

## Industry Day - Tuesday 06.09.2022

Open to all interested researchers!

9:00 - 9:15 **Welcome Coffee** Foyer 47

### Workshops 9:15 - 10:45

**WS09** **DIVERSE – 4th Workshop on Advanced Technologies in Industrial Vehicular Systems - Part 1** **V47.01**

*Saad Mubeen, Mohammad Ashjaei*

09:15 - 10:45 The innovation in modern vehicles can be largely attributed to advanced computer-controlled functionalities. With the increasing volume of these functionalities, the complexity in vehicular systems has increased enormously over the past few years. The objective of this workshop is to provide a platform to the researchers and practitioners to present and discuss advanced technologies that can address the challenges faced by the developers of vehicular systems.

09:15 - 09:45 Real-time Edge Orchestration: Opportunities and Challenges Dakshina Dasari  
 09:45 - 10:15 Taming overheads and timing analysis of complex data chains in embedded real-time systems Peter Ulbrich  
 10:15 - 10:45 Meeting End-to-End Delays by Design – From Analysis to Implementation Matthias Becker

**WS03** **First Workshop on Implementing Asset Administration Shells (ImplAAS) - Part 1** **V47.02**

*Thomas Kuhn, Sten Grüner, Pablo Oliveira Antonino, Daniel Porta, Frank Schnicke*

09:15 - 10:45 ImplAAS is a workshop to discuss research challenges and experiences regarding the digital transformation of manufacturing environments with Asset Administration Shells and digital twins. Further relevant topics cover the use of AAS for the creation of digital twins, and to virtualize (production) systems. All system domains are welcome. We solicit papers around the use, practical implementations, and experiences with Asset Administration Shells and digital twins that cover a wide range of research topics with a focus on the digital transformation of manufacturing and the digitization of value chains.

09:15 - 09:30 ETFA22-000278 FA\*ST Service – An Open Source Implementation of the Reactive Asset Administration Shell Michael Jacoby  
 09:30 - 09:45 ETFA22-000279 Asset Administration Shell as Integration Layer for the Orchestration of Mixed Process and Manufacturing Plants Julian Grothoff  
 09:45 - 10:00 ETFA22-000282 Migration and synchronization of plant segments with Asset Administration Shells Stephan Schäfer  
 10:00 - 10:15 ETFA22-000296 A Blueprint Of Digital Twins In High Volume Production Environments Using The Asset Administration Shell Sascha Gärtner  
 10:15 - 10:30 ETFA22-000300 Historical Data Storage Architecture Blueprints for the Asset Administration Shell Rene-Pascal Fischer  
 10:30 - 10:45 ETFA22-000311 AI Asset Management: a Case Study with the Asset Administration Shell (AAS) Lukas Rauh

**WS08** **Towards the factory of the future: advances in planning, control, and perception of industrial robots - Part 1** **V47.03**

*Dionisis Andronas, Marco Faroni, Stefano Ghidoni, Alessandro Umbrico*

09:15 - 10:45 Industrial robots play a key role in industrial automation. Robotic arms populate shop-floors: they are used for pick-and-place, assembly, inspection, and many other tasks, to increase the throughput of productive processes and alleviate fatigue and risks of human workers. A huge research effort has been put into the reasoning, planning, and control of robotic manipulators. Nonetheless, industrial implementations often do not exploit at full the great advancements made in these fields. This workshop aims at discussing how recent developments in planning and control of robot manipulators, on the one hand, and synergetic integration with results from Artificial Intelligence and cognition, on the other, can advance the state of the art and be applied to real-world manufacturing.

09:15 - 09:20 Welcome and Introduction Alessandro Umbrico  
 09:20 - 10:20 Invited Talk Werner Klaus  
 10:20 - 10:45 ETFA22-000420 Continuous Teleoperation of a Robotic Manipulator via Brain-Machine Interface with Shared Control Stefano Tortora

**WS02** **CLONAR - Cloud Native Real-Time Systems - Part 1** **V47.06**

*Mohammad Ashjaei, Daniel Corujo, Paulo Pedreiras*

09:15 - 10:45 CLONAR will be a place where R&D solutions involving cloud native and real-time systems will be manifested and shared. The objective is to attract works focusing on either advancements from the industrial sphere or the cloud sphere (or both), in order to achieve groundbreaking innovative systems for industry automation. Theoretical, experimental, trials or lessons learned will allow the experts communities of both areas to witness the deployment capability of the state of the art, or to pave the way for further evolutions.

09:15 - 09:45 ETFA22-000400 TOLERANCER: A Fault Tolerance Approach for Cloud Manufacturing Environments Auday Al-Dulaimy  
 09:45 - 10:15 Toward Networking for Intelligent Realities Kurt Tutschku  
 10:15 - 10:45 A cloud on time Johan Eker

**WS05** **Biointelligent Manufacturing – Looking to biology with engineering eyes - Part 1** **V47.05**

*Thomas Bauernhansl, Robert Mieke, Ralf Takors*

09:15 - 10:45 The aim of the workshop is to bring together researchers and practitioners and provide them with a platform to report on recent advances in the newly emerging area of biointelligent manufacturing. After the talks of three invited speakers, we attempt to define the basis for a joint perspectives paper in a peer-reviewed journal in a collaborative workshop.

09:15 - 09:45 Biointelligence – A new perspective for sustainable production? Thomas Bauernhansl  
 09:45 - 10:15 How bioconvergence does change products and processes? Holger Eickhoff  
 10:15 - 10:45 Status, potentials and challenges of soft sensors in bioprocess technology Dominik Ulrich Geier

10:45 - 11:00 **Coffee Break** Foyer 47

### Workshops 11:00 - 13:00

**WS09** **DIVERSE: Advanced Technologies in Vehicular Systems - Part 2** **V47.01**

11:00 - 11:30 Towards Smart Construction Vehicle Industry Sara Afshar  
 11:30 - 12:00 New cloud services for ADAS with 5G communications Roberto Cavicchioli  
 12:00 - 12:30 Using TSN for Timing Critical Communication in Avionics & Aerospace : Requirements and Challenges Rafik Henia  
 12:30 - 13:00 Bringing Model-driven Vehicle Software Architectures and Timing Analysis Together: The Rubus Approach John Lundbäck

**WS03** **First Workshop on Implementing Asset Administration Shells (ImplAAS) - Part 2** **V47.02**

11:00 - 11:15 ETFA22-000326 Asset Administration Shell as an Enabler of Intent-Based Networks for Industry 4.0 Automation Refik Fatih Ustok  
 11:15 - 11:30 ETFA22-000346 Implementing a Metadata Manager for Machine Learning with the Asset Administration Shell Alexandre Sawczuk da Silva  
 11:30 - 11:45 ETFA22-000405 Employing Messenger Communication with Asset Administration Shells Markus Damm

WS07	<b>Future of Process Automation in BioPharma - Part 1</b>		V47.02
Lucas Vogt, Anselm Klose			
12:00 - 13:00	The biopharma industry imposes a unique set of requirements and challenges for the automation of its processes, whose emphases differ significantly from other industries. Consequently, this workshop aims to create a discussion platform for the industry specific needs regarding automation technologies. The talks aim to interconnect process automation, factory automation and operator centric design for biopharma from an industry point of view.		
12:00 - 12:30	Introduction to the BioPharma World from an Owner/Operator View		Uwe Schwarzat
12:30 - 13:00	Outlook Digital Plants in Biopharma		Michel Claes
WS08	<b>Towards the factory of the future: advances in planning, control, and perception of industrial robots - Part 2</b>		V47.03
11:00 - 11:25	ETFA22-000389	Learning Action Duration and Synergy in Task and Motion Planning for Human-Robot Collaboration	Samuele Sandrini
11:25 - 11:50	ETFA22-000412	Enhanced Cognition for Adaptive Human-Robot Collaboration	Alessandro Umbrico
11:50 - 12:15	ETFA22-000359	Inverse Optimal Control for the identification of human objective: a preparatory study for physical Human-Robot Interaction	Paolo Franceschi
12:15 - 12:45	Panel Discussion and Conclusions		
WS02	<b>CLONAR - Cloud Native Real-Time Systems - Part 2</b>		V47.06
11:00 - 11:30	Predictable Cloud Computing Enhanced by Real-Time Scheduling in the Linux Kernel		Tommaso Cucinotta
WS05	<b>Biointelligent Manufacturing – Looking to biology with engineering eyes - Part 2</b>		V47.05
11:00 - 13:00	Joint Workshop		
WS06	<b>Digital twins, components and systems for smart mechatronic applications - Part 1</b>		V47.04
Martin Cech, Manuel Beschi, Antonio Visioli			
11:00 - 13:00	Research on digital twin technologies is affecting all of engineering domains. Specifically, one can see huge interest of applying digital twin technologies in smart production technologies, robots and mechatronic devices. However, lots of components and systems must be modelled, each with a bit different approach. The proposed workshop should focus on specific systems (SW, HW, sensors, actuators) that are necessary to run machines in optimal way. Next, workshop will focus on specific toolchains and modelling platforms that allow to model those components and integrate partial models into bigger units using standardized interfaces.		
11:00 - 11:20	ETFA22-000360	Whitening of greenhouse's roof using drones and Petri net models	Sofia Hustiu
11:20 - 11:40	ETFA22-000347	Digital Twins and AI in Smart Motion Control Applications	Martin Cech
11:40 - 12:00	ETFA22-000286	An Evaluation Framework for Vision-in-the-Loop Motion Control Systems	Chaitanya Jugade
12:00 - 12:20	ETFA22-000249	Automated Multi-sensory Data Collection System for Continuous Monitoring of Refrigerating Appliances Recycling Plants	Mikhail Polikarpov
12:20 - 12:40	ETFA22-000357	Construction of a Digital Twin for Reliability Analysis: A Case Study of a Storage Process	Vicente Lucena
12:40 - 13:00	ETFA22-000372	Design of robust PI controller by combining robustness regions with time-domain criteria	Martin Cech
WS10	<b>Enabling robust, converged networks for Industry 4.0 - Part 1</b>		V47 1.125
Lukasz Wisniewski, Jos Knockaert, Philippe Saey			
11:00 - 13:00	The aim of this workshop is to present and practically demonstrate the state of the art of some of the key enabling technologies of Industry 4.0, such as SPE, TSN and OPC UA PubSub, and to evaluate how these facilitate the convergence of OT and IT networks for Industry 4.0. This workshop will deliver high quality lectures by experienced domain experts, describing the potentials as well as the limits of the technologies mentioned above. To facilitate the interactive discussion, the workshop will be accompanied by several live demonstrations using industrially relevant equipment, that practically show the current possibilities of the mentioned technologies, a number of measurement tools and methods, and aspects of robustness such as EMI/EMC and redundancy.		
11:00-11:10	Welcome and introduction to the workshop		
11:10-11:30	TSN Fundamentals		Mario Schoppmeier
11:30-11:45	Converged OT and IT traffic in TSN network with brownfield PROFINET RT		Arne Verhoeven
11:45-12:00	Ethernet TSN preemption - live demonstration		Mario Schoppmeier
12:00-12:25	OT/IT traffic in brownfield TSN vs. PROFINET RT - live demonstration		Arne Verhoeven
13:00 - 14:00	<b>Lunch Break</b>		Mensa
14:00 - 15:00	<b>Plenary Speech Industry Day „Practicalities of Data Analytics and AI in Industrial Control” - Dr. Andrea Dunbar (CSEM SA)</b>		V47.01
15:00 - 15:15	<b>Coffee Break</b>		Foyer 47
<b>Workshops 15:15 - 17:45</b>			
WS09	<b>DIVERSE: Advanced Technologies in Vehicular Systems - Part 3</b>		V47.01
15:15 - 16:45	The new game in town: RUST in the automotive context		Paulo Garcia
15:45 - 16:30	Panel Discussion		
WS07	<b>Future of Process Automation in BioPharma - Part 2</b>		V47.02
15:15 - 15:45	Industrial Modular and Mobile Automation for a Bio Facility of the Future		Frank Maurer
15:45 - 16:15	User Guided Decision Making: The Future of Biologics Development and Manufacturing		David Pollard
16:15 - 16:45	Conductive Design for Process Engineering and Plant Operation		Florian Pelzer
16:45 - 17:45	Panel Discussion		
WS06	<b>Digital twins, components and systems for smart mechatronic applications - Part 2</b>		V47.04
15:15 - 15:35	ETFA22-000379	Comparing repetitive control strategies in lift applications	Manuel Beschi
15:35 - 15:55	ETFA22-000415	Sim2Real image translation to improve a synthetic dataset for a bin picking task	Diana Duplevska
15:55 - 16:15	ETFA22-000255	NC controlled robot for adaptive and constant force 3D polishing	Diego Gonzalez

WS10	Enabling robust, converged networks for Industry 4.0 - Part 2		V47.1.125
14:00-14:25		Robustness against EMI: continuous waves vs. broadband vs. real life	Jos Knockaert
14:25-14:30		Redundancy for robustness: 802.1CB	Arne Verhoeven
14:30-14:50		Single Pair Ethernet: Fundamentals & measurement methods	Philippe Saey
15:10-15:45		Ethernet, RS485 and SPE under EMI - live demonstration	Jos Knockaert
15:45-16:00		Single Pair Ethernet Measurements - live demonstration	Mathieu Troch
16:00-16:25		802.1CB and HSR+PRP - live demonstration	Arne Verhoeven
16:25-16:45		OPC UA PubSub in TSN networks	Oliver Konradi
16:45-17:05		OPC UA TSN on field level devices - live demonstration	Oliver Konradi
19:00 - 22:00	<b>Welcome Reception</b>		White Hall of the New Castel ("Weisser Saal im Neunen Schloss") Schloßplatz 4, 70173 Stuttgart
<b>Wednesday Session - 07.08.2022</b>			
8:45 - 9:30	<b>Welcome Ceremony</b>		V47.01
9:30 - 10:30	<b>Keynote: „Industrie 4.0 from Technologies to Ubiquitous Use“ - Prof. Dr. Dr. h.c. Detlef Zühlke (Technologie-Initiative SmartFactory KL e.V.)</b>		V47.01
10:30 - 11:00	<b>Coffee Break</b>		Foyer 47
<b>Parallel Sessions 11:00 - 12:30</b>			
T4	<b>Digital Twins and their Application</b>		V47.01
	Hans Wernher van de Venn   Vicente Lucena		
11:00 - 11:20	ETFA22-000176	A factory planning and design framework for integrating the Digital Twin in Industry 4.0	Tim van Erp
11:20 - 11:40	ETFA22-000177	Method for selecting Digital Twins of Entities in a System-of-Systems approach based on essential Information Attributes	Milapji Singh Gill
11:40 - 12:00	ETFA22-000198	Integrating an XPath-Enhanced OPC UA Data Collection Into Industrial Communication	Johannes Theissen-Lipp
12:00 - 12:20	ETFA22-000268	A Virtual Commissioning Selection Approach for Machine Automation	Daniel Siegrist
T1	<b>Domain Specific Modeling and Software Engineering in Automation</b>		V47.02
	Bianca Wiesmayr   Alexander Fay		
11:00 - 11:20	ETFA22-000141	Domain-specific Language for Condition Monitoring Software Development	Faruk Pasic
11:20 - 11:40	ETFA22-000186	Architecture Blueprints to Enable Scalable Vertical Integration of Assets with Digital Twins	Frank Schnicke
11:40 - 12:00	ETFA22-000161	Software deployment in manufacturing environments: A requirements analysis	Matthias Schneider
12:00 - 12:20	ETFA22-000114	Industry Voices on Software Engineering Challenges in Cyber-Physical Production Systems Engineering	Kevin Feichtinger
T10	<b>Artificial Intelligence and Energy Systems</b>		V47.03
	Andrea Bonci   Tomas Ausberger		
11:00 - 11:20	ETFA22-000243	Learning Physically Meaningful Representations of Energy Systems with Variational Autoencoders	Samim Multaheb
11:20 - 11:40	ETFA22-000105	Active Power Optimization of a Turning Process by Cutting Conditions Selection: A Q-Learning Approach	Aitor Duo
11:40 - 12:00	ETFA22-000156	Embedding Anomaly Detection Autoencoders for Wind Turbines	José Luis Conradi Hoffmann
12:00 - 12:20	ETFA22-000094	Reducing configuration efforts in energy management systems based on natural language processing methods and asset administration shells	Maximilian Both
SS06	<b>Innovative applications of Time Sensitive Networking (TSN) technologies and standards</b>		V47.04
	Stefano Scanzio   Alon Regev		
11:00 - 11:20	ETFA22-000042	Updating the Linux TAPRIO Scheduler in Deterministic Time	Christian von Arnim
11:20 - 11:40	ETFA22-000115	Safety-related Applications over Wireless Time Sensitive Networks	Jetmir Haxhibeqiri
11:40 - 12:00	ETFA22-000185	On the relevance of TSN for Substation Communication Networks	Théo Docquier
12:00 - 12:20	ETFA22-000189	Time-Sensitive Networking Over 5G for Industrial Control Systems	Nikhileswar Kota
T3	<b>Scheduling and analysis of real-time systems applications</b>		V47.05
	Inés Alvarez Vadillo   Mohammad Ashjaei		
11:00 - 11:20	ETFA22-000029	Distributed method for Economic Dispatch Problem in power network with multiple uncertainties	Karel Kubiček
11:20 - 11:40	ETFA22-000098	Task and Memory Mapping Optimization for SDRAM Interference Minimization on Heterogeneous MPSoCs	Alfonso Mascareñas González
11:40 - 12:00	ETFA22-000100	Contention-free scheduling of PREM tasks on partitioned multicore platforms	Zahaf Houssam-Eddine
12:00 - 12:20	ETFA22-000155	Intrusion Detection in Multicore Embedded Systems based on Artificial Immune Systems	Leonardo Passig Horstmann
T5	<b>Advanced Design of Industrial Controllers</b>		V47.06
	Antonio Visioli   Ivan. Pisa		
11:00 - 11:20	ETFA22-000006	Custom Matlab Toolbox for Systems with Parametric Uncertainties and Time Delay with Factorization for Two-Degree-of-Freedom Feedback Loop	Marek Dłapa
11:20 - 11:40	ETFA22-000149	Transfer Learning Suitability Metric for ANN-based Industrial Controllers	Ivan Pisa
11:40 - 12:00	ETFA22-000023	A comparison between PID and PIDA controllers	Antonio Visioli
12:30 - 14:00	<b>LUNCH BREAK</b>		Mensa

Parallel Sessions 14:00 - 15:30

T4		Operation and Maintenance		V47.01
		Nico Braunisch   Santiago Soler Perez Olaya		
14:00 - 14:20	ETFA22-000082	Maintenance interval monitoring and cutting edge breakout detection using an instrumented tool	Sascha Gent	
14:20 - 14:40	ETFA22-000165	Anomaly Detection in Hot Forming Processes using Hybrid Modeling - Part II	Cederic Lenz	
14:40 - 15:00	ETFA22-000233	Machine learning for monitoring and predictive maintenance of cutting tool wear for clean-cut machining machines	Andrea Bonci	
15:00 - 15:20	ETFA22-000060	On the Impact of Transport Times in Flexible Job Shop Scheduling Problems	Damiano Carra	
T1		Performance Issues and Energy Management		V47.02
		Jörg Walter   Patrick Denzler		
14:00 - 14:20	ETFA22-000166	Energy-efficient Flow-shop Scheduling in the Printing Industry using Memetic Algorithm	Ke Shen	
14:20 - 14:40	ETFA22-000209	Probability-based, Risk-adjusted Energy Consumption Optimisation in Industrial Applications	Aleksey Bratukhin	
14:40 - 15:00	ETFA22-000032	Exploring Timing Covert Channel Performance over the IEEE 802.15.4	Ricardo Severino	
15:00 - 15:20	ETFA22-000207	How Real (Time) Are Virtual PLCs?	Diogenes Javier Perez	
T10		Artificial Intelligence Approaches for Automation		V47.03
		Martin Cech   Karel Kubicek		
14:00 - 14:20	ETFA22-000170	Graph Neural Networks Based Meta-scheduling in Adaptive Time-Triggered Systems	Samer Alshaer	
14:20 - 14:40	ETFA22-000039	Towards Deep Industrial Transfer Learning: Clustering for Transfer Case Selection	Benjamin Maschler	
14:40 - 15:00	ETFA22-000058	Synthetic time series dataset generation for unsupervised autoencoders	Hendrik Klopries	
15:00 - 15:20	ETFA22-000146	Identifying repeating patterns in IEC 61499 systems using feature-based embeddings	Antonio Manuel Gutierrez	
WIP6		Computer Vision and Human-Machine Interaction in Industrial and Factory Automation		V47.04
		Riccardo Monica   Frank Golasowski		
14:00 - 14:05	ETFA22-000265	AI-Based Assistance System for Manufacturing	Sahar Deppe	
14:05 - 14:10	ETFA22-000292	Identification of Barriers to and Opportunities for Adoption of Machine Vision for Small and Medium-sized Enterprises	Mikkel Graugaard Antonsen	
14:10 - 14:15	ETFA22-000305	Visual Detection of Tiny and Transparent Objects for Autonomous Robotic Pick-and-Place Operations	Timo Markert	
14:15 - 14:20	ETFA22-000306	COVERED, CollabOrative Robot Environment Dataset for 3D Semantic segmentation	Fatemeh Mohammadi Amin	
14:20 - 14:25	ETFA22-000322	Comparison of Deep Learning Models in Position Based Visual Servoing	Cosmin Copot	
14:25 - 14:30	ETFA22-000351	Towards Tabular Data Extraction From Richly-Structured Documents Using Supervised and Weakly-Supervised Learning	Arnab Ghosh Chowdhury	
14:30 - 14:35	ETFA22-000388	Multi-Model Machine Learning based Industrial Vision Framework for Assembly Part Quality Control	Steffen Klarmann	
14:35 - 14:40	ETFA22-000396	Segmentation and Error Detection of PV Modules	Amr Abdo	
14:40 - 14:45	ETFA22-000284	Concept for a Distributed Picking Application Utilizing Robotics and Digital Twins	Magnus Redeker	
WIP8		Intelligent Sensors, Sensor Networks, and Information Processing		V47.04
		Frank Golasowski   Philipp Westphal		
14:45 - 14:50	ETFA22-000271	A Methodology for classifying Data relevance to utilize external Data Sources in the Digital Twin	Gary Hildebrandt	
14:50 - 14:55	ETFA22-000299	Using Machine Learning for Diaphragm Prediction in Solenoid Valves	Sebastian Heinze	
14:55 - 15:00	ETFA22-000325	Sensor fusion for functional safety of autonomous mobile robots in urban and industrial environments	Yannick Wunderle	
15:00 - 15:05	ETFA22-000327	Time-efficient Sensor Data Prediction using ID-C-MLP Algorithm for Industrial IoT	Made Adi Paramartha Putra	
15:05 - 15:10	ETFA22-000371	Real-Time Velocity Estimation Algorithm for a Multivariable Motion Sensor	Federico Mazzoli	
15:10 - 15:15	ETFA22-000259	Additive-subtractive manufacturing of multi-material sensor-integrated electric machines using the example of the transversal flux machine	Michael Baranowski	
WIP3		Analysis of real-time applications		V47.05
		Svetlana Girs   Gaetano Patti		
14:00 - 14:05	ETFA22-000264	Heuristic-based Task-to-Thread Mapping in Multi-Core Processors	Mohammad Samadi Gharajeh	
14:05 - 14:10	ETFA22-000356	A Two-phase Metamorphic Approach for Testing Industrial Control Systems	Dragos Truscan	
14:10 - 14:15	ETFA22-000381	Memory allocation for low-power real-time embedded microcontroller: a case study	Tomasz Kloda	
14:15 - 14:20	ETFA22-000398	Towards Practical and Formal Security Risk Analysis of IoT Applications	Muhammad Taimoor Khan	
14:20 - 14:25	ETFA22-000377	Cognitive and Time Predictable Task Scheduling in Edge-cloud Federation	Mohammad Ashjaei	
WIP2		Industrial Communication Technologies and Systems & Real-Time (and Networked) Embedded Systems		V47.05
		Gaetano Patti   Svetlana Girs		
14:25 - 14:30	ETFA22-000393	5G RAN Slicing to Support Reliability in Industrial Applications	M.Carmen Lucas-Estañ	
14:30 - 14:35	ETFA22-000291	Data Autonomy in Message Brokers in Edge and Cloud for Mobile Machinery: Requirements and Technology Survey	Petri Kannisto	
14:35 - 14:40	ETFA22-000267	NextGenGW: a software-based architecture targeting IoT interoperability	Carlos Resende	
14:40 - 14:45	ETFA22-000418	Exploiting Software-Defined Networking to improve runtime reconfigurability of TSN-based networks	Luca Leonardi	
14:45 - 14:50	ETFA22-000352	Towards an Industrial Converged Network with OPC UA PubSub and TSN	Oliver Konradi	
14:50 - 14:55	ETFA22-000368	Secure Onboarding of IIoT Devices using OPC UA	Florian Kohnhäuser	
14:55 - 15:00	ETFA22-000390	The Effects of Clock Synchronization in TSN Networks with Legacy End-stations	Mohammad Ashjaei	
15:00 - 15:05	ETFA22-000319	Implementing a First CNC for Scheduling and Configuring TSN Networks	Inés Álvarez	
15:05 - 15:10	ETFA22-000364	MALOC: Building an adaptive scheduling and routing framework for rate-constrained traffic in TSN	Nitin Desai	
15:10 - 15:15	ETFA22-000335	Towards multi-hop real-time communications over LoRa networks for industrial applications	Lucia Lo Bello	
15:15 - 15:20	ETFA22-000273	Towards a Testbed for Critical Industrial Systems: SunSpec Protocol on DER Systems as a Case Study	Esteban Damian Gutierrez Mlot	
T5		Industrial Control Applications		V47.06
		Fotis Koumboulis   Gabriel Laport Vargas		
14:00 - 14:20	ETFA22-000121	Supervisor design for an assembly line in the presence of faults	Fotis N. Koumboulis	
14:20 - 14:40	ETFA22-000129	Makespan reduction for Time-Weighted Systems using a Clonal Selection algorithm	Gabriel Laport Vargas	
14:40 - 14:45	ETFA22-000175	Manoeuvring of Differential Drive Mobile Robots on Horizontal Plane through I/O Decoupling	Fotis N. Koumboulis	
15:30 - 16:00	Coffee Break		Foyer 47	

Parallel Sessions 16:00 - 17:30

T4		Optimisation		V47.01
		Santiago Soler Perez Olaya   Hans Wernher van de Venn		
16:00 - 16:20	ETFA22-000037	Grey Wolf Optimization using Improved mutation oppositional based learning for optimization problems	Hayata Saitou	
16:20 - 16:40	ETFA22-000195	Exploiting Process Dynamics in Multi-Stage Schedule Optimization for Flexible Manufacturing	Michael Balszun	
16:40 - 17:00	ETFA22-000208	Energy-optimal timing of stochastic robot stations in automotive production lines	Mattias Hovgard	
17:00 - 17:20	ETFA22-000157	An open source benchmark simulator for sustainable and flexible pharmaceutical manufacturing	Dana Copot	

T1	Safety and Security		V47.02
	Kaja Balzereit   Alois Zoitl		
16:00 - 16:20	ETFA22-000103	Functional Safety Use Cases in the Context of Reconfigurable Manufacturing Systems	Dieter Etz
16:20 - 16:40	ETFA22-000192	Towards Resilience by Self-Adaptation of Industrial Control Systems	Laurin Prenzel
16:40 - 17:00	ETFA22-000014	An OT Forensic Model Based on Established IT Forensics Using IIRA	Alexios Karagiozidis
17:00 - 17:20	ETFA22-000055	On the Security of IO-Link Wireless Communication in the Safety Domain	Thomas Doebbert

T10	Artificial Intelligence Applications		V47.03
	Marina Indri   Pangcheng David Cen Cheng		
16:00 - 16:20	ETFA22-000204	Development of a Framework for Continual Learning in Industrial Robotics	Minh Trinh
16:20 - 16:40	ETFA22-000110	An AI benchmark for Diagnosis, Reconfiguration & Planning	Jonas Ehrhardt
16:40 - 17:00	ETFA22-000219	A Digital Twin-based Approach Performing Integrated Process Planning and Scheduling for Service-based Production	Zai Mueller-Zhang

T8	Intelligent Sensors, Sensor Networks, and Information Processing		V47.04
	Frank Golaowski   Ramez Doud		
16:00 - 16:20	ETFA22-000010	Hierarchical Feature Fusion based Reconstruction Network for Unsupervised Anomaly Detection	Binjie Zhao
16:20 - 16:40	ETFA22-000074	Comprehensive Analysis of Supply Voltage Watermarking for Protection of Sensor Systems	Albert Treytl
16:40 - 17:00	ETFA22-000083	Universal energy information model for industrial communication	Maxim Runge
17:00 - 17:20	ETFA22-000235	Approximate Fast Fourier Transform-based Preprocessing for Edge AI	Lukas Krupp
17:20 - 17:40	ETFA22-000251	Identification, Activity, and Biometric Classification using Radar-based Sensing	Le Nguyen

SS01	Model-based/Data-driven Safety, Security and Privacy in Society 5.0		V47.06
	Taimoor Khan   Dimitrios Serpanos		
16:00 - 16:20	ETFA22-000244	Towards Multilevel Modelling and Monitoring of Real-time Personalised Health Conditions	Asad Aftab
16:20 - 16:40	ETFA22-000246	A Civil Protection Early Warning System to Improve the Resilience of Adriatic-Ionian Territories to Natural and Man-made Risk	Kyriakos Stefanidis
16:40 - 17:00	ETFA22-000248	On the Performance and Scalability of Simulators for Improving Security and Safety of Smart Cities	Ali Mohsin

SS12	Automation of Automation		V47.05
	Werner Kraus   Thomas Bauernhansl		
16:00 - 16:20	ETFA22-000125	Towards Automatic Inventory Checking Using an Autonomous Unmanned Aerial Vehicle	Jaromir Stanko
16:20 - 16:40	ETFA22-000127	Efficient Creation of Behavior Models for Digital Twins Exemplified for Vacuum Gripping Systems	Valentin Stegmaier
16:40 - 17:00	ETFA22-000134	Semantic Modeling of a cyber-physical biological production platform	Simon Pieske
17:00 - 17:20	ETFA22-000181	Integration method of custom information models into existing OPC UA Servers	Aleksandra Mueller

## Thursday Session - 08.09.2022

Parallel Sessions 9:00 - 10:30

WIE	Women in IES - Part 1		V47.01
	Lucia Lo Bello   Larisa Dunai		
9:30 - 9:40		Welcome and Introduction to the Women in IES initiative	Lucia Lo Bello
09:40 - 10:00		The role of AI and Explainable AI in Telecom industry	Rafia Inam
10:00 - 10:20		Collaborative robotics as part of the daily activities in various fields	Marta Millet Pascual Leone

T1	IT System Architectures and IT/OT Convergence		V47.02
	Virendra Ashiwal   Wolfgang Kastner		
9:00 - 9:20	ETFA22-000089	A toolchain for testing OPC UA interfaces	Andrea Walchshofer
9:20 - 9:40	ETFA22-000196	Supporting a Model-driven Development Process for Distributed Control Software	Bianca Wiesmayr
9:40 - 10:00	ETFA22-000236	Comparing Different Persistent Storage Approaches for Containerized Stateful Applications	Patrick Denzler
10:00 - 10:20	ETFA22-000113	Architecture Blueprints for the Application of the Industry 4.0 Asset Administration Shell	Frank Schnicke

WIP9	Recent research in Complex Automation Systems and Systems Engineering		V47.03
	Christian Neureiter   Arndt Lüder		
9:00 - 9:05	ETFA22-000262	A bi-directional Interface enabling cross-disciplinary Systems Engineering with RAMI 4.0 and AutomationML	Christoph Binder
9:05 - 9:10	ETFA22-000283	Digital resource models in engineering and operation – Data transformation and process changes	Carmen Listl
9:10 - 9:15	ETFA22-000340	Functional Smart Grid Application Development	Felix Knorr
9:15 - 9:20	ETFA22-000342	Automated Model-Based Reliability Assessment of Software-Defined Manufacturing	Philipp Grimmeisen
9:20 - 9:25	ETFA22-000344	Static Data Race Detection in Multi-Task Programs for Industrial Robots	Meenakshi D'Souza
9:25 - 9:30	ETFA22-000348	A New Approach to Secure Industrial Communication Systems Based on Revolution Pi Module	Henry Beuster
9:30 - 9:35	ETFA22-000350	Studio4Education: An Educational Model-Driven Workbench for IoT Automation	Fadwa Reikik
9:35 - 9:40	ETFA22-000353	Balanced Selection in Industrial Bin Picking	Sofia Fernanda Espericueta Martinez
9:40 - 9:45	ETFA22-000365	Upcoming domains for the MTP and an evaluation of its usability for electrolysis	Lukas Bittorf
9:45 - 9:50	ETFA22-000367	A software engineering point of view on digital twin architecture	Gaëlic Bechu
9:50 - 9:55	ETFA22-000387	Formed Workpieces in Industrial Bin Picking	Matthias Sarna
9:55 - 10:00	ETFA22-000391	Towards Coordinating Production Reconfiguration	Kristof Meixner
10:00 - 10:05	ETFA22-000399	Data requirements for factory layout planning and simulation – Setting up a module-based concept for information delivery manuals	Marian Süße
10:05 - 10:10	ETFA22-000406	Towards Design Patterns for Production Security	David Hoffmann
10:10 - 10:15	ETFA22-000407	Towards Multi-View Test Specification in CPPS Engineering	Dietmar Winkler

WIP5	Industrial Control		V47.04
	Ramon Vilanova   Raúl Suárez		
9:00 - 9:05	ETFA22-000313	Improving Gold Mining Process Operations using Advanced Control Systems	Ramon Vilanova
9:05 - 9:10	ETFA22-000339	Nonlinear model based control for the BioPower 5 CHP plant	Jukka Kortela

<b>WIP7</b>	<b>Intelligent Robots and Systems</b>		<b>V47.04</b>
	Raul Suárez   Ramon Vilanova		
9:10 - 9:15	ETFA22-000263	Graphical visualization of contact forces and hand movements during in-hand manipulation	Raul Suarez
9:15 - 9:20	ETFA22-000317	Efficient and robust trajectory generation for robotic manipulators	Leopold Palomo-Avellaneda
9:20 - 9:25	ETFA22-000341	Learning-based Success Validation for Robotic Assembly Tasks	Arik Laemmle
9:25 - 9:30	ETFA22-000358	Edge Computing in Autonomous and Collaborative Assembly Lines	Dominik Urbaniak
9:30 - 9:35	ETFA22-000369	Vehicle Fault-Tolerant Robust Power Transmission Line Inspection Planning	František Nekovář
9:35 - 9:40	ETFA22-000373	Learning-based Detection of Leg-Surface Contact using Position Feedback Only	Jiří Kubík
9:40 - 9:45	ETFA22-000375	Towards Industry-Inspired Use-Cases for Path Finding in Robotic Mobile Fulfillment Systems	Benedikt Hein
9:45 - 9:50	ETFA22-000384	A framework for safe and intuitive human-robot interaction for assistant robotics	Fiorella Sibona
9:50 - 9:55	ETFA22-000397	Randomized multi-goal path planning for Dubins vehicles	Vojtech Vonasek
9:55 - 10:00	ETFA22-000403	Reasoning and state monitoring for the robust execution of robotic manipulation tasks	Jan Rosell
<b>T4</b>	<b>Verification and Testing</b>		<b>V47.05</b>
	Tobias Kleinert   Nico Braunsch		
9:00 - 9:20	ETFA22-000028	Verification of a safety-related I&C system for nuclear power plant by model checking, test case generation and automatic testing	Karel Kubiček
9:20 - 9:40	ETFA22-000310	Automatic Test Suite Generation for PLC Software in the Internet of Production	Marco Grochowski
<b>WIP04</b>	<b>Automated Manufacturing Systems</b>		<b>V47.05</b>
	Tobias Kleinert   Nico Braunsch		
9:40 - 9:45	ETFA22-000280	Work cell for assembling small components in PCB	Mauro Queirós
9:45 - 9:50	ETFA22-000297	Extracting Functional Machine Knowledge from STEP Files for Digital Twins	Birte Caesar
9:50 - 9:55	ETFA22-000307	AI-Based Surface Roughness Prediction Model for Automated CAM-Planning Optimization	Lea Tonejša
9:55 - 10:00	ETFA22-000309	Quality inspection of critical aircraft engine components: towards full automation	Davide Cannizzaro
10:00 - 10:05	ETFA22-000411	Behavior Trees based Flexible Task Planner Built on ROS2 Framework	Thomas Ribeaud
10:05 - 10:10	ETFA22-000413	A graph-based knowledge representation and pattern mining supporting the Digital Twin creation of existing manufacturing systems	Dominik Braun
<b>T10</b>	<b>Artificial Intelligence and Manufacturing</b>		<b>V47.06</b>
	Antonio Visioli   Samuele Sandrini		
9:00 - 9:20	ETFA22-000223	Benchmarking and Prediction of Entities Performance on Manufacturing Processes through MEA, Robust XGBoost and SHAP Analysis	Eugénio Rocha
9:20 - 9:40	ETFA22-000225	Impact Analysis of KPI Scenarios, Automated Best Practices Identification, and Deviations on Manufacturing Processes	Maria Joao Lopes
<b>WIP10</b>	<b>Artificial Intelligence in Automation</b>		<b>V47.06</b>
	Antonio Visioli   Samuele Sandrini		
9:40 - 9:45	ETFA22-000324	Active Learning Application for Recognizing Steps in Chemical Batch Production	Benjamin Klöpffer
9:45 - 9:50	ETFA22-000328	Explaining solutions to multi-stage stochastic optimization problems to decision makers	Andreas Bunte
9:50 - 9:55	ETFA22-000362	FPGA Realization of a Neural Network based Motor Controller	Francesco Diodati
9:55 - 10:00	ETFA22-000363	Automated generation of asset administration shell: A transfer learning approach with neural language model and semantic fingerprints	Yuchen Xia
10:00 - 10:05	ETFA22-000414	Deep learning-based 5G indoor positioning in a manufacturing environment	Hannes Vietz
10:05 - 10:10	ETFA22-000378	ML4ProFlow: A Framework for Low-Code Data Processing from Edge to Cloud in Industrial Production	Christian Klarhorst
10:10 - 10:15	ETFA22-000394	A reinforcement learning approach for optimal heating curve adaption	Stephan Seidel
10:30 - 11:00	<b>Coffee Break</b>		<b>Foyer 47</b>
<b>WIE</b>	<b>Women in IES - Part 2</b>		<b>V47.01</b>
11:20 - 11:40	From Oilfield to IT – life as a woman in Engineering		Nadja Yang
11:40 - 12:00	Agile Development @ Bosch Power Tools		Heike Raatz
12:00 - 12:20	Closing		Lucia Lo Bello
<b>T11</b>	<b>Communication in Vehicular Systems</b>		<b>V47.02</b>
	Saad Mubeen   Ramez Daoud		
11:00 - 11:20	ETFA22-000021	Efficient Timing Isolation for Mixed-Criticality Communication Stacks in Performance Architectures	Kai-Björn Gemlau
11:20 - 11:40	ETFA22-000092	SynAVB: Route and Slope Synthesis Ensuring Guaranteed Service in Ethernet AVB	Weijiang Kong
11:40 - 12:00	ETFA22-000047	Characterization of Multi-Gigabit Automotive Ethernet Channel Radiated Emissions in Relation to ECU PCB Shield-Ground Implementations	Jamila Josip Borda
12:00 - 12:20	ETFA22-000160	Modeling Misbehavior Detection Timeliness in VANETS	Mateus Martínez de Lucena
<b>SS02</b>	<b>Modelling and Digital Twin</b>		<b>V47.03</b>
	Nasser Jazdi   Vicente Lucena		
11:00 - 11:20	ETFA22-000107	A methodology for creating semantic digital twin models supported by knowledge graphs	Charles Steinmetz
11:20 - 11:40	ETFA22-000182	ISO23247 Digital Twin Approach for Industrial Grade Radio Frequency Testing Station	Valdemar Leiras
11:40 - 12:00	ETFA22-000066	A Structure of Modelling Depths in Behavior Models for Digital Twins	Valentin Stegmaier
<b>SS04</b>	<b>Automation of modular systems and the Module Type Package 1</b>		<b>V47.04</b>
	Andreas Stutz   Michelle Blumenstein		
11:00 - 11:20	ETFA22-000158	Coordination of Modular Packaging Lines Using Automation Service Choreographies	Michelle Blumenstein
11:20 - 11:40	ETFA22-000172	MTPPy: Open-Source AI-friendly Modular Automation	Valentin Khaydarov
11:40 - 12:00	ETFA22-000080	Intention-based engineering for the early design phases and the automation of modular process plants	Artan Markaj
12:00 - 12:05	ETFA22-000316	Modelling service properties to manage their diversity within modular manufacturing plants (WIP)	Pascal Habiger
12:05 - 12:10	ETFA22-000365	Upcoming domains for the MTP and an evaluation of its usability for electrolysis (WIP)	Lukas Bittorf
<b>SS05</b>	<b>Machine Learning and Data Analytics for Failure Analysis in Automation and the Manufacturing Industry 1</b>		<b>V47.05</b>
	Simon Kamm   Anis Hoayek		
11:00 - 11:20	ETFA22-000026	Simulation-to-Reality based Transfer Learning for the Failure Analysis of SiC Power Transistors	Simon Kamm
11:20 - 11:40	ETFA22-000106	NLP based on GCGVAE for intelligent Fault Analysis in Semiconductor industry	Zhiqiang Wang
11:40 - 12:00	ETFA22-000215	FIDGET: Deep Learning-Based Fault Injection Framework for Safety Analysis and Intelligent Generation of Labeled Training Data	Tagir Fabarisov

SS07		<b>Skill Based Systems Engineering 1</b> Aljosha Köcher   Kristof Meixner	V47.06
11:00 - 11:20	ETFA22-000087	Capabilities and Skills in Manufacturing: A Survey Over the Last Decade of ETFA	Kristof Meixner
11:20 - 11:40	ETFA22-000101	Using Behavior Trees for Coordination of Skills in Modular Reconfigurable CPPMs.	Aleksandr Sidorenko
11:40 - 12:00	ETFA22-000073	Modeling and Executing Production Processes with Capabilities and Skills using Ontologies and BPMN	Aljosha Köcher
12:00 - 12:20	ETFA22-000159	Dynamic Replanning using Multi-Agent Systems and Asset Administration Shells	Simon Jungbluth

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

14:00 - 15:00 **Keynote: „Paradigm Shift in Mechanical Engineering – How Data and AI are Triggering Changes in Manufacturing“ - Dr. Thomas Schneider** V47.01

15:00 - 15:30 **Coffee Break** Foyer 47

**Parallel Sessions 15:30 - 16:30**

SS10		<b>Advanced Methods for the Management of Factory Networks</b> Stefano Scanzio   Oliver Konradi	V47.01
15:30 - 15:50	ETFA22-000222	Machine Learning to Support Self-Configuration of Industrial Systems Interconnected over Wi-Fi	Stefano Scanzio
15:50 - 16:10	ETFA22-000079	Industrial 5G Service Quality Assurance via Markov Decision Process Mapping	Anil Ramachandran Nair
16:10 - 16:30	ETFA22-000247	QRscript: Embedding a Programming Language in QR codes to support Decision and Management	Stefano Scanzio

T11		<b>Secure Data Processing and Prototypes in Vehicular Systems</b> Saad Mubeen   Ramez Daoud	V47.02
15:30 - 15:50	ETFA22-000019	Mimer Trust: Efficient and Secure Data Processing for Trusted Execution Environment in Automotive Systems	Simin Cai
15:50 - 16:10	ETFA22-000217	Design and Development of a Cyber-Physical System E-Bike Retrofit Prototype	Michael Oberle

SS02		<b>Safety and Risk Assessment</b> Behrang Ashtari   Nasser Jazdi	V47.03
15:30 - 15:50	ETFA22-000250	Fault Detection for Photovoltaic Systems Using Fuzzy C-Means Clustering	Iury Bessa
15:50 - 16:10	ETFA22-000131	Towards Situative Risk Assessment for Industrial Mobile Robots	Manuel Müller
16:10 - 16:30	ETFA22-000144	Situation-based Identification of Probable Loss Scenarios of Industrial Mobile Robots	Manuel Müller

SS04		<b>Automation of modular systems and the Module Type Package 2</b> Michelle Blumenstein   Andreas Stutz	V47.04
15:30 - 15:50	ETFA22-000229	Automated Integration of Remote Terminal Units via IEC Protocol with the Module Type Package	Andreas Stutz
15:50 - 16:10	ETFA22-000076	Concept for extending the Module Type Package with energy management functionalities	Leif-Thore Reiche
16:10 - 16:30	ETFA22-000202	Hybrid Commissioning of Industrial Plants: A Merge-Tool for PROFINET	Shan Fur

SS05		<b>Machine Learning and Data Analytics for Failure Analysis in Automation and the Manufacturing Industry 2</b> Simon Kamm   Anis Hoayek	V47.05
15:30 - 15:50	ETFA22-000078	Computer Vision based welding defect detection using YOLOv3	Melakhsou Abdallah Amine
15:50 - 16:10	ETFA22-000068	TinyML-based approach for Remaining Useful Life Prediction of Turbofan Engines	Stefanos Heikki Panagiotou

SS07		<b>Skill Based Systems Engineering 2</b> Kristof Meixner   Aljosha Köcher	V47.06
15:30 - 15:50	ETFA22-000227	A Mapping Approach to Convert MTPs into a Capability and Skill Ontology	Aljosha Köcher
15:50 - 16:10	ETFA22-000224	Architectural Concepts for IEC 61499-based Machine Controls: Beyond Normal Operation Handling	Lisa Sonnelthner

17:45 Gathering Time  
18:00 Bus transfer

19:00 - 22:00 **Gala Dinner** Mövenpick Hotel Stuttgart Airport  
Flughafenstraße 50, 70629 Stuttgart

**Friday Session - 09.09.2022**

9:00 - 10:00 **Keynote: „Is Ethernet the Solution for all? “ - Dr. Kirsten Matheus (BMW Group)** V47.01

10:00 - 10:30 **Coffee Break** Foyer 47

**Parallel Sessions 10:30 - 12:30**

T7		<b>Planning and human-robot interaction</b> Raúl Suárez   Andrea Bonci	V47.01
10:30 - 10:50	ETFA22-000036	Dynamic Path Planning of a mobile robot adopting a costmap layer approach in ROS2	Pangcheng David Cen Cheng
10:50 - 11:10	ETFA22-000234	Task Space Vector Field Guiding for Motion Planning	Fernando Urra
11:10 - 11:30	ETFA22-000045	Domain Adaptation With Evolved Target Objects for AI Driven Grasping	Anish Pratheepkumar
11:30 - 11:50	ETFA22-000130	Process-driven Collision Prediction in Human-Robot Work Environments	Luca Geretti
11:50 - 12:10	ETFA22-000242	Improving safety in physical human-robot collaboration via deep metric learning	Maryam Rezayati
12:10 - 12:30	ETFA22-000054	GLIR: A Practical Global-local Integrated Reactive Planner towards Safe Human-Robot Collaboration	Mohamed El-Shamouty

T9		<b>Engineering process challenges</b> Christoph Binder   Arndt Lüder	V47.02
10:30 - 10:50	ETFA22-000049	Towards Round-trip Engineering to evolve Complex Production Systems by utilizing AutomationML	Christoph Binder
10:50 - 11:10	ETFA22-000152	A Coordination Artifact for Multi-disciplinary Reuse in Production Systems Engineering	Kristof Meixner
11:10 - 11:30	ETFA22-000051	Configurable Solutions for Low-Cost Digital Manufacturing: a Building Block Approach	Jan Kaiser
11:30 - 11:50	ETFA22-000194	Impact of Modularization and Coupling on the Complexity of Industrial Control and Automation Systems	Aydin Homay
11:50 - 12:10	ETFA22-000200	Coupling and Decoupling in IEC 61499 and IEC 61131-3 Applications	Aydin Homay
12:10 - 12:30	ETFA22-000212	Street Lighting Simulation for Energy Efficiency Improvement	Alireza Estaji

<b>T2</b>	<b>Wireless systems in industrial applications</b>			<b>V47.03</b>
	Stefano Scanzio   TBD			
10:30 - 10:50	ETFA22-000075	Towards Performance Benchmarking of Cyclic OPC UA PubSub over TSN	Sten Grüner	
10:50 - 11:10	ETFA22-000116	Towards 5G-Aware Robot Planning for Industrial Applications	Nils Jörgensen	
11:10 - 11:30	ETFA22-000123	Multi-AP Coordination PHY/MAC Management for Industrial Wi-Fi	Iñaki Val	
11:30 - 11:50	ETFA22-000084	Deep Neural Network for Indoor Positioning Based on Channel Impulse Response	Van-Lan Dao	
11:50 - 12:10	ETFA22-000117	Experimental Characterization of In-Pipe Acoustic Communication Channels Through Measurement of Pressure Transfer Functions	Markeljan Fishta	
<b>T6</b>	<b>Robots and Computer vision in Factory Automation</b>			<b>V47.04</b>
	Luca Leonardi   Timo Market			
10:30 - 10:50	ETFA22-000035	Detection of Unsorted Metal Components for Robot Bin Picking Using an Inexpensive RGB-D Sensor	Riccardo Monica	
10:50 - 11:10	ETFA22-000030	Visual Monitoring Intelligent System for Cardboard Packaging Lines	Pablo Gil	
11:10 - 11:30	ETFA22-000031	Automation of Offline Tool Wear Measurement on the Example of Inserts for Super-Alloy Machining	Philipp Westphal	
11:30 - 11:50	ETFA22-000201	WireAR: AR-based electrician-assistance system for visualization of wiring process	Anastasia Archangelskaya	
11:50 - 12:10	ETFA22-000018	HawkEye-HMI-Generation: A Method to Synthesize Zoomable Process Automation User Interfaces	Heiko Koziolok	
<b>SS08</b>	<b>Industry 5.0 – Augmenting the Human Worker in Balanced Automation Systems</b>			<b>V47.05</b>
	Tamás Ruppert   David Romero			
10:30 - 10:50	ETFA22-000240	Intelligent Collaborative Manufacturing Space for Augmenting Human Workers in Semi-Automated Manufacturing Systems	Tamás Ruppert	
10:50 - 11:10	ETFA22-000193	Trajectory Prediction of Moving Workers for Autonomous Mobile Robots on the Shop Floor	Andreas Löcklin	
11:10 - 11:30	ETFA22-000108	A Review on Communicative Mechanisms of External HMIs in Human-Technology Interaction	Peter Thorvald	
11:30 - 11:50	ETFA22-000270	A methodology to select wearable devices for Industry 5.0 applications	Elias Montini	
<b>SS14</b>	<b>Knowledge Graphs for Smart Manufacturing</b>			<b>V47.06</b>
	Franz Georg Listl   László Nagy			
10:30 - 10:50	ETFA22-000069	Knowledge Graph-based Support for Automated Manufacturability Analysis	Irlan Grangel-Gonzalez	
10:50 - 11:10	ETFA22-000201	Variant generation of software-defined mechatronic systems in model-based systems engineering	Matthias Weiß	
11:10 - 11:30	ETFA22-000085	Context-enriched modeling using Knowledge Graphs for intelligent Digital Twins of Production Systems	Timo Müller	
	Nada Sahlab   Irlán Grangel-González			
11:30 - 11:50	ETFA22-000162	Ontological Architecture for Knowledge Graphs in Manufacturing and Simulation	Franz Georg Listl	
11:50 - 12:10	ETFA22-000138	Accessing and Interpreting of OPC UA Event Traces based on Semantic Process Descriptions	Tom Westermann	
12:10 - 12:30	ETFA22-000218	Human-centered knowledge graph-based design concept for collaborative manufacturing	László Nagy	
12:30 - 14:00	<b>Lunch Break</b>			<b>Mensa</b>
<b>Parallel Sessions 14:00 - 15:30</b>				
<b>T7</b>	<b>Industrial and autonomous applications</b>			<b>V47.01</b>
	Andrea Bonci   Raúl Suárez			
14:00 - 14:20	ETFA22-000011	The Correction of the Nozzle-Bed-Distance in Robotic Curved Layer Fused Deposition Modeling with ULTEM 9085	Gian Frederik Mewes	
14:20 - 14:40	ETFA22-000043	Leading vehicle length estimation using pressure data for use in autonomous driving	Matis Ottan	
14:40 - 15:00	ETFA22-000093	Software-defined testing facility for component testing with industrial robots	Julian Hanke	
15:00 - 15:20	ETFA22-000008	On the creation of a robotics software architecture for AI-based advanced applications	Ignacio Fidalgo	
<b>T9</b>	<b>Digital twins</b>			<b>V47.02</b>
	Prerna Juhlin   Arndt Lüder			
14:00 - 14:20	ETFA22-000059	A method for mapping novel product groups in AutomationML as the first step for creating their virtual twin	Johannes Prior	
14:20 - 14:40	ETFA22-000061	Cloud-enabled Drive-Motor-Load Simulation Platform using Asset Administration Shell and Functional Mockup Units	Prerna Juhlin	
14:40 - 15:00	ETFA22-000154	Designing a Digital Shadow for Efficient, Low-Delay Analysis of Production Quality Risk	Sebastian Kropatschek	
15:00 - 15:20	ETFA22-000199	An interactive learning approach on digital twin for deriving the controller logic in IEC 61499 standard	Midhun Xavier	
<b>T2</b>	<b>TSN in Industrial Systems</b>			<b>V47.03</b>
	Mohammad Ashjaei   Manuel Barranco			
14:00 - 14:20	ETFA22-000206	Aligning Emerging Technologies onto I4.0 principles: Towards a Novel Architecture for Zero-defect Manufacturing	Konstantinos Apostolakis	
14:20 - 14:40	ETFA22-000191	Migrating Legacy Ethernet-Based Traffic with Spatial Redundancy to TSN networks	Mateu Jover	
14:40 - 15:00	ETFA22-000168	Holistic Monitoring for heterogeneous industrial Time Sensitive Networks	Santiago Soler Perez Olaya	
15:00 - 15:20	ETFA22-000063	A Detailed Analysis of Timing Effects in an IEC 61499 Ethernet/TSN Communication Scenario	Friederike Bruns	
<b>T6</b>	<b>Automatic Learning in Computer Vision Applications</b>			<b>V47.04</b>
	Riccardo Monica   Philipp Westphal			
14:00 - 14:20	ETFA22-000213	Am I done learning? - Determining learning states in adaptive assembly systems	Philip Sehr	
14:20 - 14:40	ETFA22-000214	Synthetic Training Data Generation for Convolutional Neural Networks in Vision Applications	Hannes Vietz	
14:40 - 15:00	ETFA22-000142	Interpretable image features for anomaly identification on hexagonal net knitting machines	Tetsuo Imai	
15:00 - 15:20	ETFA22-000067	Enhancing Vehicle State Recognition in Logistics Industrial Parks via Dynamic Hidden Markov Model	Yang Liu	

WIP1	Development, adoption and application of IT for automation systems		V47.05
	Alois Zoitl   Andreas Bunte		
14:00 - 14:05	ETFA22-000355	How to make energy flexibility business models work - the case for integration into existing ERP systems	Maximilian Stange
14:05 - 14:10	ETFA22-000253	An Analysis of Use Cases for the Asset Administration Shell in the Context of Edge Computing	Marie Platenius-Mohr
14:10 - 14:15	ETFA22-000266	Integrating Third-Party Asset Monitoring Applications in an Edge Architecture using the Asset Administration Shell	Marie Platenius-Mohr
14:15 - 14:20	ETFA22-000287	Supporting Variability Management in Cyber-Physical Production Systems: Towards Semi-Automatic Delta Model Mining for IEC 61499	Hafiyyan Sayyid Fadhillah
14:20 - 14:25	ETFA22-000401	Model-aware Simulation of IEC 61499 Designs	Sven Mehlhop
14:25 - 14:30	ETFA22-000298	Evaluation of Middleware Technologies for the PLC-Service Bus in IEC 61499	Virendra Ashwal
14:30 - 14:35	ETFA22-000290	Controlling concurrent events in IEC 61499 based systems on FPGAs	Martin Melik Merkmians
14:35 - 14:40	ETFA22-000303	Toward a Generic Mapping Language for Transformations between RDF and Data Interchange Formats	Artan Markaj
14:40 - 14:45	ETFA22-000316	Modelling service properties to manage their diversity within modular manufacturing plants	Pascal Habiger
14:45 - 14:50	ETFA22-000323	RPC-Based OPC-UA Agent for Legacy PLCs	Minyoung Sung
14:50 - 14:55	ETFA22-000338	Concurrent OPC UA information model access, enabling real-time OPC UA PubSub	Patrick Denzler
14:55 - 15:00	ETFA22-000345	Connecting Industrie 4.0 Digital Twins during Execution to Other Components' Interfaces	Magnus Redeker
15:00 - 15:05	ETFA22-000334	Towards an Asset Administration Shell Integrity Verification Scheme	Andre Bröring
15:05 - 15:10	ETFA22-000304	Modeling Error Propagation in a Modular Plant	Santonu Sarkar
15:10 - 15:15	ETFA22-000312	A Model Based Framework for Testing Safety and Security in Operational Technology Environments	Mukund Bhole
15:15 - 15:20	ETFA22-000314	Automating Safety and Security Risk Assessment in Industrial Control Systems: Challenges and Constraints	Pushparaj Bhosale
15:20 - 15:25	ETFA22-000404	Work In Progress: Towards Adaptive RF Fingerprint-based Authentication of IIoT devices.	Ricardo Severino

WIP11	WIP: Vehicular Embedded Systems		V47.06
	Saad Mubeen   Ramez Daoud		
14:40 - 14:45	ETFA22-000277	Evolution of the Automotive Reference Architecture Model towards a Domain-Specific Systems Engineering Approach	Katharina Polanec
14:45 - 14:50	ETFA22-000315	Fault-Tolerant Low-Cost Analog Sensor Implementation for By-Wire Vehicle	Ramez Daoud
14:50 - 14:55	ETFA22-000330	Fault-Tolerant Optical Controller Area Network (FTO-CAN) Based on Heartbeat Signal Termination	Duc Hoang
14:55 - 15:00	ETFA22-000376	Evil SteVe: An Approach to Simplify Penetration Testing of OCPP Charge Points	Lisa Gebauer
15:00 - 15:05	ETFA22-000343	On in-vehicle network security testing methodologies in construction machinery	Sheela Hariharan
15:05 - 15:10	ETFA22-000382	Work in Progress: A Centralized Configuration Model for TSN-5G Networks	Zenepe Satka
15:10 - 15:15	ETFA22-000383	AUTOSAR University Package Classic Demonstrator	Moisés Urbina Fuentes

15:30 - 16:00 **Coffee Break** Foyer 47

**Parallel Sessions 14:00 - 15:30**

T7	Calibration, localization and control		V47.01
	Andrea Bonci   Marina Indri		
16:00 - 16:20	ETFA22-000041	An Unified iterative Hand-Eye Calibration Method for Eye-on-Base and Eye-in-Hand Setups	Daniele Evangelista
16:20 - 16:40	ETFA22-000197	CloudVision: DNN-based visual localization of autonomous robots using prebuilt LIDAR point cloud	Evgeny Yudin
16:40 - 17:00	ETFA22-000007	Deep Reinforcement Learning Based Networked Control with Network Delays for Signal Temporal Logic Specifications	Junya Ikemoto

T9	Safety and Security		V47.02
	Nikolaos Papakonstantinou   Arndt Lüder		
16:00 - 16:20	ETFA22-000013	Security and Safety Integration for the Nuclear Instrumentation and Control Systems	Joonas Linnosmaa
16:20 - 16:40	ETFA22-000040	CrossTest: a cross-domain physical testbed environment for cybersecurity performance evaluations	Markus Karch
16:40 - 17:00	ETFA22-000102	Decision Tree Models of Continuous Systems	Swantje Plambeck

T3	Real-time networks		V47.03
	Luca Leonardi   Gaetano Patti		
16:00 - 16:20	ETFA22-000173	Schedulability Analysis of WSAN Applications: Outperformance of a Model Checking Approach	Marjan Sirjani
16:20 - 16:40	ETFA22-000293	Cellular Interface Selection in Multi-Homed Vehicular Onboard Gateways	Bernd-Ludwig Wenning

17:00 - 17:15 **Closing Session** V47.01