15th IFAC Workshop on Intelligent Manufacturing Systems

September 11-12, 2025, Koszalin, Poland

KOSZALIN UNIVERSITY OF TECHNOLOGY

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Contents

Welcome to IFAC IMS 2025

Dear Colleagues and Friends,

It is with great pleasure that we welcome you to the 15th IFAC Workshop on Intelligent Manufacturing Systems (IMS 2025), which will take place in Koszalin, Poland, on 11-12 September 2025. This event offers a unique opportunity to explore the integration of cutting-edge technologies and artificial intelligence in manufacturing processes.

In today's fast-changing environment, both industry and academia face major challenges and new opportunities. IMS 2025 will focus on key topics such as the Industrial Internet of Things (IIoT), artificial intelligence, machine learning, robotics, automation, digital twins, advanced sensing, edge-to-cloud computing, and new manufacturing technologies.

The workshop aims to provide a vibrant platform for researchers and practitioners to exchange their findings, case studies, and innovative approaches. Its scope covers a wide range of subjects, from intelligent production systems, bio-inspired design, and self-organization, to sustainable and human-centered solutions aligned with the visions of Industry 4.0 and Industry 5.0.

We strongly believe that advancing intelligent manufacturing systems must serve a greater purpose: building a more efficient, resilient, and human-friendly industry. IMS 2025 will be a place to inspire new ideas, foster interdisciplinary collaboration, and actively engage young researchers and practitioners.

We extend our sincere gratitude to all authors, reviewers, committee members, and partners whose contributions make this event possible. Your commitment and vision are what drive this community forward.

We invite you to take part fully, share boldly, and connect meaningfully throughout the workshop. And while in Koszalin, we encourage you to enjoy the city's unique character - located by the Baltic Sea, surrounded by lakes and forests, offering the perfect setting where science, culture, and nature come together.

With warm regards,

Grzegorz Bocewicz and Krzysztof Rokosz

Conference Chairs, IFAC IMS 2025

Conference Organization

International Program Committee (IPC):

Chair: Ahmad Barari, Ontario Tech University, Canada

Co-Chair: Zdzisław Kowalczuk, Gdansk University of Technology, Poland

Industry V.C.: Georg Weichhart, Primetals Technologies Austria

National Organizing Committee (NOC):

Chair: Grzegorz Bocewicz, Koszalin University of Technology, Poland

Vice-Chair: Krzysztof Rokosz, Koszalin University of Technology, Poland

Industry V.C.: Piotr Bartkiewicz, GlobalLogic Koszalin, a Hitachi Group Company

IFAC Technical Committee 5.1 – Manufacturing Plant Control

The Technical Committee TC 5.1. adopts a high-level perspective of manufacturing plant control, addressing a broad scope of activities required for the management of manufacturing operations in industrial facilities. These range from product design, to manufacturing engineering, management and control, including equipment maintenance, as well as related industrial services, monitoring and control of product and process quality, and factory logistics. Manufacturing engineering focuses also on the benefits and capabilities of advanced manufacturing technologies in fabrication, assembly, disassembly, and remanufacturing. The opportunities of advanced automation and digitalization are especially considered, dealing with the increasingly connected operations and the collaborations across different business functions. The transformative impact of new technologies integration, and especially the interaction and synergies between humans and technologies within the manufacturing plant and its work environment, are of high relevance.

Chair:

- Marco Macchi

Vice-Chairs:

- Paulo Leitao
- Maurizio Faccio
- Christos Emmanouilidis
- Ahmad Barari

Vice-Chair for Education:

- Hind Bril El-Haouzi

Vice-Chair for Publication:

- Yuval Cohen

Vice-Chair for Industry:

- Aitor Arnaiz

Vice-Chair for Social Media:

- Elisa Negri

Follow us on LinkedIn: IFAC CC 5 (look for: #ifac_tc51)

Conference Venues

MK Bowling – on the eve of the conference (10th September), a social meeting at the bowling alley, with possible registration of participants.

Address: Stefana Okrzei 3 street (building of Galeria Kosmos)
4 minutes by foot from the Gromada Hotel

When: 17:00 on Wednesday 10th September 2025

Gromada Hotel – venue for the evening Banquet on Thursday 11th September

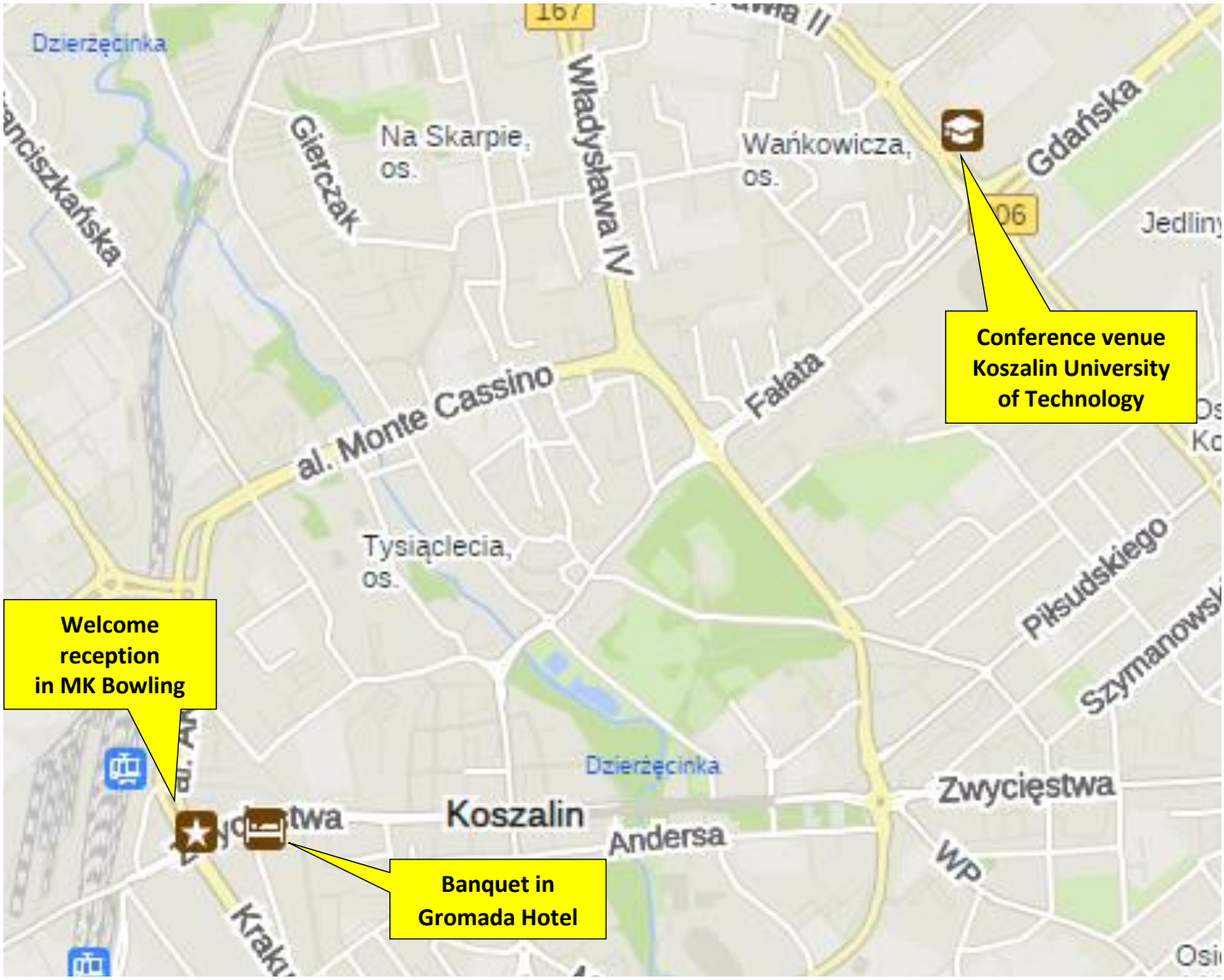
Address: Zwycięstwa 20/24 street (37 minutes by foot from the main conference venue)

When: 19:00 on Thursday 11th September 2025

Distances between conference venues:

MK Bowling – Gromada Hotel: 4 minutes by foot

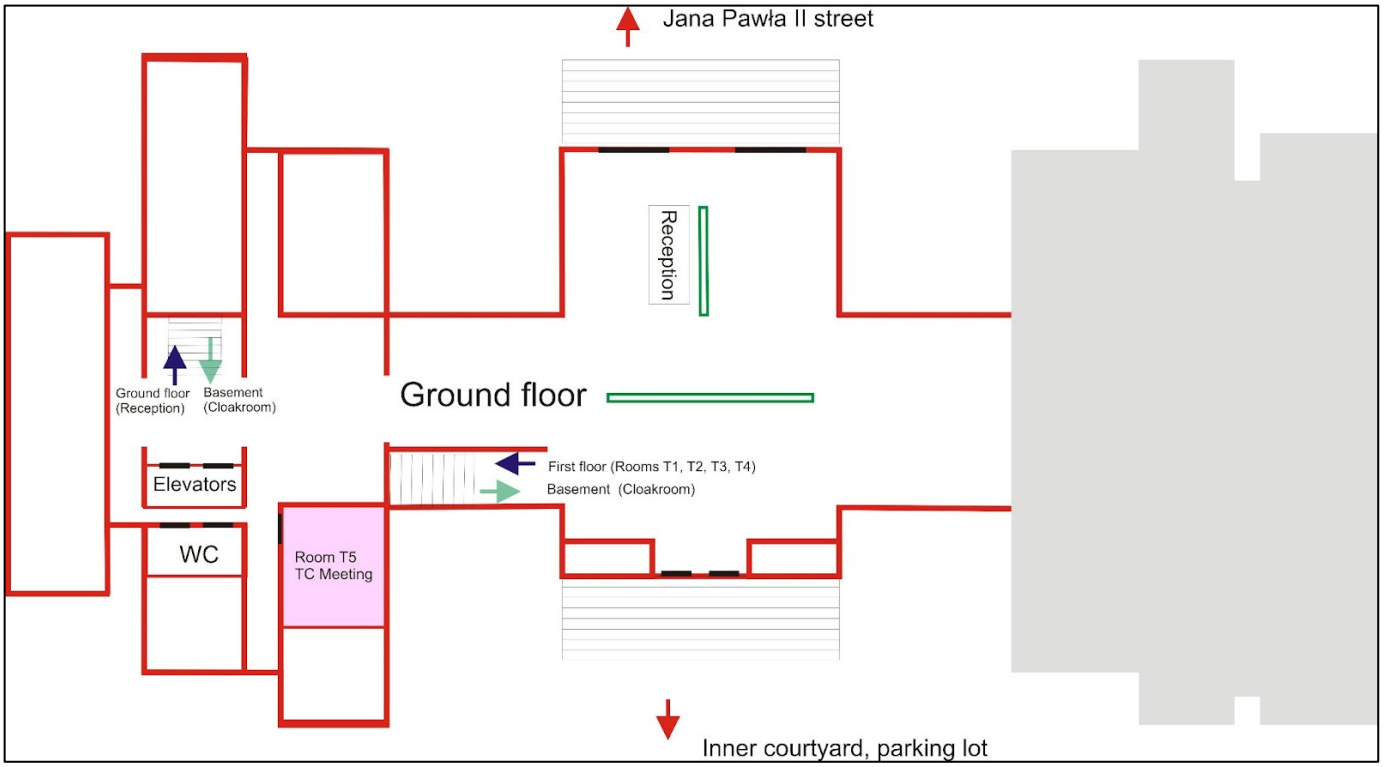
Gromada Hotel – Koszalin University of Technology: 37 minutes by foot, 10 minutes by car

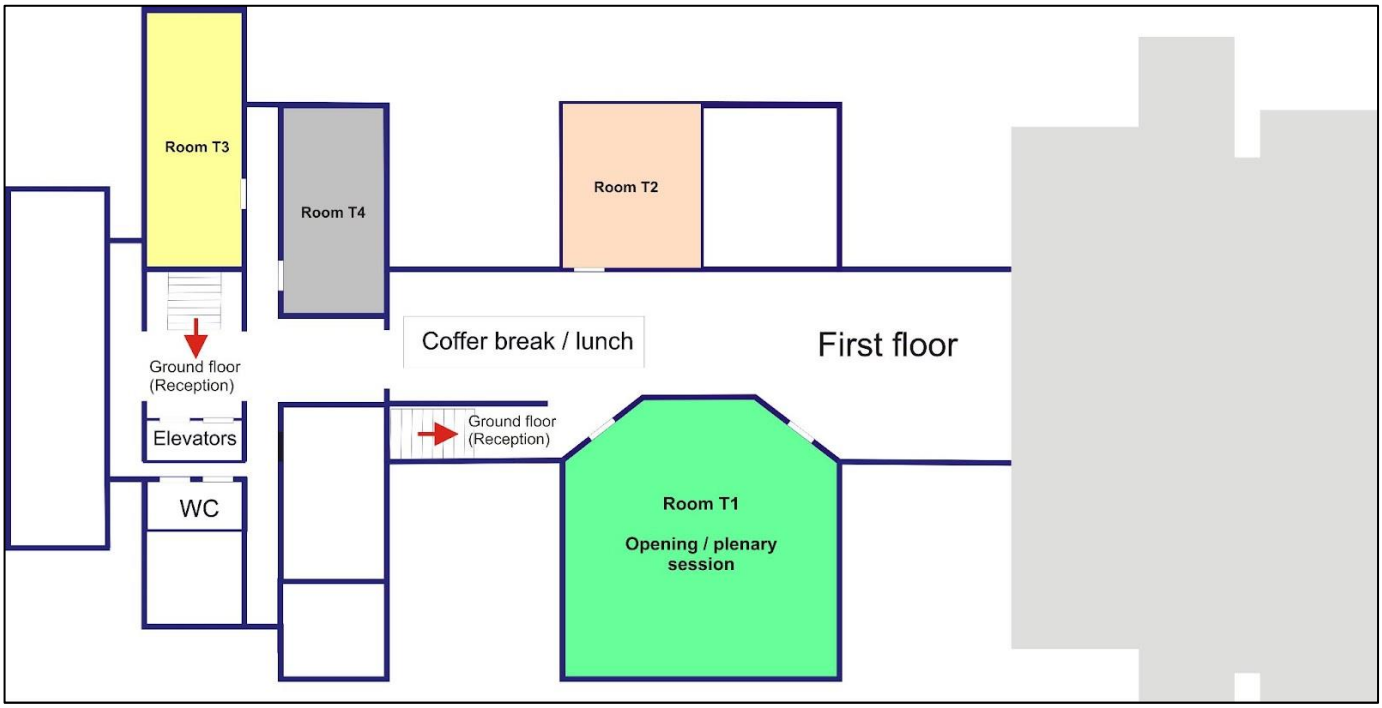


Koszalin University of Technology

All conference sessions and keynotes (11th and 12th September) will be held in the University building, at Śniadeckich 2 street.

Coffee breaks and lunches are served outside the conference rooms (T1, T2) on the first floor (below see building plan).





Program at a Glance

DAY 0, Wednesday, September 10th	
17:00-21:00	Welcome reception *MK Bowling, Galeria Kosmos*

DAY 1, Thursday, September 11th				
08:15-09:00	Registration ThuRE			
09:00-09:15	Conference opening ThuOR (Room T1)			
09:15-09:45	Plenary session I - Prof. A. Kusiak ThuP1L (Room T1)			
09:45-10:15	Coffee break			
10:15-12:00	Regular session ThuAT1 (Room T1)	Invited session ThuAT2 (Room T2) *Design and Operation of Next Generation Manufacturing Systems*	Invited session ThuAT3 (Room T3) *Advances Toward Smart Digitized Shopfloors*	Invited session ThuAT4 (Room T4) *Error-Free Manufacturing Control*
12:00-12:30	Coffee break			
12:30-13:00	Plenary session II - Prof. D. Ivanov ThuP2L (Room T1)			
13:00-13:30	Plenary session III - Prof. P. Golińska-Dawson ThuP3L (Room T1)			
13:45-14:45	Lunch			
14:45-16:15	Regular session ThuBT1 (Room T1)	Invited session ThuBT2 (Room T2) *Intelligent Additive Manufacturing*	Invited session ThuBT3 (Room T3) *Human Work and Skills for Advanced Manufacturing in AI and Industry 5.0 Era*	Invited session ThuBT4 (Room T4) *LLM and Generative AI for Intelligent Manufacturing Systems*
16:15-17:00	TC 5.1 Meeting (Room T5)			
19:00-24:00	Banquet *Hotel Gromada*			

DAY 2, Friday, September 12th					
09:30-10:30	Registration FriRE				Excursion to Cold War Museum 9:00 - 13:30
10:30-11:00	Plenary session IV - Prof. M. Zaremba FriP4L (Room T1)				
11:00-11:30	Coffee break				
11:30-13:30	Invited session FriAT1 (Room T1) *Recent Advances in Smart and Sustainable Manufacturing and Maintenance - part I*	Invited session FriAT2 (Room T2) *Interoperability in Smart Manufacturing Systems (ISMS)*	Invited session FriAT3 (Room T3) *Smart Supply Chain and Logistics: Leveraging Industry 4.0 and Industry 5.0*		
13:30-14:30	Lunch				
14:30-16:00	Invited session FriBT1 (Room T1) *Recent Advances in Smart and Sustainable Manufacturing and Maintenance - part II*	Regular session FriBT2 (Room T2)	Regular session FriBT3 (Room T3)	Invited session FriBT4 (Room T4) *Numerical Methods, Modeling and Simulations*	
16:00-16:30	Closing ceremony FriCLC (Room T1)				

Technical Program

Day 1 – Thursday – 11th September

Time	Place	Event
09:00-09:15	Room T1	**Conference opening**
09:15-09:45	Room T1	**Plenary session I: Andrew Kusiak** ***Generative AI in Manufacturing: A Digital Twin Perspective*** Chair: Grzegorz Bocewicz
09:45-10:15	**Coffee break**	
10:15-12:00	**Room T1 (ThuAT1)** Regular session S1	**Chairs: Bożejko W., Sitek P.**
		Improving Robot Batching Models Through Gradient Boosting Machines Neshamar Á., Vasegaard A. E., Skovgaard Andersen R., Nielsen P.
		Mathematical Modeling for Simulating the Coverage Area of Spherical Objects with Sensors Nygaard F. A. B., Aver L. Ch., Madsen M., Bjørn V. A. E., Sung, I.
		Decomposing Supply Chain Complexity: A Multilayer Network Perspective Nguyen P., Ivanov D.
		Non-Crossing Neighborhood Searching on Quantum Computer for a Single Machine Scheduling Problem Bozejko W., Uchronski M., Wodecki M.
		A Model for Proactive Decision Support in the Rolling Bearing Production Process Wikarek J., Sitek P.
		Optimization of Production Process through TOGAF-Based Audits and Mathematical Programming Models Wikarek J., Juzon Z., Sitek P.
		Innovative Remote Monitoring and Analysis System for the Life Cycle of Chemical Raw Materials Supporting Fertilizer Producers Błażejewski A., Pecolt S., Grunt M., Zmuda Trzebiatowski P., Wątor R., Królikowski T.
	Room T2 (ThuAT2) *Design and Operation of Next Generation Manufacturing Systems*	**Chairs: Gola A., Kłos S.**
		Simulation Based Throughput Analysis of a Single-Product Reconfigurable Manufacturing System Gola A., Grznar P., Pizoń J., Janardhanan M., Wójcik Ł., Rakhimberdinova M.
		Balancing PaaS Offers Subject to Demands Constraint Szwarc E., Radzki G., Bocewicz G., Banaszak Z.
		Stakeholder Perspectives on AI in Low-Code BPM for Manufacturing Waszkowski R.
		A Feasible Schedule for Multiple Automated Guided Vehicle Pazera M., Majdzik P., Witczak M.
		Three Echelon Vehicle Routing Problem for Air Freight Distribution Network Dahanayake M., Thibbotuwawa A., Nielsen P.
		An Overview of State-Of-The-Art Technologies for Textile Supply Chain Circularity Adoption Sawani M., Thibbotuwawa A., Sebastian S., Nielsen P.
		Trend-Aware Fuzzy Decision-Making in Discrete Event Systems of Operational Management Rudnik K.

10:15-12:00	**Room T3 (ThuAT3)** *Advances Toward Smart Digitized Shopfloors*	**Chairs: Macchi M., Rudy J.**
		Smarter Manufacturing: Evaluating the Impact of Low-Cost Digital Solutions in Manufacturing SMEs Webber I., Terrazas G., Pineda D., Salter L., McFarlane D. C.
		Towards the Industrial Metaverse: A Proposal and Preliminary Validation of Its Architecture for Immersive Virtual Commissioning of Production Systems Palmitessa E., Pasquandrea M., Cattaneo L., Polenghi A.
		A Data-Driven Automatic Model Generation Methodology of Digital Twin Models for Cost-Effective Adaptability and Scalability in Manufacturing Systems Villegas T. L. F., Palmitessa E., Macchi M., Polenghi A.
		Ontology and Responsiveness in Manufacturing: A Systematic Literature Review of Applications Di Sabatino I., Mancini N., Ragazzini L., Negri E.
		Generative Assembly Line Design: Optimizing Task Assignment, Equipment Selection and Balancing Cohen Y.
		Enhancing Warehouse Efficiency with Multi-Tote Storage and Retrieval AMRs Faccio M., Granata I., Persona A.
	Room T4 (ThuAT4) *Error-Free Manufacturing Control*	**Chairs: Barari A., Tsuzuki M.**
		A Smart Air Outlet Using Shape Memory Alloy Wire Actuators for Temperature-Controlled Metrology Rooms Löffler R., Hornfeck R., Barari A.
		Standing Wave Control for Manufacturing Processes through Power Supply Adjusting Giraldo A., Carlos M., Matos Silva Junior A., Tanabi N., Barari A., Vieira Pereira L. O., Tsuzuki M.
		A Method for Analyzing the Dynamics of Concurrent Repetitive Manufacturing Processes and the Effect of Disturbances on Cycle Time Wójcik R., Crisóstomo M. M., Banaszak Z.
		Tool Wear Prediction Using Smart Data and Advanced Change Point Detection Techniques for Optimized Replacement Timing in Manufacturing Systems Janik M. Krzempek K., Sobecki P., Mazurkiewicz D., Żabiński T., Piecuch G.
		Condition Monitoring of Production Conveyor Lines Using Worm Gears under Periodic Loading Bondoc A., Gründer J., Frank J., Barari A., Monz A.
		Low Fidelity Simulation in LIVE Digital Twin to Detect Rotational Errors in Production Machinery Asbaghian F., Barari A.
		Optimal Scheduling for Minimising Energy Consumption in Fibre-Cement Manufacturing Sujinda S., Janardhanan M., Ponnambalam S.G., Nielsen I.
12:00-12:30	**Coffee break**	
12:30	Room T1	**Plenary session II: Dmitry Ivanov** ***The most adaptable will survive: Resilience and viability in times of turbulence and global uncertainty*** Chair: Marco Macchi
13:00	Room T1	**Plenary session III: Paulina Golińska-Dawson** ***The End of Ownership? Can OEMs Embrace Circular Product-as-a-Service in Consumer Markets?*** Chair: Krzysztof Rokosz
13:45-14:45	**Lunch**	

14:45-16:15	**Room T1 (ThuBT1)** Regular session S2	**Chairs: Radzki G., Piotrowska K.**
		Monitoring and Prediction of Maintenance Operations for Aircraft Engines Repair Mendonça L., Pires F., Duarte M., Barbosa J., Leitão P.
		Integration of Asset Administration Shells and Federated Learning into Software-Defined Mobile Assets Gül B., Kannanthodath Induchoodan A. M., Jazdi N., Weyrich M.
		A Process and Application-Based Framework for the Optimization of Manufacturing Process Crippa D., Cesani D., Pirola F., Sala R.
		Impact of Sitting vs Standing Baselines on Performance Parameters of Stress Classification Models in Assembly Tasks Syed D., Quadrini W., Pinzone M.
		Generation of Machining Process Plans for CNC Machine Tools Using Machine Learning Techniques Habel, J.
	Room T2 (ThuBT2) *Intelligent Additive Manufacturing*	**Chairs: Tsuzuki M., Barari A.**
		Statistics-Based Approach towards Definition of Test Criteria in Quality Assurance of Additively Manufactured Products Huxol A., Villmer F.
		Towards Automated Parameter Extraction from Engineering Documents Möller Ch., Björkskog Ch., Jatta L., Lundell A., Manngård M., Westö J.
		AI-Enabled Quality Control in Manufacturing: Evidence from an Empirical Sample of SMEs Bettoni A., Corti D., Masiero S., Barut Z., Ejsmont K., Gladysz B., Kosieradzka A.
		On the Sources of Non-Systematic Deformations and Defects in Metal Additive Manufacturing Farahnak M. Y., Tsuzuki M., Barari A.
14:45-16:15	**Room T3 (ThuBT3)** *Human Work and Skills for Advanced Manufacturing in AI and Industry 5.0 Era*	**Chairs: Emmanouilidis Ch., Patalas-Maliszewska J.**
		Resilient Maintenance Operator: Technology and Skills for Evolution Ruppert T., Scheffer S., Ansari F., Macchi M.
		Multimodal Approach to Digital Assistant Combining Text and Image Generative Artificial Intelligence for User Instruction of Machine Tools Cho S., Park J., Um J.
		Co-Creation Design Patterns for Human-AI Teaming in Manufacturing and Multi-Domain Decision-Making Emmanouilidis Ch., Zotelli J., Hengel K., Waschull S., Bokhorst J.A.C.
		Application of an Intelligent Adaptive Control System for Task Synchronization in the Cast Iron Hub Machining Process Piechowski M., Hallioui A.
		Exploring the Skills Revolution: Strategic Upskilling and Reskilling Human Operators for Advanced Manufacturing Ecosystems Chalutz-Ben Gal H., Cohen Y.
	Room T4 (ThuBT4) *LLM and Generative AI for Intelligent Manufacturing Systems*	**Chairs: Jazdi N., Rudnik K.**
		Comparative Analysis of Traditional and Transformer-Based Models in Multi-Label Classification of Industrial Requirements Gisi M., Schöler T., Legat Ch.
		Investigation of the Application Possibilities of Large Language Models (LLMs) in Dynamic Reliability Calculation Fleissner K., Jazdi N., Zhou D.
		Development of Approaches to Business Processes Improvements in a Digital Transformation Szczepanek M., Rudnik K., Deptuła A., Estrada Q.
		Development of Cognitive Architectures for Humanoid Robots in Smart Factory Majewski M., Bocewicz G., Banaszak Z.
		Point Cloud Fusion from Multiple Stereo Cameras Kowalczuk Z., Małek M., Lisek O.
16:15-17:00	Room T5	**Meeting IFAC Technical Committee 5.1 – Manufacturing Plant Control**
19:00-24:00		**Banquet** *Hotel Gromada*

Day 2 – Friday – 12th September

Time	Place	Event
10:30-11:00	Room T1	**Plenary session IV: Marek Zaremba** ***Intelligent Systems – Is Sky the Limit?*** Chair: Zdzisław Kowalczuk
11:00-11:30	**Coffee break**	
11:30-13:30	**Room T1 (FriAT1)** *Recent Advances in Smart and Sustainable Manufacturing and Maintenance - part I*	**Chairs: Antosz K., Piechowski M.**
		Multi-Criteria Vehicle Routing Problem for Maintenance in Manufacturing Systems Rudy J., Idzikowski R.
		Recognition of the Surface Roughness Processed by a Milling Cutter Based on Signals Processing Kozłowski E., Antosz K., Prucnal S., Sęp J.
		Machine Learning Methods in Quality Prediction: A Comparative Analysis of Regression Models – Case Study Antosz K., Jasiulewicz-Kaczmarek M., Husár J., de Sá J., Hallioui A.
		Digital Twins of Conveyors in PLM Tools for Logistics 4.0 Husár J., Trojanowska J., Trojanowski P., Lazorík P.
		Remanufacturing of Household Appliances in PaaS – a Decision Framework with Indicators to Support the Circularity Golinska-Dawson P., Werner-Lewandowska K., Hidalgo-Crespo J.
		Assessment of the Potential for Remanufacturing of a Washing Machine with Focus on Critical Raw Materials Kanciak W., Popławski M., Golinska-Dawson P.
		Human-Centric Model-Based Systems Engineering: Essential Skills for the Aerospace Industry Stadnicka D.
	Room T2 (FriAT2) *Interoperability in Smart Manufacturing Systems (ISMS)*	**Chairs: Patalas-Maliszewska J., Krenczyk D.**
		Synchronization Approach for Integrated Intralogistics in Mixed-Model Assembly Line Supply Systems Kalinowski K., Krenczyk D., Jarzynska M.
		Analyse of Insulation in a PIT Furnace for Low-Pressure Metal Carburizing Process Klos S., Chciuk M., Bazel M., Placzek G.
		Analysis of the Impact of the Interferences in the Vision System on a Collision Detection in the HRC Workstation towards Industry 5.0 Dudek A., Patalas-Maliszewska J.
		Defining the Close Enough Orienteering Problem with Angle Dependent Scores Nørbjerg M., Larsen M.l., Nielsen P.
		Optimising the Energy Consumption of the Production Process Using a Genetic Algorithm Jardzioch A., Witkowska W., Bartosz J.
		Cyclic Manufacturing with Transport Smutnicki Cz., Rudy J., Trotskyi S.
		Implementing Mobile Plant Maintenance in the SAP ERP System - a Case Study Kochańska J., Neugebauer Z., Michael A.X., Butdee S., Burduk A.
11:30-13:30	**Room T3 (FriAT3)** *Smart Supply Chain and Logistics: Leveraging Industry 4.0 and Industry*	**Chairs: Thibbotuwawa A., Perera N.**
		Predictive Analytics for Demand Forecasting in Automobile and Automotive Spare Parts Industry of Developing Countries: Comparative Study Tharinda N., Kosgoda D., Thibbotuwawa A., Nielsen I.
		Barriers to the Adoption of Climate-Smart Agriculture Strategies in the Horticulture Supply Chain Vishvanathan V., Thalagala N.T., Thibbotuwawa A., Nielsen P., Bocewicz G.
		Prioritizing Flood-Affected Regions for Resource Allocation Using the Analytic Hierarchy Process: A Drone-Based Emergency Response Approach Nilakshana M., Fernando M., Thibbotuwawa A., Nielsen P., Banaszak Z.

		Towards Value 5.0: An Integrated Resilience-Environmental-Social-Economic-Technological (RESET) Framework to Conceptualize Value Creation in Industry 5.0 Ecosystems Bandara A., Thibbotuwawa A., Perera N., Nielsen I.
		Design and Optimization of a Geofenced Pesticide Spraying System with Energy-Efficient Drone Route Planning Using CVRP Hareeshanan T., Fernando M., Thibbotuwawa A., Nielsen P.
		Automation-Enabled Picking Optimization in Omnichannel Warehousing: A Simulation-Based Analysis Wathuyaya S.L.; Kosgoda D.; Perera N.
		Multi-Path Emergency Routing with Driver Fatigue Using Modified Genetic Algorithm Nielsen I., Maity S., Thibbotuwawa A.
13:30-14:30	**Lunch**	
14:30-16:00	**Room T1 (FriBT1)** *Recent Advances in Smart... part II*	**Chairs: Antosz K., Piechowski M.**
		Smart and Rapid Evaluation of Sustainable Development in Industry 4.0 and 5.0 - Research Concept for a New Method Based on ERP Data Dabrowski K., Skrzypek K., Saniuk S.
		The Impact of Maintenance on Organizational Resilience Stachowiak A.
	Room T2 (FriBT2) Regular session S3	**Chairs: Plinta D., Dulina L.**
		Assembly Line Balancing Problem with Parallel Workstations and Ergonomic Consideration Aribi D., Hind B., Belkahla-Driss O.
		Reducing Hand Strain in Industrial Tasks Using the Innovative CERAA Glove System Gaso M., Zuzik J., Dulina L., Machova M., Plinta D.
		Opportunities for Leveraging Artificial Intelligence in Manufacturing: A Comparative Perspective of China and Germany on Regulation and Standardization Legat Ch., Li R., Hong P., de Meer J., Boell M.
		Enabling Humanoid Robots to Perform Human-Observed Activities Majewski M., Bocewicz G., Banaszak Z.
		Identifying and Addressing Barriers to Implementing Lean Six Sigma in Automotive Industry Cirkin E., Hosahalli Shivaram M., Nielsen I., Bocewicz G., Janardhanan M.
	Room T3 (FriBT3) Regular session S4	**Chair: Gładysz B., Szwarc E.**
		An Approach for Developing and Evaluation of Machine Learning Algorithms for Anomaly Detection of Time-Series Data Weichert I., Hirth M., Jazdi N.
		A Multi-Location Laboratory Demonstration Facility for Addressing Industrial Connectivity Challenges Brooks S., McFarlane D.C.
		Digital Twins in Maintenance and Asset Management: Evidence on the Technology Adoption from Scientific Literature and Patents Gladysz B., Quadrini W., Ruppert T., Smagowicz J., Szwed C., van Erp T., Macchi M.
		PI-Based Feedback Die Temperature Control for Aluminum Castings Reiterer F., Schnubel D.
		Federated Learning for Remaining Useful Life Prediction: A Literature Review Abdouni I., Voisin A., Cerisara, Ch., Iung B.
	Room T4 (FriBT4) *Numerical Methods, Modeling and Simulations*	**Chairs: Wojszczyk R., Hapka A.**
		Monitoring Vital Signs with an IoT Device and Web-Based Application Wojszczyk R., Sawala P.
		Simulating Employee Evacuation with Unity Sokół B.
		Using Digital Twin for Simulation in Continuous Manufacturing Processes Danel R.
		Real-Time Monitoring and Production Optimalization of Forest Harvesters Dvořák J., Natov P., Wojszczyk R.
		Race Condition Error in CNC Computer-Machine Communication Wojszczyk R.
16:00-16:30	Room T1	**Closing ceremony**

Keynotes

Thursday, September 11th, 9:15 – 9:45 Plenary Session ThuP1L, Room T1

Title: Generative AI in Manufacturing: A Digital Twin Perspective

Speaker: Andrew Kusiak, University of Iowa, USA

Andrew Kusiak is Professor of Industrial and Systems Engineering at the University of Iowa and Director of the Intelligent Systems Laboratory. He has chaired both the Industrial Engineering and the Mechanical and Industrial Engineering departments. His research applies computational intelligence to manufacturing, renewable energy, automation, sustainability, and healthcare. He has authored numerous books and hundreds of papers in leading journals sponsored by AAAI, ASME, IISE, IEEE, INFORMS, and others. A frequent keynote speaker and consultant, he has also delivered seminars worldwide. Professor Kusiak has held elected positions in professional societies and served on editorial boards of over fifty journals, including as Editor of five IEEE Transactions. He is a Fellow of the Institute of Industrial and Systems Engineers and Editor-in-Chief of Journal of Intelligent Manufacturing (Springer Nature). According to Google Scholar, his research ranks at the top globally in intelligent manufacturing, wind energy, and other technology fields.

Thursday, September 11th, 12:30 – 13:00 Plenary Session ThuP2L, Room T1

Title: The most adaptable will survive: Resilience and viability in times of turbulence and global uncertainty

Speaker: Dmitry Ivanov, Berlin School of Economics and Law, Germany

Dmitry Ivanov is Professor of Supply Chain and Operations Management at the Berlin School of Economics and Law, where he directs the Digital-AI Supply Chain Lab and the M.A. Global Supply Chain program. His research focuses on supply chain resilience and digital twins, and he is known for the Viable Supply Chain Model and pioneering ripple effect research. He holds Dr., Dr. Sc., and Dr. habil. degrees and has received multiple research excellence awards. Author of around 450 publications, including 160 journal papers and leading books such as Global Supply Chain and Operations Management (3 editions) and Introduction to Supply Chain Resilience, he is among the most cited scholars in Business and Management. He has delivered keynotes at major conferences (INFORMS, IFAC, IEEE, POM) and held roles in 70+ international events. He serves as Chair of IFAC CC 5 and is Editor-in-Chief, Associate Editor, or board member of over 20 leading journals.

Thursday, September 11th, 13:00 – 13:30 Plenary Session ThuP3L, Room T1

Title: The End of Ownership? Can OEMs Embrace Circular Product-as-a-Service in Consumer Markets?

Speaker: Paulina Golińska-Dawson, Poznań University of Technology, Poland

Paulina Golińska-Dawson is a Professor of Poznan University of Technology (PUT) and works at the Institute of Logistics (Poland). She holds DSc. (habilitation) in transport engineering. She conducts studies on: smart & sustainable supply chain, remanufacturing, and circular supply chain. She was an expert on the European Commission for the development of the Strategic Transport Research & Innovation Agenda (STRIA). At the University of Luxembourg, as a visiting scholar, she participated in projects related to sustainability. Currently at PUT, she coordinates the Scandere research project (Scaling up a circular economy business model by new design, leaner remanufacturing, and automated material recycling technologies), granted from the ERA-MIN3 programme. She is an editor of the book series "EcoProdution- Environmental Issues in Logistics & Manufacturing" by Springer. She is the author and co-author of more than 120 papers published in journals, books, and conference proceedings.

Friday, September 12th, 10:30 – 11:00 Plenary Session FriP4L, Room T1

Title: Intelligent Systems – Is Sky the Limit?

Speaker: Marek Zaremba, University of Quebec, Canada

Marek B. Zaremba is an Honorary Professor of Computer Engineering at the University of Quebec (UQO), Canada. He earned his Ph.D. in Control Systems from the Warsaw University of Technology, Poland. He has been a Visiting Professor at the Vienna University of Technology, Université de Nancy I, France, and a Visiting Scholar with the Canada Centre for Remote Sensing and the National Research Council in Ottawa. His research interests include hybrid systems, computational intelligence, real-time adaptive and learning systems, and pattern recognition in remote sensing. He is the author or co-author of five books and over 200 scientific papers. His work has been supported by NSERC, CFI, Ontario Hydro, Natural Resources Canada, and other agencies. Professor Zaremba has contributed to around 60 international conferences, chairing four. Within IFAC, he served as President of IFAC-Canada, Technical Board member, and Council member. He received the IFAC Outstanding Service Award for his contributions.

Invited sessions

Design and Operation of Next Generation Manufacturing Systems

(ThuAT2: Thursday 11th September, 10:15-12:00, Room T2)

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 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.

Advances Toward Smart Digitized Shopfloors

(ThuAT3: Thursday 11th September, 10:15-12:00, Room T3)

Ongoing technological developments are transforming industrial shopfloors through the convergence of digitalization, automation, and advanced manufacturing. These changes enhance productivity, cost efficiency, and system flexibility, while reshaping how manufacturing operates. Smart and robust systems are emerging, driven by Industry 4.0 and Industry 5.0 principles. Advances in augmented reality, machine vision, smart sensors, AI, robotics, cloud-edge computing, digital twins, and IoT are enabling connected, adaptive, and intelligent operations. Digital twins in particular support decentralized, real-time decision-making, increasing responsiveness and resilience. Industry 5.0 further complements these trends with human-centric, sustainable approaches.

This Invited Session explores how technological advances reshape shopfloors, asking: How can models and methodologies best exploit these innovations to foster efficiency? It highlights optimization, control, digitalization, automation, and management methods enabling cyber-physical manufacturing systems with self-optimization, resilience, and intelligent worker support.

Error-Free Manufacturing Control

(ThuAT4: Thursday 11th September, 10:15-12:00, Room T4)

It has been a great effort in Industry 4.0 and 5.0 eras to eliminate, reduce, model, calibrate, and compensate for various sources of the errors in manufacturing and production systems. The applications of closed-loops of inspection and manufacturing process control have been implemented widely and the actual integration of data collection/analytics with dynamic process planning in manufacturing have created many promising results. The developed methodologies also include a wide category of research achievements in developing "Digital Manufacturing Twins", where a combination of manufacturing process simulation and data-driven online manufacturing process control with support of artificial intelligence and machine learning work together to compensate and/or eliminate various types of systematic and non-systematic manufacturing errors.

This session provides an excellent forum for scientists, researchers, engineers and industrial practitioners to meet and share experiences, theoretical knowledge or application examples based on the latest trends in developing intelligent solutions, methodologies, and approaches to various error elimination, reduction, modelling, calibration, and compensation tasks in manufacturing and production systems.

Intelligent Additive Manufacturing

(ThuBT2: Thursday 11th September, 14:45-16:15, Room T2)

Additive Manufacturing (AM) is highly susceptible for digitalization in its various stages including Design for Additive Manufacturing, Additive Manufacturing Pre-Processing, Additive Manufacturing Process, and Additive Manufacturing Post-Processing. The created digitalized environment in AM successively results in great capabilities to add intelligence.

This session provides an excellent forum for scientists, researchers, engineers and industrial practitioners to meet and share experiences, theoretical knowledge or application examples based on the latest trends in developing intelligent solutions, methodologies, and approaches to various decision making tasks in additive manufacturing stages, as well as future directions and trends aimed to use artificial intelligence and machine learning to deal with the growing demand for new materials, geometric representation, part design, in-process monitoring, decision-making, etc.

Human Work and Skills for Advanced Manufacturing in AI and Industry 5.0 Era

(ThuBT3: Thursday 11th September, 14:45-16:15, Room T3)

As smart manufacturing and Industry 5.0 advance, with human-centricity at their core, understanding the evolving roles and skills of operators becomes crucial. AI, autonomous systems, and collaborative robots (cobots) are reshaping human–machine dynamics. In many contexts, AI benefits from human input, creating a synergy that requires new competencies such as data literacy, problem-solving, creativity, and collaboration with AI-driven systems.

These changes demand agility, adaptability, and continuous upskilling, supported by new tools and frameworks for managing digitized workflows and reorganized work environments. Research on human factors should examine how technology and skills interact, offering industries methods to build agile, resilient workplaces.

This session features contributions on the latest theories, methods, tools, and applications concerning human work, skills, and technology interactions in Industry 5.0.

LLM and Generative AI for Intelligent Manufacturing Systems

(ThuBT4: Thursday 11th September, 14:45-16:15, Room T4)

Industrial automation in manufacturing systems offers opportunities to increase efficiency, enhance flexibility, and support decision-making processes. While large language models (LLMs) have been mainly applied in natural language processing (NLP), their potential in automating industrial environments is becoming evident. Generative AI (GenAI) models provide tools for process optimization, system forecasting, fault diagnosis, and predictive maintenance.

This session will explore recent developments and innovative use cases for LLMs and GenAI in industrial automation. Topics include integrating LLMs and GenAI into production planning, using data analysis for predictive maintenance, enhancing quality control, and managing complex systems. AI-driven agents' role in Failure Modes and Effects Analysis (FMEA) will also be a focus, offering value in assessing potential industrial risks.

Participants will encounter real-world case studies, insights from research projects, and a discussion of challenges in implementing LLM-based technologies. This session aims to showcase both theoretical and practical applications, emphasizing the transformative potential of AI-driven solutions in industrial automation.

Recent Advances in Smart and Sustainable Manufacturing and Maintenance

(FriAT1 (part I): Friday 12th September, 11:30-13:30, Room T1)

(FriBT1 (part II): Friday 12th September, 14:30-16:00, Room T1)

With increasing globalization and contemporary market demands, manufacturing efficiency is often defined not only as the capacity for low-cost production of specified quality products but also as being in line with social and environmental requirements. In this context, the manufacturing and maintenance functions are important, ensuring asset availability and product quality while monitoring natural resource use and people and process safety. Moreover, Industry 4.0 technologies bring high potentiality for enhancing manufacturing and maintenance management and execution, which is an opportunity for integrating the sustainability dimension. Adopting sustainability in manufacturing and maintenance requires a comprehensive look at these processes and the technologies involved in their realization.

This Invited Session aims to present the state-of-the-art theoretical developments and applications of Industry 4.0 technologies for sustainability in manufacturing and maintenance processes in various industry sectors.

Smart Supply Chain and Logistics: Leveraging Industry 4.0 and Industry 5.0

(FriAT3: Friday 12th September, 11:30-13:30, Room T3)

In the modern global economy, supply chains are increasingly influenced by emerging technologies from Industry 4.0 and Industry 5.0, leading to more intelligent, efficient, and sustainable operations. The fusion of artificial intelligence, machine learning, robotics, and advanced data analytics is enabling more agile, responsive, and optimized supply chains across industries.

The agri-food supply chain and delivery logistics sectors are particularly ripe for transformation, where optimization of end-to-end operations can significantly reduce costs, minimize waste, and improve service levels. This session will explore these cutting-edge developments, along with new methodologies for optimizing logistics systems, incorporating smart technologies, and enhancing overall supply chain performance.

Interoperability in Smart Manufacturing Systems

(FriAT2: Friday 12th September, 11:30-13:30, Room T2)

Data and knowledge are central to modern production. Current challenges in production organization and management require analysis of diverse data to drive company development, making data-based models essential for data intelligence. Interoperability, in this context, is the capacity for data, information, and knowledge sharing across different components or machines, via both software and hardware. Broadly, it refers to the ability of systems, applications, and devices to connect and communicate automatically. This session will cover the process of fully automated data acquisition, formalization, and analysis, with a focus on interoperable horizontal and vertical integration across Smart Manufacturing Systems.

The session offers a forum for researchers and industrial practitioners to share experiences, theoretical issues, and application examples related to data and knowledge engineering, particularly in modeling and implementing interoperability in cyber-physical manufacturing enterprises.

Numerical methods, modeling and simulations

(FriBT4: Friday 12th September, 14:30-16:00, Room T4)

The assumptions of Industry 4.0 include the digitization of production and related processes, requiring appropriate software with implemented data structures and algorithms. The session covers numerical methods, simulations, and modeling in manufacturing and supporting processes, focusing on tools that enable data transformation, simulations, and model building. These solutions optimize production and ensure product quality. Topics also include software as a product, the software development process, and related issues like IoT, CNC control, HMI, and web applications. The session offers a platform for designers and practitioners to exchange knowledge and experience.

Excursion

During the conference, it will be the opportunity to participate in an excursion to the Cold War Museum. Bus transfer from conference venue and guided tour will take place on the second day of the conference (September 12th) in the morning (9:00–13:00), during some sessions (please check the conference program). **The pickup location is the ground floor of conference venue (Śniadeckich 2 street) at the reception.**

The Shelters in Podborsko – Cold War Nuclear Base

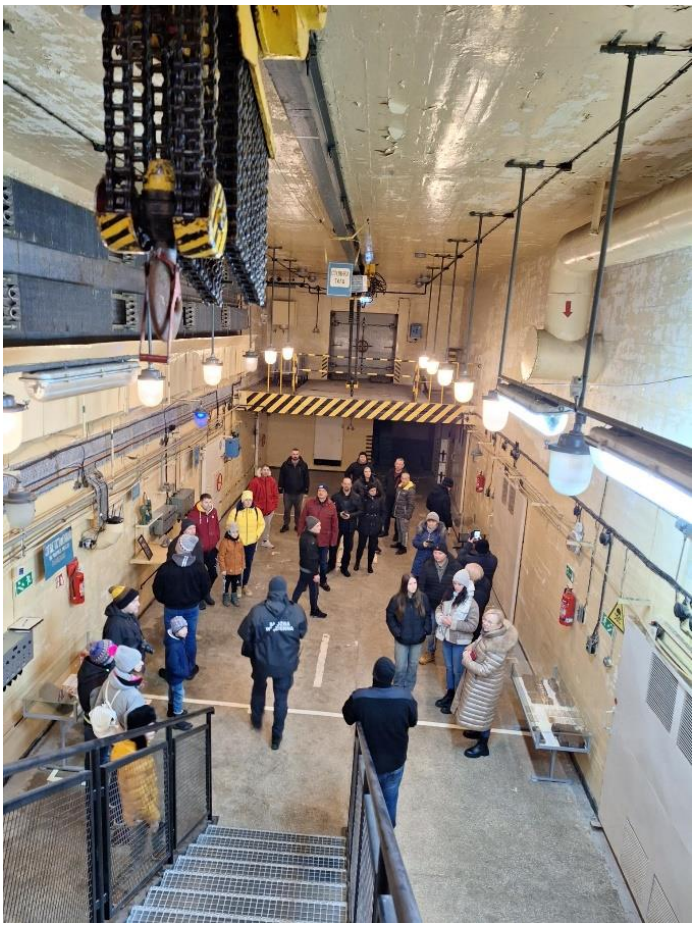
The Podborsko shelters are part of a former Soviet nuclear base, known as Facility 3001. Built in the late 1960s under the "Vistula" program, the site consisted of two bunkers, each capable of storing 80 nuclear warheads. Hidden in the forest near Podborsko (Białogard County), it was staffed by about 150 Soviet soldiers and kept under strict secrecy.

Structure and Purpose

The complex includes two reinforced bunkers (Nos. 17 and 18, each 986 m²) and a later "Granit"-type shelter, the best preserved in Poland. Equipped with cooling, ventilation, generators, and Soviet electrical systems, the base stored up to 160 warheads for SCUD-B missiles. Warheads were transported in sarcophagus-like containers on anchored carts. The last ones were removed in 1988; Soviet troops left in 1992.

Museum Today

Since 2015, the Polish Arms Museum has managed the site. Bunker 17 opened to visitors in 2016, offering tours with original equipment, weapons, uniforms, chemical suits, and memorabilia. A highlight is the SCUD-B engine compartment.



Visitor Experience

Over 90% of the base remains intact, creating an authentic Cold War atmosphere. **Attention: The interior stays cold (6–10 °C), so visitors should dress warmly.**

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