## Program

**Wednesday, May 27th, 2015**

<table>
<thead>
<tr>
<th>Time</th>
<th>Session</th>
</tr>
</thead>
<tbody>
<tr>
<td>08:00 - 09:00</td>
<td>Registration</td>
</tr>
<tr>
<td>09:00 - 09:45</td>
<td>Opening Session</td>
</tr>
</tbody>
</table>
| 09:45 - 11:00 | **Session 1: Wireless Networks**  
Chair: Francisco Vasques  
Using LTE as an Access Network for Internet-Based Cyber-Physical Systems  
Mohammad Elattar and Jürgen Jasperneite ..... 1  
Extracting Markov Chain Models from Protocol Execution Traces for End to End Delay Evaluation in Wireless Sensor Networks  
François Despaux, Ye-Qiong Song and Abdelkader Lahmadi ..... 8  
Multi-hop routing within TDMA slots for teams of cooperating robots  
Luis Oliveira, Luis Almeida and Pedro Lima ..... 16 |
| 11:00 - 11:30 | Coffee break                                                            |
| 11:30 - 12:30 | **Keynote 1: Industrial Communication and Networking in Automation Systems – today and tomorrow**  
Chair: Stefano Vitturi  
Industrial Communication and Networking in Automation Systems – today and tomorrow  
Linus Thrybom .... N/A |
| 12:30 - 14:00 | Lunch break                                                             |
| 14:00 - 15:00 | **TII-SS-1: Reliability and Architectures**  
Chair: Martin Wollschlaeger  
iPRP: Parallel Redundancy Protocol for IP Networks  
Miroslav Popovic, Maaz Mohiuddin, Dan-Cristian Tomozei and Jean-Yves Le Boudec ..... 24  
A RESTful Extension of OPC UA  
Sten Grüner, Julius Pf rommer and Florian Palm ..... 28 |
| 15:00       | Coffee break                                                            |
15:30

15:30 - 17:00
TII-SS-2: Scheduling and Performance Analysis
Chair: Jürgen Jasperneite

FlexRay Static Segment Scheduling on Two Independent Channels with Gateway
Jan Dvořák and Zdeněk Hanzálek ..... 32

Improving Profinet IRT Frame Packing Using Ethernet Control Characters
Ralf Schlesinger, Thilo Sauter and Andreas Springer ..... 36

Holistic Analysis for Fork-Join Distributed Tasks supported by the FTT-SE Protocol
Ricardo Garibay-Martínez, Geoffrey Nelissen, Luis Lino Ferreira, Paulo Pedreiras and
Luis Miguel Pinho ..... 40

Thursday, May 28th, 2015

09:00 - 11:00
TII-SS-3: Industrial Wireless Communication Systems
Chair: Lucia Lo Bello

A WSN Data Retransmission Mechanism Based on Network Coding and Cooperative Relayers
Odilson Valle, Carlos Montez, Gustavo Araujo, Ricardo Moraes and Francisco Vasques ..... 44

The IEEE 802.11n wireless LAN for real-time industrial communication
Federico Tramarin, Stefano Vitturi, Michele Luvisotto and Andrea Zanella ..... 48

A Simulation-based Comparison of IEEE 802.11’s Timing Advertisement and SyncTSF for Clock Synchronization
Aneeq Mahmood, Reinhard Exel and Thilo Sauter ..... 52

Scheduling Transmissions in Industrial Networks Using Source Relaying and Packet Aggregation
Svetlana Girs, Andreas Willig, Elisabeth Uhlemann and Mats Björkman ..... 56

11:00 - 11:30
Coffee break

11:30 - 12:30
Keynote 2: Helping people(besides machines) understand each other in integrated manufacturing
Chair: Paulo Pedreiras

Helping people (besides machines) understand each other in integrated manufacturing
Nicola Guarino ..... N/A

12:30 - 14:00
Lunch break

14:00 - 15:00
WiP-S1: Industrial Communication Networks: Design, Analysis and Performance
Chair: Henning Trsek
Less Wires - a Novel Approach on Combined Power and Ethernet Transmission on a Single, Unshielded Twisted Pair Cable
Derk Wesemann, Jens Dünnermann, Marian Schaller, Norman Banick and Stefan Witte ..... 60

Software Defined Networking Applied to the Heterogeneous Infrastructure of Smart Grid
Stefano Rinaldi, Paolo Ferrari, Dennis Brandao and Sara Sulis ..... 64

Performance Analysis of the Ethernet Powerlink Poll Response Chaining Mechanism
Mladen Knezic, Branko Dokic and Zeljko Ivanovic ..... 68

A Configuration Agent based on the Time-Triggered Paradigm for Real-Time Networks
Marina Gutiérrez, Wilfried Steiner, Radu Dobrin and Sasikumar Punnekkat ..... 72

Experimental Evaluation of Network Component Crashes and Trigger Message Omissions in the Flexible Time-Triggered Replicated Star for Ethernet
David Gessner, Alberto Ballesteros, Andreu Adrover and Julian Proenza ..... 76

Seamless reconfiguration of Time Triggered Ethernet based protocols
Lukasz Wisniewski, Satendrasingh Chahar and Juergen Jasperneite ..... 80

Applying End-to-end Path Delay Analysis to Multi-rate Automotive Systems Developed using Legacy Tools
Saad Mubeen and Thomas Nolte ..... 84

Analytical Approach to Multiple Memoryless Backoff Contention Analysis
Marek Miśkowicz, Jakub Szyduczyński and Dariusz Kościelni R ..... 88

Modeling Burst Errors in Industrial Networks
Andreas Platschek, Bernd Thiemann and Heimo Zeilinger ..... 92

15:00 - 15:30
Coffee break and poster session 1

15:30 - 17:30
Session 2: Real-Time and Industrial Ethernet
Chair: Luis Lino Ferreira

An Analysis of Real-Time Ethernets With Regard to Their Automatic Configuration
Lars Dürkop, Jürgen Jasperneite and Alexander Fay ..... 96

Optimising Non-Real Time Frame Handling in Real Time Ethernet Nodes
Lukas Itin and Hans Dermot Doran ..... 104

Improving EtherCAT Master-Slave Synchronisation Precision using PTCP Embedded in EtherCAT Frames: A Proof-of-Concept
David Ganz, Serafin Leschke and Hans Dermot Doran ..... 112

IoT integration on Industrial Environments
Miguel Díaz-Cacho Medina, Emma Delgado, Pablo Falcón and Antonio Barreiro ..... 119

Data supply chain in Industrial Internet
Andrea Buda, Kary Främling, Sylvain Kubler, Manik Madhikermi, Saeed Mirzaeifar and Jukka Borgman ..... 126
Friday, May 29th, 2015

Session 3: Architectural Issues
Chair: Marek Miśkowicz

A Resource Oriented Architecture for Web-Integrated SCADA Applications
Pablo Valério Polônia, Luiz F. Bier Melgarejo and Max Hering De Queiroz ..... 133

On the Use of Multiple MAC Registration Protocol in Industrial Networks
Paolo Ferrari, Alessandra Flammini, Stefano Rinaldi, Mattia Rizzi, Emiliano Sisinni and Gunnar Prytz ..... 141

Sensor Based Transaction Temporal Database Architecture
Michal Kvet, Karol Matiáško and Monika Vajsová ..... 149

Time-Synchronized Wireless Sensor Network for Structural Health Monitoring Applications in Railway Environments
Iñaki Val, Aitor Arriola, Cristina Cruces, Raul Torrego, Eduardo Gomez and Xabier Arizkorreta ..... 157

A Reference Architecture for Condition Monitoring
Martin Wollschlaeger, Stefan Theurich, Albrecht Winter, Frank Lubnau and Christoph Paulitsch ..... 165

Coffee break

Session 4: Building Automation
Chair: Paolo Ferrari

Distribution of control functionality in energy-aware industrial building environment
Aleksey Bratukhin, Aneeq Mahmood and Anetta Nagy ..... 173

Model-Driven Integration of Building Automation Systems into Web Service Gateways
Daniel Schachinger and Wolfgang Kastner ..... 181

Lunch break

WiP-S2: Wireless Networks, Applications and Virtualized environments
Chair: Aleksey Bratukhin

Exploiting Voting Strategies in Partially Replicated IEC 61499 Applications
Mario de Sousa, Christos Chrysoulas and Aydin Homay ..... 189

ZigBee Cluster Tree Formation For Time-Bounded Data Flows in One Collision
Domain
Aasem Ahmad and Zdenek Hanzalek ..... 193

Developing CPPS within IEC-61499 based on Low Cost Devices
Marcelo Garcia, Federico Pérez, Isidro Calvo and Guadalupe Moran ..... 197

Control of Robots and Machine Tools with an Extended Factory Cloud
Axel Vick, Christian Horn, Martin Rudorfer and Jörg Krüger ..... 201

Pedro M. Rodríguez, Íñaki Val, Aitor Lizeaga and Mikel Mendicute ..... 205

Evaluation of Open Source SIEM for Situation Awareness Platform in the Smart Grid Environment
Rafal Leszczyna and Michal Ryszard Wróbel .... 209

A Sleep-Scheduling Scheme for Enhancing QoS and Network Coverage in IEEE 802.15.4 WSN
Tiago Semprebom, Carlos Montez, Gustavo Araújo and Paulo Portugal ..... 213

Enhancing the Real-Time behavior of IEEE 802.11n
Federico Tramarin, Stefano Vitturi and Michele Luvisotto ..... 217

Towards Low-data-rate Communications for Cooperative Mobile Robots
Gaetano Patti, Giovanni Muscato, Nunzio Abbate and Lucia Lo Bello ..... 221

15:00 - 15:30
Coffee break and poster session 2

15:30 - 17:00
Session 5: Reliability and Safety
Chair: Radu Dobrin

Minimizing Revalidation and Recertification in Evolutionary Embedded Systems
Waled Almakhawi and Roman Obermaisser ..... 225

Improving Safety Message Delivery through RSU’s Coordination in Vehicular Networks
Nuno Ferreira and José Fonseca .... 233

Scheduling feedback for scalability and reliability in a streaming multicast protocol
Julio Cano, Ana Pereira, Luis Oliveira and Luis Almeida ..... 241

17:00 - 17:30
Closing Session