – or Build Your Own?** Mark Richardson, LDRA	11:00
Update on Maintenance of IEC 61508-3 for Safety Software Michael Kindermann, Pepperl+Fuchs	**Reference Potential and Current Displacement on Ground Lines.** Thomas Eichstetter, Essentielle Elektronik Eichstetter	**Managing the Risk of Adopting Third Party Code in a Functional Safety Context** Martin Woodhall, LDRA	11:30
SIL and ASIL – is that Really the Principal Difference Between Safety for Plants and Safety for Cars? Andreas Weber, J. Schmidt, Altran	**Single Pair Ethernet Filter Design (part 2)** Martin Leihenseder, Würth Elektronik eiSos	**Is Golang (Go) a Suitable Programming Language for IoT Applications?** Stefan Wellnitz, DH electronics	12:00
Discussion/Q&A	Discussion/Q&A	Discussion/Q&A	12:30
	Networking		12:45
Safety Processes and Standards 2	**Hardware Development**	**Languages & Standards: MISRA**	
Model-based Top-down Flow for Safety related Automotive Battery Management Ics Dr. Ralph Görgen, Mark Hafermalz, NXP Semiconductors Germany	**Fast Prototyping with Embedded Super Computers** Alexey Gromov, ZHAW Institute of Embedded Systems	**MISRA C/C++ Situation Report** Andrew Banks, LDRA Software Technology + MISRA	13:30
A Proposed Risk-based Approach to ISO 26262 Tool Error Detection and Tool Qualification Priyasloka Arya, LDRA	**Bluetooth Commercial Antenna Performance in Real World Wearable Applications** Dr. Matthew Magill, Queen's University Belfast	**How to Put MISRA and AUTOSAR Coding Compliance Into Practice** Dr. Dennis Kengo Oka, Synopsys; Dr. Ralf Huuck, Logilica	14:00
A Showcase for Model Based Code Generation for Multicore Safety Systems Prof. Dr. Peter Fromm, Darmstadt University of Applied Sciences	**Textile Circuits – Making Textiles Smart** Kay Ullrich, Textilforschungsinstitut Thüringen-Vogtland e.V.	**BARR-C:2018 and MISRA C:2012: Synergy Between the Two Most Widely Used C Coding Standards** Prof. Dr. Roberto Bagnara, BUGSENG / University of Parma	14:30
Discussion/Q&A	Discussion/Q&A	Discussion/Q&A	15:00
	Networking		15:15
Panel Discussion: Embedded Artificial Intelligence		Chair: Prof. Dr.-Ing. Axel Sikora	15:30
Safety Processes and Standards 3	**Hardware Power**	**Development Process**	
Passing Cyber Security Evaluation – Tips for Embedded Engineers and Product Managers Juho Vesanen, National Cyber Security Centre, Finnish Transport and Communications Agency	**Track Keynote:** **Power Management in Embedded Systems** Colin Walls, Mentor, a Siemens Business	**Track Keynote:** **The Application of Open Source Technologies to Embedded Systems** Mike Milinkovich, Eclipse Foundation	16:15
Hardware Security You Can Touch Mihai Tudosie, Infineon Technologies Austria	**Circuit and Antenna Design of a Simultaneous Wireless Power Transfer and Near Field Communication System** Christian Merz, Würth Elektronik eiSos	**Embedded Systems Go Mainstream** Maarten Koning, Wind River	16:45
Using SESIP to Simplify Security Evaluation and Build Trusted IoT Products Gil Bernabeu, GlobalPlatform	**Meeting the Complex Power Supply Demands of ADAS and Autonomous Driving Functions** Sebastian Scholz, Maxim Integrated	**Guidelines and Best Practices for Managing Open Source Software for Embedded Systems** Prof. Robert Oshana, NXP Semiconductors	17:15
Discussion/Q&A	Discussion/Q&A	Discussion/Q&A	17:45

Tuesday, 02 March
Conference Program

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	Internet of Things – Platforms & Applications	Connectivity Solutions	Embedded OS
10:00	**Welcome**		
10:15	**Conference Keynote: Engineering Smart Ecosystems**		Prof. Dr. Peter Liggesmeyer, Fraunhofer IESE
	Software for IoT 1	**Wired Fieldbus 2**	**OS Automotive, Android, AutoSAR**
11:00	**Are High-level Languages and Tools Forbidden Fruit for Embedded Developers?** Valter Minute, Toradex	**Comparative Analysis of CAN, CAN FD and Ethernet for Networked Control Systems** Andrea Reindl, OTH Regensburg	**Progress on the AUTOSAR Adaptive Platform for Intelligent Vehicles** Günter Reichart, AUTOSAR
11:30	**n-Blocks Studio – Model based Low Code Ssoftware Development for Low Power Embedded Devices** Nikolaos Chalikias, Cork Institute of Technology	**Ethernet-APL – Ethernet to the Field of Process Plants** Benedikt Spielmann, Endress+Hauser Digital Solutions	**Functional Safety: Software Partitioning and Functionality Assignment for Complex and High Performance Architectures** Dr. Ahmed Khan, Mathias Fritzson, Siemens Digital Industries Software
12:00	**Native Execution of Java for Embedded Market and IoT** Bruno Caballero, Microdoc Computersysteme	**Extended communication capabilities for embedded networking** Reiner Zitzmann, CAN in Automation (CiA)	**An Introduction to Android Automotive OS** Chris Simmonds, 2net
12:30	Discussion/Q&A	Discussion/Q&A	Discussion/Q&A
12:45	Networking		
	Software for IoT 2	**Bluetooth 1**	**OS Open Source**
13:30	**Combine C++ and Java Into a Single ARM Executable Using GraalVM** Vojin Jovanovic, Oracle	**Optimizing Bluetooth Low Energy for Energy Efficiency** Clement Chaduc, Texas Intruments Norway	**What Differs the Android Open Source Project from Other Linux Distributions?** Sergio Prado, Embedded Labworks
14:00	**Cloud Driven CI/CD for Embedded Linux** Richard Elberger, Amazon Web Services	**Reliable Industrial Communication Using Bluetooth Technology** Pelle Svensson, ublox	**Formally Verifying the FreeRTOS IPC Mechanism** Nathan Chong, Amazon Web Services
14:30	**Lightweight Tooling to develop lightweight Systems – Advance your IoT Solution by Web-based Modeling and Code Generation** Marcus Munzert, Generative Software	**Bluetooth Mesh – Lessons Learned and Notes from the Field** Szymon Slupik, Silvair	**Innovation in the Fast Lane: Disrupting Automotive Software Development Through Open Source** Dan Cauchy, The Linux Foundation, Automotive Grade Linux
15:00	Discussion/Q&A	Discussion/Q&A	Discussion/Q&A
15:15	Networking		
15:30	**Panel Discussion: Safety and Security**		Chair: Prof. Dr.-Ing. Peter Fromm
	Data Management	**TSN 2**	**ROS**
16:15	**The Evolution from IoT to IoE With the Help of Blockchain and the Example „Smart Data Lake"** Marc Hamperl, infoteam Software	**TSN With Linux – The Challenges Ahead** Kurt Kanzenbach, Linutronix	**Redundant Computer Vision for Fault-Tolerant Autonomous Driving in C++ and ROS2** Prof. Dr. Frank Tränkle, Hochschule Heilbronn
16:45	**Deterministic Database Management in Mission-Critical Applications** Andrei Gorine, McObject	**Time Synchronization over IEEE 802.11** Kamil Alkhouri, Hochschule Offenburg	**Design and Deployment of Automated Parking Valet on ROS and ROS2 Networks** Shashank Sharma, MathWorks
17:15	**Data Streams, MQTT and No-code Apps on the Edge, in the Cloud and In-between** Philipp Struß, Cedalo	**Time Sensitive Networking Over 5G and WiFi for Industrial** Anil Keshavamurthy, Dr. Dave Cavalcanti, Intel	**ISO 26262 Certification of ROS 2** Dr. Dejan Pangercic, Mehul Sagar, Apex.AI
17:45	Discussion/Q&A	Discussion/Q&A	Discussion/Q&A

Safety & Security	Software & Systems Engineering	Autonomous & Intelligent Systems	
Welcome			10:00
Conference Keynote: Engineering Smart Ecosystems		Prof. Dr. Peter Liggesmeyer, Fraunhofer IESE	10:15
Security Processes and Standards	**Development Process**	**Embedded AI 1**	
Implementing the 13 Best Practices for Consumer Electronics Security Haydn Povey, Secure Thingz	**Software Lifecycle Activity Costs for Secure Embedded Systems** Marcus Nissemark, Green Hills Software	**Prototyping and Deployment of Deep Neuronal Networks on FPGAs** Dimitri Hamidi, The Mathworks	11:00
Security Risk Assessment Using TARA Nishant Khadria, Deloitte	**Test Driven Development for Mission Critical Embedded Software** Mark Richardson, LDRA	**Democratizing Machine Learning for Embedded Developers** Alessandro Grande, Arm	11:30
Planning for the Protection of Your Product IP Throughout the Volume Curve Clive Watts, Secure Thingz	**Adopting Agile Software Development Best Practices for Functionally Safe System Development** Shrikant Satyanarayan, LDRA	**Change Your Mindset: Embedded Machine Learning for Predictive Maintenance** David Henry, Arm	12:00
Discussion/Q&A	Discussion/Q&A	Discussion/Q&A	12:30
	Networking		12:45
Safety Architectures 1	**Measures & Metrics**	**Embedded AI 2**	
Applying Automated Formal CCC Checks for Complex Systems Development Wolfgang Meincke, BTC Embedded Systems	**How to SQuaRE the Circle of Software Quality Measures** Andrew Banks, LDRA	**TinyML for AI at the Very, Very Edge** Rajeev Muralidhar, P. Vyawahare, Amazon Web Services	13:30
Designing Safety In by Extending System Modeling Languages Dr. Juha-Pekka Tolvanen, MetaCase	**Mature Enough? A Maturity Model for Model Based Systems Engineering** Dr. Henning Femmer, Qualicen	**Greater AI Visibility in Embedded Software** Dr. James Hui, Wind River	14:00
How to Bulletproof Systems Built With C++ Martin Woodhall, LDRA	**Embedded Software Development to Manage the Complexities of Today's Automotive Distributed Systems** Brendan Morris, Siemens Digital Industries Software	**Machine Learning at the Edge: From Transfer Learning to Inferencing** Markus Levy, Natraj Ekambaram NXP Semiconductors	14:30
Discussion/Q&A	Discussion/Q&A	Discussion/Q&A	15:00
	Networking		15:15
Panel Discussion: Safety and Security		Chair: Prof. Dr.-Ing. Peter Fromm	15:30
Safety Architectures 2	**Requirements Engineering**	**Embedded AI 3**	
Track Keynote: Taming Timing – Combining Static Analysis With Non-intrusive Tracing to Compute WCET Bounds on Multicore Processors Dr. Daniel Kästner, AbsInt Angewandte Informatik	**Requirement Verification and 360 Degree Traceability** Deepu Chandran, Shrikant Satyanarayan, LDRA	**Understanding Artificial Intelligence: Explainable AI with Interpretable KPI Labels** Dr. Rudolf Felix, PSI FLS Fuzzy Logik & Neuro Systeme	16:15
Control-Flow Evaluation on Multicore Controllers Using Real-Time Trace Information Stephan Radke, Hochschule Darmstadt University of Applied Sciences	**A Rigorous but Practical Specification Technique for Embedded Systems** Prof. Robert Oshana, NXP Semiconductors	**Software Driven SoC Architectural Exploration for AI and ML Accelerators With RISC-V** Simon Davidmann, Imperas Software	16:45
Statically Safer Polymorphism With C11 Generics Alex Gilding, Perforce Software	**How COVID-19 has Changed the Requirements Engineering Process Among Embedded Companies** Micaël Martins, Visure Solutions	**Quantizing Edge Neural Networks With Qkeras** Russell Klein, Mentor, A Siemens Business	17:15
Discussion/Q&A	Discussion/Q&A	Discussion/Q&A	17:45

Wednesday, 03 March
Conference Program

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	Embedded Human-Machine-Interface	Internet of Things – Platforms & Applications	Connectivity Solutions
10:00	**Welcome**		
10:15	**Conference Keynote: Display Disruption: How New Display Technologies are Changing the Industry** Paul Gray, Omdia		
	HMI Libraries	**OTA Firmware Updates**	**Wired Fieldbus 3**
11:00	**Vulkan SC – Safety Critical Graphics and Compute Library** Michael Pyne, CoreAVI & Industrial	**New Approach to the Over-The-Air Updates for Connected Devices** Sergey Lyubka, Cesanta	**Securing Bridges in CAN/CANopen (FD) Systems** Olaf Pfeiffer, Embedded Systems Academy
11:30	**Standardising Low-cost GPUs for Embedded Industrial Use** Kristof Beets, Imagination Technologies	**Ktwo: Orchestrator Based Firmware Distribution Mechanism** Taimor Imtiaz, Intel Deutschland	**Enabling Seamless Cryptographic Rekeying in Industrial Real-Time Communication Systems** Heiko Bühler, Hochschule Offenburg
12:00	**Cross-Platform HMI Families for Modern Embedded Devices** Andy Walter, macio	**Why Firmware Update Over the Air (FOTA) is an Essential Part of Scaling IoT** Andrew Powers, Arm	**CAN FD Light** Yao Yao, CAN in Automation
12:30	Discussion/Q&A	Discussion/Q&A	Discussion/Q&A
12:45	Networking		
	HMI Design Methods 1	**Low Energy Devices**	**Bluetooth 2**
13:30	**Track Keynote: Human Factors and User Interface Technology for Embedded Systems** Prof. Robert Oshana, NXP Semiconductors	**Power Savings for IoT Devices** Hans-Guenter Kremser, Texas Instruments Deutschland	**Improving the Connection Range and Time in Car Access Systems Using Bluetooth Role Switching Techniques** David Lara, Texas Instruments
14:00	**Strike the Right Balance of Performance and Visual Experience for Hi-Res Displays Using MCU Graphics Accelerators** Victor Hugo Osornio, NXP Semiconductors	**Unveiling Scalable and Open Source Energy Star Network Proxying Solution for Greener Connected World** Dr. Yoong Siang Song, Intel	**Next Generation Bluetooth Audio Becomes a Reality** Nick Hunn, WiFore
14:30	**How to Drive Down the Cost and Power of On-device Voice-based Devices** Kobus Marneweck, Arm	**Battery-free LPWAN Nodes for Bridges and Walls** Prof. Dr. Marcel Meli, ZHAW	**Understanding Reliability in Bluetooth Technology** Martin Woolley, Bluetooth SIG
15:00	Discussion/Q&A	Discussion/Q&A	Discussion/Q&A
15:15	Networking		
15:30	**Conference Keynote: Modern Embedded Engineering: Where we are and our Exciting Future** Randall Restle, Restle LLC, Strategic Advisor to Digi-Key Electronics		
	HMI Design Methods 2	**Edge Computing**	**Large-Scale Wireless Connectivity**
16:15	**When Embedded Experts are Scarce – Low-code/No-Code Graphics Software to the Rescue** Jeff Stewart, Altia	**Connect Code – Direct, Serverless, Schemaless, Non Intrusive and Asynchronous** Dr. Burkhard Heisen, Cybus and Heisenware	**6LoWPAN Solution for Smart Metering Application Using Sub-1GHz Radio and STM32 Microcontroller** Indar Singhal, STMicroelectronics
16:45	**Accelerating Graphics Rendering Performance for ADAS With Zynq UltraScale+ MPSoC** Alok Gupta, Xilinx	**The Power of AI and Edge Computing in Achieving Defect-Free Factories** Brian McCarson, Intel	**Throughput and Latency Concerns When Designing a Mesh Network With Many Nodes** Marie Hernes, Texas Intruments Norway
17:15	**How to Develop a Low Power, Robust, Secure Embedded Voice Capture Pipeline on a Single Arm Cortex M-class Device** Brian Clinton, Arm	**Edge Computing Architectures for the Management of Embedded IoT Devices** Prof. Robert Oshana, NXP Semiconductors	**Wi-SUN – Key to Unlocking Massive IoT** Soumya Shyamasundar, Abitzen Xavier, Silicon Labs
17:45	Discussion/Q&A	Discussion/Q&A	Discussion/Q&A

Safety & Security	Software & Systems Engineering	Autonomous & Intelligent Systems	
Welcome			10:00
Conference Keynote: Display Disruption: How New Display Technologies are Changing the Industry Paul Gray, Omdia			10:15
Safe AI	**DevOps**	**AI Hardware**	
Standards About AI in Systems with Reference to Functional Safety Frank Poignée, infoteam Software	**Ready for EmbSecDevOps? Enhance your Embedded Product With Security-by-Design Decisions and Maintain Security in Your Development Lifecycle!** Michael Brandl, CYOSS	**Track Keynote: Dependable Neural Networks Through Redundancy – Comparing Architectures** Prof. Hans Dermot Doran, Zürich University of Applied Sciences	11:00
Trustworthy AI-based Systems With VDE-AR-E 2842-61 Henrik J. Putzer, cogitron	**DevOps-Toolchains in Embedded Software Development - Towards Trancparency and Traceability** Dmitry Chibisov, Dr. Chibisov Software Quality	**Transforming IoT Endpoints with AI** Chris Shore, Arm	11:30
Edge Machine Learning for Saftey Cirtical Systems Dr. Rikard König, Ekkono Solutions	**IoT in the Age of DevOps** Florian Bader, Thomas Rümmler, AIT	**Enhancing the Deployment of Quantization Aware DNN for Inference Acceleration With Vitis AI** Alok Gupta, Xilinx	12:00
Discussion/Q&A	Discussion/Q&A	Discussion/Q&A	12:30
Networking			12:45
Security Hardware	**DevOps / MBD**	**AI Use Cases**	
Secure IoT Firmware For RISC-V Processors Cesare Garlati, Hex Five Security	**DevSecOps Carves a Path to Digital Transformation for Autonomous Embedded Systems** Bruno Chaves, Wind River	**Algorithms for Distributed Sensor Fusion & Tracking** Dimitri Hamidi, The Mathworks	13:30
Keep Device Data Safe With Secure Erase Thom Denholm, Tuxera	**Securing the DevSecOps Platform: Approaches, Methods, and Tools** Arlen Baker, Wind River	**Optical Flow Odometry** Dr. William Lovegrove, Bob Jones University	14:00
DRAM as Security and Privacy Threat to IoT and Embedded Systems Hans Diesing, Zentel EMEA	**From MATLAB to C Code for Heterogeneous Embedded Systems – Using Abstraction Levels for Specialized Optimizations** Oliver Oey, emmtrix Technologies	**Reducing the Energy Consumption of a Refrigerator Using Reinforcement Machine Learning** Özgür Özkan, Arcelik; Cameron LaFolette, Arm	14:30
Discussion/Q&A	Discussion/Q&A	Discussion/Q&A	15:00
Networking			15:15
Conference Keynote: Modern Embedded Engineering: Where we are and our Exciting Future Randall Restle, Restle LLC, Strategic Advisor to Digi-Key Electronics			15:30
Security Use Cases	**Software & System Quality**		
Seamless integration of Cyber Security with Functional Safety will Make Autonomous Driving for Automotive and Industry Solutions Secure and Robust Thorsten Lorenzen, Texas Instruments Sales	**Finding the Serious Bugs that Matter with Advanced Static Analysis** Paul Anderson, GrammaTech		16:15
Security Testing of a Lithotripter Medical Device Based on MDR and MDCG Wilfried Kirsch, Prof. Dr. Hartmut Pohl, softScheck	**Optimizing Heterogeneous Compute Platforms for Domain Controllers** Florent Lebeau, Arm	**Sign-up & Registration: www.embedded-world.eu**	16:45
A Security Architecture for Protecting Safety-Critical Railway Infrastructure Prof. Dr. Christoph Krauß, Fraunhofer SIT	**Performance Measurement and Testing of Realtime MCU-virtualized Applications** Dr. Stéphane Turlier, OpenSynergy		17:15
Discussion/Q&A	Discussion/Q&A		17:45

Thursday, 04 March
Conference Program

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	Internet of Things – Platforms & Applications	System-on-Chip (SoC) Design	Safety & Security
10:00	**Welcome**		
	Security in IoT 1	**Complex IC & System Solutions**	**Security Architectures 1**
10:15	**Panel Discussion: Embedded Vision**		Chair: Prof. Dr.-Ing. Axel Sikora
11:00	**New Aspects of PSA Certified for Securing IoT and Edge Devices** Robert Coombs, Arm	**Maximising Energy Efficiency When Designing SoCs for Endpoint AI** Gergely Kiss, Arm	**Functional Safety and Security for Microcontrollers: Conflict or Cooperation?** Alessandro Bastoni, STMicroelectronics
11:30	**A General IoT Security Classification Framework** Dr. Oana Fabiana Andreescu, Internet of Trust	**FPGA-based Modelling, IP-Implementation and Measurements of Aging Effects Due to TID or Electrical and Thermal Stress** Vidwath Paramesh, Josef J. Schmid, iSyst Intelligente Systeme	**Application of TPM2.0 in Industrial and Automotive Systems Using the Feature API of the Open Source Software Stack** Florian Schreiner, Infineon Technologies
12:00	**OPC UA PubSub IIOT Platform With Secure Embedded Secret** Vincent Lacroix, Systerel	**Automotive and Mobile: Converging Video Content Requirements** Ralph Grundler, Antonio Salazar, Synopsys	**Achieving Mixed Criticality and Cat3 Pld on Single_SoC** Matteo Salardi, Intel
12:30	Discussion/Q&A	Discussion/Q&A	Discussion/Q&A
12:45	Networking		
	Security in IoT 2	**IP Core Design & Integration**	**Security Architectures 2**
13:30	**Building Secure Industrial and Embedded Applications with PSA Certified** Simon Butcher, Arm	**Track Keynote: Architecture Trends for Sensing and Computing to Enable Automated Driving** Robert Schweiger, Cadence Design Systems	**Accelerating Security for Linux IoT Endpoints** Michele Riga, Shebu V Kuriakose, Arm
14:00	**Secure IoT Firmware For Cortex-M Processors** Cesare Garlati, Hex Five Security	**Secure Boot Concept on the Zynq Ultrascale+ MPSoC** Thierry Delafontaine, Zürich University of Applied Sciences	**Security Considerations in Linux for the Automotive World** Saurabh Arora, Elektrobit Automotive
14:30	**Analyzing a Real-World Wireless IoT Encryption and Authentication Protocol Using a Threat Modeling Framework** Jakob Buron, Silicon Labs	**Standardizing the TEE – The IoT Opportunity** Gil Bernabeu, GlobalPlatform	**An Architecture For Trusted Operation of IoT Devices** Colin Duggan, BG Networks; K. Thangappan Jasmin, Infotech
15:00	Discussion/Q&A	Discussion/Q&A	Discussion/Q&A
15:15	Networking		
15:30	**Conference Keynote: Challenges of Digital Transformation for the New Intelligent Edge** Kevin Dallas, Wind River		
	IoT Use Cases 1	**Mixed Signal & Energy Optimization**	**Hacking**
16:15	**Energy Prediction in Edge Environment for Smart Cities** Oluwatobi Oyinlola, Intel	**The Challenges of Combining Mixed Signal Connectivity IP Into Your SoC** Roger Walker, Imagination Technologies	**Fuzz Attacks for Embedded Network Devices** DeWitt Seward, Silicon Labs
16:45	**LoRa 2.4G. plugging the precision positioning intelligence gap for Campus wide Use cases** Albert Baker, Danalto	**Semiconductor Process Selection from ESD Perspective: FinFET, SOI or CMOS?** Benjamin Van Camp, Sofics	**Sidechannel Analysis in Embedded Devices** DeWitt Seward, Silicon Labs
17:15	**Using MQTT Based Adapters to Enable Testing for Industrial Applications (IIoT)** Prof. Rix Groenboom, Parasoft	**Low Voltage Signal-Chain for the IoT Sensors of the Future** Maurizio Gavardoni, Maxim Integrated	**Security is a System Level Problem: A Case Study** Josh Norem, Silicon Labs
17:45	Discussion/Q&A	Discussion/Q&A	Discussion/Q&A

Software & Systems Engineering	Embedded Vision	
Welcome		10:00
Software Quality	**Application Case Studies**	
Panel Discussion: Embedded Vision	Chair: Prof. Dr.-Ing. Axel Sikora	10:15
Testing, Model Checking and Static Analysis – Dream Team or Rivals? Dr. Sebastian Krings, Axivion	**Embedded Vision in ArgiTech: Livestock Weight Monitoring** Lyubomyr Dutko, Lemberg Solutions	11:00
The Practicalities of Automotive Software Safety Analysis Deepu Chandran, LDRA	**GPU FPGA Accelerated Real time System Implementation for Stereo 3D Mapping and Visual Odometry** Yashwant Kumar Temburu, Indian Institute of Technology Bombay	11:30
Secure Diagnostics for Connected Vehicles Dr. Ahmed Khan, Dirk Vogel, Siemens Digital Industries Software	**A Vision Based Unsupervised Method for Realtime Anomaly Detection in Welding Process** Tara K. Thimmanaik, Intel	12:00
Discussion/Q&A	Discussion/Q&A	12:30
Networking		12:45
Software Quality: Static Analysis	**Systems Integration 1**	
Static Data and Control Coupling Analysis Dr. Daniel Kästner, AbsInt Angewandte Informatik	**Key Trends in the Deployment of Edge AI and Computer Vision** Jeff Bier, Edge AI and Vision Alliance	13:30
Combining Static Unit and Integration Analysis Dr. Daniel Kästner, AbsInt Angewandte Informatik	**Benefits of Industrial Cameras for Embedded Vision Applications** Felix Nikolaus, Allied Vision Technologies	14:00
Maximizing the Value of Static Analysis for Modern Development Miroslaw Zielinski, Parasoft	**Faster Deployments With Software-defined Smart Cameras** Michele Riga, Arm	14:30
Discussion/Q&A	Discussion/Q&A	15:00
Networking		15:15
Conference Keynote: Challenges of Digital Transformation for the New Intelligent Edge Kevin Dallas, Wind River		15:30
Software Quality: Coding	**Systems Integration 2**	
Dynamic Memory Allocation & Fragmentation in C & C++ Colin Walls, Mentor, a Siemens Business	**Track Keynote: The State of Khronos Standards Powering the Future of Embedded Vision & Inferencing** Neil Trevett, The Khronos Group	16:15
Advanced Compiler Optimizations for the Smallest, Fastest Code Greg Davis, Green Hills Software	**Accelerated Computer Vision Processing Pipelines on Versal With AIE and PL Fabric** Alok Gupta, Xilinx	16:45
Hack-proofing your C/C++ Code Greg Davis, Green Hills Software	**A Deterministic Approach to Inferencing on Real Time Safety Critical Embedded Systems** Lucas Fryzek, Core Avionics & Industrial	17:15
Discussion/Q&A	Discussion/Q&A	17:45

Friday, 05 March
Conference Program

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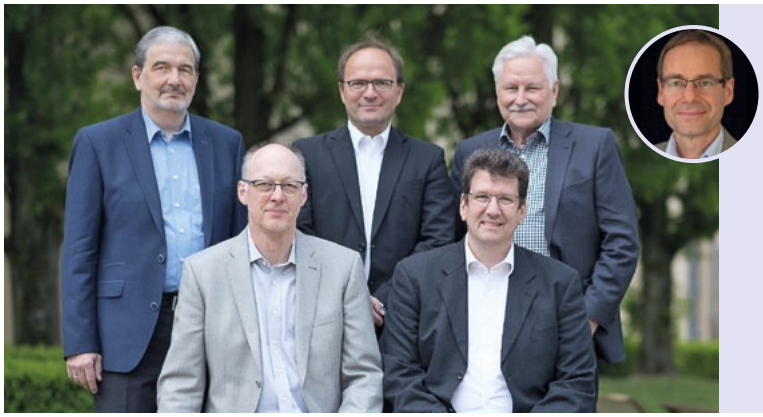
	Internet of Things – Platforms & Applications	System-on-Chip (SoC) Design	Safety & Security
10:00	**Welcome**		
	Security im IoT 3	**Core Integration & Tools 1**	**Security Architectures 3**
10:15	**Panel Discussion: Connectivity in IoT**		Chair: Prof. Dirk Pesch
11:00	**Cyber Secure Communication for Automation Devices – Legal Regulations, Market Trends and Solutions** Thierry Bieber, HMS Industrial Networks	**Jupyosys: From Browser to Silicon in Seconds** Martin Strubel, section5 / Strubel SW solutions	**Implementing the ARM Platform Security Architecture for Robust IoT Devices** Trevor Martin, Hitex UK
11:30	**Firmware Integrity in the Quantum Age – How to Prepare Against Threats of Quantum Computing Now** Martin Schläffer, Infineon Technologies	**Leveraging RISC-V Technology for Industry Use** Prof. Robert Oshana, NXP Semiconductors; Rick O'Connor, OpenHW Group	**uTango: Open Source TEE for TrustZone-M Devices** Dr. Sandro Pinto, Universidade do Minho
12:00	**SIMs, eSIMs and Secure Elements: Providing a Roadmap to Dynamic Security and Flexible Control for Connected Devices** Cyril Caillaud, Trusted Connectivity Alliance	**Working Effectively With Standard and Custom RISC-V ISA Extensions** Felipe Torrezan, IAR Systems	**Porting and Running OP-TEE on ARMv8 devices** Sergio Prado, Embedded Labworks
12:30	Discussion/Q&A	Discussion/Q&A	Discussion/Q&A
12:45	Networking		
	IoT Use Cases 2	**Core Integration & Tools 2**	**Long Term and Security**
13:30	**Revolutionary Asset Management Solutions Based on Semtech's LoRa Edge and LoRa Cloud** Pedro Pachuca, Semtech	**Innovate by Customized Iinstructions, But Without Fragmenting the Ecosystem?** Joseph Yiu, Arm	**A Long-term Security Concept for IoT Products** Dr. Hans Herrmann, cogitron
14:00	**IoT Solutions in a Regional Utility's Ecosystem** Philipp Schandelmaier-Treick, E-MAKS	**The Path to Ultra-low Power AI at the Edge** James Peet, Cambridge Consultants	**Cyber Resiliency is Becoming Critical for All Embedded Systems, Dynamic Firmware Protections, Coupled to Effective Supply Chain Security will Become Mandatory Very Soon** Eric Sivertson, Lattice Semiconductor
14:30	**The Battery Digital Twins** John Milios, Sendyne	**Exploiting Regularity for Compiling Manycore Architectures** Andres Goens, TU Dresden	**Finding N-day Security Vulnerabilities in Third-party Software** Paul Anderson, GrammaTech
15:00	Discussion/Q&A	Discussion/Q&A	Discussion/Q&A
15:15	Networking		



Steering Board

back row (from left to right):
Dr. Bernd Hense,
Prof. Dr. Axel Sikora,
Dr. Klaus Grimm
Prof. Dr. Dirk Pesch

front row:
Joachim Kroll,
Prof. Dr. Peter Fromm

Software & Systems Engineering	Embedded Vision	
Welcome		10:00
Testing & Debugging 1	**SW Tools & Tooling AI & Tool Chains**	
Panel Discussion: Connectivity in IoT	Chair: Prof. Dirk Pesch	10:15
Standardisation of Software Testing... a Necessary Evil? Andrew Banks, LDRA	**Embedded Learning and the Evolution of Machine Vision** Jonathan Hou, Pleora Technologies	11:00
Self-testing in Embedded Systems Colin Walls, Mentor, a Siemens Business	**Using Visual Inference in Edge Computing** Jim White, IoTech	11:30
Risking the New or Preserving the Old? – How to Preserve Treasures in Legacy Code Bases Ingo Nickles, Vector Informatik	**The Best of Both Worlds: Rule-based and AI for Embedded Vision** Christoph Wagner, MVTec Software	12:00
Discussion/Q&A	Discussion/Q&A	12:30
Networking		12:45
Testing & Debugging 2	**Embedded Vision**	
Software Testing Best Practices for Embedded Systems Prof. Robert Oshana, NXP Semiconductors	**Embedded IoT Application with Computer Vision and OpenVINO** Oluwatobi Oyinlola, Intel	13:30
Agile Test Orchestration for Embedded Software Dr. James Hui, Wind River	**Optimising Neural Networks With a Holistic Vie of IoT, Cloud and Edge Using Information Reduction Pipeline Concept** Marc Suhle, Mark Hebbel, Basler	14:00
Dominate Advanced Trace in Your RISC-V Core IP Shawn Prestridge, IAR Systems	**Multimedia Performance Tuning** Marcel Ziswiler, Toradex	14:30
Discussion/Q&A	Discussion/Q&A	15:00
Networking		15:15

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+ C Secure Coding Checker
+ Checker for CERT® rules and AUTOSAR C++14 styleguide
+ Checking individual coding guidelines
+ Dead code detection
+ Static code analysis
+ Race condition analysis
+ Common Weakness Enumerator
+ Delta analysis
+ Include profiler
+ Metrics including HIS
+ Cycle detection
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Classes
Conference Program

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Monday, 01 March

13:30 - 18:00	**Class 1.1** **The Power of APIs and Containers on Embedded Switching** Florian Pachinger, Cisco Systems	**Class 3.1** **Build Your Own Embedded Linux CI/CD Pipeline Using the Cloud** Richard Elberger, Amazon Web Services	**Class 4.1** **Security Beyond Cryptography: Security Enclave for Asymmetric Multi-processing** Lawrence Case, NXP Semiconductors	**Class 6.1** **Effective Use Cases, User Stories, and Scenarios** Dr. Bruce Douglass, Bruce-Douglass.com

Tuesday, 02 March

09:00 - 13:30	**Class 5.1** **Ultra Low Power Hands-on Workshop** Herman Roebbers, Altran	**Class 10.1** **FPGA-Design Using C/C++ and High-Level Synthesis** Prof. Dr. Frank Kesel, Hochschule Pforzheim		
13:30 - 18:00			**Class 6.2** **Agile for Embedded Systems** Dr. Bruce Douglass, Bruce-Douglass.com	**Class 6.3** **The Greg Davis Class – Advanced C/C++ Coding and Debugging Techniques** Greg Davis, Green Hills Software

Wednesday, 03 March

09:00 - 12:30	**Class 3.2** **Embedded Android Workshop** Karim Yaghmour, Opersys	**Class 6.4** **Creating Domain-Specific Modeling Languages: Hands-on** Dr. Juha-Pekka Tolvanen, MetaCase			
13:30 - 18:00			**Class 5.2** **Easy Design of IoT Wireless Devices Embedding Antennas** Dr. Jaume Anguera, Fractus Antennas	**Class 6.5** **Advanced Behavioral Modeling with UML/SysML: Activities** Dr. Bruce Douglass, Bruce-Douglass.com	**Class 6.6** **Modern C++ for Embedded Development** Greg Davis, Green Hills Software

Thursday, 04 March

09:00 - 12:30	**Class 3.3** **Introduction to Embedded Linux in Theory and Practice – Short Crash Course** Robert Berger, Reliable Embedded Systems	**Class 3.4** **Fast Track to Yocto Project** Chris Simmonds, 2net	**Class 6.7** **How to Improve Software Quality Through Test Automation** Ingo Nickles, Vector Informatik			
13:30 - 18:00				**Class 5.3** **Production Optimized Hardware Design** Stefan Kinzlbauer, Ginzinger electronic systems	**Class 6.8** **Advanced Behavioral Modeling with UML/SysML: State Machines** Dr. Bruce Douglass, Bruce-Douglass.com	**Class 8.1** **Developing Artificial Intelligence Using Machine Learning at the Edge with Embedded µSoC FPGAs** Grant Jennings, GOWIN Semiconductor