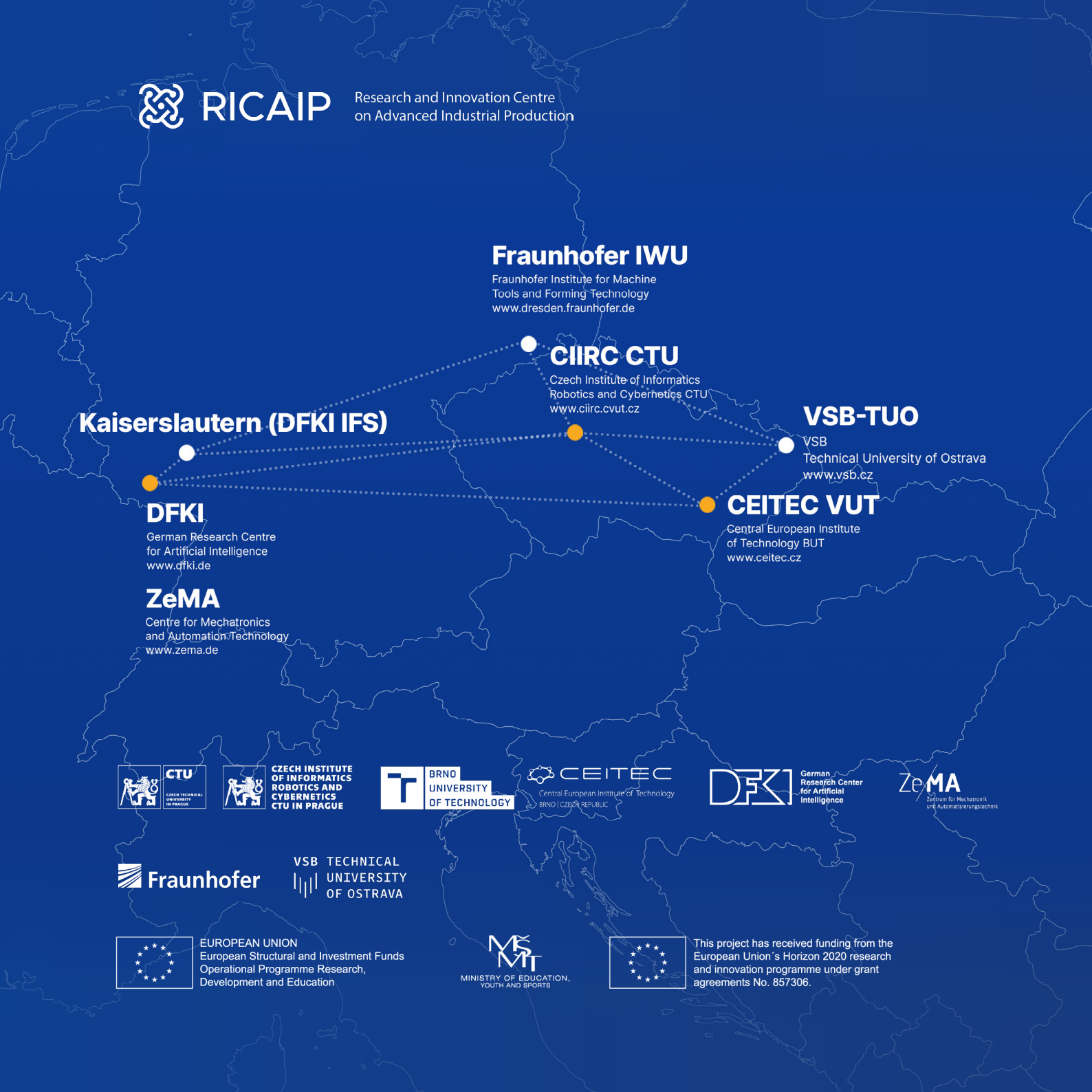
RICAIP

Research and Innovation Centre
on Advanced Industrial Production

ANNUAL REPORT 2022

EU Project Creating a RICAIP Centre


RICAIP
Research and Innovation Centre
on Advanced Industrial Production
Fraunhofer IWU
Fraunhofer Institute for Machine
Tools and Forming Technology
www.dresden.fraunhofer.de
CIIRC CTU
Czech Institute of Informatics
Robotics and Cybernetics CTU
www.ciirc.cvut.cz
Kaiserslautern (DFKI IFS)
VSB-TUO
VSB
Technical University of Ostrava
www.vsb.cz
DFKI
German Research Centre
for Artificial Intelligence
www.dfki.de
CEITEC VUT
Central European Institute
of Technology BUT
www.ceitec.cz
ZeMA
Centre for Mechatronics
and Automation Technology
www.zema.de
CTU
CZECH TECHNICAL UNIVERSITY IN PRAGUE
CZECH INSTITUTE OF INFORMATICS ROBOTICS AND CYBERNETICS CTU IN PRAGUE
BRNO UNIVERSITY OF TECHNOLOGY
CEITEC
Central European Institute of Technology
BRNO | CZECH REPUBLIC
DFKI
German Research Center for Artificial Intelligence
ZeMA
Zentrum für Mechatronik und Automatisierungstechnik
Fraunhofer
VSB TECHNICAL UNIVERSITY OF OSTRAVA
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 agreements No. 857306.

2022 Highlights

27 April 2022
CIIRC CTU International Advisory Board (IAB) counselling RICAIP

28 April 2022
Grand Opening: RICAIP Testbed Prague at CIIRC CTU

28 April 2022
Signing of MoU with Fraunhofer IWU and Technical University Ostrava (VŠB-TUO)

28-29 April 2022
RICAIP Days: Conference, workshop, open day

30 May - 1 June 2022
Hannover Messe 2022: RICAIP Human-Robot Demonstrator presented by DFKI and ZeMA

17 June 2022
Flash Call Info: European Digital Innovation Hubs (EDIH)
All RICAIP partners succeeded with their EDIH proposals.

11 July 2022
Visit of Robert Habeck
German Federal Vice-Chancellor and Minister of Economy and Climate Protection

24 August 2022
Flash Call Info: Testing and Experimentation Facility for Manufacturing (TEF)
Czech RICAIP partners and testbeds in Prague, Brno and Ostrava create the Czech node in AI-MATTERS project.

12-13 September 2022
Czech-French AI Workshop on Artificial Intelligence, www.czech-french-ai.cz

26 September 2022
Visit of Frans Timmermans
Executive Vice-President of the European Commission for the Green Deal for Europe

4-7 October 2022
Brno International Engineering Fair (MSV Brno 2022)
First exhibit of RICAIP testbed demonstrators in 5G SA environment

31 October 2022
Visit of Ivan Bartoš
Deputy Prime Minister for Digitisation and Minister of Regional Development

4 November 2022
RICAIP Tenure Track Position Holder - Dr. Torsten Sattler
Received highly selective EXPRO Grant from the Czech Science Foundation (GACR)

30 November 2022
Grand Opening: RICAIP Testbed Brno at CEITEC BUT

30 November 2022
RICAIP Young Investigator Award (RIYA) ceremony at CEITEC BUT

Tilman Becker, PhD
RICAIP Director

It's a great pleasure to present our annual report for 2022. During the previous year, we have seen a continuation of the extraordinary collaboration between the partners from the Czech Republic and Germany in setting up a Centre of Excellence for AI and Industry 4.0. We have also reached a critical milestone in 2022 with the re-opening of the improved Prague testbed in April 2022 and the opening of the newly constructed Brno testbed in November.

We have also begun to implement the first steps of our vision of a European network of distributed testbeds and research capacity. In April 2022, we started the collaboration with the Fraunhofer IWU institute and the TU Ostrava.

With the testbed infrastructure in place, we were able to start work on joined Use Cases with all partners that will help to make distributed production and Manufacturing as a Service graspable and provide a starting point for industrial collaborations in the future.

Finally, RICAIP is embedded in a growing ecosystem for AI and its application in Industry, in particular in the Czech Republic. We will start 2023 with the kick-off of EDIH initiatives in Brno, Prague and Saarbrücken and also our participation in the European TEF Manufacturing. These initiatives will provide further channels for dissemination and collaboration with regional industrial partners.

We are looking forward to a busy year 2023.

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

During the year 2022, we have worked hard on reaching our goals to finalize the installation of state-of-the-art equipment both in Prague and Brno. Nearly all of the proposed technologies have been delivered. That is why we were able to organize the RICAIP Prague facility re-opening in April 2022, and the RICAIP Brno facility ceremonial opening in November 2022. The RICAIP results are regularly presented to the public. We have started to be engaged in a German-Czech bilateral project AIQUAMA.

The RICAIP Consortium has accepted two new associated partners: the Fraunhofer IWU Institute Dresden and TU Ostrava in April 2022.

We expect to continue according to the RICAIP plan in 2023, focusing our attention on the development of the use cases and the dissemination of the results. The AI Ecosystem around the RICAIP Center is considered to be a basis for the long-term sustainability of the RICAIP Centre after the RICAIP Project is over.

The RICAIP project is on the right 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.
RICAIP creates a unique research environment for the development and testing of innovative solutions for advanced and fully integrated industrial production.

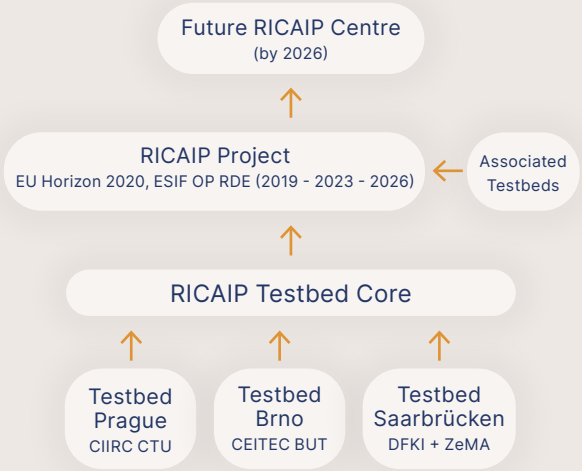
Mission

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 corporates 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 OP RDE of the 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.

Total funding 2019 – 2026

€27.89 mil.

Investments
(mostly technology equipment)

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

€14.99 mil.

CIIRC CTU	CEITEC BUT	DFKI	ZeMA
49%	26%	17%	8%

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

€33.48 mil.

CIIRC CTU	CEITEC BUT
59%	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

New Unique Technologies in Czech Testbeds

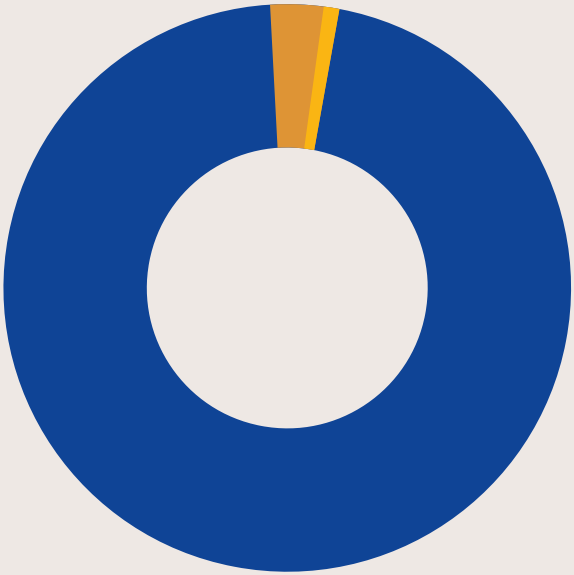
For the period from the start of the project until 31 December 2022

Delivered technologies
EUR 25.07 mil

Technologies yet to be contracted in 2023
EUR 3.02 mil

Contracted technologies to be delivered
EUR 1.06 mil

EUR Average ECB Rate (2022)
= 24,566 CZK, Amount excl. VAT



5G Stand-Alone Campus Network

RICAIP Testbeds in Prague and Brno

Based on the memorandum signed with T-Mobile CZ in 2021, CIIRC CTU and the RICAIP Testbed Prague took the advantage of the first academic full-featured 5G Stand-Alone private campus in CEE. In cooperation with T-Mobile CZ, the private 5G SA network was installed also in the RICAIP Testbed Brno at CEITEC BUT at the end of 2022.

5G SA networks allow to transmit data to an application server (edge server) with guaranteed latency and bandwidth, so that the server's high computing power can be used for industrial computer vision applications or other neural network deployments. It opens new activities in industrial wireless communications including wireless automation networks.

In 2022, RICAIP Testbed Prague has already developed several innovative 5G demonstrators, showing how 5G SA communication can help industries on their path to digital transformation deploying AI-based solutions. The robotic 5G applications developed in RICAIP testbeds were presented with great success at the Brno International Trade Fair in September 2022.

The International Advisory Board (IAB) of CIIRC CTU counselling RICAIP

27 April 2022 (half-day hybrid meeting)

Chaired by Prof. Wolfgang Wahlster, the International Advisory Board saw an in-depth presentation of RICAIP and provided compliments, extensive discussion, and advice. The final recommendations summarize four major trends in Industrial AI that RICAIP will have on its research agenda in the next decade of Industrie 4.0:

1. The use of multi-agent architectures with holonic agents in a heterarchical organization, breaking the historical automation pyramides;
2. Achieving zero-defect manufacturing by detecting errors immediately;
3. Active digital twins, based on complex physical models going beyond machine learning; and
4. Enhancing the compute stack with edge computing on the bottom and sky computing on the top.

IAB Meeting with the participation of industry professionals: Prof. Wolfgang Wahlster, DFKI; Prof. Duncan McFarlane, Cambridge University; Prof. Masaki Nakagawa, Tokyo University of Agriculture and Technology (TUAT); Arnd Schirrmann, Airbus; Kenwood Hall, Rockwell Automation; Dr. Dimitar Filev, Ford Motor Company; Prof. A Min Tjoa, Vienna University of Technology.

RICAIP Testbed Representatives

Prague | Brno | Saarbrücken

Pavel Burget

Director of Testbed for Industry 4.0, CIIRC CTU

Pavel Václavek

Research Group Leader, Research Area Coordinator, CEITEC BUT

Tim Schwartz

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

Petr Kolář

Deputy Head of Industrial Production & Automation Department (IPA), CIIRC CTU

"We develop and test advanced production and assembly systems that ensure scalability and fast implementation by enterprises of any size, mainly SMEs. We focus on digital and AI-driven services for industry as well as training and upskilling of company specialists and educational programs for university students."

Jakub Hrabec

Head of RICAIP Industry 4.0 Testbed Brno, CEITEC BUT

"Testbed in Brno is dealing namely with machines and their interaction with humans. Nearly all planned equipment has been installed and experiments are starting. In the next period, we will focus on integration of software solutions to be able to start providing services to research teams and industrial partners."

Khansa Rekik

Researcher, Robotics and Human-Machine Interaction Group, ZeMA

"In our testbed we focus on human-centered approaches for digitalized and reconfigurable production. Our main priority for the upcoming period is building a complex cross-site production system supported by a multi-agent architecture."

Opening of the RICAIP Testbed Prague

27 - 29 April 2022
Testbed for Industry 4.0, CIIRC CTU

The grand opening of the fully equipped Industry 4.0 testbed at CIIRC CTU took place during the RICAIP Days 2022 in presence of representatives of Czech Government, German Ambassador and stakeholders from academia and industry. The three-day event started with the RICAIP International Advisory Board meeting and continued with inspiring lectures, workshop and open-door day.

"It is important that RICAIP, as a project of European significance, has a centre in the Czech Republic and that it will bring Czech companies significant opportunities to develop their technological and innovation potential. The Testbed for Industry 4.0 at CIIRC CTU is concrete tangible proof of this."
Helena Langšádlová, Czech Minister for Science, Research and Innovation

- RICAIP Conference on challenging industry-driven research topics
- Open days in Testbed for Industry 4.0
- Robotix Academy led by ZeMA
  - Hands-on workshop on human-robot collaboration

Live Connections to Testbeds

Opening of the RICAIP Testbed Brno

30 November – 1 December 2022
Industry 4.0 Testbed, CEITEC BUT

Industrial partners, Industry 4.0 experts and researchers gathered in Brno for the testbed opening at CEITEC BUT in November 2022. After a ceremonial opening and a one-day conference, nearly 200 people visited testbed during guided tours as part of this three-day series of events.During the opening ceremony, the RICAIP Young Investigator Award was also announced.

"I was impressed by how closely this centre cooperates with industry. Our economies are very similar to each other with a high share of industry. We can compete only through being smarter, more efficient, more productive. And this is exactly what RICAIP is about, what the infrastructure specifically at CEITEC BUT and CIIRC CTU is about and also what wider Czech-German cooperation is about"
H.E. Andreas Künne, German Ambassador in the Czech Republic

- Ceremonial opening with high-level stakeholders
- Industry 4.0 Conference on trends in modern production
- Open day for general public with a number of guided tours

New robotic demonstrators

New Members of RICAIP Network

28 April 2022

Signature of MoUs with Fraunhofer IWU & TU Ostrava

With the festive signature of a Memorandum of Understanding, RICAIP network was enriched by two new partners affiliated to the RICAIP Industrial Testbed Core: The University of Mining – Technical University of Ostrava (VŠB-TUO) and the German institute Fraunhofer IWU with its technical branch in Dresden.

"0ur involvement in the joint efforts of RICAIP is a logical outcome of several years of cooperation."
- Prof. Steffen Ihlenfeldt, Director, Fraunhofer IWU

"Our cooperation builds on joint activities of our CPIT TL3 testbed in Ostrava with both RICAIP testbeds in Prague and in Brno. It is therefore symbolic that we all met today and officially confirmed these ties."
- Prof. Václav Snášel, Rector, VŠB-TUO

Kaiserslautern

Cooperation with teams of DFKI Innovative Factory Systems (IFS) and SmartFactory KL

A new addition to RICAIP is the participation of the DFKI research department IFS headed by Prof. Martin Ruskowski, which has set up a shared production environment named Production Level 4. They cooperate with research at the University of Kaiserslautern and regional as well as international industrial players through the SmartFactory_KL association.
www.smartfactory.de/en

Success: Digital Services for Companies

Through the "From the Lab to the Market" vision, the European Commission supports projects aimed at deploying digital AI-based technologies & services and their uptake by the innovation ecosystem, in particular SMEs.

In 2022, the RICAIP partners succeeded with their project proposals in the Horizon Europe calls for European Digital Innovation Hubs (EDIH) and Testing and Experimentation Facilities (TEF) with start of the operation in 2023.

RICAIP Testbeds provide research and experimentation environment for development of innovative digital solutions, testing and validation services to increase companies' efficiency and competitiveness.

Testing and Experimentation Facilities (TEF)

AI-MATTERS

AI-MATTERS is the TEF for Manufacturing sector that provides physical and virtual facilities, in which technology providers can get support to test their latest AI-based software and hardware technologies.

Focus

Deployment of solutions in AI, robotics, and intelligent systems for flexible production.

It connects 25 institutions in 8 nodes across Europe.
The Czech node is created by testbeds in CIIRC CTU, CEITEC BUT and VŠB-TUO.

Total budget of the whole consortium

€Budget (2023-2027): EUR 30 mil. funded by the EU under the Digital Europe Programme (DIGITAL), second half to be funded by national governments.

European Digital Innovation Hub (EDIH)

Throught the testbeds in Prague, Brno and Saarbrücken, RICAIP network provides access to technological expertise and testing ("test before invest") as well as innovation services such as training and digital skills development.

EDIH CTU
Prague, CIIRC CTU

Providing professional AI/ML services for the local SMEs, small mid-caps and public sector organizations with respect to their digital & green transformation.

EDIH DIGIMAT
Brno, CEITEC BUT

Offering AI services to SMEs, focus on digital transformation and automation in the manufacturing sector mainly in the South Moravia Region.

EDIH CITAH
Saarbrücken, DFKI

AI-based services to SMEs in the area of agriculture, the food industry and the health sector in Weser-Ems Region, Lower Saxony.

EDIH Saarland
Saarbrücken, DFKI & ZeMA

Offering services to SMEs and public administration focusing on digitalisation, artificial intelligence and future key technologies in Saarland.

Research Focus

Prague

- **Data Life cycle**
  IoT and data analytics in data acquisition, data storage, big data. Edge computing, data privacy and sovereignty.
- **Production processes**
  Additive manufacturing, process and machine diagnostics, process optimization.
- **Digital Twin & Digital Shadow**
  Matching of physical systems and simulations, virtual commissioning, dynamic models of machines.
- **Smart Factory and Distributed Production**
  Automatic production planning, material flow planning, modular and flexible production, logistic operations, production as a service.

Brno

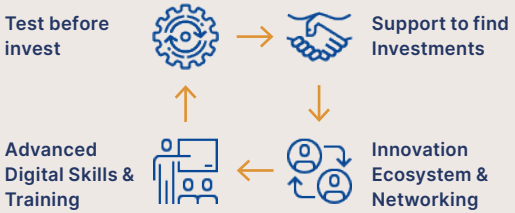
- **Flexible production systems**
  Additive and subtractive technologies, robotics, mobile manipulators, UGV, UAV.
- **Human-Machine-Robot Cooperation**
  AR / VR technology, Precise localization and navigation in an industrial environment.
- **Machines & Mechatronics Systems Diagnostics**
  Sensors for diagnostics, acoustic holography, acoustic emission. Advanced automation and AI applications.
- **Advanced actuators**
  Advanced actuators for industry, drives for electromobility. Cybersecurity in distributed production systems, IoT, industrial 5G communications.

Saarbrücken

- **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 neural-symbolic imitation learning.
- **Remote collaboration**
  Research and development of solutions for remote collaboration between distant production sites.

Services

RICAIP testbeds contribute to the EU strategy towards wider AI deployment from the lab to the market. To accelerate the exploitation of the latest developments in AI, robotics, smart and autonomous systems, the RICAIP testbeds provide a wide range of services for both developers and end-users, especially SMEs. Most substantially, the services focus on "test before invest" in areas such as factory-level optimization, human-robot interaction, and adoption of emerging AI-enabling technologies. However, the types of services are much more diverse and can be categorised as follows:



Selected Demonstrators

For more demos visit

Saarbrücken

Cross-site Human-human Collaboration Demonstrator Using a UR-10 Robot as Embodiment for the Remote Worker

This joint DFKI-ZeMA RICAIP demonstrator shows cross-site human-human collaboration using a UR-10 robot as embodiment for the remote worker. The RICAIP system demonstrates a multi-site and distributed manufacturing scenario in which a robotic arm is intuitively controlled remotely in real-time using VR glasses. The scenario covers a distributed, collaborative assembly of a cased Raspberry-Pi consisting of different parts: the CPU-board, the upper and lower part of the case and a fan.

Prague

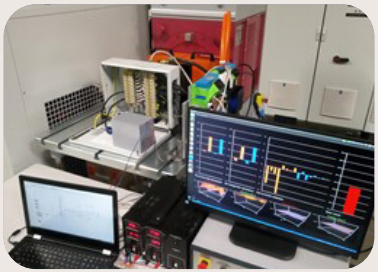
5G Network Deployment on a Five-axis Delta Robot with Conveyor

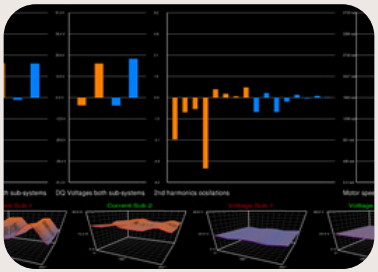
The robot was built together with its digital twin to allow for kinematic and dynamic simulations but also for diagnostics of the real-robot behavior. The robot is also equipped with a handle for so-called manual guidance, thanks to which the robot movements can be taught by an operator. Through the campus 5G SA network, the robot connects to an application server (edge server) and thus can use its high computing power for applications deploying neural networks, computer vision and other functionalities. This proves the deployment of 5G-based applications and serves as a how-to for further industrial-type applications of 5G networks.

Brno

On the edge AI implementation for fault detection demonstration

This demonstrator is a comprehensive system for measuring and real-time detection of interturn short-circuits. It shows the possibility to design a fail-operational system using a properly designed dual three-phase machine and advanced control algorithm in combination with a fast fault detection system.





New Selected Technologies Purchased & Installed

RICAIP Testbed Prague

- KUKA automatic warehouse (3 autonomous trolleys, 2 mobile collaborative robots) for transporting parts between production facilities and collaborating with humans; connected with Localization system RTLS by Siemens.
- A new workplace - assembly line for flexible fast production - with several technologies towards flexible production.
- The existing fast robot for pick & place operations has been expanded with a robotic cell for robotic vision applications integrated to Flexlink conveyor intralogistics.
- Testbed control room for monitoring the production in distributed testbeds and presentation of research results to the public.
- Systems for machine vision (cameras with depth measurement, cameras in the robotic cell), systems for data exchange between individual machines and superior systems (SDK for the development of OPC-UA server and client, servers and laptops), other grippers for industrial robots, pallets for automatic handling and tool holders for machine tools equipped with RFID chips for their precise identification.

RICAIP Testbed Brno

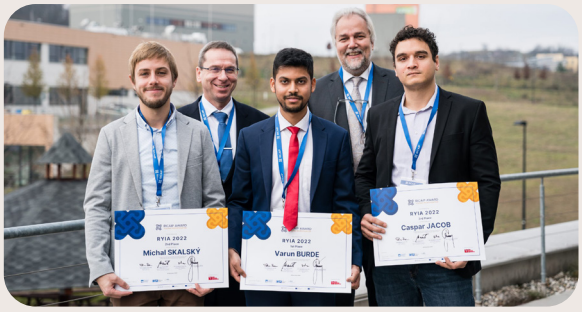
- Automated 3D scanning system from Hexagon providing precise measurement of objects and parts dimension. It allows both quality check and reverse engineering in production process.
- Whole testbed is now also covered by Vicon optical localisation system, which can provide precise real-time information on position of robots, humans, and other objects.
- Private 5G SA network installed allowing new activities in industrial wireless communications including wireless automation networks.

RICAIP Young Investigator Award (RYIA)

RICAIP clearly recognises the importance of human resource development and especially the support to young researchers in the initial stages of their scientific career. Therefore, the RICAIP Young Investigator Award (RYIA) for scientific talents under 35 was established.

The first edition of RYIA was announced within the opening ceremony of RICAIP Testbed Brno on 30 November 2022.

The following top three RYIA 2022 winners were appreciated by an international jury for their scientific contributions within the Industry 4.0 domains.



BUT Rector L. Janíček and RICAIP Director T. Becker with the three RIYA 2022 winners

RICAIP AWARD
YOUNG INVESTIGATOR

General Sponsor

BRNO UNIVERSITY OF TECHNOLOGY

Organising Partner

CEITEC

1st Place

Varun Burde

CIIRC CTU

Varun specialises on the core tasks of object manipulation, using state-of-the-art artificial intelligence and vision methods. His focus is on performing grip or grasp of the object with robots for advanced Industry 4.0 applications.

2rd Place

Michal Skalský

CEITEC BUT

Michal specialises on sensors for measurement of motion and position with special attention to fibre-optical sensors with focus on very precise interferometric free-space optical sensor for dynamic displacement measurement achieving pm accuracy utilizing closed-loop control.

3rd Place

Caspar Jacob

DFKI

Caspar specialises on mixed reality applications for Industry 4.0 and human-robot collaboration. He was a key-developer for the VR-part of the joint DFKI-ZeMA demonstrator, showing cross-site human-human collaboration using a UR-10 robot as embodiment for the remote worker.

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, PhD
Director, RICAIP

Executive Board

Tilman Becker, PhD
Director, RICAIP

Pavel Burget, PhD
Head of Testbed for Industry 4.0,
CIIRC CTU

Vít Dočkal, PhD
Strategic Projects
Management, CIIRC CTU

Andrey Girenko, PhD
R&D Administration, DFKI

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

Dipl.-Ing. Christoph Speicher
Research Group Leader, ZeMA

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

86
Headcount

Academic and Non-Academic Staff involved in RICAIP in 2022

RICAIP Tenure Track Position Holders at CIIRC CTU

Tomáš Mikolov

Artificial intelligence, Machine Learning, Neural Networks and Complex Systems

Torsten Sattler

Computer Vision, 3D Reconstruction & Visual Localisation

Mikoláš Janota

Formal Methods, Automated Reasoning & SAT Solving

Martin Suda

Machine Learning & Automated Reasoning

Heads of Testbed Teams & Other Research Leaders Involved in RICAIP

Pavel Burget

Director of Testbed for Industry 4.0, CIIRC CTU

Petr Kolář

Deputy Head of Industrial Production & Automation Department (IPA), CIIRC CTU

Jakub Hrabec

Head of Testbed Industry 4.0, CEITEC BUT

Tim Schwartz

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

Martin Ruskowski

Head of Innovative Factory Systems, DFKI

Achim Wagner

Deputy Head of Innovative Factory Systems, DFKI

Alexis Bernhard

Innovative Factory Systems, DFKI

Khansa Rekik

Artificial Intelligence & Human-Robot Interaction

Petr Beneš

Instruments & Instrumentation, Acoustics, Automation & Control Systems, Materials Science, CEITEC BUT

Petr Blaha

Computer Science, Energy & Fuels, CEITEC BUT

Luděk Žalud

Computer Science, Robotics, Automation & Control Systems, CEITEC BUT

Zdeněk Havránek

Instruments & Instrumentation, Acoustics, CEITEC BUT

Selected Publications

Kulhánek J., Derner E., Sattler T., Babuška R.: ViewFormer: NeRF-free Neural Rendering from Few Images Using Transformers, European Conference on Computer Vision (ECCV), 2022.

Suda M.: Vampire Getting Noisy: Will Random Bits Help Conquer Chaos? (System Description). In IJCAR 2022: 659-667 Lecture Notes in Computer Science, vol 13385. Springer, Cham. DOI 10.1007/978-3-031-10769-6_38

Jacob C., Espinosa F., Luxenburger A., Merkel D., Mohr J., Schwartz T., Gajjar N., Rekik K.: Digital Twins for Distributed Collaborative Work in Shared Production, IEEE International Conference on Artificial Intelligence & Virtual Reality 2022, 2022.

Hudcová B., Mikolov T.: Classification of Discrete Dynamical Systems Based on Transients. Artificial Life 2021; 27 (3–4): 220–245. doi: https://doi.org/10.1162/artl_a_00342

Janota M., Piepenbrock J., Piotrowski B.: Towards Learning Quantifier Instantiation in SMT, Proceedings of SAT 2022.

Selected Synergic Projects

Selected projects, relevant to RICAIP, or using the RICAIP infrastructure, or involving the members of the RICAIP teams; implemented or received in 2022; started after the start of the RICAIP Teaming II project (09/2019).

Communication & Dissemination Activities

CIFI: 3rd Czech Israeli Forum on Innovation: Smart Cities
25 May 2022

Researchers' Night
30 September 2022

US-EU Workshop on Intelligent Manufacturing
2-3 June 2022

Brno Engineering Fair 2022
4-7 October 2022

At a joint stand with the National Center for Industry 4.0, T-Mobile and Česká spořitelna, RICAIP presented several robotic demonstrators using the 5G SA network installed on site.

Hannover Messe 2022
30 May – 2 June 2022

DFKI and ZeMA presented a new RICAIP demonstrator on VR-based remote human-robot collaboration in assembly as a distributed production scenario at the main DFKI booth.

Visit of PMC Precision Machinery R&D Center Taiwan in Brno
8 November 2022

37 Visits in testbeds

13 Workshops

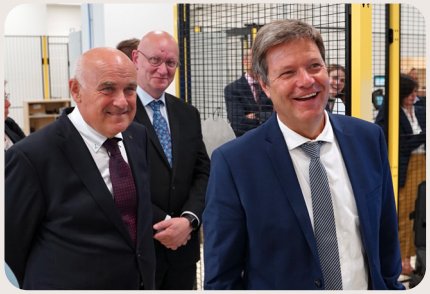
4 Conferences

9 Seminars on societal topics

16 Press releases Articles on website

158 Appearances in online & printed media

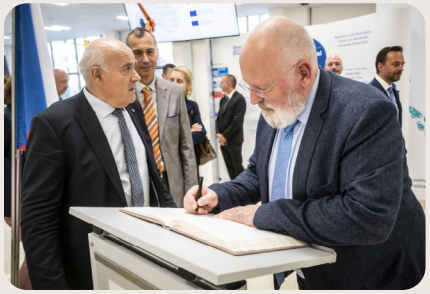
Selected Visits



Visit of German Vice-Chancellor Robert Habeck

11 July 2022

The Federal Vice-Chancellor and Minister of Economy and Climate Protection Robert Habeck visited Prague Testbed. He was very interested in the specific setting and focus of cooperation between academia and industry, which has been developed within the testbed.



Visit of Frans Timmermans and a debate on Green Deal

26 September 2022

The Executive Vice-President of the European Commission for the Green Deal for Europe, Frans Timmermans, visited RICAIP Testbed for Industry 4.0 in Prague and had an open discussion with students and scientists from the Czech Technical University.

Visit of Ivan Bartoš

31 October 2022

Czech Deputy Prime Minister for Digitisation Ivan Bartoš presented the agenda of Czech Digital Week to the press at CIIRC CTU and visited RICAIP Testbed for Industry 4.0 in Prague.

Visit of Emilija Stojmenova Duh

10 November 2022

Slovenian Minister for Digital Transformation Emilia Stojmenova Duh visited RICAIP and saw several industrial demonstrators developed by young researchers.

RICAIP Research and Innovation Centre on Advanced Industrial Production

RICAIP Annual Report 2022

Third edition of the RICAIP Annual Report. Published in May 2023.
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