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Programme

Day 1 • Wednesday, June 13th

9:00 - 9:20 **Welcome and opening remarks**

9:20 - 10:30 **Session 1 • Industrial Cyber-Security**

Chair: Shuvra Bhattacharyya, University of Maryland, USA

Modelling and Automatic Mapping of Cyber Security Requirements for Industrial Applications: Survey, Problem Exposition, and Research Focus.

Marco Ehrlich, Lukasz Wisniewski, Henning Trsek and Jürgen Jasperneite

Challenges and Prospects of Communication Security in Real-Time Ethernet Automation Systems.

Thomas Müller, Andreas Walz, Manuel Kiefer, Hans Dermot Doran and Axel Sikora

Toward Attribute-Based Access Control Policy in Industrial Networked Systems.

Manuel Cheminod, Luca Durante, Fulvio Valenza and Adriano Valenzano

10:30 - 11:00 **Coffee break**

11:00 - 12:30 **Session 2 • Wireless Industrial Communications**

Chair: Jürgen Jasperneite, Fraunhofer IOSB-INA, Germany

Deadline-Constrained Repeat reQuest Mechanisms for Wireless Communication Channels.

Gianluca Cena, Stefano Scanzio, Lucia Seno and Adriano Valenzano

Bit Error Performance of a PSSS Transmission System in Industrial Environments.

Lisa Underberg, Elias Peter, Ramona Croonenbroeck and Rüdiger Kays

A Neural Network Clock Discipline Algorithm for the RBIS Clock Synchronization Protocol.

Gianluca Cena, Stefano Scanzio and Adriano Valenzano

Model-Based Cosimulation for Industrial Wireless Networks.

Jing Geng, Honglei Li, Yanzhou Liu, Yongkang Liu, Mohamed Kashef, Richard Candell and Shuvra Bhattacharyya

12:30 - 14:00 **Lunch**

14:00 - 15:15 Keynote 1

Chair: Liliana Cucu-Grosjean, INRIA, France

IoT Applications: from a Simple Idea to in Situ Deployment through Lab Experimentation.

Nathalie Mitton, INRIA, Lille, France

15:15 - 15:45 Coffee break**15:45 - 17:45 Session 3 • Fieldbus and Real-Time Ethernet networks**

Chair: Jean-Luc Scharbarg, University of Toulouse, France

Concept for the Coexistence of Standard and Real-Time Ethernet.

Ralf Schlesinger, Andreas Springer and Thilo Sauter

An Independent yet Efficient Analysis of Bandwidth Reservation for Credit-Based Shaping.

Jingyue Cao, Mohammad Ashjaei, Pieter Cuijpers, Reinder Bril and Johan Lukkien

Incorporating TSN/BLS in AFDX for Mixed-Criticality Applications: Model and Timing Analysis.

Anaïs Finzi, Ahlem Mifdaoui, Fabrice Francès and Emmanuel Lochin

Frame Transmission Time Control for TDMA-Based Ethernet.

Naoto Hagino, Masaaki Yamamoto and Takahiro Yakoh

Error Detection and Management in CAN XR.

Gianluca Cena, Ivan Cibrario Bertolotti, Tingting Hu and Adriano Valenzano

Welcome Reception

Day 2 • Thursday, June 14th

9:00 - 10:30 Work-in-Progress • Session1

Chair: Tingting Hu, University of Luxembourg, Luxembourg

Industry 4.0: Fashion Faith and Fantasy.

Paolo Pinceti and Micaela Caserza Magro

Bio-Inspired Scheme for Congestion Control in Wireless Sensor Networks.

Muhammad Royyan, Muhammad Rusyadi Ramli, Jae-Min Lee and Dong-Seong Kim

Enhanced Flexible LoRaWAN Node for Industrial IoT.

*Emiliano Sisinni, Dhiego Fernandes Carvalho, Paolo Ferrari, Alessandra Flammini,
Diego Rodrigo Cabral Silva, Ivanovitch Da Silva*

IoT Agriculture System Based on LoRaWAN.

Danco Davcev, Kosta Mitreski, Stefan Trajkovik, Viktor Nikolovski and Nikola Koteli

Adaptive Duplication Avoidance for Wi-Red.

Gianluca Cena, Stefano Scanzio and Adriano Valenzano

Dimensioning Wireless Use Cases in Industrial Internet of Things.

Yongkang Liu, Richard Candell, Mohamed Kashef and Lotfi Benmohamed

**Simplifying Functional Safety Communication in Modular,
Heterogeneous Production Lines.**

Dieter Etz, Thomas Frühwirth, Ahmed Ismail and Wolfgang Kastner

**Identification of Safety Regions in Vehicle Platooning via Machine
Learning.**

Alessandro Fermi, Maurizio Mongelli, Marco Muselli and Enrico Ferrari

Towards Integration of Industrial Ethernet with 5G Mobile Networks.

*Arne Neumann, Lukasz Wisniewski, Rakash SivaSiva Ganesan,
Peter Rost and Jürgen Jasperneite*

10:30 - 11:00 **Coffee break**

11:00 - 12:30 **Session 4 • Industrial Wireless Sensor and Sensor/Actuator Networks 1**

Chair: Luis Lino Ferreira, CISTER/ISEP, Portugal

**Synchronous Transmissions + Channel Sampling = Energy Efficient
Event-Triggered Wireless Sensing Systems.**

Camilo Rojas and Jean-Dominique Decotignie

**Energy Balanced Routing for Latency Minimized Wireless Sensor
Networks.**

Hans-Peter Bernhard, Andreas Springer, Peter Priller and Leander Hörmann

**High Resolution Testbed for Heterogeneous Industrial Wireless Sensor
and Actuator Networks.**

Albert Pötsch, Hans-Peter Bernhard and Andreas Springer

Simulative Performance Analysis of IO-Link Wireless.

Dan Wolberg, Markus Rentschler and Pascal Gaggero

12:30 - 14:00 **Lunch**

14:00 - 15:15 Keynote 2

Chair: Ivan Cibrario Bertolotti, CNR-IEIT, Italy

SMP Challenges for Real-Time Embedded Systems.

Joel Sherrill, On-Line Applications Research Corporation, Huntsville, Alabama - USA

15:15 - 15:45 Coffee break**15:45 - 17:45 Session 5: Novel Network Paradigms and Architectures for Industry 4.0**

Chair: Gianluca Cena, CNR-IEIT, Italy

Design Patterns for the Industrial Internet of Things.

Gedare Bloom, Bassma Alsulami, Ebelechukwu Nwafor and Ivan Cibrario Bertolotti

Reliability-Oriented Multipath Communication for Internet-Based Cyber-Physical Systems.

Mohammad Elattar, Maxim Friesen, Dominik Henneke and Jürgen Jasperneite

Formally Verified Latency-Aware VNF Placement in Industrial Internet of Things.

Guido Marchetto, Riccardo Sisto, Jalolliddin Yusupov and Adlen Ksentini

Investigation on a Distributed SDN Control Plane Architecture for Heterogeneous Time Sensitive Networks.

Sebastian Schriegel, Thomas Kobzan and Jürgen Jasperneite

The Arrowhead Framework Applied to Energy Management.

Rafael Rocha, Michele Albano, Luis Lino Ferreira, Flávio Relvas and Luisa Matos

Gala Dinner

Day 3 • Friday, June 15th

9:30 - 10:30 Work-in-Progress • Session 2

Chair: Stefano Scanzio, CNR-IEIT, Italy

Scheduling in Time-Sensitive Networking (TSN) for Mixed-Criticality Industrial Applications.

Voica Gavriliuț and Paul Pop

Reducing AFDX Jitter in a Mixed NoC/AFDX Architecture.

Laure Abdallah, Jérôme Ermont, Jean-Luc Scharbarg and Christian Fraboul

Analysis and Modeling of Asynchronous Traffic Shaping in Time Sensitive Networks.

Zifan Zhou, Ying Yan, Michael Berger and Sarah Ruepp

CyberFactory#1 - Securing the Industry 4.0 with Cyber-Ranges and Digital Twins.

Adrien Bécue, Yannick Fourastier, Isabel Praça, Alexandre Savarit, Claude Baron, Baptiste Gradousof, Etienne Pouille and Carsten Thomas

Cybersecurity Assurance Control Baseline for Smart Grid Communication Systems.

Adegboyega Ogundokun, Pavol Zavorsky and Bobby Swar

Protecting PROFINET Cyclic Real-Time Traffic: a Performance Evaluation and Verification Platform.

Thomas Müller and Hans Dermot Doran

10:30 - 11:00 **Coffee break**

11:00 - 12:30 **Session 6: Industrial Wireless Sensor and Sensor/Actuator Networks 2**

Chair: Markus Rentschler, Balluff GmbH, Germany

SHARP: a Novel Hybrid Architecture for Industrial Wireless Sensor and Actuator Networks.

Óscar Seijo, Zaloa Fernández, Iñaki Val and Jesús López-Fernández

Random-Deadline Missing Probability Analysis for Wireless Communications in Industrial Environments.

Mohamed Kashef and Nader Moayeri

A Dual-Standard Solution for Industrial Wireless Sensor Network Deployment: Experimental Testbed and Performance Evaluation.

Eusebiu Jecan, Catalin Pop, Zoltan Padrah, Ovidiu Ratiu and Emanuel Puschita

Efficient Relay Selection Algorithm for Cooperative Routing in Underwater Acoustic Sensor Networks.

Hoa Tran-Dang and Dong-Seong Kim

12:30 - 14:00 **Lunch**

14:00 - 15:20 **Work-in-Progress • Session 3**

Chair: Nader Moayeri, NIST, USA

Assistance System to Support Troubleshooting of Complex Industrial Systems.

Dorota Lang, Paul Wunderlich, Mario Heinz, Lukasz Wisniewski, Jürgen Jasperneite, Oliver Niggemann and Carsten Röcker

The Need for Efficient Multicast Routing in Low-Power IPv6 Mesh Networks.*Philipp Raich and Wolfgang Kastner***An Approach for Testing Software on Networked Transport Robots.***Ichiro Satoh***A Modular Interoperability Layer for Connecting the Business and Manufacturing systems.***Philippe Glanon, Selma Azaiez and Chokri Mraidha***Efficient DDS Monitoring System for Large Amount of Data.***Min-Young Son, Dong-Seong Kim and Joong-Hyuck Cha***Verification and Validation of a Simulation Model for Energy Use in Buildings.***George Kalogeras, Christos Koulamas, Athanasios Kalogeras and Antonios Moronis***Leveraging OPC-UA Discovery by Software-Defined Networking and Network Function Virtualization.***Dominik Henneke, Alex Brozmann, Lukasz Wisniewski and Jürgen Jasperneite***15:20 - 16:10** *Coffee break***16:10 - 17:20** **Session 7 • Information Modelling in Cyber-Physical Systems***Chair: Athanasios Kalogeras, Research Center ATHENA, Greece***From ISA 88/95 Meta-Models to an OPC UA-Based Development Tool for CPPS under IEC 61499.***Marcelo Garcia, Edurne Irisarri, Federico Pérez, Marga Marcos and Elisabet Estevez***Reducing Integration Effort for Cyber-Physical Systems through Integrated Information Modelling using Annotated Application Code.***Johannes Schmitt, Sten Grüner and Roland Braun***Industrial Data-Collector by Enabling OPC-UA Standard for Industry 4.0.***Mohammad Ghazivakili, Claudio Demartini and Claudio Zunino***17:20 - 17:30** *Closing*