RICAIP

Research and Innovation Centre
on Advanced Industrial Production

ANNUAL REPORT

EU Project Creating a RICAIP Centre

2019-2020

RICAIP
Research and Innovation Centre on Advanced Industrial Production

DFKI
German Research Centre
for Artificial Intelligence

ZeMA
Centre for Mechatronics
and Automation Technology

CIIRC CTU
Czech Institute of Informatics
Robotics and Cybernetics CTU

CEITEC BUT
Central European Institute
of Technology BUT

RICAIP is an international distributed research centre of excellence (CoE) that focuses on research in robotics and artificial intelligence (AI).

RICAIP develops a strong cooperation at an international level evolving the concept of Industry 4.0 and addressing current needs, gaps, and demands of the industrial sector and society.

To simulate and practically verify the concept of distributed production, RICAIP creates a virtually interconnected state-of-the-art R&D infrastructure in the form of the RICAIP Industrial Testbed Core.

Its backbone consists of multi-site experimental facilities
- Testbed for Industry 4.0 at CIIRC CTU in Prague,
- Testbed at CEITEC BUT in Brno,
- Joint testbed of DFKI and ZeMA in Saarbrücken.

RICAIP is a Czech-German centre hosted at CIIRC CTU in Prague with a maximum degree of autonomy and direct participation of all its four founding partners.

The establishment of the RICAIP Centre is the main objective of the RICAIP Project that received funding from the European Union's Horizon 2020 (No. 857306) and from the ESIF OP RDE (CZ.02.1.01/0.0/0.0/17_043/0010085).

Contents

Foreword

"It is my great pleasure to introduce the first annual report of RICAIP. It feels like we are still at the beginning of implementing our vision of a distributed testbed for advanced industrial production, making use of the latest research advances in AI, robotics, and many related fields. But we have already achieved truly remarkable steps from the first visions to a well-established research centre.

In 2017, work on RICAIP started with an intriguing vision by Prof. Mařík at CIIRC CTU in Prague. It found highly engaged partners at CEITEC BUT in Brno and meet with an enthusiastic team in Saarbrücken at ZeMA and DFKI where Prof. Wahlster has provided invaluable support for RICAIP from the very beginning. This led to a successful Phase-1 project which worked out the business plan that RICAIP is now following in the implementation of Europe's first distributed testbed.

The initial build-up phase started with an impressive kick-off in September 2019, and since then it has seen an ongoing, enormous planning and investment in remodelled facilities, new and upgraded machines. Exactly 100 years after the word "robot" was coined by Czech writer Karel Čapek, robots now are a quintessential part of industrial production and RICAIP has installed a wide variety of robots at all sites.

RICAIP is a team effort and I am very grateful to work with a fantastic team that supports all areas of operation, from research in AI and engineering to operational, managerial, and administrative tasks. Thank you all!

COVID-19 has of course been a challenge for all of our efforts but we can now begin to look forward to operations going back to normal. Looking back, the response to the challenges of COVID-19 was swift and has made a huge impact: as an example, team members at CIIRC CTU devised the first designs for a certified FFP3 mask and have made the design freely available.

At first sight, the enormous investment in infrastructure is the biggest event at RICAIP these days. Just as important to RICAIP are four distinguished young researchers, Mikoláš Janota, Tomáš Mikolov, Martin Suda, and Torsten Sattler who have accepted our tenure track positions at CIIRC CTU and will support the fundamental research at RICAIP.

Our whole team is eagerly looking forward to the upcoming year which will introduce our first working use cases and see RICAIP become fully operational."

Tilman Becker
RICAIP Director

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.
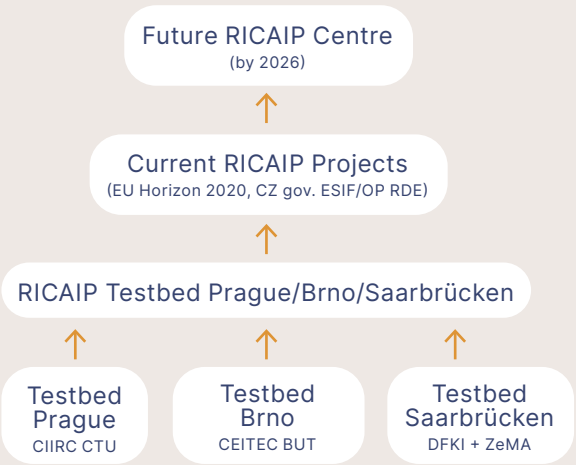
Vision

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.

Future RICAIP Centre
(by 2026)

Current RICAIP Projects
(EU Horizon 2020, CZ gov. ESIF/OP RDE)

RICAIP Testbed Prague/Brno/Saarbrücken

Testbed Prague
CIIRC CTU

Testbed Brno
CEITEC BUT

Testbed Saarbrücken
DFKI + ZeMA

2
EU countries

4
Partners

3
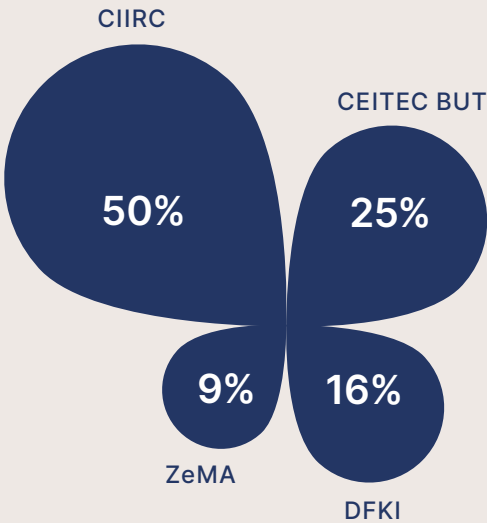Founding Industrial Testbeds

Total funding 2019 – 2026
€48.47 mil.
EUR rate 25.5 CZK

European Commission
EU Horizon2020: H2020-WIDESPRE-AD-01-2018-2019 – Teaming Phase 2
Grant Agreement No. 857306
€14,986,215

EU & Czech Ministry of Education, Youth, and Sports
Complementary funding from ESIF OP RDE
Project No. CZ.02.1.01/0.0/0.0/17_043/0010085
€33,481,628

CIIRC
50%

CEITEC BUT
25%

ZeMA
9%

DFKI
16%

CIIRC
59%

CEITEC BUT
41%
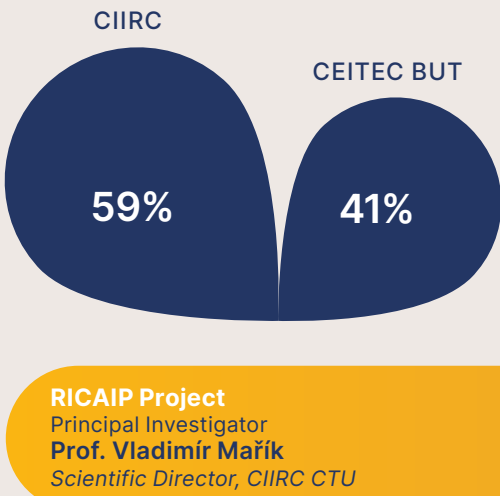
RICAIP Project
Principal Investigator
Prof. Vladimír Mařík
Scientific Director, CIIRC CTU

€ 27.89 mil. for investments (of which majority for technology equipment)

57 %

www.ciirc.cvut.cz

CIIRC CTU

Czech Institute of Informatics, Robotics and Cybernetics Czech Technical University in Prague

Český institut informatiky, robotiky a kybernetiky České vysoké učení technické v Praze

CIIRC CTU concentrates on cutting-edge fundamental and applied research in a variety of fields in computer science and artificial intelligence (AI), tackling key areas of manufacturing, energetics, smart cities, and a healthy society. CIIRC CTU builds a unique ecosystem for AI and advanced manufacturing, interconnecting Czech industry and academia with the main European research and innovation networks. It provides both state-of-the-art research infrastructure and expertise for joint projects supporting the digital transformation of small and medium-size enterprises. CIIRC CTU helps to integrate the research and education as well as technology transfer from academia to industry.

8
Research
Departments

15.5
Million EUR
Turnover

4
Specialised
Centres

212
FTE
278
Headcounts

CEITEC BUT

**Central European Institute of Technology
Brno University of Technology**

**Středoevropský technologický institut
Vysoké učení technické v Brně**

CEITEC BUT forms a key component of cutting-edge research infrastructure with unique facilities and conditions for both basic and applied research in research areas of Advanced Nanotechnology, Microtechnology, Advanced Materials, and Industrial Cybernetics, Instrumentation and Systems Integration. The new Industry 4.0 testbed facility will deepen opportunities in the already established research focus on cybernetics and robotics, smart sensors, advanced control technologies, and their industry applications.

16
Research Groups

16.7
Million EUR Turnover

295
FTE

507
Headcounts

Deutsches Forschungszentrum für Künstliche Intelligenz GmbH

DFKI

German Research Center
for Artificial Intelligence

Deutsches Forschungszentrum
für Künstliche Intelligenz GmbH

DFKI has been operated as a non-profit, Public-Private-Partnership since 1988.
Today, it maintains sites in Kaiserslautern, Saarbrücken, and Bremen,
a project office in Berlin, a laboratory in Lower Saxony, and branches in Lübeck,
St. Wendel, and Trier. DFKI combines scientific excellence and commercially-
oriented value creation with social awareness. In the field of artificial
intelligence, DFKI has been concentrating on the goals of human-centric
AI for more than 30 years. Research is committed to essential, future-oriented
areas of application and socially relevant topics while developing the innovative
software technologies as well as implementing the Industry 4.0 vision.

3
Main Sites

64.6
Million EUR Turnover

1,120
Employees

ZeMA

Centre for Mechatronics and Automation Technology

Zentrum für Mechatronik und Automatisierungstechnik gGmbH

ZeMA is an application-oriented research institute that transfers its research results directly to industrial and producing companies through active technology transfer. The work priorities are mechatronic systems, innovative production technologies, and Industry 4.0 applications. ZeMA has established an industrial testbed with a diverse demonstrator environment for the automotive, aircraft, and machine manufacturing sector and other sectors. ZeMA works closely with the Saarland University and the Saarland University of Applied Sciences. Furthermore, ZeMA cooperates with various partners of the Greater Region (Saar-Lor-Lux) and has launched the centre Power4Production, the Mittelstand 4.0 Competence centre as well as the Robotix Academy, shaping the engineering education and technology transfer at the cross-regional level.

5
Research Groups

120
Employees

Prague Testbed

Part I
Robotics and Flexbile production:
Laboratory focuses on automatic assembly, planning and virtualization of production - located on the ground floor 850 m².

1. Automatic loading station
2. Robotic cells for flexible production
3. Multi-axis motion system - delta robot and conveyor
4. Universal robotic cells
5. Automatic warehouse with mobile robots
6. Robotic 3D printing
7. Flexible robotic line with a collaborative robot
8. Interactive collaborative robotic workplace for assembly
9. Robotic cells for machine vision
10. Robotic workplace for gastronomy
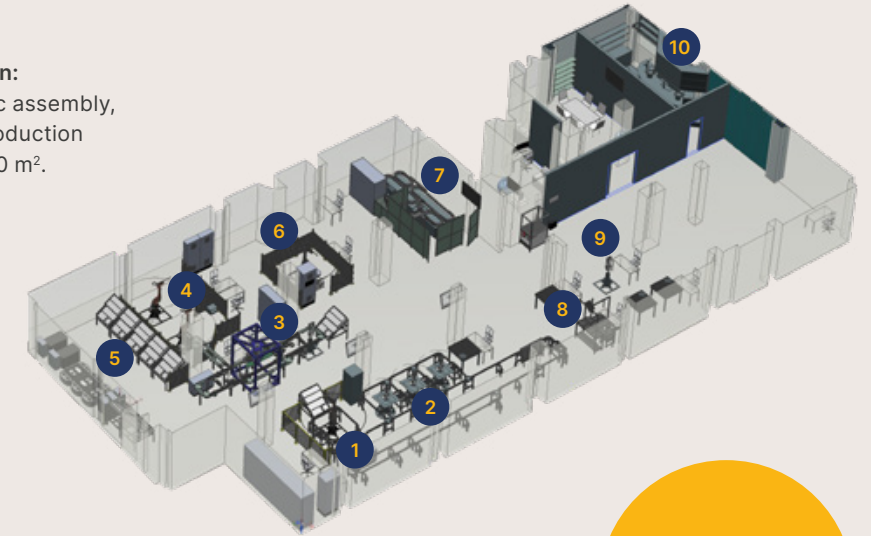
1,640 m²

+ 3D Printing Centre - 130 m².
+ Smart Grid Lab - 90 m².

Part II
Robotics and Production technologies:
Laboratory focuses on production machines and technologies - located in the basement 570 m².

1. Robotic laser cell
2. Femtosecond+nanosecond laser machine
3. Education and training area
4. Metrology laboratory
5. Machining and hybrid processes area
6. Tool setting area
7. Collaborative robot area
8. EDM machine
9. Industrial robot area

Research Focus of the Prague Testbed

Multiagent system for planning of production at different levels of hierarchy

- Level of one machine, level of production site, distributed production
- Process & machine diagnostics, process optimization

Digital twin and digital shadow

- Processing of production data, process state analysis, production scenarios, manufacturing processes, metrology solutions, statistical process control

Production processes and production machines

- Production machines
- Machining processes
- Laser technologies
- Additive and hybrid processes
- Advanced robotics for industrial production

Distributed production

- Production as an interconnected ecosystem of productions sites, logistics & customers, autonomous distributed decisions & production plans
- Production as a service – next stage of distributed production

Brno Testbed

Brno testbed is located in an industrial hall within the Brno University of Technology campus and is being currently under the construction.

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

460 m²

Research Focus of the Brno Testbed

Flexible production systems

- Additive/subtractive technologies combination
- Flexible transport systems – AGVs, AUVs, mobile manipulators

Human-machine-robot cooperation

- Precise 3D localisation of robots, machines, tools, workers
- Prediction of workers' intentions
- VR/AR techniques, human-machine interfaces

Machines & mechatronic systems diagnostics

- Vibro-diagnostics, AI based machine health estimation/prediction
- Acoustic holography, acoustic emission analysis, sensors for diagnostics

Advanced actuators

- High-performance rotational and linear motor drives
- Fail-operational actuators in production systems
- AI based control optimization, fault detection and fault mitigation

Saarbrücken Testbed

>4,000 m²

The testbed-area of over 4,000 m² includes two industrial halls and various areas for experimental demonstrators and prototypes for the factory and production of the future. The main focus is Industrie 4.0, digitalization, AI applications in production as well as robotics. The Centre for Innovative Production Technologies (Power4Production), which is jointly operated by ZeMA and DFKI is also

located on the ZeMA premises. DFKI's German-Czech Innovation Laboratory for Human-Robot Collaboration in Industrie 4.0 (MRK4.0 Lab), which was founded in 2016 and funded by the German Ministry of Education and Research, is a part of Power4Production and of the RICAIP testbed. The MRK4.0 Lab hosts more than 25 robots of different kinds.

Research Focus of the Saarbrücken Testbed

Sensors and actuators

- Deployment of intelligent materials to develop and innovate new products and applications

Automotive production

- Development of new production and commission technologies for the next generation of cars

Robotics applications

- Research in the area of human-robot-collaboration, sensitive robotics as well as AI applications for robotic applications

Industrie 4.0 and digitalization

- Research and development of solutions for a digitized and human-centred and reconfigurable production

Technology transfer

- Transfer of latest research results to producing companies especially in the field of Industrie 4.0, digitalization, assistance systems and AI

Steering Committee

Prof. Vladimír Mařík
*Scientific Director,
CIIRC CTU*

Prof. Radimír Vrba
Director, CEITEC BUT

Prof. Antonio Krüger
Director, DFKI

Prof. Rainer Müller
Director, ZeMA

Director

Tilman Becker
Director, RICAIP

International Advisory Board of CIIRC CTU

Steering Committee

CIIRC CTU Committee

CTU Rector

Guarantee of Autonomy

RICAIP Director

Executive Board

Executive Board

Tilman Becker
Director, RICAIP

Pavel Burget
Head of Testbed for Industry 4.0, CIIRC CTU

Vít Dočkal
Head of Project Management Office, CIIRC CTU

Jana Koehler
Head of Research Department, DFKI

Jan Nedvěd
Financial Manager, Secretary of Institute, CEITEC BUT

Christoph Speicher
Research Group Leader, ZeMA

Pavel Václavek
Research Group Leader, and Research Area Coordinator, CEITEC BUT

Teams of RICAIP Testbeds

Pavel Burget
Director of Testbed for Industry 4.0, CIIRC CTU

Robotics and Flexible production, focus on the automatic assembly, planning and virtualization of production.

Petr Kolář
Deputy head of Industrial Production & Automation (IPA), CIIRC CTU

Robotics and Production technologies, focus on the production machines and technologies.

Petr Kadera
Head of the Intelligent Systems for Industry Group, CIIRC CTU

Focus on the design and development of distributed intelligent solutions for manufacturing control, transportation, and smart grids.

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

Focus on the advanced control technologies to develop an energy optimal, safe and reliable control of robotics systems and technological processes.

Research Leaders Involved in RICAIP

Anselm Blocher
Researcher and Project Manager, DFKI

Jana Koehler
Head of Research Department, DFKI

Sophia Saller
Research Department Manager, DFKI

Luděk Žalud
Researcher, CEITEC BUT

Zdeněk Havránek
Researcher, CEITEC BUT

Khansa Rekik
Researcher, Robotics and Human-Machine Interaction Group, ZeMA

Tim Schwartz
Head of Research Group Human-Robot-Communication, DFKI

36 Academic & Non-Academic Staff in 2020

"Through our accredited education programs, the FME is proud partner of the RICAIP infrastructure. The running education activities and numerous master and doctoral thesis solved on RICAIP equipment are confirmation of the viable collaboration concept."

Prof. Michael Valášek
Dean, Faculty of Mechanical Engineering (FME), CTU in Prague

Project & Communication Team

Eva Doležalová
RICAIP PR & Marketing Manager, CIIRC CTU

Andrey Girenko
R&D Administrator, DFKI

Lucie Kuljovská
Project Manager, CEITEC BUT

Heike Leonhard
PR Manager, DFKI

Petra Mikešová
Financial Manager, CIIRC CTU

Svenja Nickolai
Marketing & Communication, ZeMA

Johana Štěrbová
Financial Manager, CIIRC CTU

Jovana Jovic Tadic
Administration, RICAIP

Eva Troppová
Senior Project Manager, CIIRC CTU

Kateřina Vlková
PR Manager, CEITEC BUT

Tenure Track Holders

Tomáš Mikolov
CIIRC CTU
came to CIIRC CTU from Facebook AI Research, where he was developing intelligent algorithms to achieve the most natural machine/human communication since 2014. Mikolov will focus, inter alia, on complex systems that may lead to further dynamic improvements in artificial intelligence.

Torsten Sattler
CIIRC CTU
worked as an associate professor at Chalmers Technical University in Gothenburg, Sweden. His main research interest is 3D computer vision, with a special focus on 3D reconstruction and visual localisation.

Mikoláš Janota
CIIRC CTU
worked as an assistant professor at the Universidade de Lisboa. His main research interest lies in the development of the next generation of automated reasoning tools. In January 2020, he received prestigious ERC CZ grant that aims at a breakthrough in the field of Satisfiability Modulo Theories (SMT).

Martin Suda
CIIRC CTU
is currently a PostDoc at CIIRC CTU conducting research in the areas of Automated Reasoning and Machine Learning. His previous postdoc positions were at the University of Manchester, UK and at TU Wien, Vienna, Austria.

Selected Synergic Projects

Acronym / ID	Project name | website	Provider	Budget of RICAIP partners in EUR ths
HumanE AI 761758	HumanE AI Network *www.humane-ai.eu*	H2020	2,621.88
POSTMAN LL1902	Powering SMT Solvers by Machine Learning *starfos.tacr.cz/en/project/LL1902*	ERC CZ	1,431.84
NCC-CAI TN01000024	National Competence Center – Cybernetics and Artificial Intelligence *starfos.tacr.cz/cs/project/TN01000024*	TA CR	1,424.71
ELISE 951847	European Learning and Intelligent Systems Excellence *www.elise-ai.eu*	H2020	1,118.75
MAS4AI 957204	Multi-Agent Systems for Pervasive Artificial Intelligence for assisting Humans in Modular Production | mas4ai.eu	H2020	861.68
I-MECH 737453	Intelligent Motion Control Platform for Smart Mechatronic Systems *www.i-mech.eu*	H2020	603.78
AI4DI 826060	Performance Artificial Intelligence for Digitizing Industry *ai4di.eu*	H2020 / ECSEL JU	546.15
VISION 952070	Value and Impact through Synergy, Interaction and coOperation of Networks of AI Excellence Centres | *www.vision4ai.eu*	H2020	502.50
TAILOR 952215	Trustworthy AI - Integrating Learning, Optimisation and Reasoning *tailor-network.eu*	H2020	378.35
PowerATP GJ20-06390Y	Powering Automatic Theorem Provers by Machine Learning	GA CR	249.40
BRAINE 876967	Big data pRocessing and Artificial Intelligence at the Network Edge *www.braine-project.eu*	H2020	238.75
ManuLearn	Learning through Manufacturing Challenges	EIT Manufacturing	79.00
M-NEST-RIS	Network for Empowering People in Added-Value Manufacturing Systems and Technologies / Regional Innovation Scheme	EIT Manufacturing	70.00
DIH-WORLD 952176	Accelerating deployment and matureness of DIHs for the benefit of Digitisation of European SMEs | dihworld.eu	H2020	62.88
LIFT EUROPE	LIFT European Network of Learning Factories	EIT Manufacturing	40.00
DigTrafoRis	Digital Transformation in RIS	EIT Manufacturing	17.00

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

Purchased and Installed Equipment in Testbeds

In 2020, RICAIP proceeded with acquiring parts of technology equipment for the testbeds in Prague and Brno. Initial phase of testbed operation is planned for mid-2021 with key parts of the equipment installed. Remaining equipment will be commissioned till the end of 2021.
Full integration of RICAIP testbeds for use-cases implementation is expected by mid-2022.

2019–2020

€14.4 mil.
Contracted
Technologies

€10.29 mil.
Delivered
Technologies
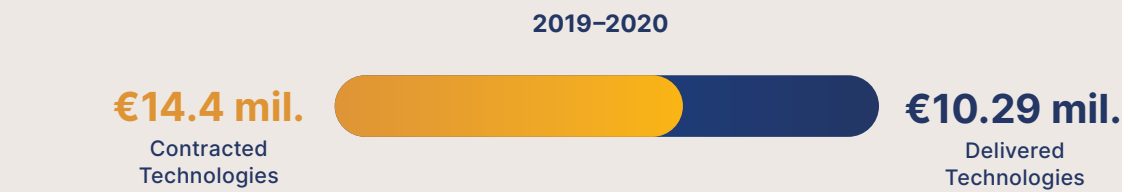
CIIRC CTU

- Several robotic workstations for assembly and machine vision connected to the flexible conveyor
- Cells with robots and conveyors working in a synchronized mode (distributed motion control) – delta robot, SCARA, collaborative robots
- Collaborative robots to be used in the production and other fields (e.g. gastronomy)
- Industrial-grade 3D printers – HP, Stratasys, Desktop Metal
- Autonomous warehouse – 6 AGVs, partially equipped with collaborative robots
- Advanced control room for connecting machines and video streams from various locations (supervision of distributed production)
- Laser welding and cutting machines
- Hybrid machining (combined additive and subtractive manufacturing)
- Advanced metrology solutions

14 6-Axis Robots

1 SCARA Robot

11 Collaborative Robots

3 Mobile Robots

3 AGVs

CEITEC BUT

Construction works on the renovation of the building
3D printing

- 3D printing from metals
- Industry-grad 3D printing from plastics

PLM software – currently under implementation

Drives dynamometers

- Unique linear-motor dynamometer (up to 15m/s speed and 10 kN force)
- Set of rotational dynamometers, unique dynamometer 20 kRPM, 250 kW

Synergies & Cooperation

European AI Ecosystem
RICAIP and CIIRC CTU have developed strong collaborations and manifold networking across European networks, especially with CLAIRE and ELLIS initiatives.

National Centre for Industry 4.0 (NCI4.0)
CIIRC CTU & CEITEC BUT are partnering the national platform connecting stakeholders from academia & industrial sector. Synergies in dissemination activities with NCIP4.0 multiply the approach to SMEs & corporates in the Czech Republic.

EDIH
All RICAIP partners in the Czech Republic as well as in Germany were successful with their national proposals for the European Digital Innovation Hub (EDIH) in the first stage and have reached the national shortlists in the EDIH call (2 proposals at the Czech side, 5 proposals at the German side).

H2020 Teaming Phase II Projects

Teaming Club initiative organized by the InnoRenew CoE, Slovenia

EIT Manufacturing
DFKI and CTU are full partners of EIT Manufacturing developing joint projects with the entire ecosystem including the RICAIP facilities.

Technical University of Ostrava (TUO)
Cooperation on a submission of RICAIP Large Research Infrastructures proposal, and the connection of the Ostrava Testbed.

ESFRI
The Czech partners with the Technical University in Ostrava applied for the Czech national call for Large Research Infrastructures (LRI). RICAIP made a first step towards the ESFRI Roadmap.

Cooperation with the CETOCOEN Excellence H2020 Teaming Phase II project supported in the Czech Republic in the area of environment and health.

Media Visibility

16 Original Articles in Media

2 Podcasts

2 Videos

6 Interviews for the Czech TV

15 Press Releases

"With CIIRC CTU, the Czech Technical University Prague is now one of the most important centres of excellence for Industry 4.0 with an excellent application environment in Czech factories. The cooperation between DFKI and CIIRC CTU as well as with other prominent partners has ensured that Europe remains the leading provider and innovation driver in Industry 4.0. Our joint EU project RICAIP is an international lighthouse of Industry 4.0."

Prof. Dr. Wolfgang Wahlster
Chief Executive Advisor (CEA), DFKI
Interview for Tecnicall 2020, on the occasion of the 10th anniversary of Industry 4.0.

199 Media appearances

Main topics
- RICAIP Kick-off
- Protective Half Mask
- New RICAIP Director
- New tenure track position
- Industry 4.0 Testbeds

86% Online

12% Print

1% Radio

2% TV

The exceptional media response was generated by the 3D protective half mask that was developed in March 2020 and was continuously communicated until the summer of 2020.

Events

Due to restrictions for event organisation connected with COVID-19 situation in 2020, the on-site events were held in 2019, virtually mainly in the second half of 2020.

RICAIP Kick-Off Ceremony

26 September 2019 | Prague, Czech Republic

150 Guests - Stakeholders from industry, academia, press, policy makers

The most prominent event accompanied by a conference programme

Presentation of RICAIP demontrators

Open day in Prague Testbed for Industry 4.0

4
Conferences

7
Workshops

7
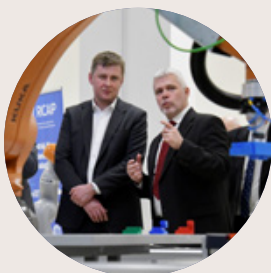Invited Speeches

Events for the General Public

- Researchers' Nights and excursions for kids
- Open days in testbeds
- Visits of Czech Minister of Foreign Affairs, Brno City Mayor
- Collaboration with Goethe-Institut Prague

The events on site were attended by almost 800 participants

380
Academia

280
Industry

90
Policy makers

15
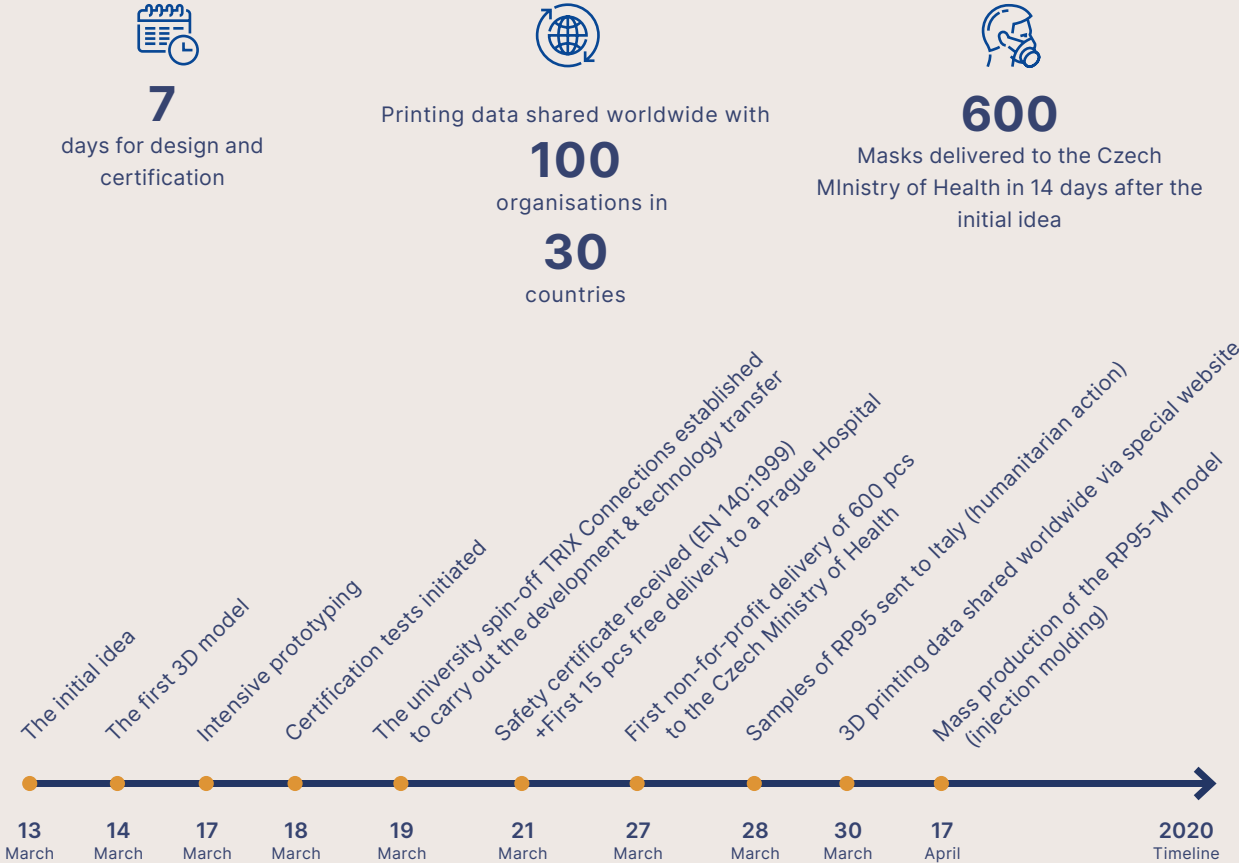Media

COVID-19 Response

Protective Half-Mask

The research team of the Testbed for Industry 4.0 at CIIRC CTU reacted promptly to the shortage of protective equipment when the first wave of COVID-19 pandemic started. In March 2020, they developed the 3D printable "CIIRC RP95-3D" protective half-mask produced via special 3D HP MultiJet Fusion printers certified as a personal protective device in accordance with the EN 140:1999 norm with the highest level of protection. The printing data was openly shared with HP MJF owners for non-commercial use worldwide.

- First RICAIP use case
- Demonstrator of the multi-site production concept
- High-quality professional product
- Real production in cooperation with industrial partners
- Complete innovation process from idea to tech transfer

EU Registered Scientific/ Technological R&D Result ID: 23759

7 days for design and certification

Printing data shared worldwide with **100** organisations in **30** countries

600 Masks delivered to the Czech MInistry of Health in 14 days after the initial idea

The initial idea — 13 March

The first 3D model — 14 March

Intensive prototyping — 17 March

Certification tests initiated — 18 March

The university spin-off TRIX Connections established to carry out the development & technology transfer — 19 March

Safety certificate received (EN 140:1999) +First 15 pcs free delivery to a Prague Hospital — 21 March

First non-for-profit delivery of 600 pcs to the Czech Ministry of Health — 27 March

Samples of RP95 sent to Italy (humanitarian action) — 28 March

3D printing data shared worldwide via special website — 30 March

Mass production of the RP95-M model (injection molding) — 17 April

2020 Timeline

Monitoring of Hospital Beds

CIIRC CTU together with the spin-off TRIX Connections developed an on-line system for monitoring hospital beds. It was implemented in the Moravian-Silesian Region, aimed to help health professionals and crisis management to handle with the growing number of hospitalised patients with COVID-19 disease.

Awards

- Research, Development and Innovation Council of the Czech Republic - **RVVI Honorary Award for Scientific Contribution to Solving the Problem of the COVID-19 Epidemic in a Global Context** ("*Česká hlava 2020*")

- **Czech TOP 100**
  Award for CIIRC CTU for involvement in the fight against COVID-19 for the protective half mask RP-95

- **European Citizen's Prize 2020** for the research team of CIIRC CTU for the "CIIRC RP95-3D" protective half mask awarded by the European Parliament

Selected Publications

- Zhang, Z., Sattler, T., Scaramuzza, D. (2020). Reference Pose Generation for Long-term Visual Localization via Learned Features and View Synthesis. *International Journal of Computer Vision, Special Issue on Performance Evaluation in Computer Vision*.

- Sunegard, A., Svensson, L., Sattler, T.: (2020). Deep LiDAR localization using optical flow sensor-map correspondences. *IEEE International Conference on 3D Vision (3DV)*.

- Stenborg, E., Sattler, T, Hammarstrand, L. (2020). Using Image Sequences for Long-Term Visual Localization. *IEEE International Conference on 3D Vision (3DV)*.

- Pion, N., Humenberger, M., Csurka, G., Cabon, Y., Sattler, T. (2020). Benchmarking Image Retrieval for Visual Localization. *IEEE International Conference on 3D Vision (3DV)*.

Human Resources Management and Career Development Plan

People are the most important factor in building the RICAIP success.

In RICAIP, roles, competences, responsibilities and career tracks are defined for both the academic and administrative positions.

- Continuous career development
- Support talents at all levels
- Clear recruitment processes
- Welcome services for newcomers

RICAIP Tenure Track Policy

The tenure track positions are crucial for the scientific leadership and mentorship.

In CIIRC CTU, originally three RICAIP tenure track positions were planned but thanks to the additional funding it was possible to recruit four excellent researchers in total.

Tenure Track positions holders get the opportunity to
- Develop their own research direction
- Build a research group around it
- Maximize the impact on the scientific excellence of RICAIP, its sustainability and dynamic development

RICAIP EU Roadmap Strategy

Towards the European Large Research Infrastructure.

In December 2020 CIIRC CTU, together with the CEITEC BUT and the Technical University of Ostrava (TUO) submitted an application – RICAIP LRI - to become the first international large research infrastructure (LRI) that will be coordinated from the Czech Republic.
The application was approved by the Steering Committee and supported by the Letter of Commitment from DFKI and ZeMA. RICAIP LRI thus represents the first step for RICAIP towards entering the ESFRI Roadmap.

Responsible Research and Innovation Strategy

An exemplary research organisation based on the principles of Responsible Research and Innovation (RRI).

- Public engagement
- Open Access & Open science
- Gender equality
- Ethical and research integrity
- Science and education

All RRI dimensions will be applied in:

- Project proposals preparation
- Already running projects
- Cooperation with industry partners and academia

Grant Lab Strategy

Open platform & a physical office in CIIRC CTU for project managers across Europe.

International teams of project managers can cooperate in seeking funding opportunities in the area of Industry 4.0.

Main focus

- Networking activities to connect RICAIP with prominent European research stakeholders and initiatives
- Searching for new grant opportunities
- Joint cooperation on preparation of new proposals
- Enhancing the joint project strategy in gaining competitive European funding
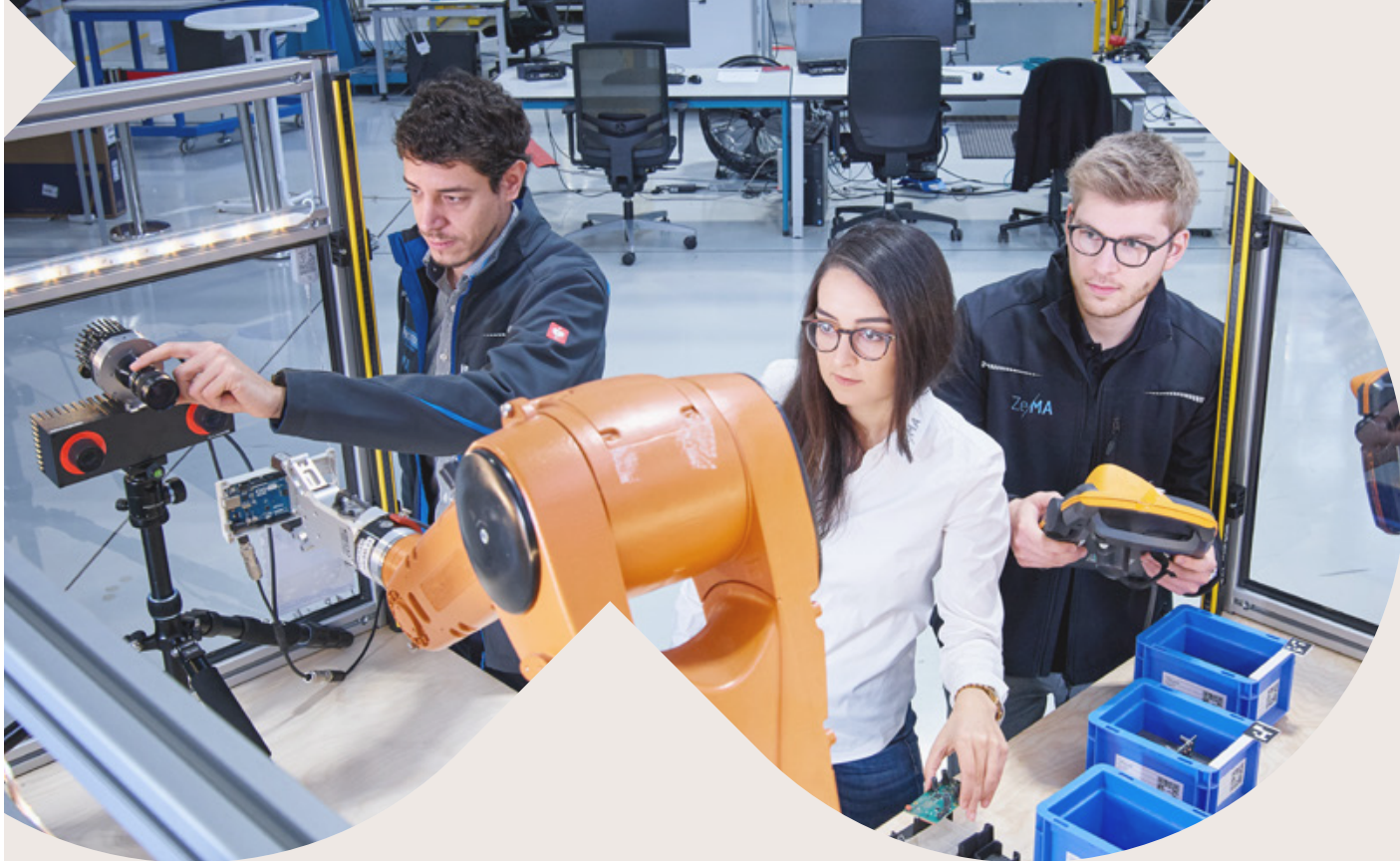
Eva Troppová
CIIRC CTU, Senior Project Manager

"I work as the grant manager of the Project Management Office at CIIRC CTU which comprises agenda of preparation and implementation of strategic international H2020 projects. At RICAIP, I focus on developing the Grant Lab Strategy and supporting the Tenure Track holders in their career development."

Kateřina Vlková
CEITEC BUT, Marketing & Communication

"I take the promotion of science as a great mission and commitment. It is a lively and dynamic environment that is constantly evolving. With our team, we strive to make the communicated results and discoveries of our scientists understandable, interesting, and inspiring for everyone. The RICAIP project is a gateway to the future and I look forward to all the results and new paths that will lead us."

Gender Action Plan

The Gender Action Plan was developed for the period 2020 – 2025.

It maintains the flexibility, reflects the challenges at all levels of the RICAIP development, and brings sufficient tools and actions to implement gender-related opportunities and mitigate gaps to:

- Foster gender balance in scientific careers (e.g. part-time jobs, home-office)
- Ensure gender balance in decision-making processes and bodies (constitution of executive RICAIP bodies)
- Integrate the gender dimension in research and innovation content (e.g. applying for H2020- SwafS calls)

Prof. Jana Koehler
DFKI, Head of Research Department

"My work is on AI-based optimization methods for industrial and business processes with a current focus on easy, adaptable and high-quality modelling with domain-specific Constraint Patterns. I am expecting novel scalable and adaptable solutions for the planning and scheduling of manufacturing operations for improved resilience, flexibility, and efficiency."

Khansa Rekik
ZeMA, Research Assistant, Advanced Robotics Engineer

"The focus of my work is mainly AI planning for applications including Robots and Humans. I work on the safety of humans and environment as well as the autonomy of the robot in terms of decision making. One of my personal expectations from RICAIP is to further exercise, develop, and explore skills and interests in robotics and AI. Another expectation is to strongly collaborate with international partners with similar background and interests and also together transfer this knowledge to whoever it is useful for."

RICAIP Research and Innovation Centre on Advanced Industrial Production

RICAIP Annual Report 2019-2020

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www.ricaip.eu

RICAIP

DFKI — German Research Center for Artificial Intelligence

CTU — Czech Technical University in Prague

CZECH INSTITUTE OF INFORMATICS ROBOTICS AND CYBERNETICS CTU IN PRAGUE

CEITEC — Central European Institute of Technology BRNO | CZECH REPUBLIC

BRNO UNIVERSITY OF TECHNOLOGY

ZeMA — Zentrum für Mechatronik und Automatisierungstechnik