CIIRC CTU
June 26, 2025
Vladimír Mařík

Structure of the Talk

1. **Introduction**
2. Activity Pillars
3. Building an AI Ecosystem
4. Excellence – Selected Highlights
5. Key Projects & Selected Results
6. Addressing Recommendations
7. CIIRC Strategic Visions

CZECH INSTITUTE
OF INFORMATICS
ROBOTICS AND
CYBERNETICS
CTU IN PRAGUE

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

- The youngest institute of the CTU

- Focus on interdisciplinary AI research in Industry 4.0, energy distribution and health-care

- **AI for Manufacturing is in the central focus**

- Established in July 2013, fully operational since May 2017 (opening of new building)

- Supports the integration of the AI & Robotic research **across the country** and **networking internationally**

CZECH INSTITUTE OF INFORMATICS ROBOTICS AND CYBERNETICS CTU IN PRAGUE

CIIRC Management & Staff
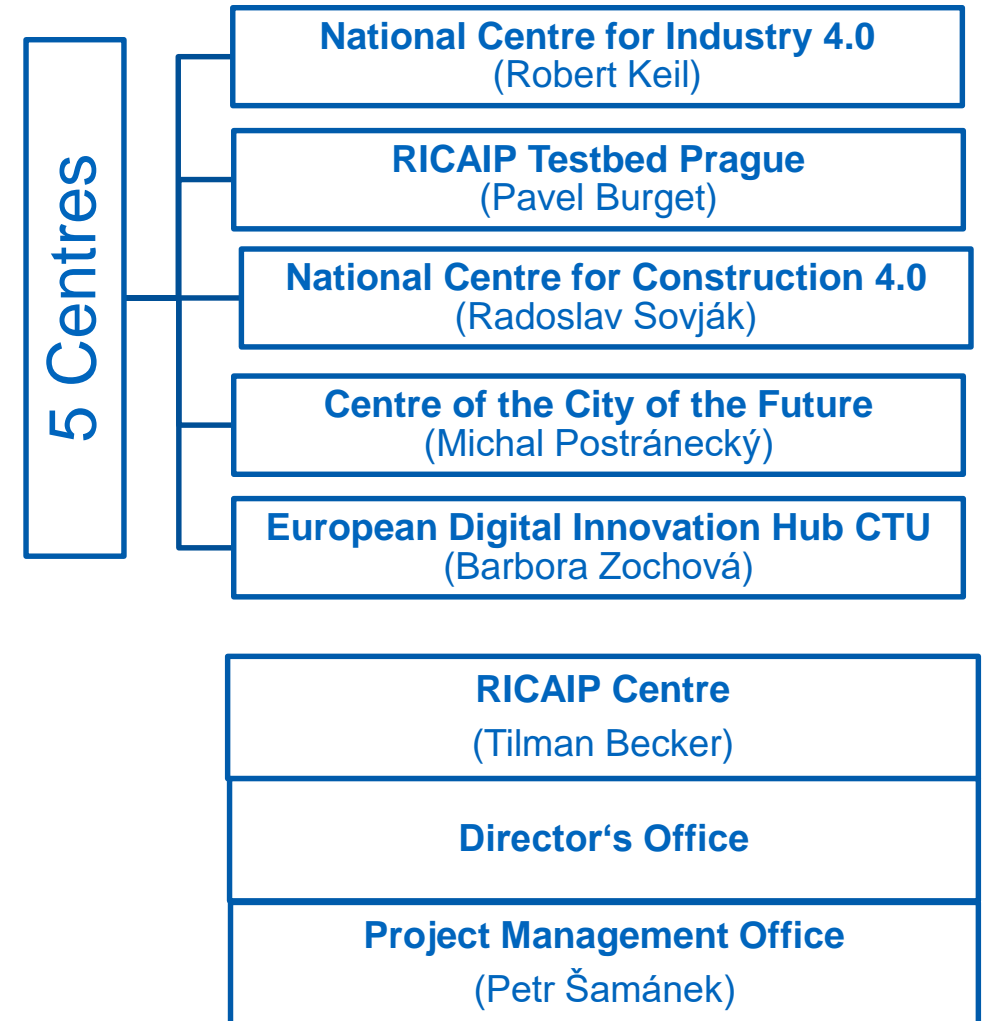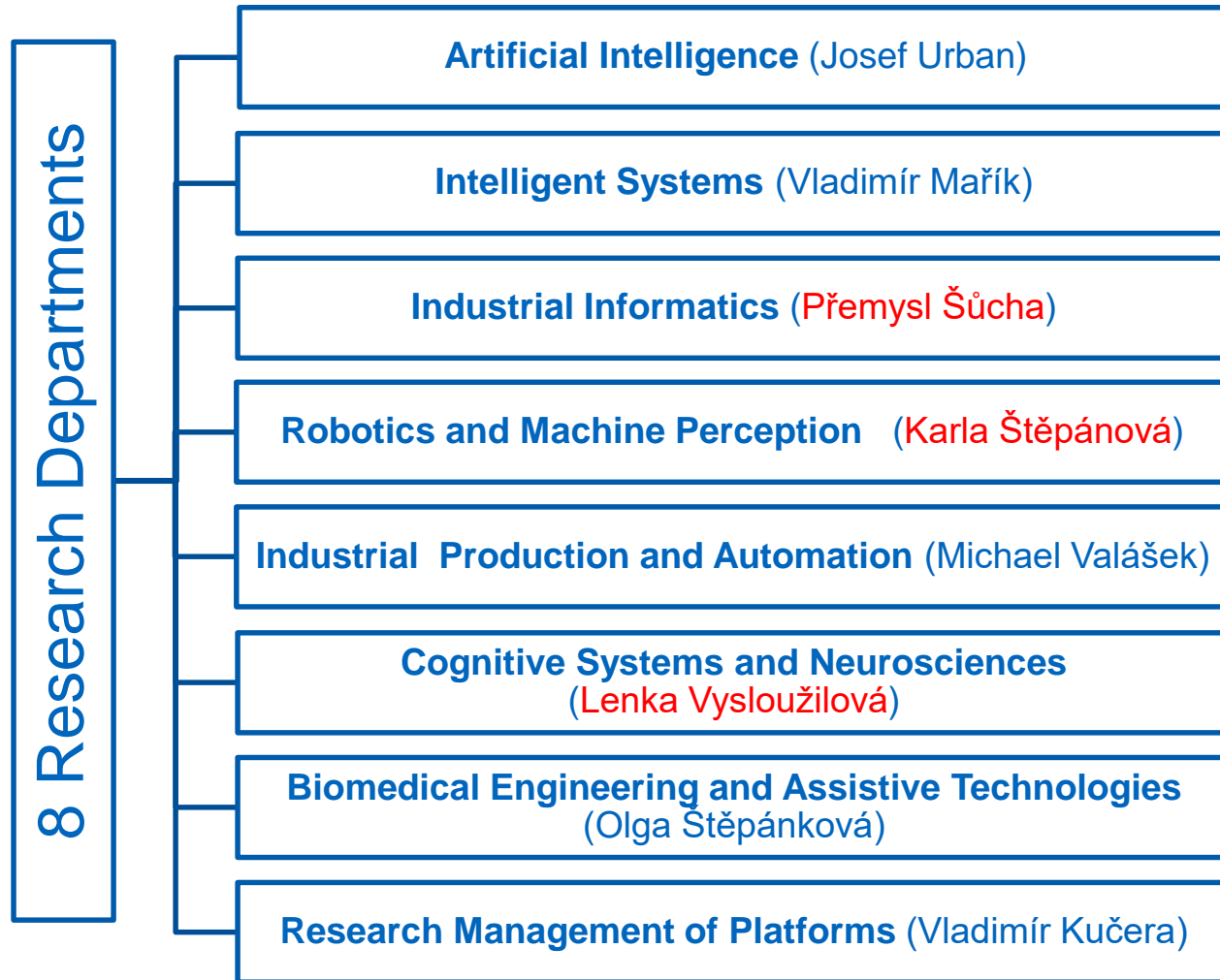
- Director: Mgr. Ondřej Velek, Ph.D.
- Scientific Director: prof. Vladimír Mařík
- Deputy Directors: prof. Václav Hlaváč
                                prof. Vladimír Kučera

Staff at the end of 2023:

- **254** employees
- **181** research staff (only 30 persons older than 50 years)
- **73** administrative and supporting staff
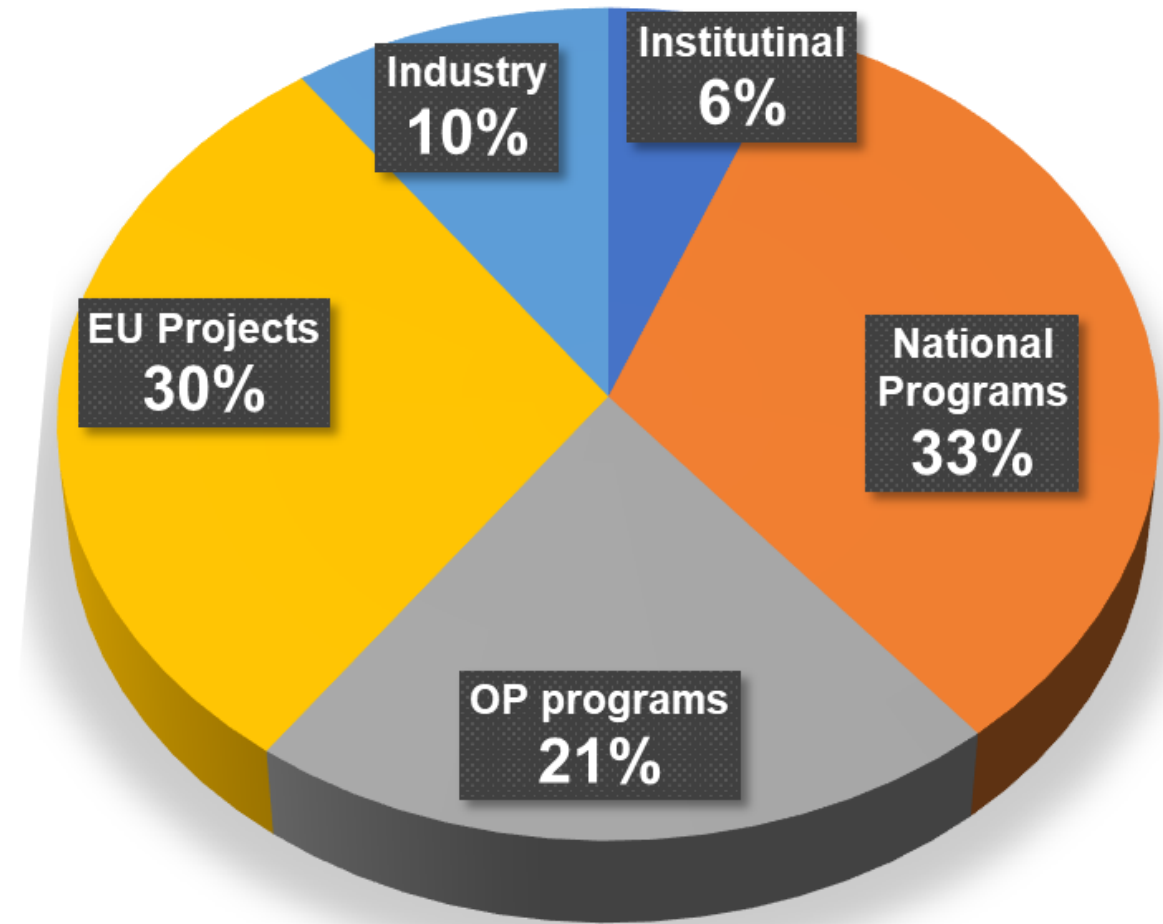
Organizational Structure

8 Research Departments

- **Artificial Intelligence** (Josef Urban)
- **Intelligent Systems** (Vladimír Mařík)
- **Industrial Informatics** (Přemysl Šůcha)
- **Robotics and Machine Perception** (Karla Štěpánová)
- **Industrial Production and Automation** (Michael Valášek)
- **Cognitive Systems and Neurosciences** (Lenka Vysloužilová)
- **Biomedical Engineering and Assistive Technologies** (Olga Štěpánková)
- **Research Management of Platforms** (Vladimír Kučera)

5 Centres

- **National Centre for Industry 4.0** (Robert Keil)
- **RICAIP Testbed Prague** (Pavel Burget)
- **National Centre for Construction 4.0** (Radoslav Sovják)
- **Centre of the City of the Future** (Michal Postránecký)
- **European Digital Innovation Hub CTU** (Barbora Zochová)

- **RICAIP Centre** (Tilman Becker)
- **Director's Office**
- **Project Management Office** (Petr Šamánek)

CIIRC CTU in Numbers – 2023 Income

Total Income	2023	EUR 21 M
Institutional funding	6%	1 260 000 €
National Programs	33%	6 930 000 €
Operational programs	21%	4 410 000 €
EU Projects	30%	6 300 000 €
Industry	10%	2 100 000 €

Grant Projects in 2024:	105
Of which	
EU (ESIF, H2020)	30
National (TACR etc.):	75

Industry 10%
Institutinal 6%
EU Projects 30%
National Programs 33%
OP programs 21%

CZECH INSTITUTE
OF INFORMATICS
ROBOTICS AND
CYBERNETICS
CTU IN PRAGUE

Research Focus

AI as the unifying element

CIIRC CTU integrates research capacities in key technological fields in both fundamental and applied research with **Artificial Intelligence**.

CIIRC's application area:

- Industrial manufacturing
- Robotics
- Biomedical systems
- Smart cities
- Intelligent energy distribution

1. Introduction
2. **Activity Pillars**
3. Building an AI Ecosystem
4. Excellence – Selected Highlights
5. Key Projects & Selected Results
6. Addressing Recommendations
7. CIIRC Strategic Visions

**CZECH INSTITUTE
OF INFORMATICS
ROBOTICS AND
CYBERNETICS
CTU IN PRAGUE**

Three Pillars of CIIRC's Efficiency

Linking excellence with applications.

The unifying element is artificial intelligence (AI).

1

EXCELLENCE IN RESEARCH

2

ADVANDED INFRA-STRUCTURE

3

TECHNOLOGY TRANSFER WITH PRACTICAL APPLICATIONS

Three Pillars of Efficiency

Excellent Research Teams: AI&Reasoning, IMPACT & R4I
2017–2023 | 16.5 M EUR total

Member of the Networks of AI Excellence Centres (AI NoEs): ELISE, TAILOR, VISION, euROBIN, and ELIAS

INFRASTRUCTURE	EXCELLENCE	TRANSFER | APPLICATION
Construction & Equipment	Research Capacity Building	Towards Sustainability Ecosystem Building
	Strengthening European Partnerships	

2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025

CTU-CIIRC Project
2014–2017 | 58.3 M EUR

National Competence Centre: Cybernetics and Artificial Intelligence
2019–2022
12.2 M EUR total

RICAIP
2019–2026
49.8 M EUR total

EDIH CTU 3 M EUR
AI-MATTERS | TEF for Manufacturing 60 M EUR total
ROBOPROX 18.3 M EUR total

ERC Consolidator Grant AI4REASON

ERC Advanced Grant FRONTIER

CZECH INSTITUTE OF INFORMATICS ROBOTICS AND CYBERNETICS CTU IN PRAGUE
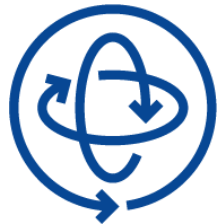
CIIRC CTU – Main AI & ML Research Areas

Natural Language Processing

Generative AI LLM
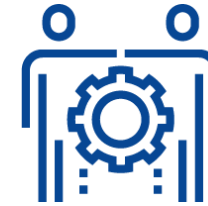
Human-Machine Interaction

AI and Reasoning

Visual Localization

Multi-Agent Systems & Agent-based Modeling

Computer Vision

Intelligent Machine Perception

Formal Methods

CZECH INSTITUTE
OF INFORMATICS
ROBOTICS AND
CYBERNETICS
CTU IN PRAGUE

1. Introduction
2. Activity Pillars
3. **Building an AI Ecosystem**
4. Excellence – Selected Highlights
5. Key Projects & Selected Results
6. Addressing Recommendations
7. CIIRC Strategic Visions

CIIRC CTU – AI-driven Industrial Ecosystem

- **AI ECOSYSTEM** in the field of industrial production, combining various forms of financing.

- **RICAIP Testbed Prague** - Testbed for Industry 4.0 in open cooperation with leading EU partners

- EU projects **EIT Manufacturing, AI-MATTERS, ELLIOT**

- OP JAK **ROBOPROX**

- **Joint labs with global companies**
  Siemens, VW - Škoda Auto, Rockwell Automation, Eaton, SMEs: Factorio Solutions, Cardam,Smart-Plan…

- **National Centre for Industry 4.0**
  An independent and open academia-industry platform, focus on SMEs ~ 61 members

- **EDIH CTU**

CIIRC CTU - AI Ecosystem

CIIRC CTU is building an **AI ecosystem** in the framework of cooperation between academia and industry in the Czech Republic and Europe, using a combination of active partnerships in main AI initiatives with the implementation of a variety of European and national projects:

- **CAIRNE** - Confederation of AI Research Laboratories in Europe
  - CAIRNE Office Prague since 02/2019

- **ELLIS** - European Laboratory for Learning and Intelligent Systems
  - One of the first ELLIS Units, since 12/2019

- **EIT Manufacturing**
  - EIT Manufacturing Hub Czechia since 2020 at CIIRC CTU

- **ADRA** - The AI, Data and Robotics Association (European PPP initiative)
  - CIIRC CTU is a research member of Adra

Aligned for the future:
The European ecosystem of excellence in AI, Data & Robotics

- In line with the "**Support from the lab to the market"** vision of the European Commission.

- CIIRC CTU is engaged across **the full range of supported areas, incl. energy saving in production**

- CIIRC CTU's engagement in projects and activities already provides a broad basis for securing a **strategic position in the European ecosystem of excellence in AI, Data & Robotics** and delivering on this vision.
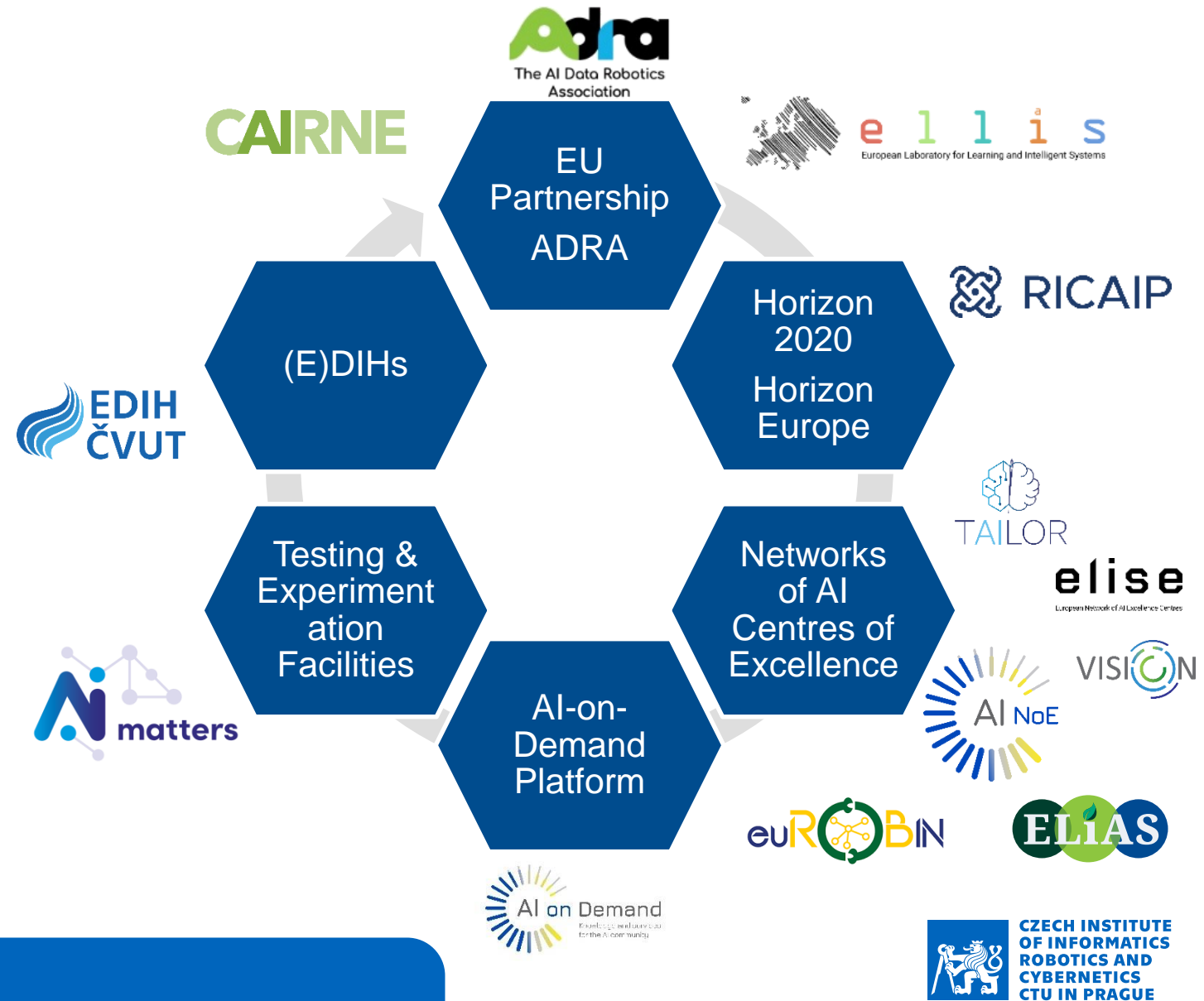
Ecosystem | National Centre for Industry 4.0

NATIONAL CENTRE FOR INDUSTRY 4.0

Main Partners:

Academic Partners

- CTU — CZECH TECHNICAL UNIVERSITY IN PRAGUE
- BRNO UNIVERSITY OF TECHNOLOGY
- VSB TECHNICAL UNIVERSITY OF OSTRAVA

Industrial Partners

- ŠKODA
- SIEMENS
- T Business

National Partners

- AMSP ČR — ASOCIACE MALÝCH A STŘEDNÍCH PODNIKŮ A ŽIVNOSTNÍKŮ ČR
- AutoSAP — SDRUŽENÍ AUTOMOBILOVÉHO PRŮMYSLU
- HOSPODÁŘSKÁ KOMORA ČESKÉ REPUBLIKY
- JIC
- SP — CONFEDERATION OF INDUSTRY OF THE CZECH REPUBLIC
- SIC — STŘEDOČESKÉ INOVAČNÍ CENTRUM

Partners:

- ČESKÁ spořitelna
- ČESKÁ ZEMĚDĚLSKÁ UNIVERZITA V PRAZE
- DEL THE FUTURE TECHNOLOGY
- Deloitte.
- ICUK
- KUKA
- MVŠO — MORAVSKÁ VYSOKÁ ŠKOLA OLOMOUC
- TECHNICKÁ UNIVERZITA V LIBERCI WWW.TUL.CZ
- Univerzita Tomáše Bati
- UNIVERZITA J. E. PURKYNĚ V ÚSTÍ NAD LABEM
- Univerzita obrany
- Vysoká škola logistiky o.p.s.
- ZÁPADOČESKÁ UNIVERZITA V PLZNI

Associated Partners:

- AXIOM TECH — digitalizace výrobních podniků
- EVIDEN
- JHV
- DEPRAG machines unlimited
- BOSSARD Proven Productivity
- SMART Informatics
- P/R/K PARTNERS advokátní kancelář
- SICK Sensor Intelligence.

Collaborating Partners:

- AMPER 2020
- AOBP
- AUTOMA
- caim
- CONTROL ENGINEERING česko
- CZECH SIGHT
- Roklen 24
- ČSPÚ — ČESKÁ SPOLEČNOST PRO ÚDRŽBU
- SVAZ CHEMICKÉHO PRŮMYSLU ČR
- TRADE NEWS
- Tate International
- Zakazka.cz

Members:

ABRA Software
ACTUM Digital
ACTUM Digital
APLIS
ČEZ DISTRIBUCE.
FLOWBOX
Fravebot
K2 Machine
Lenze

Prima Bilavčík
Radalytica
Zebra Technologies
24 Vision

Structure of the Talk

1. Introduction
2. Activity Pillars
3. Building an AI Ecosystem
4. **Excellence – Selected Highlights**
5. Key Projects & Selected Results
6. Centers
7. Addressing Recommendations
8. CIIRC Strategic Visions

CZECH INSTITUTE OF INFORMATICS ROBOTICS AND CYBERNETICS CTU IN PRAGUE

Excellence - Selected Highlights 2019 - 2023

- Publications: 300 journal papers, 480 conference papers

- CSRanking (2018-2023)
  - **5th in Europe for Computer Vision**
  - **7th for Robotics**

- The best computer scientists in the Czech Republic
(Research.com - 12/2022)
  - Josef Šivic – 2nd position
  - Tomáš Pajdla – 4th position
  - Tomáš Mikolov – 7th position
  - Torsten Sattler – 10th position

- Recently awarded prestigious individual grants:
Josef Šivic – FRONTIER **ERC Advanced Grant** (2023)
Josef Urban - NextReason **GAČR EXPRO** (2023)
Milan Němý - QUICH **GAČR JUNIOR STAR** (2023)
Mikoláš Janota - **ERC-CZ Grant** (2020)

CZECH INSTITUTE
OF INFORMATICS
ROBOTICS AND
CYBERNETICS
CTU IN PRAGUE

Excellence - Selected Awards 2020 - 2023

- The team of Josef Šedivý - Alquist AI – sucessful in the prestigious **Amazon Alexa Prize**:
  - Winner of the Amazon Alexa Prize Social Bot Grand Challenge 2021
  - 2nd and 3rd places in subsequent evaluations.

- Josef Šivic - **ECCV 2020 The Overall Best Method for Paper** "CosyPose: Consistent multi-view multi-object 6D pose estimation"

- Vladimír Kučera - **Česká hlava Award 2021**; Member of the American Philosophical Society 2023

- Tomáš Pajdla - **CVPR 2022 Best Paper Award** for Learning to Solve Hard Minimal Problems"; **ICCV 2021 Marr Prize Best Paper** Honorable Mention Award

CZECH INSTITUTE OF INFORMATICS ROBOTICS AND CYBERNETICS CTU IN PRAGUE

Structure of the Talk

1. Introduction
2. Activity Pillars
3. Building an AI Ecosystem
4. Excellence – Selected Highlights
5. **Key Projects & Selected Results**
6. Addressing Recommendations
7. CIIRC Strategic Visions

CZECH INSTITUTE
OF INFORMATICS
ROBOTICS AND
CYBERNETICS
CTU IN PRAGUE

- **RICAIP** - international multi-site centre of excellence connecting testbeds in Prague, Brno, and Saarbrücken (GE).

- European Centre of Excellence driving the transformation of industrial production through AI, robotics, and digital twin technologies.

- Bridging cutting-edge research and industrial applications to develop innovative solutions for advanced distributed manufacturing.

Financial support:
48 Mil. EUR / 1 239 Mil. CZK
H2020:   15 Mil. EUR
ESIF/ OP RDE: 33 Mil. EUR

Teaming for Excellence

CZECH INSTITUTE
OF INFORMATICS
ROBOTICS AND
CYBERNETICS
CTU IN PRAGUE

RICAIP Network of Collaborating Testbeds
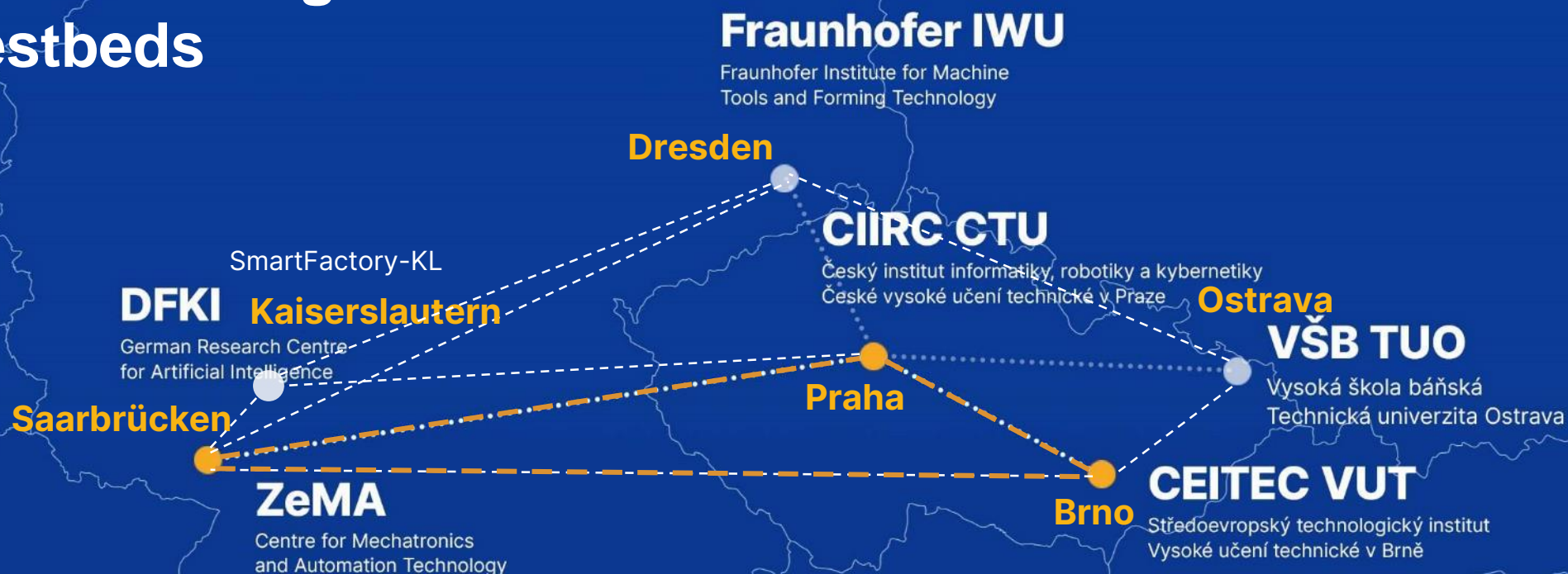
Fraunhofer IWU
Fraunhofer Institute for Machine Tools and Forming Technology

Dresden

SmartFactory-KL
DFKI
German Research Centre for Artificial Intelligence
Kaiserslautern

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

Ostrava
VŠB TUO
Vysoká škola báňská
Technická univerzita Ostrava

Praha

Saarbrücken

ZeMA
Centre for Mechatronics and Automation Technology

Brno
CEITEC VUT
Středoevropský technologický institut
Vysoké učení technické v Brně

RICAIP TESTBED **PRAGUE**

Production and assembly processes

Industrial planning and automation

Energy management

Human-machine collaboration

AI and robotics for production

RICAIP Testbed Prague Infrastructure

RICAIP TESTBED PRAGUE
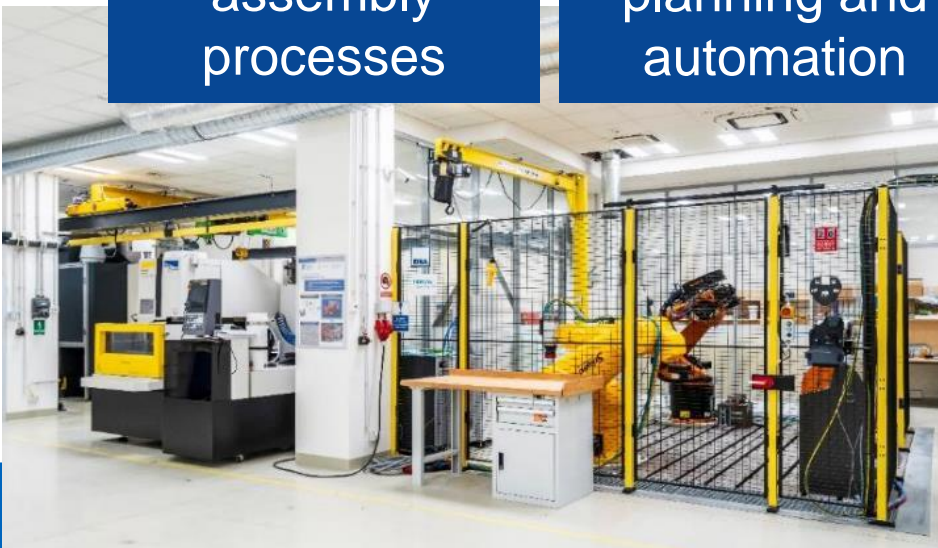
Part I: Robotics & Flexible Production

1. Assembly line for flexible production
2. Automatic loading robotic station
3. Multi-axis motion system with a delta robot
4. Universal robotic cell
5. Automated warehouse with a fleet of mobile robots
6. Robotic multi-axis additive manufacturing and measurement
7. Assembly line for flexible fast production
8. Cell for assisted assembly with collaborative robots
9. Robotic vision cells
10. Robobar

+ 3D Printing Centre

- Industrial 3D printers of various technologies
- Plastic and metal printing
  130 m2

+ Smart Grid Lab

- For advanced electricity distribution systems
- Optimization of production processes regarding available energy sources, incl. PV systems
  90 m2

Part II: Robotics & Production Technologies

1. Robotic laser cell
2. Femtosecond and 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. High precision CNC wire EDM
9. Industrial robot area

850 m2

1 640 m²

570 m²

CZECH INSTITUTE OF INFORMATICS ROBOTICS AND CYBERNETICS CTU IN PRAGUE

Robotic and Computer Vision Center Václav Hlaváč

Mobile Robotics Lab Libor Přeučil

Autonomous Systems Lab Zdeněk Hanzálek

Smart Home and Assistive Technologies
Lenka Vysloužilová, Olga Štěpánková

Center for the Cities of the Future Michal Postránecký

ŠKODA Auto Lab Petr Bouchner

Joint Research Labs with Eaton Zdeněk Hanzálek
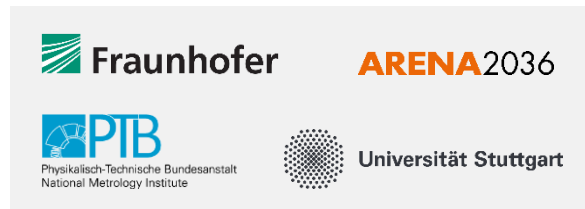
Rockwell Automation Petr Kadera

CZECH INSTITUTE
OF INFORMATICS
ROBOTICS AND
CYBERNETICS
CTU IN PRAGUE
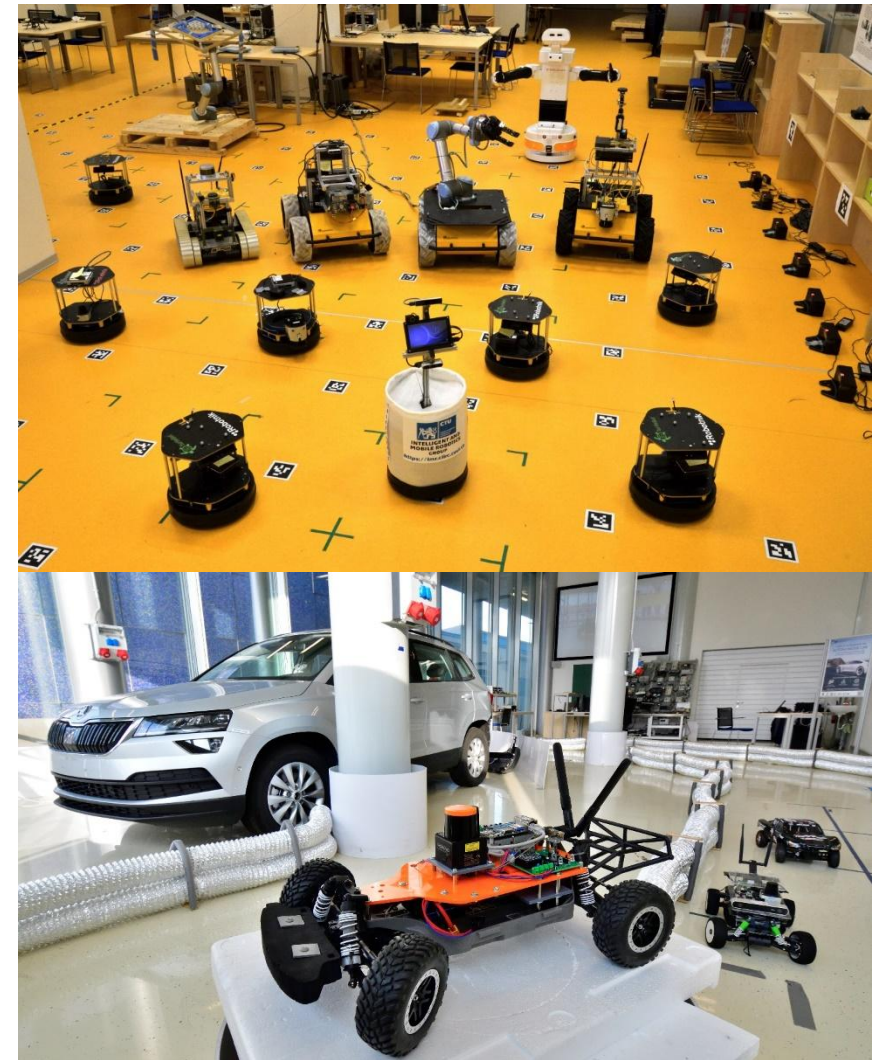
AI-MATTERS - The Manufacturing TEF

AI in ManufActuring TesTing and ExpeRimentation facilities for European SMEs

7 Nodes   1 Satellite

Node 3 – Denmark
Node 4 – Netherlands
Node 2 – Germany
Node 5 – Czechia
Node 1 – France
Node 6 – Spain
Node 7 – Italy
Satellite 8 – Greece

Network coordinator

Co-funded by the European Union

Funded by the European Union
NextGenerationEU

CZECH RECOVERY PLAN

AI-MATTERS - The Manufacturing TEF

AI-Matters is a network enhancing European manufacturing resilience through AI, robotics, and autonomous systems for flexible production.

It offers a dynamic service catalog that adapts to industry needs.

- All consortium members bring their expertise in manufacturing for different sectors such as automotive, space and mobility, textile, recycling
- The 7 node-level-ecosystems work in a cohesive collaborative framework and are rooted in their regional innovation ecosystem.

€60 M — 5-year project with total budget of 60 mil. EUR incl. 30 mil EUR from EU Digital Europe.

25 — Excellent facilities in key of robotics, AI, energy optimization, object identification, predictive maintenance and digitalization.

100+ — The expert teams are made up of specialists and enthusiasts from our partners and can be found in 8 EU countries.

Grants — Funding for the costs from the Digital Europe programme and the Czech Ministry of Industry and Trade programme.

Manufacturing — Knowledge base for the manufacturing sector, including transport, HR or control processes.

300+ — Service catalogue containing hundreds of services and products for SMEs to streamline production

CZECH INSTITUTE OF INFORMATICS ROBOTICS AND CYBERNETICS CTU IN PRAGUE
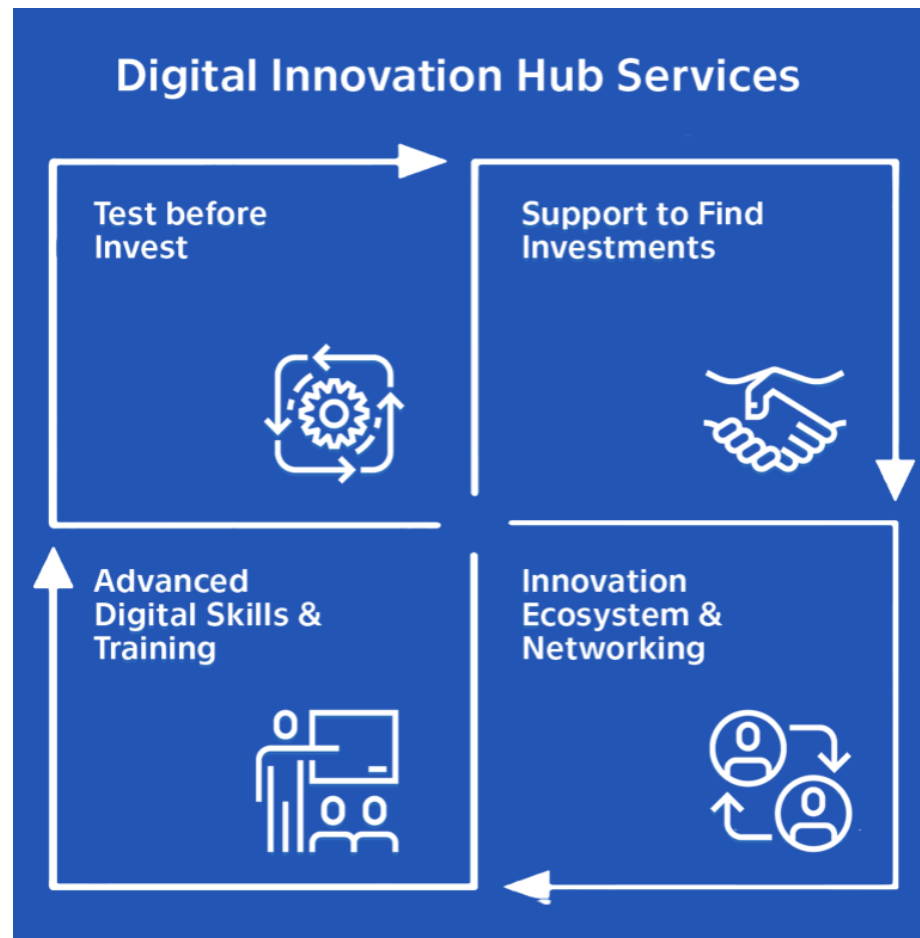
- The network of EDIH centres acts as the one-stop shop where **companies and public institutions** can get advice, training and access to the latest technologies using artificial intelligence (AI).

- 168 EDIHs funded by Digital Europe Programme and EU MSs (05/2025)

- Czech Republic: 6 EDIHs incl. EDIH CTU
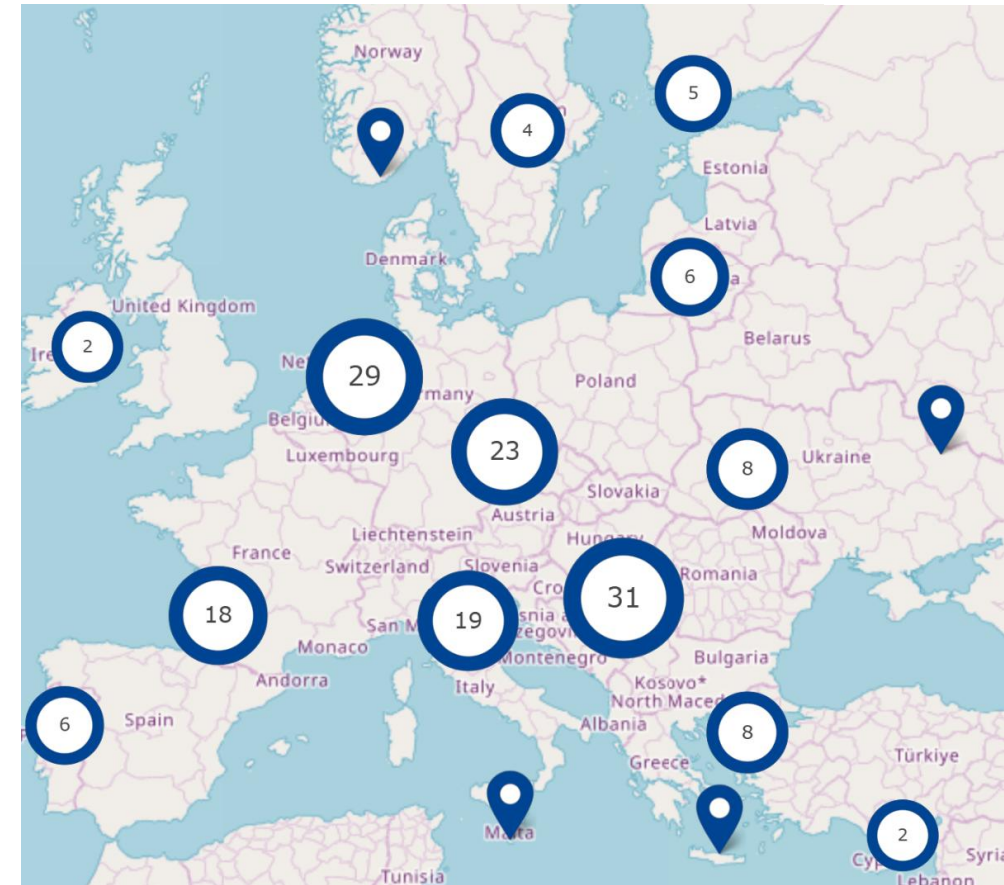
4 pillars of services for SMEs and Public Sector Organisations (PSOs):

- **Test before Invest** – technical solutions for companies – EDIH CTU's main focus

- **Innovation Ecosystem and Networking** – structural support for companies

- **Support to Find Investment** – economy aid (assisting in finding private or public capital)

- **Advanced Digital Skills & Trainings** – upskilling & reskilling of employees

Digital Innovation Hub Services

Test before Invest

Support to Find Investments

Advanced Digital Skills & Training

Innovation Ecosystem & Networking

Co-funded by the European Union

Funded by the European Union
NextGenerationEU

CZECH RECOVERY PLAN

CZECH INSTITUTE OF INFORMATICS ROBOTICS AND CYBERNETICS CTU IN PRAGUE

- Automated solution for Lego for the readjustment of counting machines in the production of bricks and cubes:

- 8 000 types of bricks, 277 categories of boxes, 36 counting machines – 20 min time for the machine readjustment

- The system is uble to:

  - Understand dozens of production parameters

  - Distinguish between cubes by shape, color, weight…

  - Control the flow of bricks

  - Monitor a performance of the machines

  - Manage the machines according to orders

CZECH INSTITUTE
OF INFORMATICS
ROBOTICS AND
CYBERNETICS
CTU IN PRAGUE

Support to companies: Technology proofing

- Example: drill wear monitoring for improved usage of the tool life time

Sensorless monitoring of drilling operation

Spindle current amplitude

Current production limit

Enhanced tool potential

Current [A]

No. of produced parts per drill
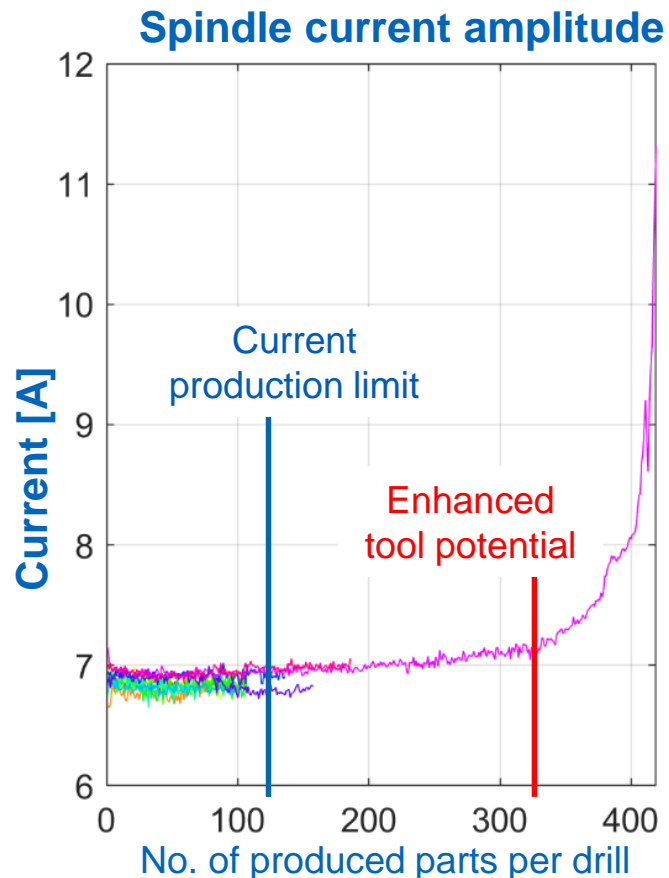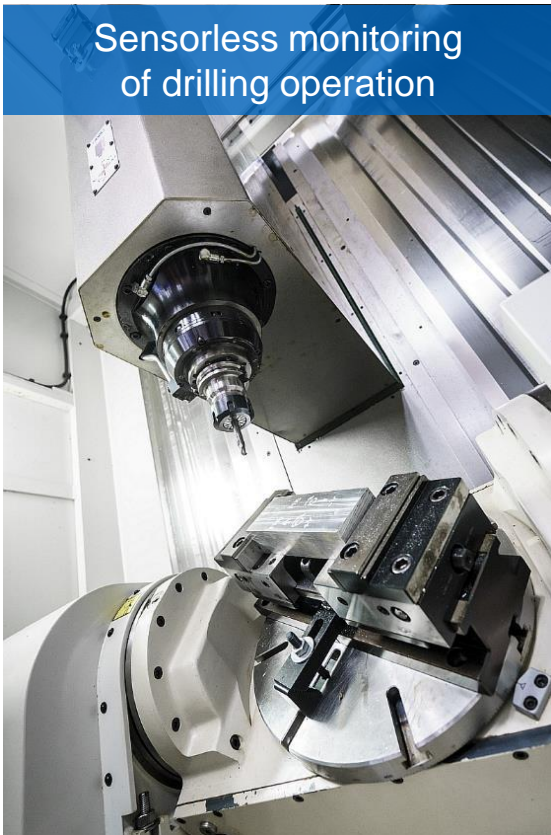
- Example: physical and virtual proofing of the robotic assembly workplace

Gripper development

Physical proofing of the critical operations
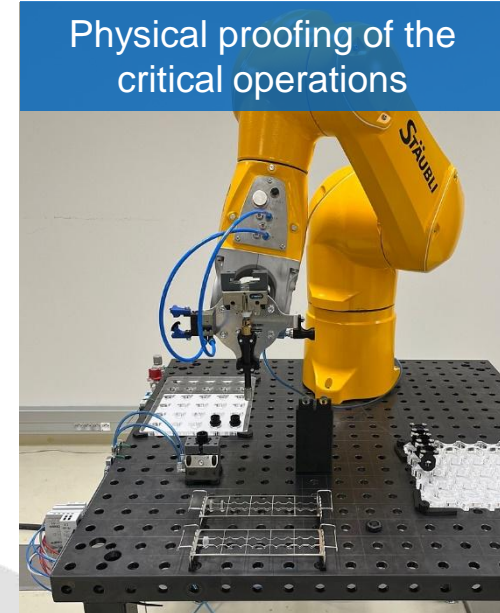
Virtual commissioning and testing of the production line

Test before invest

CZECH INSTITUTE OF INFORMATICS ROBOTICS AND CYBERNETICS CTU IN PRAGUE
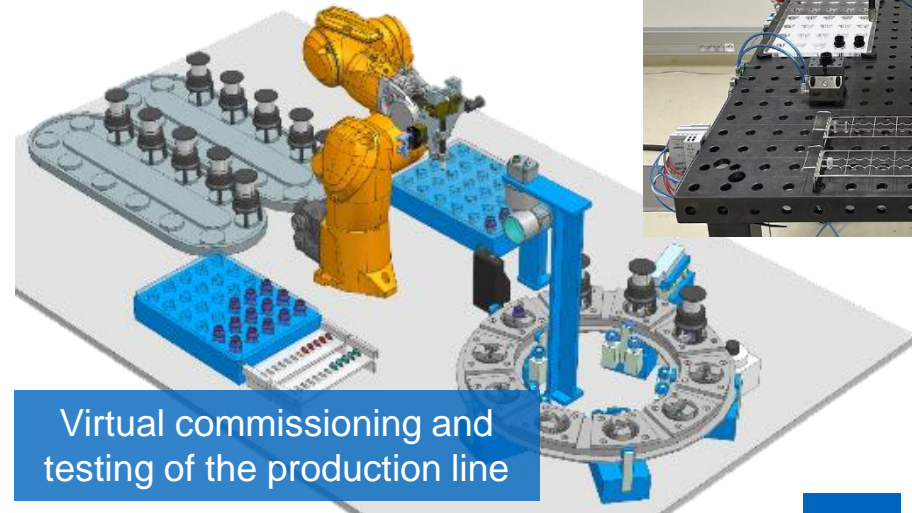
Trend: Model-Driven Industrial Production

- **AI planning and scheduling using a formal digital twin of a production system**
  - Planning Domain Definition Language (PDDL) in the digital twin and planner/scheduler
  - Matchmaking of production resources into production operations (required and provided skills), AI reasoning based on ontologies and PDDL
  - Communication with the production line via OPC UA
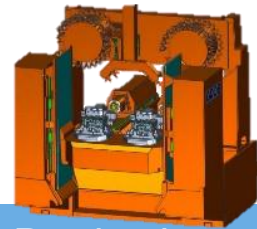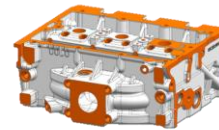 - MES uses Python-wrapped AML
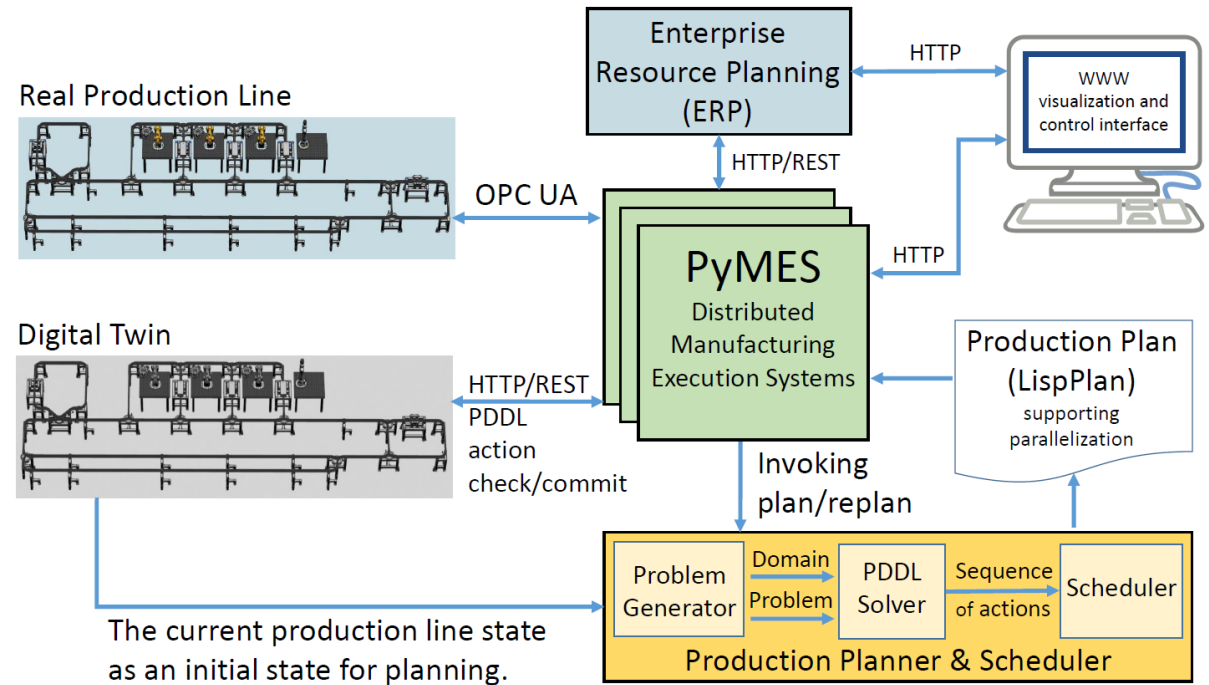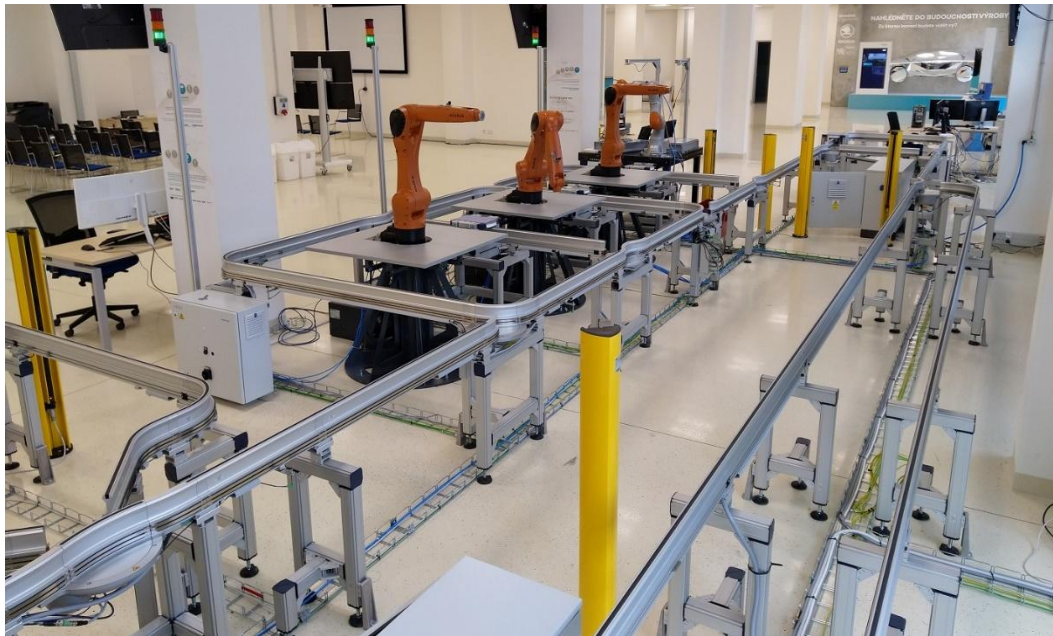
Quality Control – towards Zero-error Production

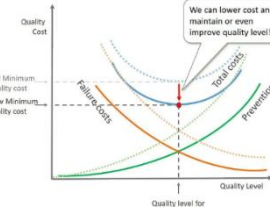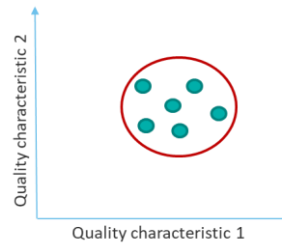Part from previous operation or input material from suppliers

Production process

Produced part

Sampling plan

Optimization – automated and cost-efficient decision about what to measure and when

Sampled part

Ontologies – semantic representation of process structure accompanied by a reasoning

Measurement

Quality characteristic 2

Quality characteristic 1

Use cases:

- Engine head machining at S K O D A
- Cement clinker quality control

Control action

In-process variables

Quality characteristics
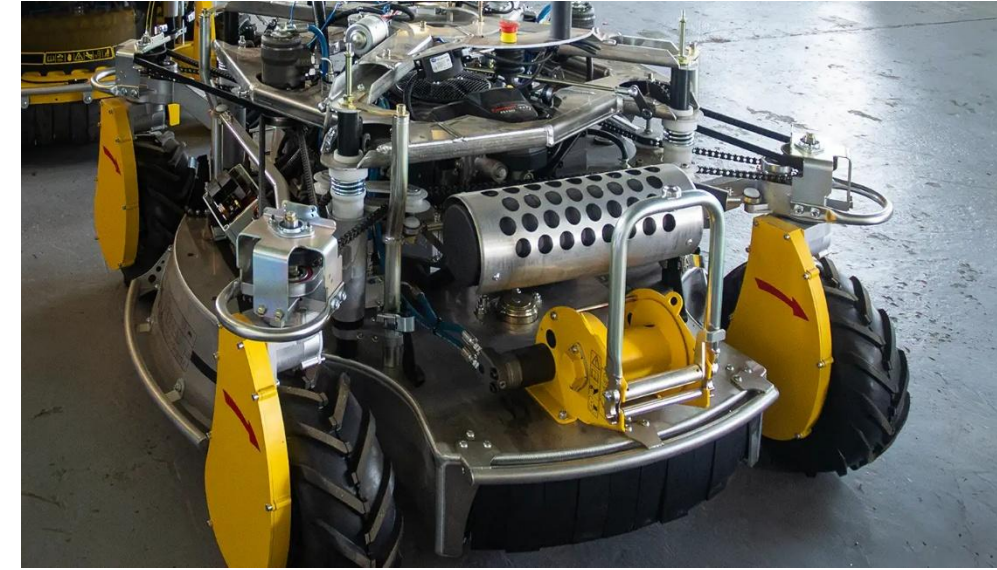
Anomaly detection – machine learning based detection from post-process or/and in-process variables

Selection of control action

Problem cause

Diagnosis

Alarm

NonOK state detection

CZECH INSTITUTE OF INFORMATICS ROBOTICS AND CYBERNETICS CTU IN PRAGUE

Solutions for Industry: Autonomous vehicles with AI-based features

- Service provided to the SMAUT company

- Autonomous mower control for mowing grass at photovoltaic power plants

- The vehicle platform will be fully autonomous with set of AI-based self navigation models tested and verified

- Augmenting existing machines with sensors to understand the surrounding environmnets and recognition of objects

- Automated mapping processes incl. map updating

- Data and AI integration and testing

- **Multi-agent approach – the digital twins are enhanced by communication modules which enable targeted communication and negotiations**

  - Each machine, coveyor, autonomous carriage, but also semiproduct is represented by an agent, the agents communicate in the virtual space, make decision which is then physically implemented

  - Enables dynamic scheduling and fast system reconfiguration: scheduling system for **Airbus Industries** assembling lines, integration of 5 robots from different vendors for **Blumenbecker,**

  - Excellent for integration with **Virtual Reality systems**

**CZECH INSTITUTE
OF INFORMATICS
ROBOTICS AND
CYBERNETICS
CTU IN PRAGUE**

ROBOPROX Project

Robotics and Advanced Industrial Production

- **OP JAK** project Supported by MEYS with **467,9 mil. CZK (18,7 mil. EUR)** of eligibility costs (06/2023-06/2028)
- 4 University partners – CTU, BUT, VSB-TUO, ZCU/UWB
- CTU-wide collaboration: 4 faculties and 2 institutes (FEE, FME, FCE, FIT, IEAP, CIIRC CTU as the project coordinator)
- ROBOPROX focuses on the use of algorithms and optimization methods in areas of
  - production and logistics planning, energy efficiency,
  - flexible deployment of robots with a high degree of autonomy,
  - safe human-robot collaboration in a limited workspace and the use of drones,
  - Interdisciplinary research combining optimization, systems theory, and materials engineering for modular design and surface engineering.

18 Research groups

13 Research areas

180 Researchers

ELLIOT Project

ELLIOT – European Large Open Multi-Modal Foundation Models For Robust Generalization On Arbitrary Data Streams (July 2025 – June 2029)

- ELLIOT will build open, trustworthy and general-purpose Multimodal Foundation Models with strong generalization and reasoning, for real-world, data-rich applications.

- Leveraging Europe's world-class HPC infrastructure and the open science values of the ELLIS - *European Laboratory for Learning and Intelligent Systems* community (CIIRC hosts ELLIS Unit Prague).

- **CIIRC CTU is leading several key research areas, incl. robot perception, AI safety, and will contribute to the adaptation of models to real-world tasks.**

€25M	HE project
30	partners
12	countries

ELLIOT

ELLIOT: A New EU Flagship Project to Develop the Next-Generation of Multimodal Generalist Foundation Models

Funded by the European Union

CZECH INSTITUTE
OF INFORMATICS
ROBOTICS AND
CYBERNETICS
CTU IN PRAGUE

CLARA - Center for Artificial Intelligence and Quantum Computing in System Brain Research – Total Budget 43 mil EUR

- **CLARA strives to address the grand challenge of vitality and longevity of neurons**

What are the necessary and sufficient conditions to maintain optimal function, vitality and **longevity of a neuron to exceed 100 years**?

- **CLARA Testbed - Innovative distributed hybrid computing infrastructure connected to EuroHPC supercomputers and quantum computers**
- **Pilotní use-case - testing hypotheses of optimal brain performance associated with the cellular calcium signaling cascade**
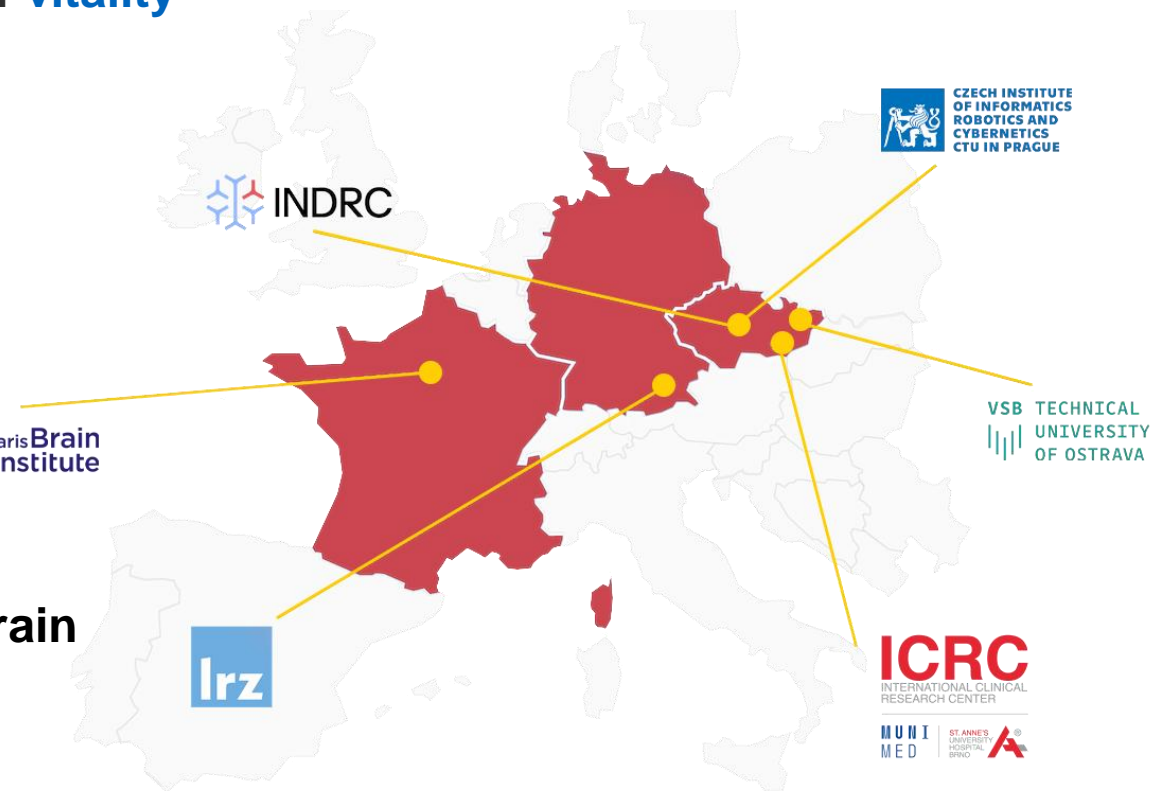
National Center for Industry 4.0

Open industry-academia ecosystem connecting innovation leaders, universities, companies and organizations whose goal is to jointly contribute to the development of Industry 4.0 in the Czech Republic.

- **61 partners** from industry, academia, innovation entities and professional media

- **Main pillars**: technological visions, support for education, awareness-raising activites, development of collaborative projects

- Helping Czech manufacturing companies with **assessing their digital maturity** and defining their digital strategy

- **A platform for a broad education on technological possibilities**: national events, regional professional conferences, technological workshops, educational events

- Close connection with the **RICAIP testbed network and national and international initiatives** (EDIH, TEF AI-MATTERS, EIT Manufacturing, GAIA-X)

International Cooperation – 2022 and 2023

- **Marik Institute of Artificial Intelligence, Robotics, and Cybernetics** was laid in Jaipur, India, at NIMS University, modeled after CIIRC, officially announced in 2023, opened on April, 2025.

- **EU-US workshop on Intelligent Manufacturing** supported by NSF – with leading US research bodies

- Through the **INPACE** project, CIIRC is involved in actively supporting the implementation of the Digital Partnership policy with Japan, the Republic of Korea, Singapore, and India by creating a **sustainable Indo-Pacific European hub.**

- **Memorandum of Understanding** with Tunghai University in Taiwan.

Recommendations from the previous evaluation

1. Applied Research Projects (Sections 3.2 – 3.4)
2. Applied Research Results (Sections 3.5 – 3.6)
3. Cooperation with the Non-Academic Environment and Technology Transfer (Sections 3.7 – 3.9)
4. Recognition by the Scientific Community (Sections 3.10 – 3.11)
5. Popularisation of R&D&I (Section 3.12)
6. Additional Recommendations

CZECH INSTITUTE OF INFORMATICS ROBOTICS AND CYBERNETICS CTU IN PRAGUE

1. Applied Research Projects (Sections 3.2 – 3.4)

"Difficult to say too much about applied and contract research income other than keeping up the good work. Perhaps licensing income could be looked at again. It just seems that with so much research going on there should be more licensing money obtainable."

The SW licensing is still a quite difficult task in the Czech conditions. We were successful just in 3 cases up to now. We do continue in our efforts.

CZECH INSTITUTE
OF INFORMATICS
ROBOTICS AND
CYBERNETICS
CTU IN PRAGUE

"It would have been nice to see 5 returns in section 3.6 in the first instance. Given the research projects ongoing, we felt that there would be 2 further projects that would qualify and indeed there were. Clearly it would be good to make sure there are 5 ready for the next assessment. Industrial collaboration was evident."

It has been difficult to select 10 best returns form a set of tens of them.

3. Cooperation with the Non-Academic Environment and Technology Transfer (Sections 3.7 – 3.9)

"It would be nice to see a range of examples of successful implementation in section 3.9."

CIIRC CTU has significantly strengthened its role as a national and international leader in industry collaboration through its transfer centers:

- **Centre for Industry 4.0**
- **Centre for Construction 4.0**
- **Centre of the City of the Future**
- **RICAIP Testbed Prague** (cooperating with other testbeds such as RICAIP Testbed Brno and CPIT TL3 at Technical University of Ostrava and tens of other labs through projects such as AI-MATTERS, AIRISE…)
- **RICAIP Centre of Excellence**, which connects Czech testbeds with German research facilities (DFKI and ZeMA).

CZECH INSTITUTE
OF INFORMATICS
ROBOTICS AND
CYBERNETICS
CTU IN PRAGUE

"Very high standard achieved in this section. Good to see that eventually all the slots were filled."

To summarize: After 5 years, there are not enough slots for listing all the high-quality awards and achievements.

5. Popularisation of R&D&I (Section 3.12)

"Whilst events involving the unit have been very well orchestrated, media reports and appearances (TV/radio/magazines/newspapers) were initially absent from the submission, which was a great shame. For the unit such output means better awareness by the public (incl. politicians) of the research being performed by the unit. Additionally, it is important to have other activities such as open days for the public to visit, meeting the staff etc. This is useful for attracting young scholars from schools and high schools and can be an effective tool to gain appropriate young professionals."

Over the past period, we have significantly expanded our media presence across TV, radio, newspapers, and online platforms, ensuring that our research and innovations reach broader audiences beyond academia and industry. Researchers actively participate in public discussions, media interviews, and outreach programs, providing insights into emerging technologies such as artificial intelligence. Throughout 2019 – 2023, there were almost 7000 articles about CIIRC CTU, its activities and research published in the media.

Additionally, we have actively organized open days, public lectures, and outreach activities.

CZECH INSTITUTE
OF INFORMATICS
ROBOTICS AND
CYBERNETICS
CTU IN PRAGUE

6. Addressing Additional Recommendations

Student Engagement

CIIRC CTU actively involves students from an early stage in their academic journey. Several examples are described in detail in section 3.6, other include student involvement into research through their semestral, bachelor or master thesis at CIIRC labs.

Scientific Cooperation with European Institutions

CIIRC CTU has established itself as a key player in European research collaborations

Interdisciplinary Activities

CIIRC CTU fosters interdisciplinary collaboration across research domains, e.g. participation in **TAH (Technologies, Art, Humanities) Innovation Centre** since 2023. Strong cooperation with **Karel Čapek Center.**

PhD Program Development

A dedicated PhD program has been a long-term strategic goal of CIIRC CTU. In 2024, significant progress was achieved through collaboration with the **Faculty of Electrical Engineering of CTU**. CIIRC is now a **Training Department**, offering top-tier education and research opportunities in informatics, robotics, cybernetics, and bioengineering.

CZECH INSTITUTE OF INFORMATICS ROBOTICS AND CYBERNETICS CTU IN PRAGUE

PhD @ CIIRC

- **Success: CIIRC became a PhD-training workplace of FEE (8 Mar 2024)**
  - **3** study programs
    - Computer Science
    - Cybernetics and Robotics
    - Bioengineering
      - Full responsibility for the supervision and quality control
      - Representation on study program boards
  - **20** supervisors & **30** students
  - **5** students defended in 2024/2025 (2 more expected in 2025)
  - **7** (2024) + **9** (2025) new students
- **Supervision/co-supervision of students elsewhere**
  - CTU (20), UOCHB (2), CUNI (1), TU Delft (5), RU Nijmegen (2), ETH (1), INRIA/ENS (1), JKU Linz (1), U of Innsbruck (1), U of Tübingen (1), Politecnico di Torino (1), U of Ostrava (1)
  - Defended 24/25: 4 Delft, 1 INRIA, 1 Chalmers U, 1 NTU Athens
- **The main challenge**
  - All supervisors must have a habilitation
    - motivate (new CIIRC bylaws: tenure requires habilitation)
    - improve the habilitation process (CTU Internal Evaluation Board)
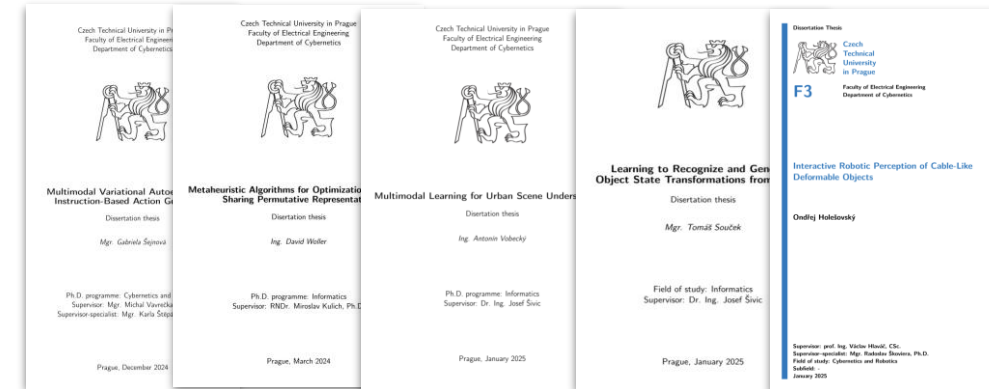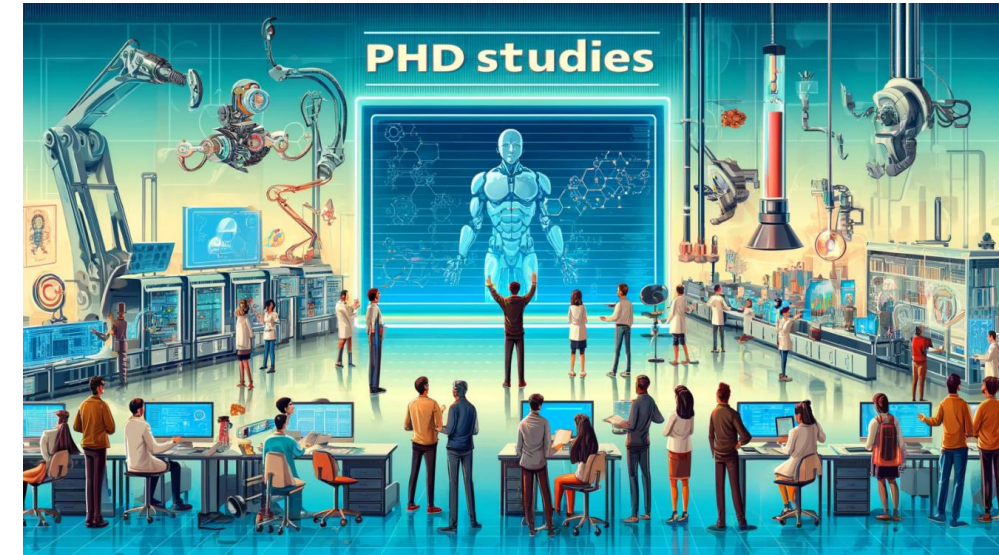
CZECH INSTITUTE
OF INFORMATICS
ROBOTICS AND
CYBERNETICS
CTU IN PRAGUE

Structure of the Talk

1. Introduction
2. Activity Pillars
3. Building an AI Ecosystem
4. Excellence – Selected Highlights
5. Key Projects & Selected Results
6. Addressing Recommendations
7. **CIIRC Strategic Visions**

CZECH INSTITUTE
OF INFORMATICS
ROBOTICS AND
CYBERNETICS
CTU IN PRAGUE

Strategic Goals

- Maintain and strengthen CIIRC's position as a **premier research and experimental center for intelligent manufacturing.**

- Further establish CIIRC as a **leading European AI research center**, advancing fundamental research and technological breakthroughs.

- Support economic and societal **transformation in Czechia and Europe via AI applications and infrastructure**, contributing to national and EU strategies.

- Enhance **diagnostics and treatment for neurodegenerative diseases** (e.g., Alzheimer's, Parkinson's) via AI, in collaboration with Paris Brain Institute, Mayo Clinic, and Leibniz Supercomputing Center (CLARA initiative).

Thank you for your attention!

www.ciirc.cvut.cz

@CIIRCCTU   @CIIRCCTU   CIIRC