

## Call for Papers

### SS07 – From Automation to Autonomy: AI-Driven Industrial Operations

#### Organized and Chaired by

Gianluca Manca<sup>1</sup>, Marcel Dix<sup>2</sup>, Amirhossein Najafi<sup>3</sup>, Franz C. Kunze<sup>1</sup>, Alexander Windmann<sup>4</sup>, Oliver Niggemann<sup>4</sup>, Mehmet Mercangöz<sup>5</sup>, Tongwen Chen<sup>3</sup>

<sup>1</sup>Ruhr University Bochum, Germany (e-mail: {gianluca.manca, franz.kunze}@rub.de)

<sup>2</sup>ABB Corporate Research Center, Mannheim, Germany (e-mail: marcel.dix@de.abb.com)

<sup>3</sup>University of Alberta, Edmonton, Canada (e-mail: {najafi2, tchen}@ualberta.ca)

<sup>4</sup>Helmut Schmidt University, Hamburg, Germany (e-mail: {alexander.windmann, oliver.niggemann}@hsu.hamburg)

<sup>5</sup>Imperial College London, UK (e-mail: m.mercangoz@imperial.ac.uk)

- ❖ **FOCUS.** Industrial autonomy relies on multiple layers of intelligence, including real-time sensing, digital twins, learning-based methods such as reinforcement learning, distributed multi-agent coordination, and AI assistants for decision support. Semi-autonomous and autonomous operation requires integration with existing control and safety layers, decision-making under uncertainty, runtime monitoring of system limits, and human-machine interfaces that preserve situational awareness and enable appropriate interventions. This session targets methods, architectures, and system components that support industrial plants across autonomy maturity levels; from today's automation with human supervision to more autonomous operation that remains robust to variability, disturbances, and rare abnormal situations. It also addresses perspectives on the use of AI agents in process industries and the implications for operator roles, safety assurance, and operational performance.

#### ❖ TOPICS

- ❖ AI agent architectures for plant autonomy, including LLM-based agents, RL, and multi-agent systems
- ❖ Data quality, uncertainty handling, and robust AI methods for autonomous systems, including drift and fault tolerance
- ❖ Alarm management and abnormal situation handling for autonomous plants
- ❖ Control room automation and autonomy, AI-enabled alarm monitoring
- ❖ Explainability, trustworthiness, and resilience of autonomous decision-making
- ❖ Human-AI interaction and collaboration, including operator roles, shared autonomy, and handover or takeover concepts
- ❖ Adaptive and Dynamic HMLs for Enhanced Situational Awareness, Cognitive Load Reduction, and Supervision of Autonomous Functions (Intent, State, and Uncertainty Visualization)
- ❖ Cybersecurity for agent-based and autonomous plant architectures
- ❖ Case studies, industrial pilots, and lessons learned from autonomy deployments

- ❖ **AIM.** This Special Session addresses the transition from automation to autonomy in AI-driven industrial operations. It brings together researchers and practitioners to discuss methods, system architectures, and operational concepts, including supervision, abnormal situation handling, and collaboration between humans and autonomous functions.

- ❖ **CONFERENCE FORMAT.** The conference will comprise multi-track sessions for regular papers, to present significant and novel research results with a prospect for a tangible impact on the research area and potential implementations.

#### ❖ AUTHOR'S SCHEDULE (2026)

##### ❖ Regular and special sessions papers

Submission deadline ..... April 19  
Acceptance notification ..... May 25  
Deadline for final manuscripts ..... July 4

##### ❖ Work-in-progress/Industry practice papers

Submission deadline ..... May 31  
Acceptance notification ..... June 19  
Deadline for final manuscripts ..... July 4

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