RICAIP

Research and Innovation Centre
on Advanced Industrial Production

ANNUAL REPORT 2024

EU Project Creating a RICAIP Centre

RICAIP

Research and Innovation Centre on Advanced Industrial Production

CTU CZECH INSTITUTE OF INFORMATICS ROBOTICS AND CYBERNETICS CTU IN PRAGUE

www.ciirc.cvut.cz

BRNO UNIVERSITY OF TECHNOLOGY

www.ceitec.eu

CEITEC Central European Institute of Technology

dfki Deutsches Forschungszentrum für Künstliche Intelligenz German Research Center for Artificial Intelligence

www.dfki.de

ZeMA

www.zema.de

Fraunhofer

www.dresden.fraunhofer.de

VSB TECHNICAL UNIVERSITY OF OSTRAVA

www.vsb.cz

2024 Highlights

31 January
Visit of Dr. Jayant Jagtap (NIMS University, Jaipur, India) in Prague

13 March
3D Precise Measurement on CMM and Laser Scanning Workshop, Brno
Co-organised with EDIH DIGIMAT

21 March
Global Goals Summit 2024, Prague
Co-partnered with the Association of Social Responsibility (A-CSR)

4 April
Day of Artificial Intelligence and Smart Industry Digitalisation, Brno
Co-organised with the Investment and Business Development Agency CzechInvest

5 April
Visit of a Latvian Delegation, Prague
Latvian Ministry of Economy & Latvian Embassy

11 April
CLAIRE: Europe's Moonshot Ambitions for AI, Brussels
Panel discussion including Tilman Becker, RICAIP director

2 May
Visit of Koreatsu Aoki, CEO of TOYOTA/TPCA, in Prague

27 May
CIIRC International Advisory Board, Prague
External evaluation of RICAIP and live-stream visit of the RICAIP Testbed Prague

29 May
Open Day for Industry 4.0, Prague

19 June
SheCodes MeetUp 2024, Prague
Co-organised with the European Networks of Excellence Centres - AI NoEs

19 June
ADRA European Convergence Summit, Online
RICAIP virtual booth and a pitching session

9-13 September
IDESSAI Summer school, Saarbrücken
RICAIP Day on robotics and innovation, including tours of the testbed

27 September
Researchers' Night, Prague

8 October
All-Hands-Meeting of German Competence Centers for AI, Dresden
RICAIP Human-robot demonstrator

8-11 October
MSV Brno 2024 - International Engineering Fair, Brno
5 demonstrators, guided tours in the testbed

16 October
AI Days: Young AI Research Forum, Prague

18 October
Visit of a delegation from the Japanese Ministry of Foreign Affairs, Prague

30 October
Women in Cyber – Conference, Prague

4-5 November
ADRForum 2024, Eindhoven
Gold partner with an onsite booth and demonstrator, cross-project workshop

19 November
SOCAIETY 2025 Conference, Prague

19 November
Labour Market in the Digital Era Conference, Brno

18 December
Caroline Parkinson: "Future of Innovations: Industry, Academia, and Creative Tech", Prague

Tilman Becker, PhD
RICAIP Director

The RICAIP project has made large steps in 2024 towards its goal of establishing a sustainable RICAIP Centre. We have seen the use of the RICAIP Testbed infrastructure in a multitude of projects beyond the RICAIP project: in particular, as part of the European Testing and Experimentation Facility for Manufacturing (TEF), supported by the AI-MATTERS project, and local European Digital Innovation Hubs (EDIH) in Prague, Brno and also in Saarbrücken and Kaiserslautern.
The testbeds are used with our industrial and academic partners for experiments and as a proving ground in research and development. The testbeds are used in a rising number of projects, including RAASCEMAN, Cynergy4MIE, AIQUAMA and many more. At the same time, we are pushing our work on RICAIP Use Cases, focusing on distributed manufacturing, working towards a software integration infrastructure ranging from low-level 5G communication to high-level MES connectivity.
We are now beginning the final period of the RICAIP project, and yet, it is only the beginning of our ongoing journey fulfilling our mission of support in research and development, education, consulting and public outreach.
I hope you will find this annual report helpful in understanding all of RICAIP's activities and offerings. We are looking forward to working with you!

Prof. Vladimír Mařík
Scientific Director, CIIRC CTU
Principal Investigator of RICAIP Project,
Member of the RICAIP Steering Committee

The activities of the RICAIP Centre were extremely rich and successful in 2024.
The RICAIP Centre was continuing in fulfilling the project plan and intensified the dissemination activities, especially those targeting the broad public.
The RICAIP Testbeds in Prague and Brno enriched a portfolio of tasks being solved and prepared unique presentations of distributed modular manufacturing, including demonstrators of the remote-control system connecting different RICAIP testbeds in Prague, Saarbrücken, and Brno to solve the joint use cases.
The RICAIP team was present at the Brno MSV Fair and invoked a deep interest of the Fair visitors, including the President of the Czech Republic Petr Pavel and the Prime Minister of the Czech Republic Petr Fiala.
The year 2024 was also very important from another point of view: The RICAIP Centre has intensified its cooperation with the European EDIH infrastructures (EDIH DIGIMAT in Brno, EDIH CTU in Prague, EDIH SAARLAND in Saarbrücken) as well as with the National Centre for Industry 4.0.
The RICAIP teams were instrumental in preparing a unique book on Industry 4.0 as a guidebook for industry transformation in the Czech Republic.
The RICAIP teams are also very active in the TEF project AI-MATTERS and have started to explore the LLM technology. All the RICAIP activities did confirm that the RICAIP project is on a good track.

About RICAIP

The Research and Innovation Centre on Advanced Industrial Production - RICAIP - is a European distributed research centre of excellence focusing on R&D in robotics and artificial intelligence applications for distributed production. RICAIP creates a unique research environment for the development and testing of innovative solutions for advanced, modular and fully integrated industrial production.

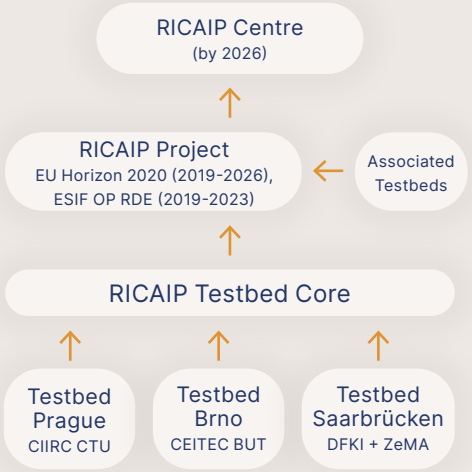
Mission

To create a collaborative ecosystem for academia, industry (large and small caps) as well as for national and regional authorities, to produce valuable, high-impact and application-oriented research results for producing and manufacturing companies.

Vision

To establish RICAIP as a key entity in major European research infrastructures for artificial intelligence, robotics, machine learning and computer science for advanced industry and production.

- Building an AI ecosystem for industrial manufacturing
- Research infrastructure for various projects and funding
- Latest technology usable by both large corporations and SMEs
- Networking across the European AI community
- Synergic activities with major European AI and manufacturing initiatives



RICAIP Project (2019 - 2026) Total Funding

EUR rate
25.5 CZK

The establishment of the RICAIP centre is the main objective of the RICAIP project - jointly funded by the EU Horizon 2020 and ESIF/ OP RDE of the Czech Ministry of Education, Youth and Sports with EUR 48.5 million for 2019-2026.

Principal Investigator **Prof. Vladimír Mařík,** *Scientific Director, CIIRC CTU*

€48.47 mil.

Initial RICAIP Project

Total Baseline Budget - Teaming Grant (2019 - 2026)

€14.99 mil.

European Commission EU Horizon2020: H2020-WIDESPREAD-01-2018-2019 – Teaming Phase 2 (09/2019 - 02/2026) **Grant Agreement No. 857306**

- **CIIRC | 49%**
- **CEITEC | 26%**
- **DFKI | 17%**
- **ZeMA | 8%**

€33.48 mil.

EU & Czech Ministry of Education, Youth, and Sports
Complementary funding from ESIF OP RDE (09/2019 - 06/2023)
Project No. CZ.02.1.01/0.0/0.0/17_043/0010085

- **CIIRC | 59%**
- **CEITEC | 41%**

This project has received funding from the European Union´s Horizon 2020 research and innovation programme under grant agreements No. 857306.

EUROPEAN UNION
European Structural and Investment Funds
Operational Programme Research, Development and Education

MINISTRY OF EDUCATION, YOUTH AND SPORTS

€51,8 mil.

Leveraged Income

Since the beginning of the RICAIP project (09/2019)

Thanks to RICAIP and its infrastructure, this income has been leveraged through synergistic projects, including public grants, projects, and contractual research with industry, as well as other collaborations. The number is the budget awarded to RICAIP partners.

- **€ 36.4 | 70%**
  Grants in collaboration with industry (incl. EDIHs and TEF)
- **€ 12.6 | 24%**
  Other grants
- **€ 2.8 | 5%**
  Contractual research with Industry

Selected Synergic Projects in 2024

Selected projects, relevant to RICAIP, or using the RICAIP infrastructure, or involving the members of the RICAIP teams.

€ 35 mil.
Awarded to RICAIP partners

57
projects

For more information visit ricaip.eu/research/synergic-projects

Research Focus

RICAIP Testbed Prague
CIIRC CTU

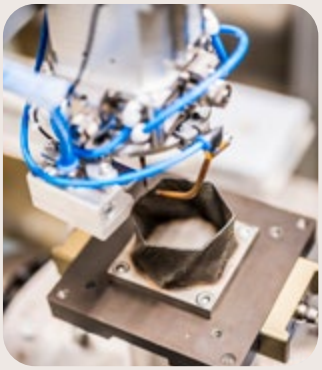
- **AI for Autonomous Robotics and Manufacturing Quality**
  IoT and data analytics, data storage, big data. Image processing, quality inspection, and control. Flexible robotic manipulation with various types of parts. Edge computing, data privacy, and sovereignty.
- **Production Machines and Processes**
  Additive manufacturing using various technologies, including robotic 3D printing, machining and laser processes. Monitoring and control of manufacturing processes for improved quality and productivity. NC code generation and virtual simulation of CNC machine and robot operations. Robots in manufacturing, handling, and assembly. Process and machine diagnostics. Production optimization.
- **Digital Twin and Digital Shadow**
  Synchronization of physical systems and simulations. Virtual commissioning of manufacturing and processes. Dynamic machine models. Predictive maintenance.
- **Smart Factory and Distributed Manufacturing**
  Automated production planning, material flow planning. Modular and flexible production, logistics operations. Manufacturing-as-a-Service.
- **Advanced Energy Systems**
  Optimization of manufacturing processes integrating available energy sources. Electric power distribution systems incorporating diverse green energy sources.

RICAIP Testbed Brno
CEITEC BUT

- **Flexible Manufacturing Systems**
  Additive and subtractive technologies, robotics, mobile manipulators, UGVs, UAVs.
- **Human-Machine and Human-Robot Collaboration**
  AR/VR technologies, precise localization and navigation in industrial environments. Remote monitoring, visual telepresence.
- **Machines and Mechatronic Systems**
  Diagnostics and sensors for predictive maintenance. Vibrodiagnostics, acoustic holography, acoustic emission. Advanced automation and AI applications.
- **Advanced Actuators**
  Advanced rotary and linear drives for industrial applications. Drive systems for electromobility. Fault-tolerant drives, advanced drive control. Diagnostics and monitoring.
- **Sensor Networks and IoT**
- **Edge computing, HPC, AI applications in industry**

Testbed Saarbrücken
DFKI-ZeMA

- **Industry 4.0 and digitalisation**
  Research and development of solutions for a digitised and human-centred and reconfigurable production.
- **Robotics applications**
  Research in the area of Human-Robot Collaboration, Human-Robot Interaction and sensitive robotics.
- **Artificial Intelligence**
  Research and development in the area of multimodal dialogue systems, transfer learning, planning and neuralsymbolic imitation learning.
- **Remote collaboration**
  Research and development of solutions for remote collaboration between distant production sites.



RICAIP Testbeds in the Czech Republic

Since 2019, RICAIP has systematically developed a unique research infrastructure for testing and validating advanced manufacturing technologies, including artificial intelligence, robotics, and cyber-physical systems. Significant investments from the Czech ESIF Operational Programme Research, Development and Education (OP RDE) as complementary funding to the prestigious Horizon 2020 Teaming for Excellence initiative have been made in the Czech testbeds in Prague and Brno. By bridging academic excellence and industrial relevance, this infrastructure strengthens the Czech Republic's and Europe's position in the global transformation toward digital and autonomous production.

Thanks to that, the Czech testbeds are equipped with specific technologies according to their focus, ranging from various types of industrial, collaborative and mobile robots and robotic cells for manufacturing, assembly, integrated intralogistics and warehousing, multi-axis motion systems, machine vision systems and other applications, to production machines for machining, hybrid processes, manufacturing technologies and control systems.

Machinery items — **56**

Pieces of hardware — **198**

Software — **20**

for a total of **€ 28.1 mil.**

RICAIP Testbeds - Features & Equipment

Each testbed provides a variety of 3D printing technologies for additive manufacturing in plastics and metals, including 3D robotic printing - for prototyping, small batch production or custom parts. Other facilities include industrial manipulators, AR/VR and virtualisation technologies as well as a metrology laboratory with automated 3D scanning systems for precision measurements, laser technologies and solutions for welding in Prague, or rotary and linear dynamometers, actuators and traction drives in Brno.

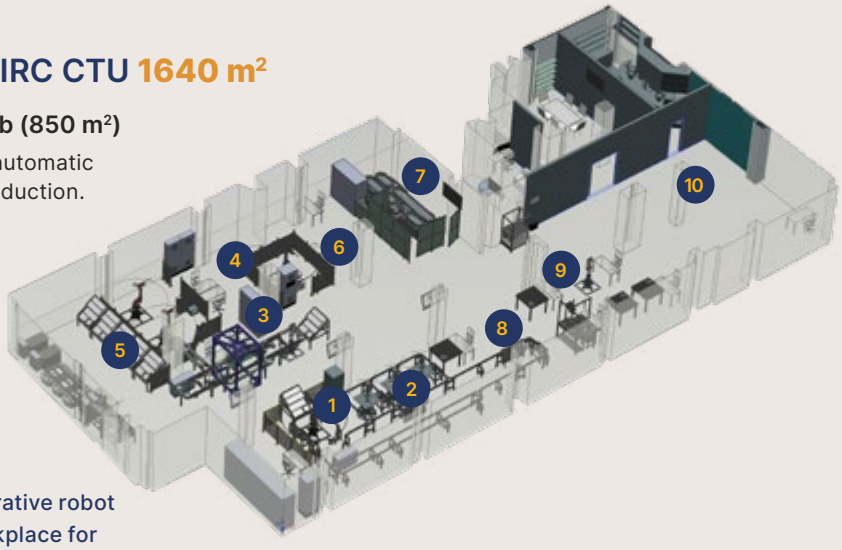
In the testbeds in Prague and Brno, private campus 5G SA (standalone) network for data transfer to the application/edge server with guaranteed latency and bandwidth was installed in cooperation with T-Mobile CZ. The high computing power of the server can be used for industrial computer vision applications or other neural network deployments.

RICAIP
TESTBED PRAGUE

Testbed for Industry 4.0, CIIRC CTU 1640 m²

Robotics and Flexible Production Lab (850 m²)

Located on the groundfloor. Focuses on automatic assembly, planning & virtualisation of production.

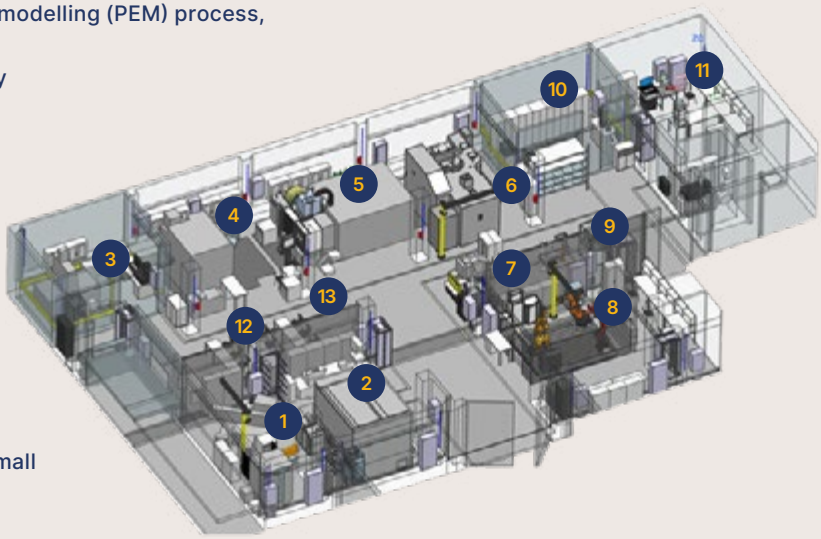


1. Automatic loading station
2. Robotic cells for flexible production
3. Multi-axis motion system – Delta robot with 5G and AI
4. Universal robotic cells
5. Automated warehouse with a fleet of mobile robots
6. Robotic 3D scanning and printing
7. Flexible assembly line with a collaborative robot
8. Interactive collaborative robotic workplace for assembly
9. Robotic cells for machine vision Pick & Place
10. Robotic workplace for gastronomy

Robotics and Production Technologies Lab (570 m²)

Located in the basement. Focuses on production machines and technologies

1. Ultra-short pulse laser machine (nano-, pico- and femtosecond laser source)
2. Robotic cells: robotic laser cell for laser metal deposition (LMD) using wire or powder, robotic cell for large-scale plastic printing using plastic extrusion modelling (PEM) process, robotic cell for robot milling
3. Workpiece metrology laboratory
4. Machine tools: 4-axes horizontal milling machine, 5-axes hybrid center combining milling and WAAM in one working space
5. Weldprint hybrid technology
6. Horizontal milling machine
7. EDM Machine
8. Industrial robots
9. Collaborative robot area
10. Cutting tool presetting area
11. 3D scanning technologies for small and large-scale parts
12. Metallographic grinder
13. Education and training area



3D Printing Centre (130 m²)

1. Meltio Engine - Multiaxis Metal Additive Manufacturing
2. Formlabs Form 3BL - Resin 3D printer
3. Desktop Metal Studio system
4. HP Multi Jet Fusion 4200 - Powder Bed Fusion - Highly professional polymer powder thermal fusing 3D print
5. Stratasys Fortus 450mc - Industrial FDM printer
6. Stratasys Polyjet J750 - Full-color, multi-material photopolymer printing
7. Trumpf TruPrint 1000 - LMF (Laser Metal Fusion) small format 3D powder printer

Smart Grid Lab (90 m²)

For advanced electricity distribution systems and optimisation of production processes

RICAIP
TESTBED BRNO

Industry 4.0 Testbed, CEITEC BUT 460 m²

1. Dynamometers for industrial linear and rotational actuators
2. 3-axis machining center
3. Assembly line with collaborative robots
4. 5-axis machining center
5. AR/VR
6. Precise measurement of dimensions
7. Robotised warehouse
8. Laser cutting/welding
9. Turning machine
10. 3D printing from plastics and metals
11. Private 5G SA network
12. NVIDIA DGX H100 + NVIDIA DGX A100 HPC system

Saarbrücken & Kaiserslautern Testbeds >4,000 m2

Laboratory for Human-Robot Collaboration, Saarbrücken (250 m²)

- Multi-cell collaborative assembly station
- Bin-picking station
- Mobile Industrial Robot for in-site transport
- Local and Global Vision systems
- An AR/VR system for robot remote control

Technologie-Initiative SmartFactory-KL, Kaiserslautern (180 m²)

- Modular Workstation for (re-)assembly of a battery pack

Demonstrators

RICAIP uses AI methods and other technologies to develop new solutions tackling two major use cases

- Foundational technologies for **distributed production** and
- New approaches to production by providing **Production as a Service** (PaaS).

To showcase these concepts, the RICAIP teams develop several demonstrators considering real challenges from industrial settings. The teams collaborate on these solutions across the testbeds. The RICAIP testbeds also showcase the implementation of the **software integration architecture** in practice and provide a testing and validation environment, while emphasizing human-machine collaboration in remote-control scenarios.

Visit RICAIP website for more information

ricaip.eu/demonstrators

Watch the video on RICAIP concept of Distributed Manufacturing on YouTube

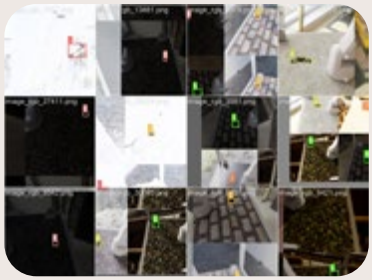
RICAIP YouTube Channel

Selected Demonstrators

- Fail-aware actuators
- Virtually machined surface used for quality control algorithm
- Remote inspection robot
- Human-robot collaboration with robot path planning
- Laboratory for robotics and flexible production
- Remote human-human collaboration with robotic embodiment
- (Dis-)Assembly of battery pack
- Local human-robot collaboration
- Bin picking
- Raspberry Pi assembly

Selected RICAIP Demonstrators Showcased in 2024

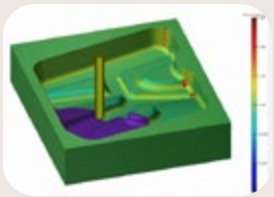
Flexible Modular Robotic Cell: Retrofitting Battery Module



Industrial Metaverse: Autonomous Manipulation Robotic Cell

Robotic Beer Dispenser 2.0

Sustainable Manufacturing: 5G IIoT and Machine Data Collection for Energy Consumption Monitoring



Virtually Machined Surface Used For Quality Control Algorithm

Seleted demos showcased at MSV Brno 2024 RICAIP website

Remote Inspection Robot

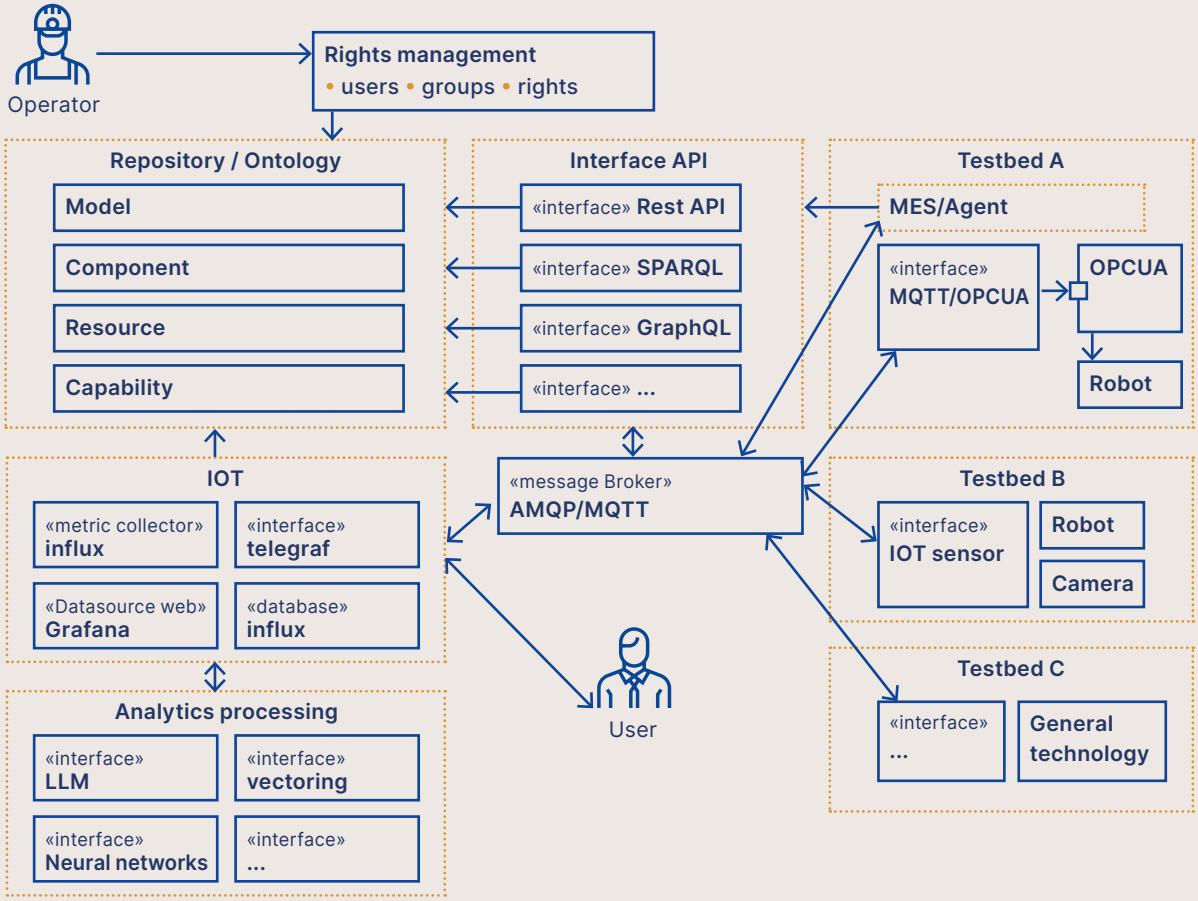
Remote Human-Human Collaboration With Robotic Embodiment

3D Object Reconstruction

Software Integration

Digitization and integration of diverse software systems are core challenges for distributed manufacturing and new business models such as **Production as a Service** (PaaS). The **RICAIP Software Integration Architecture** is a top-down approach to integrating production sites, local production lines, workstations, machines and individual sensors. Distributed production sites - RICAIP testbeds - are interconnected by message brokers considering human interfaces in their various roles as workers, operators, controllers and management.

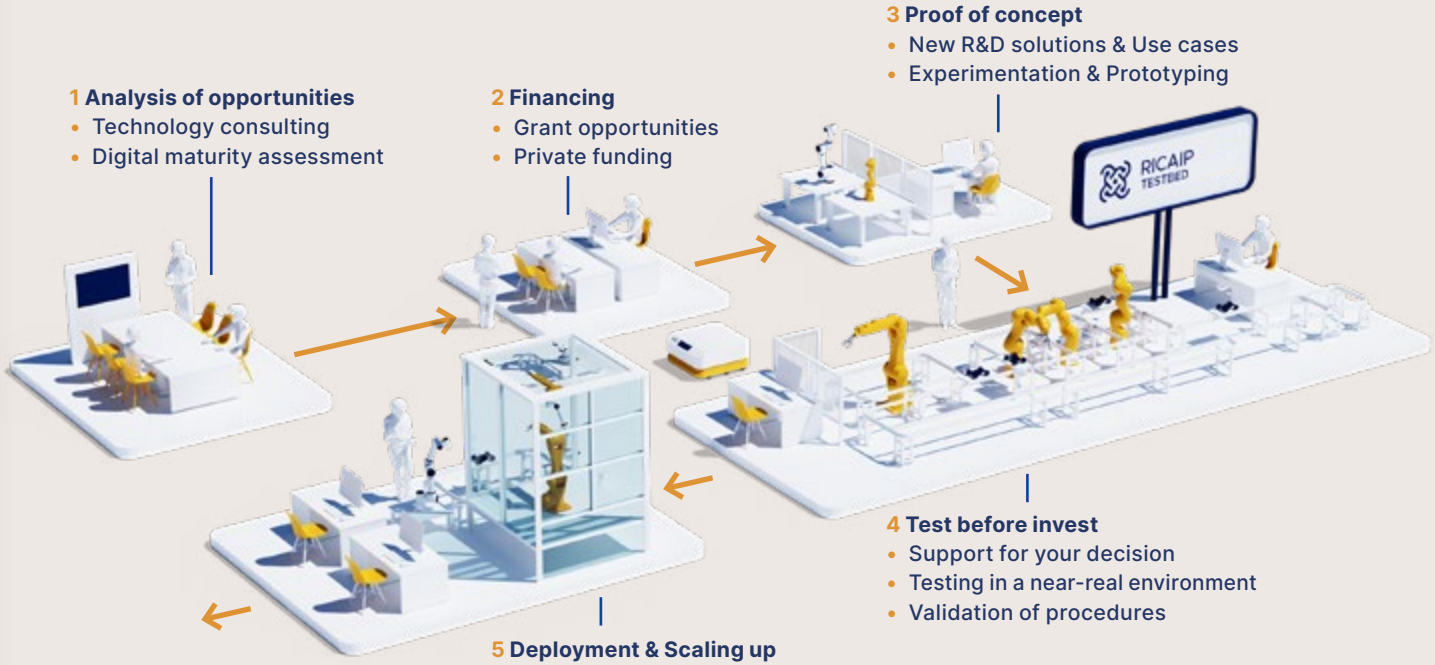
RICAIP draws on the experience of its partners and builds on the **Multi-Agent Systems (MAS)** approach and on **Asset-Administration Shells (ASS)** for increased modularity, including a hierarchical approach with a holonic MAS.



RICAIP Innovation Ecosystem

The state-of-the-art infrastructure, together with the deep-tech knowledge of the RICAIP research teams, is well complemented by the expertise of the technology companies that collaborate with testbeds, namely within the ecosystem of the National Centre for Industry 4.0. Thanks to RICAIP testbeds, manufacturers, innovators, technology providers and system integrators have access to the full range of **services in every stage of their innovation cycle.**

One of RICAIP's core missions is to help manufacturing companies, namely **small and medium-sized enterprises (SMEs)**, adopt advanced technologies and accelerate their digital transformation. As the EU places strong emphasis on empowering SMEs with access to AI-powered tools and digital innovation, the RICAIP network of collaborating testbeds in Prague, Brno, Saarbrücken and in Ostrava offers a unique real-world environment where SMEs can safely develop, test, and validate new solutions before investing in full-scale deployment.



Supporting SMEs with Advanced Services and Innovation Infrastructure

Tailored Experimentation Services within AI-MATTERS TEF

Within the **AI-MATTERS TEF**, the RICAIP partners provide specialised services for testing and validating trustworthy AI technologies in manufacturing. These include **"Test, Experiment and Study Services"** targeting factory-level optimisation, human-robot interaction, and other emerging technologies. SMEs and start-ups can access expert support to configure and evaluate AI-based solutions in real production-like environments. Expert teams also offer technical validation procedures, data infrastructure for experimentation, and access to a European pool of testbeds, positioning RICAIP testbeds as key entry points to the EU-wide TEF network.

Innovation and Capacity-Building Support through EDIHs

RICAIP testbeds also contribute to **four European Digital Innovation Hubs (EDIHs)**, offering SMEs broad support in starting or scaling their digital transformation. These services include **"test before invest"** demonstrations, expert consulting, digital skills training programmes and development tailored to the needs of SMEs. Through EDIHs, RICAIP testbeds help companies assess their digital readiness, explore suitable technologies, and access innovation support, often serving as a first step toward deeper technical testing under TEF.

More information
ricaip.eu/edih

+300 services
accessible through TEF and EDIHs

- Analysis, deployment and testing of intelligent sensing systems
- Production Planning
- Data insights
- Computer modelling and simulation, data processing
- Help with setting up power converters and industrial electric drives
- Diagnostics and optimization of electric drives and machines
- Support for the development of control algorithms for electric drives and power electronics
- HIL development and testing of components/integrations for control systems/control algorithms
- Energy management in factories
- Monitoring and quality evaluation of production processes (machining processes, additive manufacturing processes, laser-based production processes)
- Robotic cell control
- Testing of electrical components
- Statistical process control
- Digitalisation strategy in production
- Additive manufacturing services
- Model-driven production
- Design and simulation services
- Mobile robots, UGV, UAV support testing and development
- Supporting the testing and development of 5G industrial communications
- Edge-continuum apps testing and development
- and many more...

RICAIP People

87 **Headcount**
Academics and Non-Academics involved in 2024

Steering Committee

Prof. Vladimír Mařík
Scientific Director,
CIIRC CTU

Prof. Radimír Vrba
Director, CEITEC BUT

Prof. Antonio Krüger
Director, DFKI

Prof. Rainer Müller
Chair of Assembly Systems UdS, Head of the Assembly Systems Research Department, ZeMA

Director

Tilman Becker
Director, RICAIP

Executive Board

Pavel Burget
Director of Testbed for Industry 4.0, CIIRC CTU

Vít Dočkal
Strategic Projects Management, CIIRC CTU

Andrey Girenko
R&D Administration, DFKI

Research Teams

Jan Nedvěd
Chief Financial Officer, Secretary of Institute, CEITEC BUT

Christoph Speicher
Research Group Leader, ZeMA

Prof. Pavel Václavek
Research Group Leader, Research Area Coordinator, CEITEC BUT

RICAIP Tenure Track Position Holders at CIIRC CTU

Mikoláš Janota
Formal Methods, Automated Reasoning & SAT Solving

Tomáš Mikolov
Artificial intelligence, Machine Learning, Neural Networks and Complex Systems

Torsten Sattler
Computer Vision, 3D Reconstruction & Visual Localisation

Martin Suda
Machine Learning & Automated Reasoning

Researchers

RICAIP Testbed Prague: CIIRC CTU

Pavel Burget
Director of Testbed for Industry 4.0

Petr Kolář
Deputy Head of Industrial Production & Automation Department (IPA)

Petr Kadera
Head of Intelligent Systems for Industry; Head of Smart Grid Lab

Tomáš Jochman
Virtual Commissioning, Digital Twins, Industrial Metaverse

Alexandr Lazarov
Head of 3D Printing Center

Pavel Hradecký
Mapping and planning processes

RICAIP Testbed Brno: CEITEC BUT

Prof. Pavel Václavek
Research Group Leader, Research Area Coordinator

Jakub Hrabec
Head of Testbed Industry 4.0

Prof. Luděk Žalud
Computer Science, Robotics, Automation & Control Systems

Zdeněk Havránek
Instruments & Instrumentation, Acoustics

Petr Beneš
Instruments & Instrumentation, Vibrodiagnostics

Matúš Kozovský
SW Development

RICAIP Testbed Saarbrücken - DFKI, ZeMA | HRC4.0 Lab

Khansa Rekik
Human-Robot Collaboration, ZeMa

Tim Schwartz
Artificial Intelligence, Automotive, User Modeling & Human-Robot Interaction, DFKI

Caspar Jacob
Human-Robot Collaboration, DFKI

Xiaomei Xu
Human-Robot Collaboration, ZeMa

Testbed Kaiserslautern - DFKI IFS/ SmartFactory KL

Alexis Bernhard
Innovative Factory Systems, DFKI

Achim Wagner
Deputy Head of Innovative Factory Systems, DFKI

Prof. Martin Ruskowski
Head of Innovative Factory Systems, DFKI

Selected Publications in 2024

69 in 2024

188 since 2019

Publications

M. Janota, C. Chow, J. Araújo, M. Codish, P. Vojtěchovský
SAT-based Techniques for Lexicographically Smallest Finite Models
AAAI 2024

J. Jakubův, M. Janota, J. Piepenbrock, J. Urban
Machine Learning for Quantifier Selection in cvc5
ECAI 2024

J. Ventura, Z. Kukelova, T. Sattler, D. Baráth
Absolute Pose from One or Two Scaled and Oriented Features
Proceedings of the IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR) 2024

F. Bártek, K. Chvalovský, M. Suda
Regularization in Spider-Style Strategy Discovery and Schedule Construction.
In: Benzmüller, C., Heule, M.J., Schmidt, R.A. (eds) Automated Reasoning. IJCAR 2024. Lecture Notes in Computer Science, vol 14739. Springer, Cham, 2024.

F. Bártek, K. Chvalovský, M. Suda
Cautious Specialization of Strategy Schedules
PAAR'24: 9th Workshop on Practical Aspects of Automated Reasoning. CEUR Workshop proceedings, 2024

M. Kozubík, P. Václavek
Control Set Reduction for PMSM Predictive Controller via Assisted Learning Algorithm
IEEE 33rd International Symposium on Industrial Electronics (ISIE), 2024

S. Svědiroh, L. Žalud
Atlas Fusion 2.0 – A ROS2 Based Real-Time Sensor Fusion Framework
Lecture Notes in Computer Science, Springer Nature, 2024

M. Kozubík, L. Veselý, E. Aufderheide, P. Václavek
Parallel Computing Utilization in Nonlinear Model Predictive Control of Permanent Magnet Synchronous Motor.
IEEE Access, 2024

L. Zezula, M. Kozovský, P. Blaha
Diagnostics of Interturn Short Circuits in PMSMs With Online Fault Indicators Estimation.
IEEE Transactions on Industrial Electronics, 2024

A. T. Bernhard, B. Blumhofer, M. Ruskowski, A. Wagner, A. Luxenburger, D. Porta
Leverage Asset Administration Shells to Support Artificial Intelligence Planning
IEEE 29th International Conference on Emerging Technologies and Factory Automation (ETFA), 2024

T. Jochman, V. Voltr, O. Svec, V. Kubacek, P. Burget, V. Hlavac
Integrating augmented reality within digital twins for smart robotic manufacturing systems
29th IEEE International Conference on Emerging Technologies and Factory Automation (ETFA), 2024

V. Burde, A. Moroz, V. Zeman, P. Burget
Object Pose Estimation Using Implicit Representation For Transparent Objects
ECCV Workshop, 2024

K. Rekik, J. Grimaldo da Silva, A. Bashir, R. Müller
Predictive Intention Recognition Using Deep Learning for Collaborative Assembly
IEEE CoDIT, 2024

X. Xu, A. Bashir, R. Müller
A robot-system for picking parts from unstructured bins – A practical Approach
CIRP CATS, 2024

Selected Highlights

Brno MSV International Engineering Fair 2024

RICAIP showcased its role as the innovation infrastructure and solutions provider for manufacturing on a joint booth with the ecosystem of the National Centre for Industry 4.0 and 9 key technology partners, including Siemens, T-Mobile, DEL, SICK, Česká spořitelna or EIT Manufacturing. Several robotic demonstrators developed by RICAIP Testbed Prague formed the core of the joint exhibition.

Key features

- Visit of the Czech President and Prime Minister
- Presentation of the entire network, infrastructure, services
- Real demonstrators onsite:
  - Robotic cell on second-life batteries demonstrating automated modular production
  - industrial metaverse showcase
  - 3D object reconstruction cell
  - 5G IIoT system
- Synergies with EDIH, AI MATTERS TEF
- Guided tours in RICAIP Testbed Brno

Selected Highlights

ricaip.eu/events/

3D Precise Measurement on CMM and Laser Scanning Workshop

- Co-organised with EDIH DIGIMAT
- 2-day workshop with theoretical and practical aspects

Open day for Industry 4.0

- Co-organised with NCP4.0 and EIT Manufacturing
- Live-streamed onsite event
- Conference with a panel discussion and presentations of concrete Industry 4.0 solutions
- RICAIP Testbed Prague tours
- 200 guests from 121 organisations

SheCodes MeetUp

- 20+ Women onsite & online
- To discuss personal experience with studying and pursuing a career as a woman in the STEM fields

Young AI Research Forum

- Part of the AI Days (Dny AI) in RICAIP Testbed Prague
- Interactive format for students and junior researchers to gain practical know-how, share experience and establish new relationships.

ADRForum 2024

- Presentation of RICAIP by Tilman Becker
- Onsite Human-Robot Collaboration demonstrator from DFKI – RICAIP Testbed in Saarbrücken.

Labour Market in the Digital Era Conference

- Part of the Week for Digital Czechia
- 4 Expert speakers
- Interactive format for students and professionals to share experience

2024 Communication and Dissemination activities in numbers

16 Conferences (where RICAIP org/co-org or invited presentation)

34 Visits

10 Workshops

18 Seminars on societal topics

13 Press releases and articles

173 Appearances in online & printed media

RICAIP Research and Innovation Centre on Advanced Industrial Production

RICAIP Annual Report 2024

Fifth edition of the RICAIP Annual Report. Published in May 2025.
Time period concerned: 01/2024 – 12/2024.

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EUROPEAN UNION
European Structural and Investment Funds
Operational Programme Research, Development and Education

MINISTRY OF EDUCATION, YOUTH AND SPORTS

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No. 857306.