



**15th IFAC Workshop**  
**Intelligent Manufacturing Systems (IMS 2025)**  
**Koszalin, Poland, 11-12 September 2025**



<https://ims2025.pl/>

This proposal is endorsed by TC 5.1, TC 5.2 and TC 9.2

Invited Session Proposal:

**Design and Operation of Next Generation Manufacturing Systems**

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**Keywords:** manufacturing system, automation, robotization, flexibility, reconfigurability, smart factory, sustainable production,

**Code: 3dbw2**

**ABSTRACT**

Within the current industrial environment, manufacturing companies are facing radical changes forcing to improve their standard in product and process design management. High flexibility, dynamic market demand, increasing customization, high-quality products, changeable batches and short product life cycles are among the key factors driving the transition from the traditional manufacturing systems to be so-called Next Generation Manufacturing Systems (NGMSs). Dedicated Manufacturing Systems (DMSs), Flexible Manufacturing Systems (FMSs) and Cellular Manufacturing Systems (CMSs) show increasing limits in adapting themselves to the most recent market features. The consequence of this is the search for solutions for production systems that, through the implementation of the latest achievements in science and technology, would allow for meeting current market requirements by realizing flexible and cost-effective production of personalized products.

The objective of this Invited Session (IS) is to present the latest research results in the field of designing modern and future production systems, taking into account the paradigms of Industry 4.0 and Industry 5.0 as well as modern techniques and tools used in the design process. In that context this IS focuses on:

- design of subsystems for manufacturing, transport and storage of NGMSs,
- optimization of production flow in Industry 4.0 and Industry 5.0 oriented manufacturing systems,
- application of artificial intelligence methods for the control, planning and scheduling of production systems and processes.
- multi-physics modelling, simulation, virtual and augmented reality in manufacturing,
- human-machine interaction, human-robot collaborative assembly, operator ergonomics.

The session covers all theoretical and application oriented aspects of smart, reconfigurable and intelligent manufacturing systems. Topics of interest include, but are not limited to:

- Paradigms of modern technologies in production, assembly and maintenance.
- Manufacturing systems design for industrial applications.
- Automation and robotization of manufacturing systems.
- Simulation of production systems and processes.
- Flexibility and reconfigurability in production and maintenance.
- Smart and intelligent manufacturing systems.
- Sustainable production and material-handling systems.
- Artificial intelligence methods in decision support systems
- Intelligent methods in manufacturing systems design and operation
- Smart factories and Industrial Internet of Things (IIoT)
- Reliability & risk assessment in production and maintenance processes.

Contributions containing of both: the theoretical and practical results obtained in this area are welcome.

### Timeline:

- **December 16, 2024:** Deadline for paper submission
- **March 03, 2025:** Notification of acceptance/rejection
- **April 07, 2025:** Final paper submission
- **September 11-12, 2025:** 15th IFAC IMS Workshop (IMS 2025), Koszalin, Poland

### **Manuscript Preparation**

For Manuscript Preparation please look at <http://www.ifac.papercept.net/conferences/support/support.php>

For Manuscript submission please look at <https://ifac.papercept.net/conferences/scripts/start.pl>

Upon submission, make sure to use the **Invited session identification code: to be announced latter**

For any further information, please contact the Special Session Technical Committee

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