



# WFCS 2012

21. - 24.05.2012 • 9<sup>TH</sup> IEEE INTERNATIONAL WORKSHOP ON  
FACTORY COMMUNICATION SYSTEMS (WFCS 2012)

« TECHNICAL PROGRAMME »





## Schedule

Start	End	Tuesday, May 22nd
08:45	09:00	<b>Opening Session</b>
09:00	10:00	<b>Session 1: Applications</b>
10:00	10:30	Coffee break
10:30	12:00	<b>Session 2: Controller Area Networks</b>
12:00	13:30	Lunch break
13:30	14:30	<b>Keynote 1: Cyber-Physical Systems in Factory Automation</b>
14:30	15:30	<b>WiP Session 1: Wireless Networks and Application Design</b>
15:30	16:15	Coffee break and Poster discussion
16:15	17:45	<b>Session 3: Wireless Networks I</b>
19:00	20:00	<b>Welcome Reception</b>
Start	End	Wednesday, May 23rd
09:00	10:00	<b>WiP Session 2: Industrial Communication Networks</b>
10:00	10:45	Coffee break and Poster discussion
10:45	12:15	<b>Session 4: Wireless Networks II</b>
12:15	13:45	Lunch break
13:45	15:15	<b>Session 5: Ethernet</b>
15:15	16:00	Coffee break
16:00	17:30	<b>Session 6: Verification, Fault tolerance and performance</b>
19:00	23:00	<b>Conference Dinner</b>
Start	End	Thursday, May 24 <sup>th</sup>
09:00	10:00	<b>Keynote 2: Smart Grid Communications</b>
10:00	10:30	Coffee break
10:30	12:00	<b>Session 7: Modelling and Design, Flexray</b>
12:00	13:30	Lunch break
13:30	13:45	<b>Closing Session</b>
14:00	18:00	<b>Excursion</b>

## Programme at a Glance

Start	Tuesday, May 22	Wednesday, May 23	Thursday, May 24
08:00			
08:15	<b>Registration</b>		
08:30			
08:45	<b>Opening Session</b>		
09:00			
09:15	<b>Session 1: Applications</b>	<b>WiP Session 2</b>	<b>Keynote 2 (Dr. Kai Struebbe, TÜV SÜD)</b>
09:30			
09:45			
10:00	Coffee break	Coffee break and Poster discussion	Coffee break
10:15			
10:30			
10:45			
11:00	<b>Session 2: CAN</b>	<b>Session 4: Wireless II</b>	<b>Session 7: Modelling and Design, Flexray</b>
11:15			
11:30			
11:45			
12:00			
12:15			
12:30	Lunch break	Lunch break	Lunch break
12:45			
13:00			
13:15			
13:30			<b>Closing Session</b>
13:45	<b>Keynote 1 (Dr. Jochen Schlick, DFKI)</b>		
14:00			
14:15			
14:30		<b>Session 5: Ethernet</b>	
14:45	<b>WiP Session 1</b>		
15:00			
15:15			
15:30	Coffee break and Poster discussion	Coffee break	<b>Excursion: Hermann, Externsteine, HNF</b>
15:45			
16:00			
16:15		<b>Session 6: Verification, Fault tolerance and performance</b>	
16:30	<b>Session 3: Wireless I</b>		
16:45			
17:00			
17:15			
17:30			
17:45			
18:00			
18:30			
19:00	<b>Welcome Reception</b>		
19:30		<b>Conference Dinner (until 23.00h)</b>	
20:00			
20:30			
21:00			

## Tuesday, May 22<sup>nd</sup>

Start	End	Topic/Title
08:00	08:45	<b>Registration</b>
08:45	09:00	<b>Opening Session</b>
09:00	10:00	<b>Session 1: Applications</b> <b>Chair: Martin Wollschlaeger (TU Dresden, Germany)</b>  Wireless Machine Vision Systems Based on COTS Equipment <i>Gianluca Cena, Stefano Scanzio, Adriano Valenzano, Claudio Zunino</i>  A Comparison of Time- and RSS-based Radio Localization for the Factory Floor <i>Reinhard Exel, Thilo Sauter</i>
10:00	10:30	Coffee break
10:30	12:00	<b>Session 2: Controller Area Networks</b> <b>Chair: Gianluca Cena (IEIT-CNR / Politecnico di Torino, Italy)</b>  Response-Time Analysis of Mixed Messages in Controller Area Network with Priority- and FIFO-Queued Nodes <i>Saad Mubeen, Jukka Mäki-Turja, Mikael Sjödin</i>  Controller Area Network (CAN) Schedulability Analysis for Messages with Arbitrary Deadlines in FIFO and Work-Conserving Queues <i>Robert Davis, Nicolas Navet</i>  Controller Area Network (CAN): Response Time Analysis with Offsets <i>Patrick Meumeu Yomsi, Dominique Bertrand, Nicolas Navet, Robert I. Davis</i>
12:00	13:30	Lunch break
13:30	14:30	<b>Keynote 1</b> <b>Chair: Thomas Nolte (MRTC / Mälardalen University, Sweden)</b>  Cyber-Physical Systems in Factory Automation - Towards the 4th Industrial Revolution <i>Jochen Schlick (DFKI, Germany)</i>
14:30	15:30	<b>WiP Session 1: Wireless Networks and Application Design</b> <b>Chair: Paulo Pedreiras (University of Aveiro, Portugal)</b>  Assessment of the Interference Caused by Uncontrolled Traffic Sources upon Real-Time Communication in IEEE 802.11-based Mesh Networks <i>Carlos Viegas, Silvio Sampaio, Francisco Vasques, Paulo Portugal, Pedro Souto</i>  An Admission Control Mechanism to Handle Real-Time Traffic in IEEE 802.11 Networks in Open Communication Environments <i>Robson Costa, Paulo Portugal, Ricardo Moraes, Francisco Vasques</i>

Integrating Smart Cameras into ZigBee  
*Felix Schuster, Wolfgang Kastner, Wolfgang Granzer*

Performance Assessment and Tuning Rules for Low-power and Lossy Stacks  
*Nicola Accettura, Carlos Aguado Camacho, Luigi Alfredo Grieco, Gennaro Boggia, Pietro Camarda*

Minimum Latency and Energy Efficiency Routing with Lossy Link Awareness in Wireless Sensor Networks  
*Dang Hoa Tran and Dong-Sung Kim*

Energy-Efficient Packet Relaying Based on the Sensing Relevancies of Source Nodes in Visual Sensor Networks  
*Daniel Costa, Luiz Guedes, Francisco Vasques, Paulo Portugal*

Enabling Quick Deployment Wireless Sensor Networks for Smart Cities  
*David Todolí, Salvador Santonja, Víctor M. Sempere*

A Throughput-aware Routing for Distributed Industrial Cognitive Radio Sensor Networks  
*Quang Pham, Soo-Ro Kim, Dong-Sung Kim*

Deterministic real-time medium access for cognitive industrial radio networks  
*Kristina Kunert, Magnus Jonsson, Urban Bilstrup*

Scripting Language for Distributed Application Design  
*Matthias Riedl, Marco Meier, Robert Schneckenhau*

Vertical Data Integration in Automation based on IEC 61499  
*Alexander Dennert, Andreas Gössling, Jakob Krause, Martin Wollschlaeger, Ana Maria Henao Montoya*

15:30 16:15 Coffee break and Poster discussion

16:15 17:45 **Session 3: Wireless I**  
**Chair: Francisco Vasques (University of Porto, Portugal)**

Q-MAC: A queue-length aware hybrid CSMA/TDMA MAC protocol for providing dynamic adaptation to traffic and duty-cycle variation in wireless sensor networks  
*Shuguo Zhuo, Ye-Qiong Song, Zhi Wang, Zhibo Wang*

Comparative assessments of IEEE 802.15.4/ZigBee and 6LoWPAN for low-power Industrial WSNs in realistic scenarios  
*Emanuele Toscano, Lucia Lo Bello*

Statistical Analysis and Predictive Modeling of Industrial Wireless Coexisting Environments  
*Ganesh Man Shrestha, Kaleem Ahmad, Uwe Meier*

19:00 20:00 **Welcome Reception**



## Wednesday, May 23<sup>rd</sup>

Start	End	Topic/Title
09:00	10:00	<p><b>WiP Session 2: Industrial Communication Networks</b>  <b>Chair: Liliana Cucu-Grosjean (INRIA Nancy-Grand Est, France)</b></p> <p>An FPGA based HSR Architecture for Seamless PROFINET Redundancy  <i>Holger Flatt, Sebastian Schriegel, Thimo Neugarth, Jürgen Jasperneite</i></p> <p>Fast and simple scheduling algorithm for PROFINET IRT networks  <i>Lukasz Wisniewski, Markus Schumacher, Sebastian Schriegel, Jürgen Jasperneite</i></p> <p>Dynamic Frame Packing in Industrial Applications using COTS Components  <i>Jonas Schoch, David Ganz, Hans Dermot Doran, Karl Weber</i></p> <p>Active Delay Variation Control for Improving Fault Tolerance in an Avionics Network  <i>Hairui Zhou</i></p> <p>Mixing Real Time Ethernet Traffic on the IEC 61850 Process Bus  <i>Paolo Ferrari, Alessandra Flammini, Stefano Rinaldi, Gunnar Prytz</i></p> <p>A Compact Approach to Clustered Master-Slave Ethernet Networks  <i>Mohammad Ashjaei, Moris Behnam, Thomas Nolte, Luis Almeida, Ricardo Marau</i></p> <p>Approaches to reduce the Latency for High Priority Traffic in IEEE 802.1 AVB Networks  <i>Jahanzaib Imtiaz, Juergen Jasperneite, Karl Weber</i></p> <p>Implementation of End-to-End Latency Analysis for Component-Based Multi-Rate Real-Time Systems in Rubus-ICE  <i>Saad Mubeen, Jukka Mäki-Turja, Mikael Sjödin</i></p> <p>Generalisation of GPS and P-GPS in network calculus  <i>William Mangoua Sofack, Marc Boyer</i></p> <p>Physical Layer of a Novel Broadband Low-Level Fieldbus with Discrete Multitone  <i>Thomas Handte, Matthias Breuninger, Hanns Thilo Hagemeyer, Joachim Speidel</i></p> <p>A path to oscillation free controller changes  <i>Milton Cunguara, Tomás Oliveira E Silva and Paulo Pedreiras</i></p>
10:00	10:45	Coffee break and Poster discussion
10:45	12:15	<p><b>Session 4: Wireless II</b>  <b>Chair: Lucia Lo Bello (University of Catania, Italy)</b></p> <p>The Effects of Relay Behavior and Position in Wireless Industrial Networks  <i>Svetlana Girs, Elisabeth Uhlemann, Mats Björkman</i></p>

On Relaying for Wireless Industrial Communications: Is Careful Placement of Relayers Strictly Necessary?  
*Andreas Willig, Elisabeth Uhlemann*

Experimental Evaluation of Multiple Retransmission Schemes in IEEE 802.15.4 Wireless Sensor Networks  
*Odilson Tadeu Valle, André V. Milack, Carlos Montez, Paulo Portugal, Francisco Vasques*

12:15 13:45 Lunch break

**13:45 15:15 Session 5: Ethernet**  
**Chair: Wolfgang Kastner (Vienna University of Technology, Austria)**

The High-Availability Seamless redundancy protocol (HSR): Robust fault-tolerant networking and loop prevention through duplicate discard  
*Holger Heine, Oliver Kleineberg*

Hardware Acceleration Architecture for EtherCAT Master Controller  
*Tatsuya Maruyama, Tsutomu Yamada*

Controlling Multi-Switch Networks for Prompt Reconfiguration  
*Ricardo Marau, Moris Behnam, Zahid Iqbal, Pedro Silva, Luis Almeida, Paulo Portugal*

15:15 16:00 Coffee break

**16:00 17:30 Session 6: Verification, fault tolerance and performance**  
**Chair: Paulo Portugal (University of Porto, Portugal)**

Formal Verification of a Distributed Master Election Protocol  
*Gianluca Cena, Ivan Cibrario Bertolotti, Tingting Hu*

Towards a Reliable Parallel Redundant WLAN Black Channel  
*Markus Rentschler, Per Laukemann*

An Efficient Fixed-length Encoding Scheme for CAN  
*Gianluca Cena, Ivan Cibrario Bertolotti, Adriano Valenzano*

19:00 23:30 **Conference Dinner**

## Thursday, May 24<sup>th</sup>

Start	End	Topic/Title
09:00	10:00	<b>Keynote 2</b> <b>Chair: Andreas Willig, (University of Canterbury, New Zealand)</b>  Smart Grid Communications – The Key for Exploiting Renewable Energy Sources <i>Kai Struebbe (TUEV SUED; Germany)</i>
10:00	10:30	Coffee break
10:30	12:00	<b>Session 7: Modelling and Design, Flexray</b> <b>Chair: Ivan Cibrario Bertolotti (IEIT-CNR / Politecnico di Torino, Italy)</b>  Automated network layout for the industrial communication engineering system NetGen:X <i>Markus Stoess, Falk Doherr, Leon Urbas</i>  Information Modeling in Heterogeneous Building Automation Systems <i>Wolfgang Granzer, Wolfgang Kastner</i>  Guaranteeing Real-Time Message Deadlines In The FlexRay Static Segment Using a On-line Scheduling Approach <i>Rodrigo Lange, Francisco Vasques, Paulo Portugal, Romulo Silva de Oliveira</i>
12:00	13:30	Lunch break
13:30	13:45	<b>Closing Session</b>
14:00	18:00	<b>Excursion: Hermann, Externsteine, HNF</b>