IMEKO

IMEKO International Measurement Confederation

Technical Committee TC10 Technical Diagnostics

MTA SZTAKI
Hungarian Academy of Sciences
Computer and Automation Research Institute

15th IMEKO TC10 Workshop on Technical Diagnostics: "Technical Diagnostics in Cyber-Physical Era" to be held in Budapest, Hungary, on June 6-7, 2017.

Opening Ceremony

Dr. Zsolt János VIHAROS

Senior research fellow, Institute for Computer Science and Control of the Hungarian Academy of Sciences

President of the Hungarian Member Organisation of IMEKO

Scientific secretary, IMEKO TC10 on Technical Diagnostics

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About **IMEKO**
International Measurement Confederation

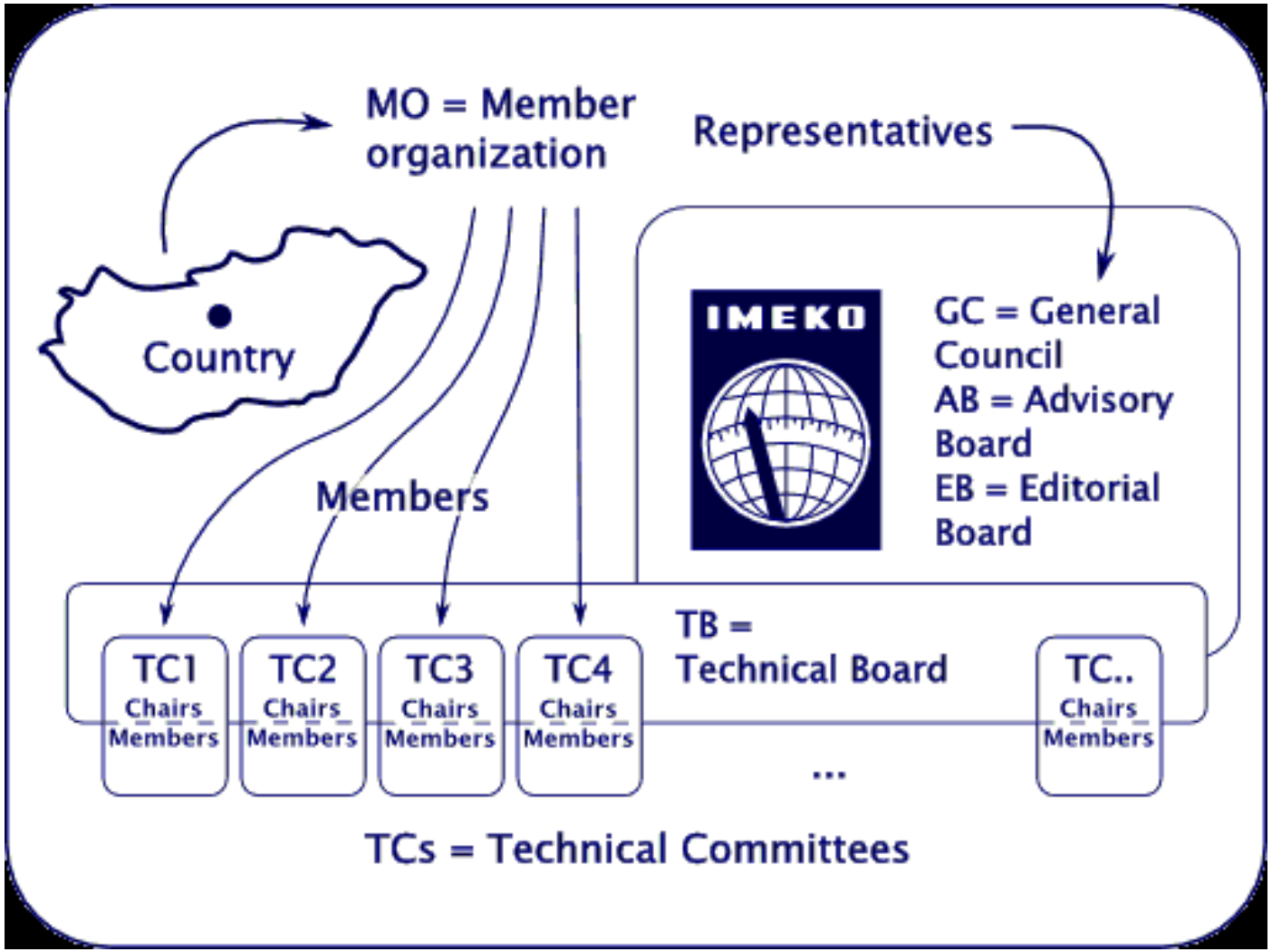
IMEKO is a **non-governmental federation** of **40 Member Organizations** individually concerned with the ***advancement of measurement technology***. Its fundamental objectives are the promotion of

- international **interchange of scientific and technical information**
- in the field of **measurement and instrumentation** and
- the enhancement of **international co-operation among scientists and engineers from research and industry**.

Founded in
1958
Budapest
Hungary

Hungary is hosting the secretariat

About **IMEKO**
International Measurement Confederation



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About **IMEKO**
International Measurement Confederation

- TC1 Education and Training in Measurement and Instrumentation (established in: 1967)
- TC2 Photonics (established in 1962)
- TC3 Measurement of Force, Mass and Torque (1967-1998: Measurement of Force and Mass)
- TC4 Measurement of Electrical Quantities (established in 1984)
- TC5 Hardness Measurement (established in 1973)
- TC6 Vocabulary Committee (activity suspended)
- TC7 Measurement Science (1975-1993: Measurement Theory)
- TC8 Traceability in Metrology (established in 1972)
- TC9 Flow Measurement (established in 1976)
- TC10 Technical Diagnostics (established in 1976)
- TC11 Metrological Infrastructures (1976-1994: Metrological Requirements for Developing Countries)
- TC12 Temperature and Thermal Measurements (established in 1979)
- TC13 Measurements in Biology and Medicine (established in 1980)
- TC14 Measurement of Geometrical Quantities (established in 1980)
- TC15 Experimental Mechanics (established in 1984)
- TC16 Pressure and Vacuum Measurement (established in 1986)
- TC17 Measurement in Robotics (established in 1987)
- TC18 Measurement of Human Functions (established in 1998)
- TC19 Environmental Measurements (established in 1999)
- TC20 Measurements of Energy and Related Quantities (1999 - 2010: Measurement Techniques for the Construction Industry, 2010 - 2015: Energy Measurement)
- TC21 Mathematical Tools for Measurements (established in 2004)
- TC22 Vibration Measurement (established in 2005)
- TC23 Metrology in Food and Nutrition (established in 2006)
- TC24 Chemical Measurements (established in 2008)

IMEKO


TC10-Aims
www.imeko.org/index.php/tc10-homepage/aims-tc10
IMEKO TC1 TC2 TC3 TC4 TC5 TC7 TC8 TC9 TC10 TC11 TC12 TC13 TC14 TC15 TC16 TC17 TC18 TC19 TC20 TC21 TC22 TC23 TC24
IMEKO
International Measurement Confederation
Technical Committee TC10
Technical Diagnostics
You are here: IMEKO ▸ TC10 ▸ Aims & Objectives
TC10
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Aims & Objectives
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TC10 - Technical Diagnostics - Objectives
Objectives of IMEKO TC10 are to facilitate the exchange of scientific and technical information on diagnostic methods, instrumentation and systems by organizing symposia, discussion meetings and encouraging the publication of technical papers. Also, the co-operation between scientists and engineers in different subject areas in solving various technical and biomedical diagnostic problems is supported.
Keywords:
Electrical and mechanical systems;
Non-destructing, non-invasive testing using innovative sensor and signal processing concepts;
Signal and model based techniques;
Fuzzy- or AI-techniques, if no modeling is possible;
Automatic decisions, supervised by human experts;
Unified diagnostic methods and components of diagnostic systems.
Safe and reliable operation of complex systems
Contact
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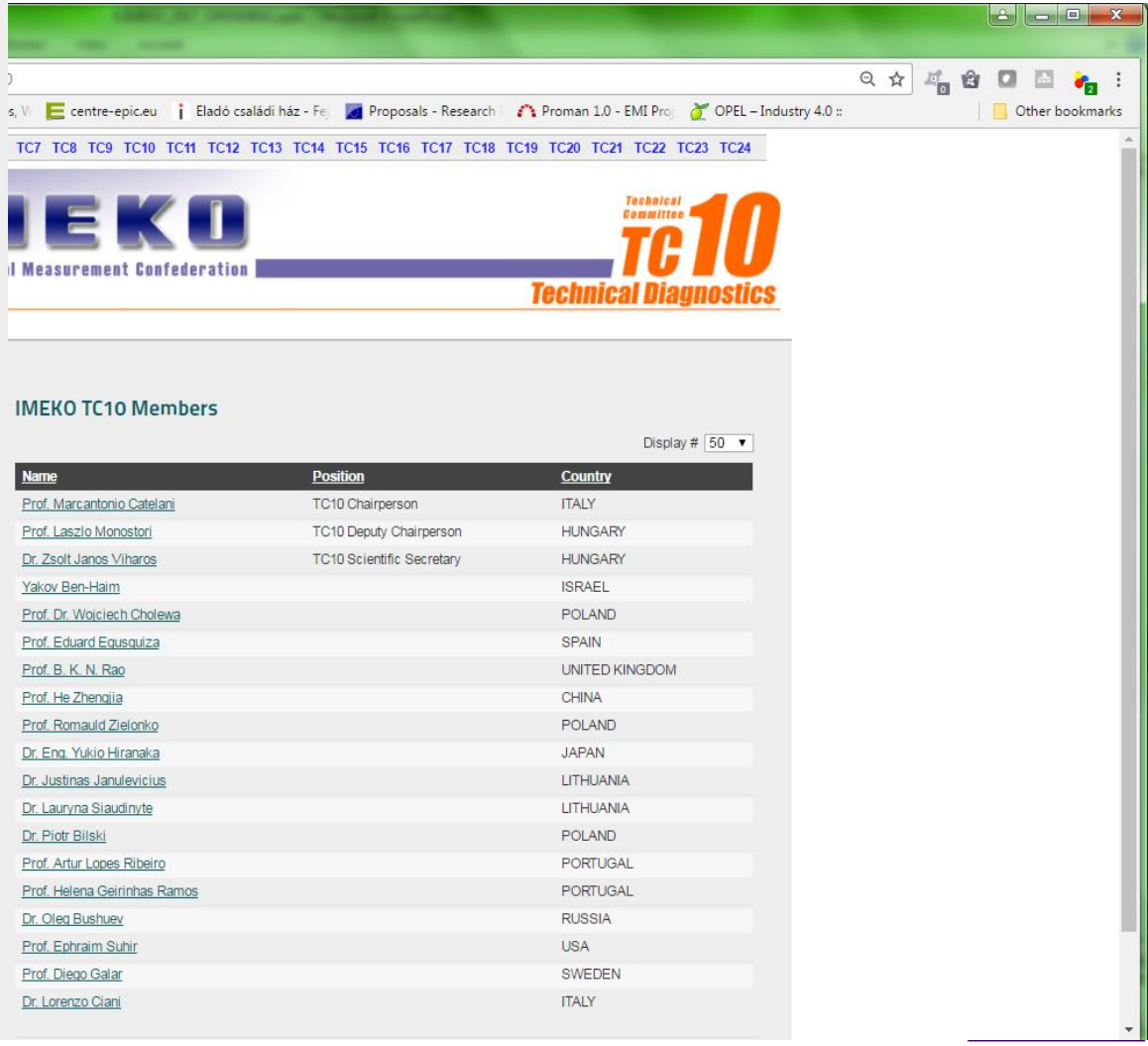
centre-epic.eu
Eladó családi ház - Fe
Proposals - Research
Proman 1.0 - EMI Pro
OPEL – Industry 4.0 ::
Other bookmarks
TC7 TC8 TC9 TC10 TC11 TC12 TC13 TC14 TC15 TC16 TC17 TC18 TC19 TC20 TC21 TC22 TC23 TC24
Technical Committee TC10
Technical Diagnostics
IMEKO TC10 Members
Display # 50
Name | Position | Country
Prof. Marcantonio Catelani | TC10 Chairperson | ITALY
Prof. Laszlo Monostori | TC10 Deputy Chairperson | HUNGARY
Dr. Zsolt Janos Viharos | TC10 Scientific Secretary | HUNGARY
Yakov Ben-Haim | | ISRAEL
Prof. Dr. Wojciech Cholewa | | POLAND
Prof. Eduard Egusquiza | | SPAIN
Prof. B. K. N. Rao | | UNITED KINGDOM
Prof. He Zhengjia | | CHINA
Prof. Romauld Zielonko | | POLAND
Dr. Eng. Yukio Hiranaka | | JAPAN
Dr. Justinas Janulevicius | | LITHUANIA
Dr. Lauryna Siaudinyte | | LITHUANIA
Dr. Piotr Bilski | | POLAND
Prof. Artur Lopes Ribeiro | | PORTUGAL
Prof. Helena Geirinhas Ramos | | PORTUGAL
Dr. Oleg Bushuev | | RUSSIA
Prof. Ephraim Suhir | | USA
Prof. Diego Galar | | SWEDEN
Dr. Lorenzo Ciani | | ITALY

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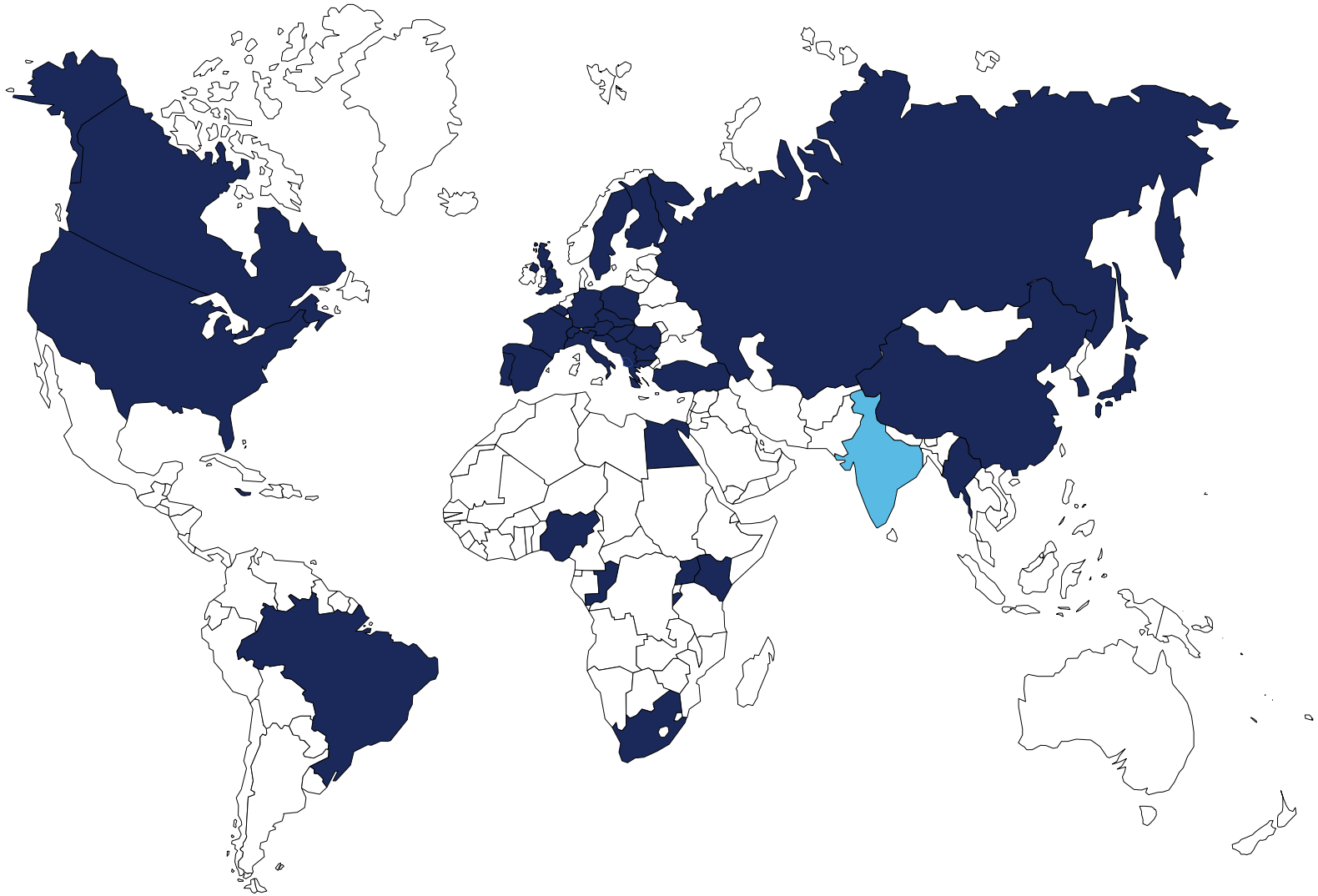

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Organisers & Sponsors

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Institute for Computer Science and Control

CENTRE OF EXCELLENCE EPIC
Production Informatics and Control

Sponsored by

aq ANTON

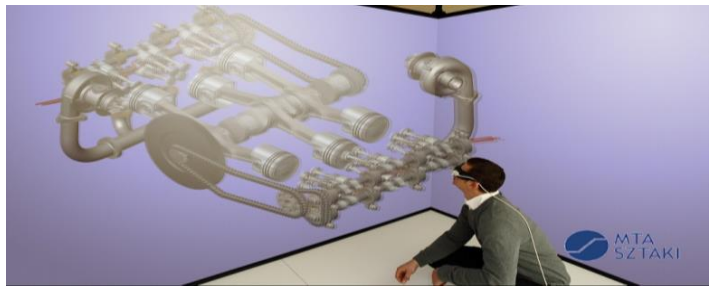
OPEL

IMEKO

Institute for Computer Science and Control
The organizer Institute

- Established in 1964
- EU **Centre of Excellence in IT**, Computer Science and Control
- **Basic** and **applied** research
- **Contract-based R&Đ&I** activity mainly on complex systems, turnkey realizations
- Transferring **up-to-date results to industry and universities**

- **Basic research**
  - Computer science
  - Systems- and control theory
  - Engineering and business intelligence
  - Machine perception and human-computer interaction
- **Applied research and innovation**
  - Vehicles and transportation systems
  - Production informatics and logistics
  - Energy and sustainable development
  - Security and surveillance
  - Networking systems and services, distributed computing



Institute for Computer Science and Control
The organizer Institute

MTA SZTAKI
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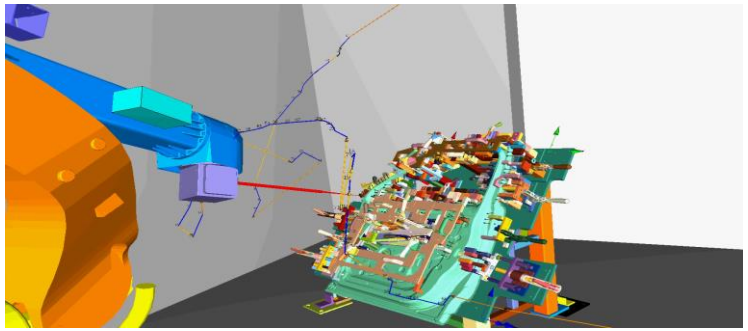
Key figures

- **Budget**
  - ~10 MEuros/year
  - ~30% basic funding
- **Staff**
  - 220
- **International reputation**
  - CIRP
  - IFAC
  - IEEE
  - **IMEKO**
  - acatech
  - KVAB
  - 45 EU VII projects
  - 12 H2020 projects

- **Basic research**
  - Computer science
  - Systems- and control theory
  - Engineering and business intelligence
  - Machine perception and human-computer interaction
- **Applied research and innovation**
  - Vehicles and transportation systems
  - Production informatics and logistics
  - Energy and sustainable development
  - Security and surveillance
  - Networking systems and services, distributed computing



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Laboratory on Engineering and Management Intelligence (EMI)

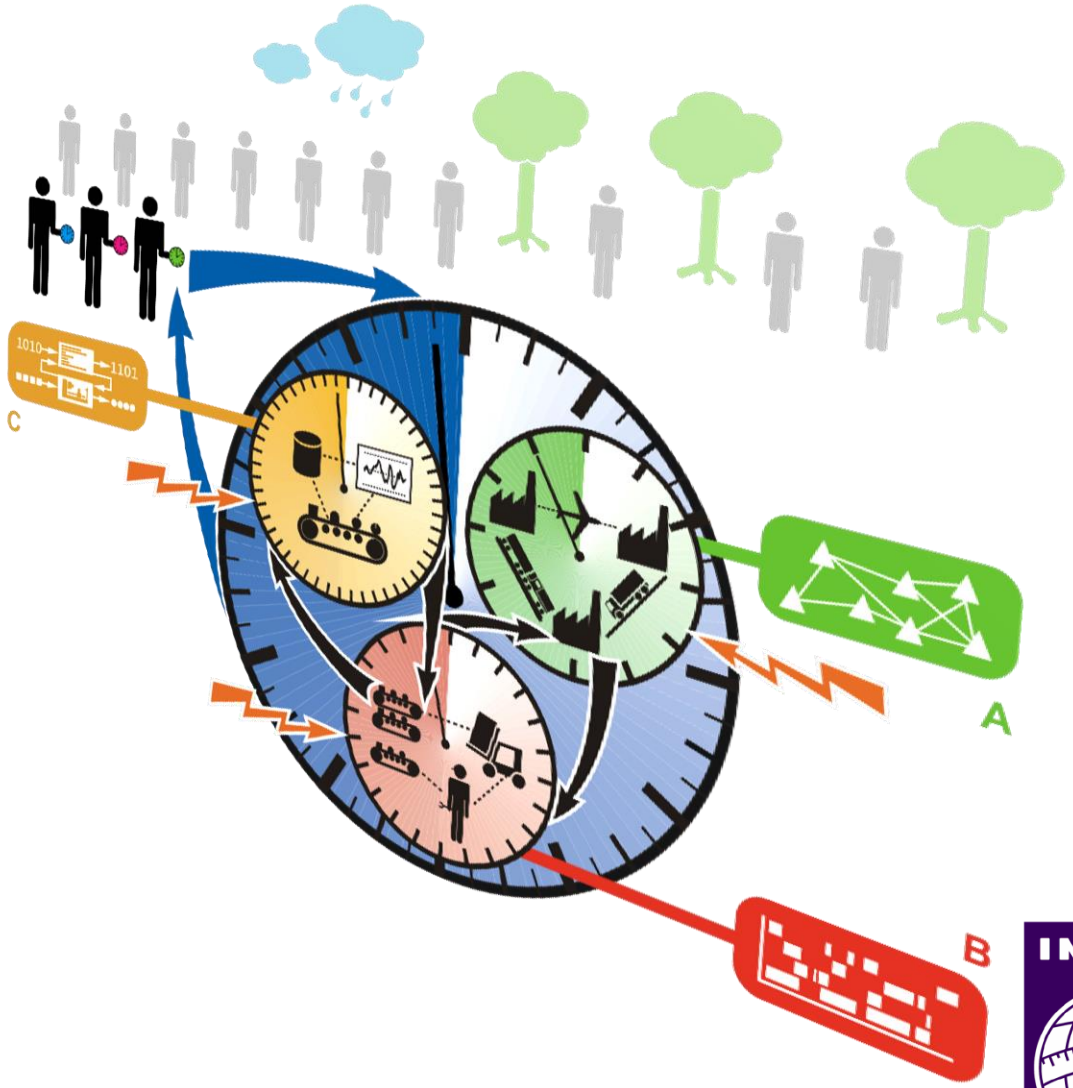
R&D&I areas

- Operation Research
- Modelling, prediction, control and optimization of technical and business processes
- Simulation of large technical and business systems, Digital Factories
- Virtual enterprises and production networks
- Technological process planning
- Production planning and scheduling
- Advanced robotics and mechanisms
- Sustainable, smart energy systems
- Production and logistics, Product service systems

Staff

- ~45 including researchers, engineers, PhD and MSc students and administration
  - 40% with PhD

https://www.sztaki.hu/en/science/departments/emi



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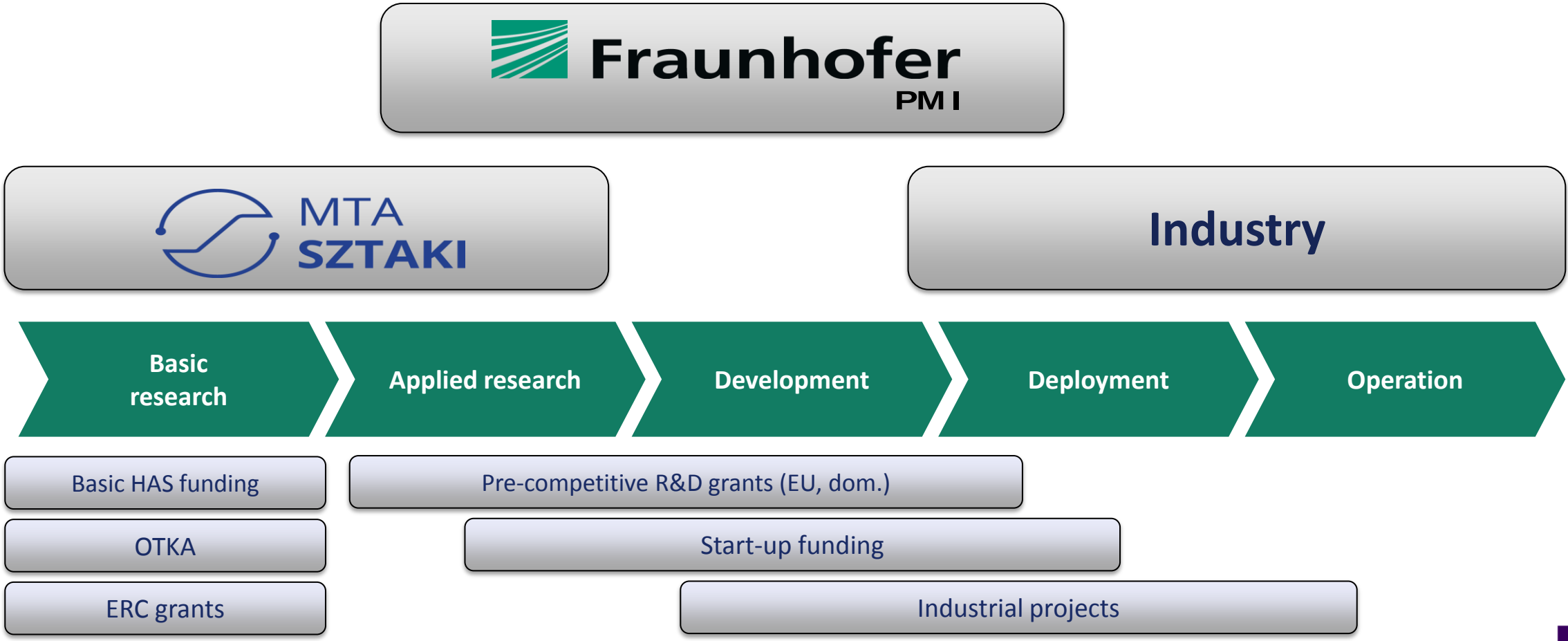
Research competences

- Discrete optimization
- Scheduling theory
- Planning theory
  - Process planning
  - Production planning
  - Supply planning, cooperative planning
- Robotics and mechanisms
- Machine learning
  - Statistical machine learning, time-series
  - Intelligent process analysis by sub-symbolic methods
- Discrete-event simulation
- Computer-aided engineering
  - Object recognition in 3D and 2D point clouds

IMEKO

Establishment of the FhG PMI project centre in 2010



Industrial solutions and services of PMI PC

Production Planning & Scheduling

- Advanced production scheduling
- Workforce scheduling system
- Maintenance scheduling
- Production planning

Production Network Management

- Supplier collaboration
- Logistics Platform™
- Dynamic supply loops

Logistics & Inventory Management

- Production logistics
- Warehouse operation mgmt.
- Storage assignment
- Logistics Platform™
- Tracking & Tracing

Manufacturing Execution Systems

- Development of MES cockpit systems (Digital Dispatcher)
- Real-time decision support (Integrated simulation support for MES)

Digital Factory & Lean Solutions

- Process analysis and modelling
- Data-mining
- Production & logistics simulation
- Lean prod. systems and tools

Diagnosis and Maintenance

- Reliability focused design, operation and maintenance of manufacturing and energy systems
- Supporting early recognition of failures

Main customers and industrial partners

Automotive		Electronics	Engineering & Logistics	Energy
• Audi Hungária	• Continental	■ GE Lighting	■ Aventics	■ GE Energy
• Daimler	• Denso	■ Robert Bosch	■ **Anton**	■ Hitachi
• **Opel**	• Knorr-Bremse	■ Hitachi	■ FESTO	■ Gamesa
• Suzuki	• Robert Bosch		■ BPW	■ E.ON

IMEKO

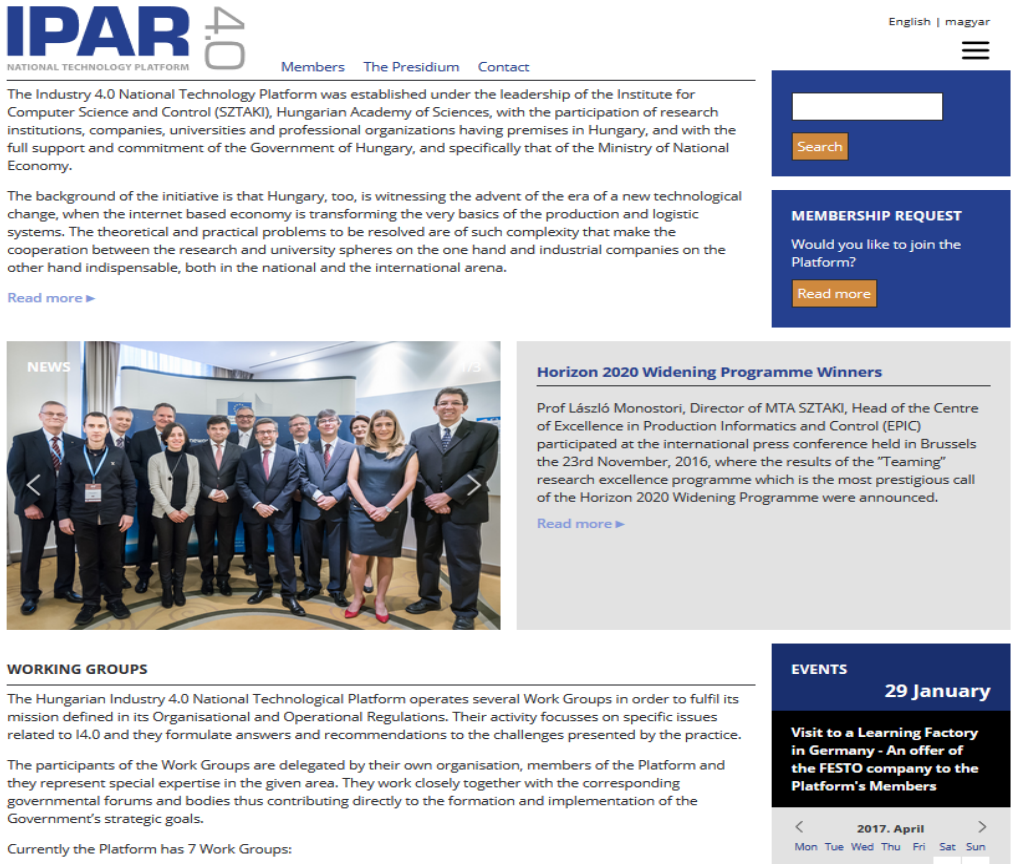
Industry 4.0 National Technology Platform

Membership:

- SZTAKI and the Ministry for National Economy, and 37 founding members
- 26 organisations have joined since
- 27 organisations waiting for getting admitted

Organisation:

- Presidium headed by SZTAKI
- 7 Working Groups
  - Strategic Planning
  - Employment, Education and Training
  - Production and Logistics
  - ICT Technologies (safety, reference architectures, standards)
  - Industry 4.0 Cyber-Physical Pilot Systems
  - Innovation and Business Model
  - Legal Framework



iKOMP

(supporting project: VKSZ_12-1-2013-0038, http://ikomp.hu/?lang=en)

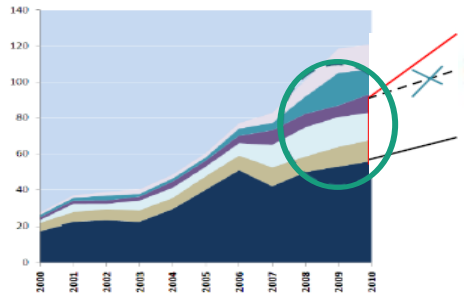
Problem description

- Highly industrialized region on the west part of Hungary with limited R&D capacity: Research and development programs related to strengthening the strategic future-oriented industries manufacturing technologies and products of regional competences carried out in comprehensive collaboration

Main Partners

- **OPEL Hungary (coord.),**
- **SZTAKI (Sci. Coord.)**, Széchenyi István University, University of West Hungary +FhA
- Delphi, jQor (Jabil), Europtec, Pylon-94, 3B Hungaria

Solution: Industry-driven R&D subprojects



Goals

- Basic research on
  - artificial and business intelligence
  - material technology solutions
  - construction solutions
- Technological competences for
  - machining segment
  - electro-technical segment
  - process-technologies
  - design-technologies
- R&D outputs with high added-value for the regional production industry
  - vehicle (electro-technical) segment
  - machining tools and equipment
  - production support solutions

iKOMP

(supporting project: VKSZ_12-1-2013-0038, http://ikomp.hu/?lang=en)

Background research activities

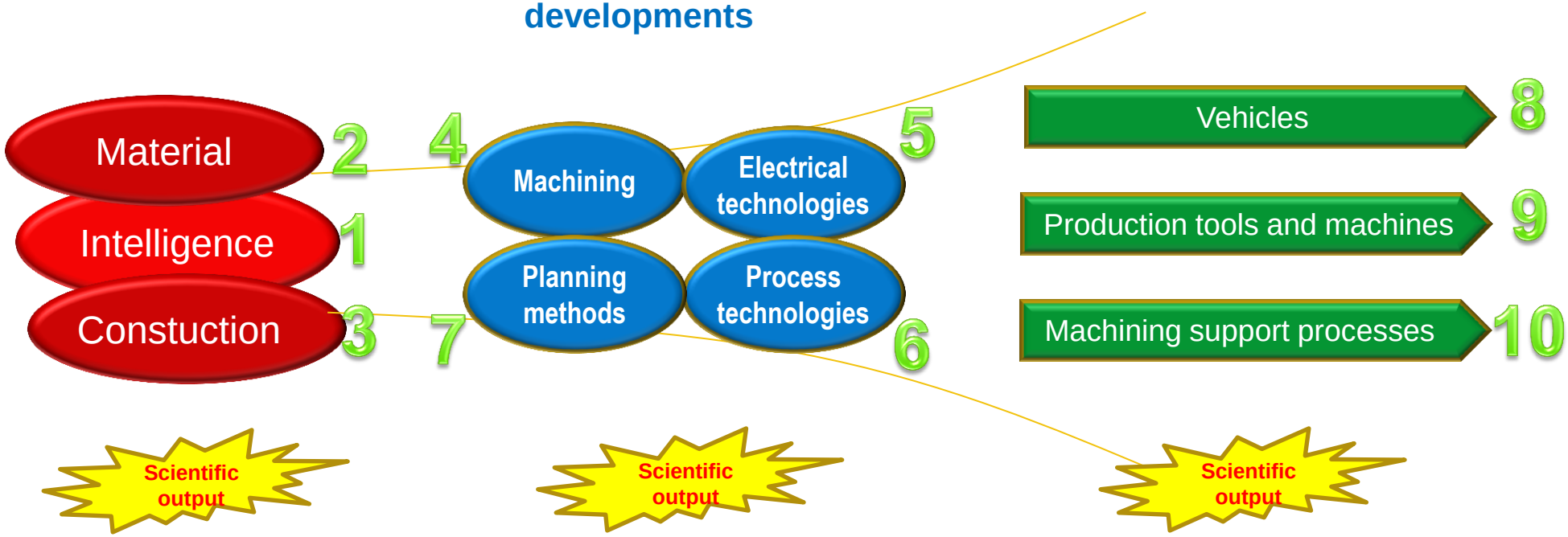
Basic- and applied research

Technological R&D competences

Applied research and experimental developments

Specific R&D competencies connected to high value products

Experimental developments



~100 scientific publications

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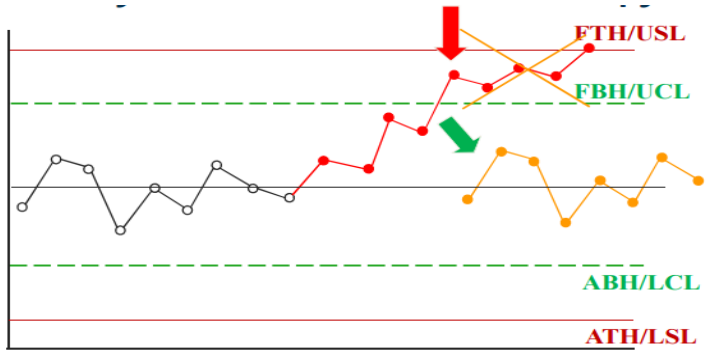
iKOMP – Scientific results: 4. Machining

(supporting project: VKSZ_12-1-2013-0038, http://ikomp.hu/?lang=en)



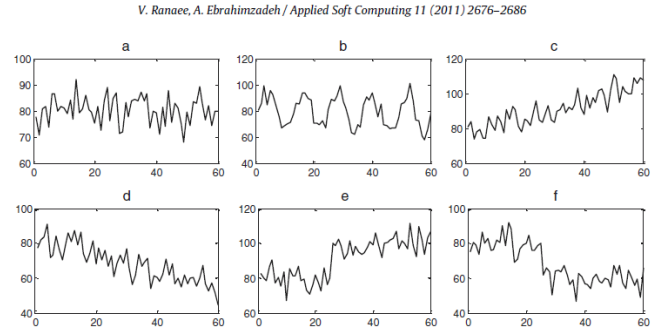
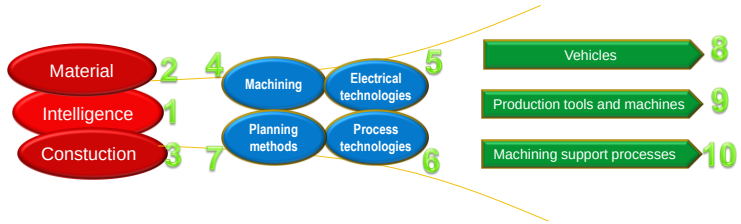
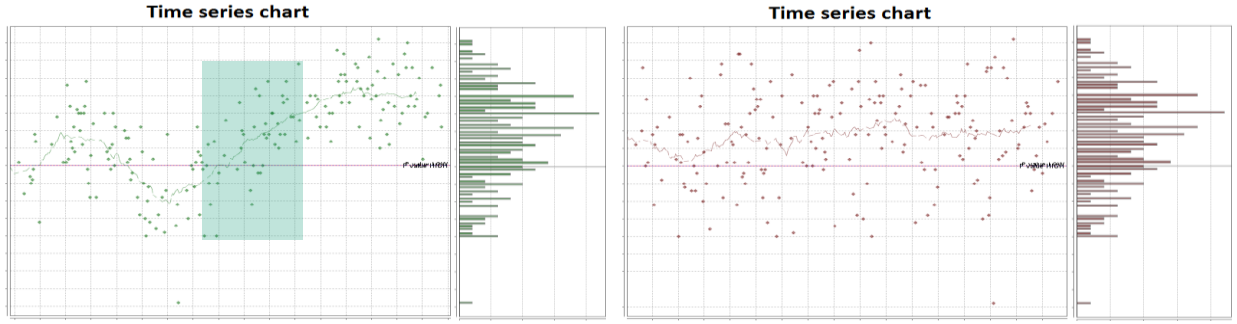
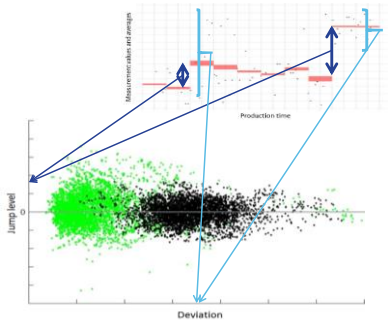
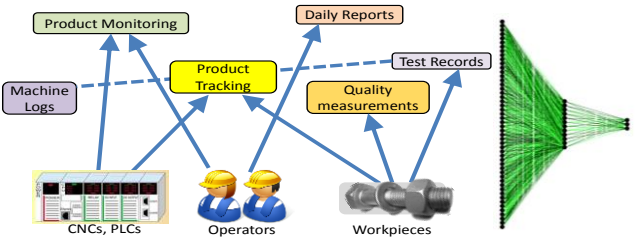


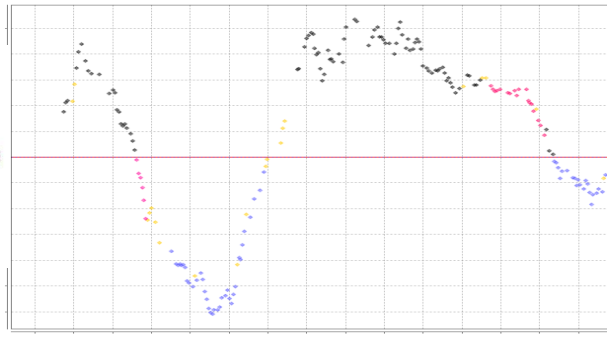
Fig. 1. Six common types of CCPs: (a) normal, (b) cyclic, (c) upward trend, (d) downward trend, (e) upward shift and (f) downward Shift.

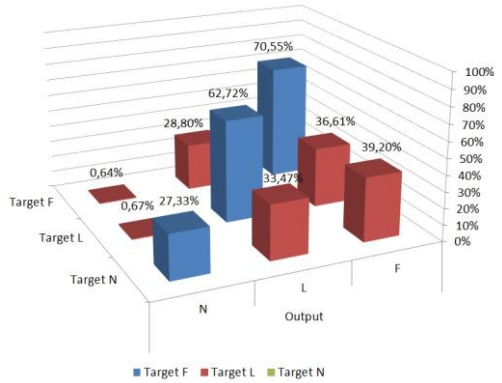












Dr. Zsolt János Viharos, Jenő Csanaki, Dr. János Nacsa, Márton Edelényi, Csaba Péntek, Krisztián Balázs Kis, Ádám Fodor, János Csempesz:

Production trend identification and forecast for shop-floor business intelligence

14th IMEKO TC10 Workshop
Technical Diagnostics
New Perspectives in Measurements, Tools and Techniques
for system's reliability, maintainability and safety

Milan, Italy, June 27-28, 2016

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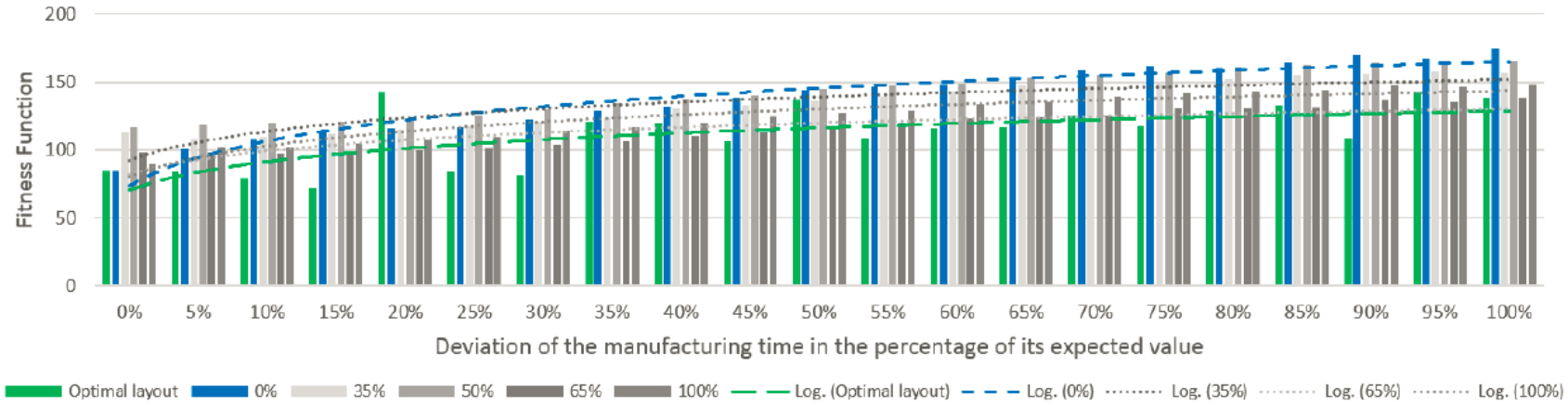
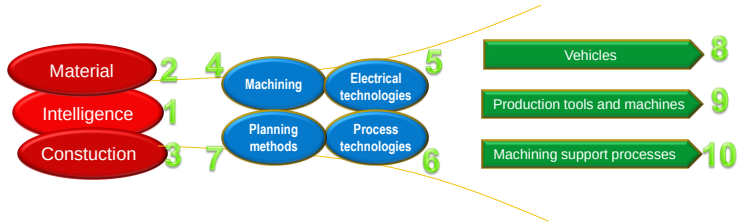
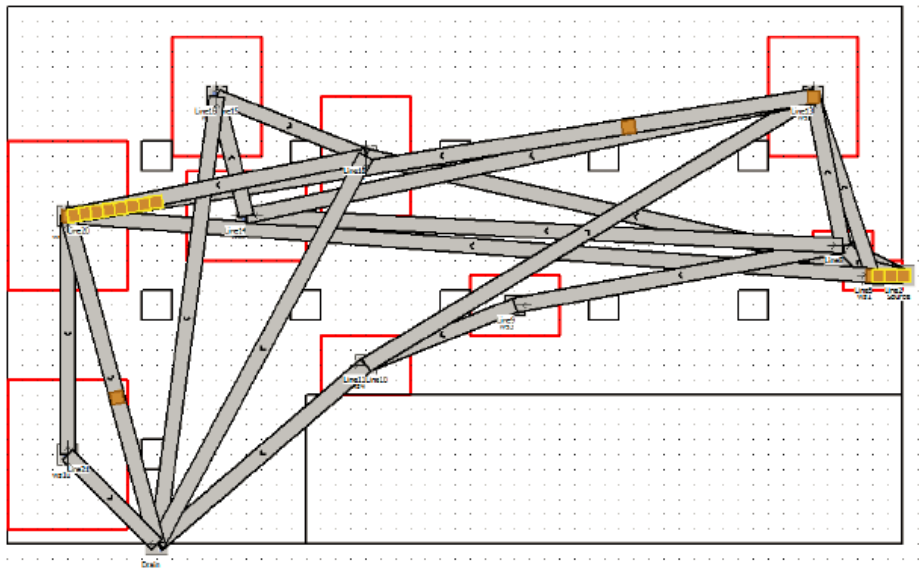
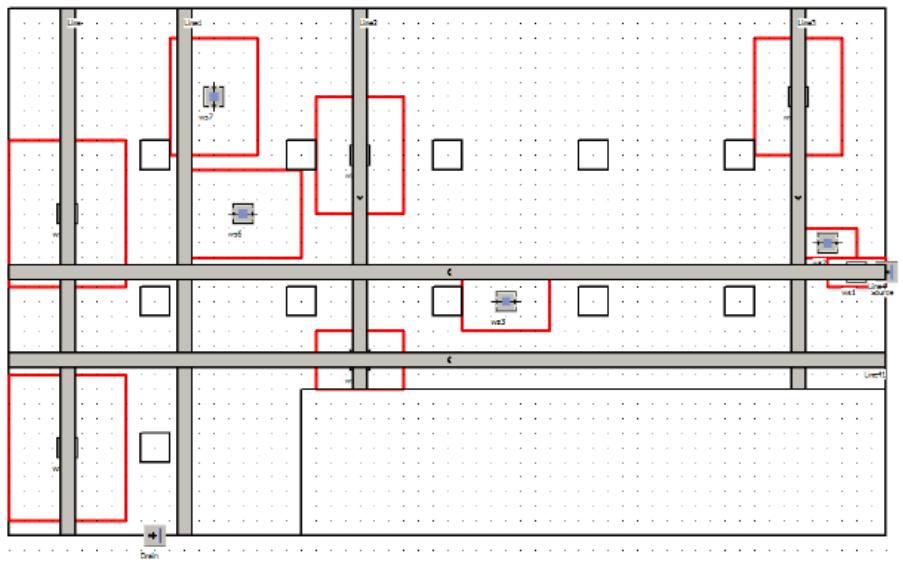
iKOMP – Scientific results: 7. Planning methods

(supporting project: VKSZ_12-1-2013-0038, http://ikomp.hu/?lang=en)









Dávid Gyulai,Ádám Szaller, Zsolt János Viharos:

Simulation-based Flexible Layout Planning Considering Stochastic Effects

49th CIRP Conference on Manufacturing Systems (CIRP-CMS 2016),
Procedia CIRP

Stuttgart, Germany, from May 25th to 27th, 2016.

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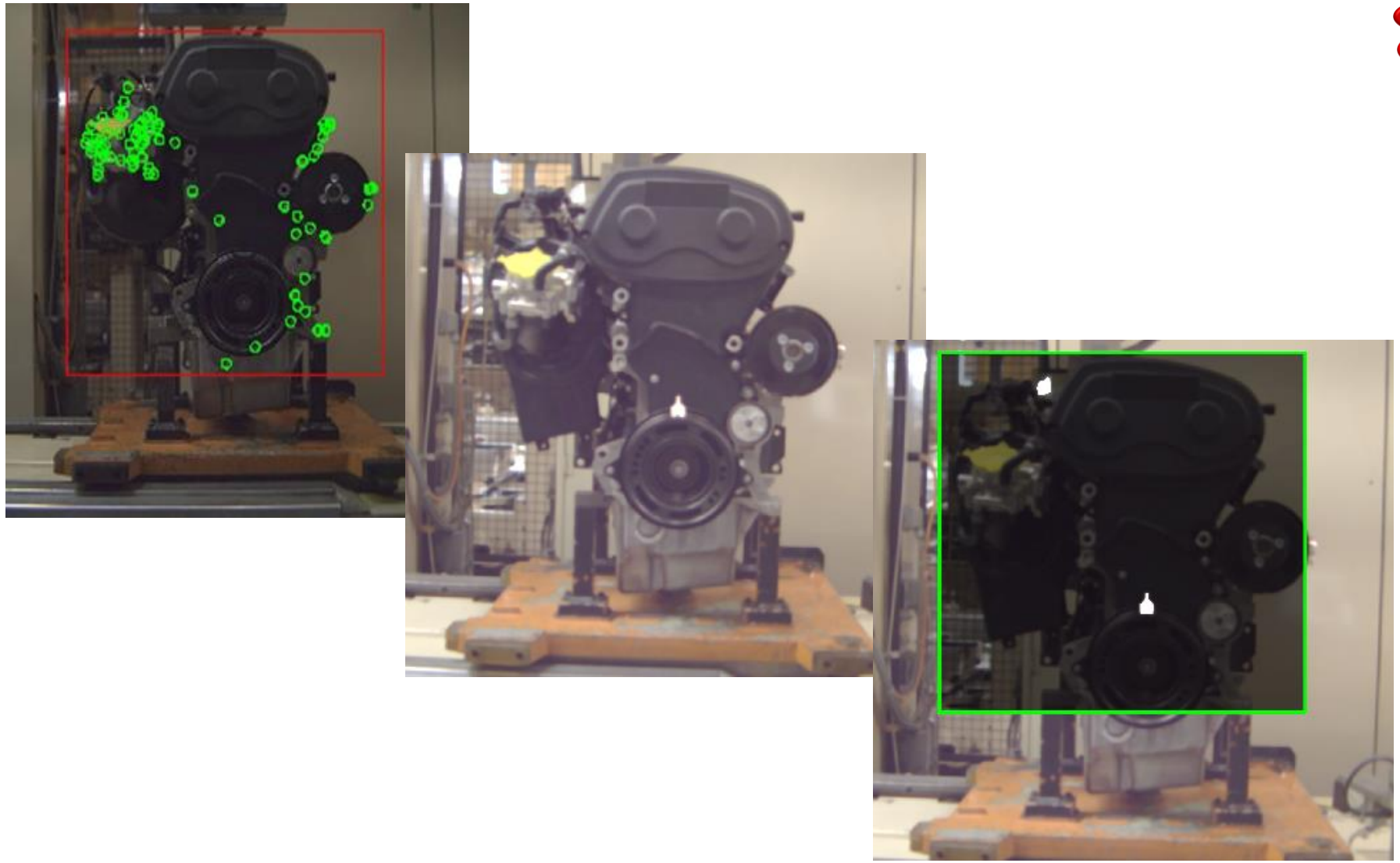
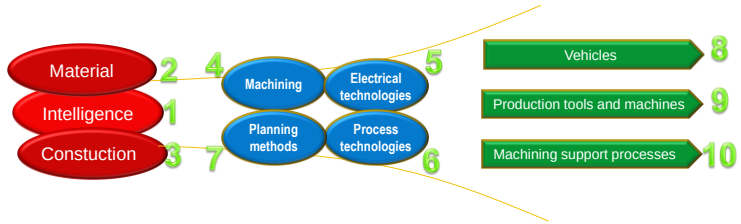
Institute for Computer Science and Control

iKOMP – Scientific results: 8. Vehicles

(supporting project: VKSZ_12-1-2013-0038, http://ikomp.hu/?lang=en)





Zs. J. Viharos, D. Chetverikov; A. Háry; R. Sághegyi; A. Barta; L. Zalányi; I. Pomozi; Sz. Soós; Zs. Kövér and B. Varjú

Vision based, statistical learning system for fault recognition in industrial assembly environment

20th IEEE International Conference on Emerging Technologies & Factory Automation

Berlin, Germany
6-9 September 2016

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Industry 4.0 Research and Innovation Centre of Excellence

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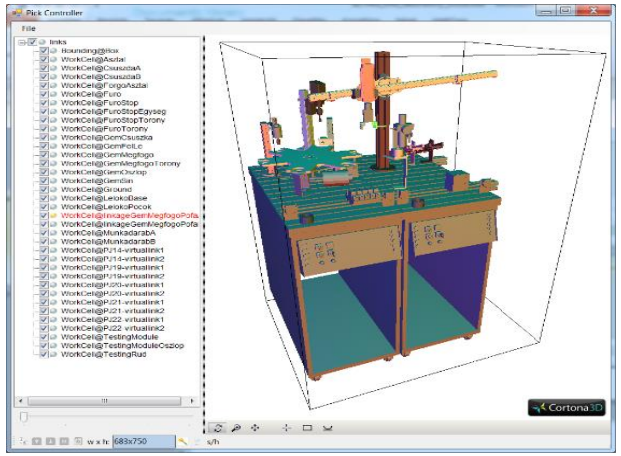
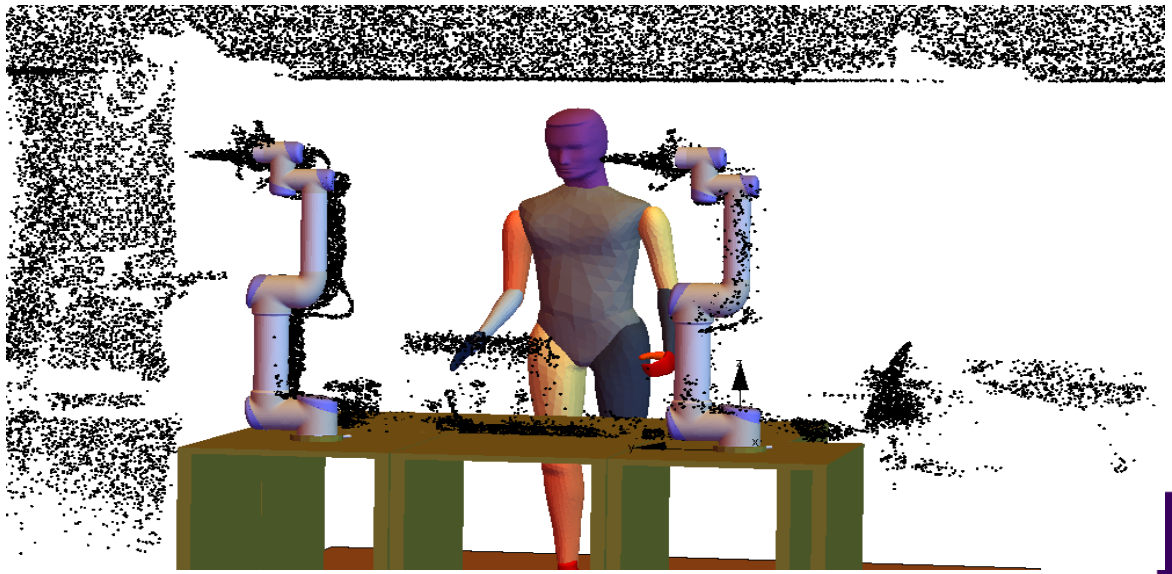
GINOP-2.3.2-15-2016-00002

Priority research fields

- Situation-aware, resource efficient and robust **production planning and control**
- Cooperative and adaptive **production and logistics networks**
- Advanced **robotics**, **human-robot** symbiosis
- Supporting ICT technologies**, cloud manufacturing**
- Industry **4.0 pilot system** for production and logistics
- **Sustainable factories** and **energy management**





CENTRE OF EXCELLENCE **EPIC**
Production Informatics and Control

European Commission

Horizon 2020
European Union funding
for Research & Innovation

IMEKO

EPIC CoE's historical background

2002: Virtual institute with FhG IPA

EPIC CoE

EPIC Ltd.
MTA SZTAKI
Fraunhofer IPA, IPT, IPK, Fraunhofer Austria
BME GPK, KJK

Fraunhofer-SZTAKI PMI
MTA SZTAKI
Fraunhofer IPA, Fraunhofer Austria

SZTAKI CoE

Upgraded SZTAKI CoE

2001 … 2010 … 2014 2015 2016 2017 2018 2019 2020 2021 2022 2023 2024

EPIC Phase 1

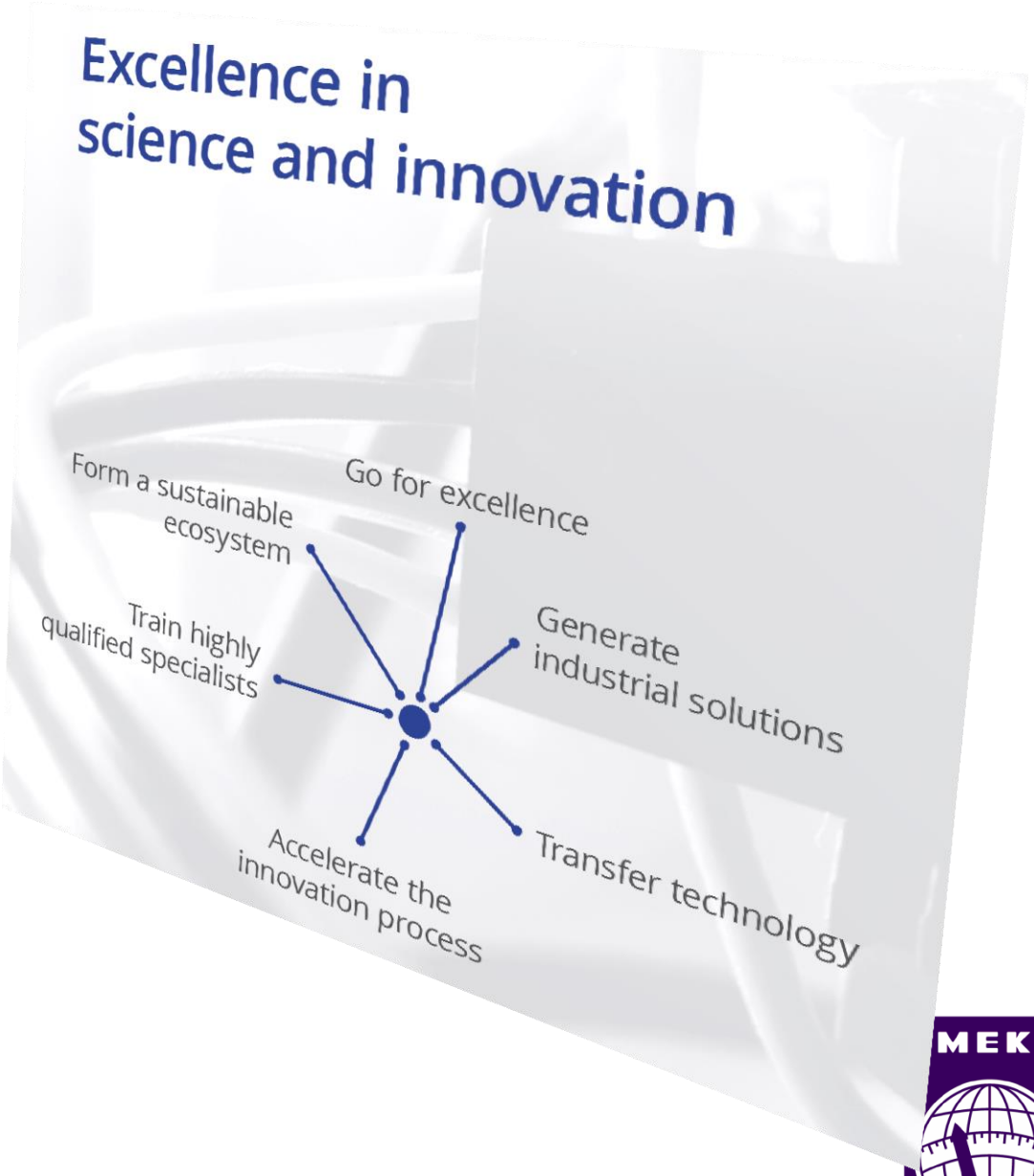
EPIC H2020 Teaming Project

2001: EU CoE

2010: PMI, Project Centre

Goals of the EPIC project

The **overarching goal** of the project is to establish the **Centre of Excellence in Production Informatics and Control (EPIC CoE)** as a leading, internationally acknowledged and sustainable focus point in its field representing **excellence in research, development and innovation related to Cyber-Physical Production (CPP)**.



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CENTRE OF EXCELLENCE EPIC
Production Informatics and Control

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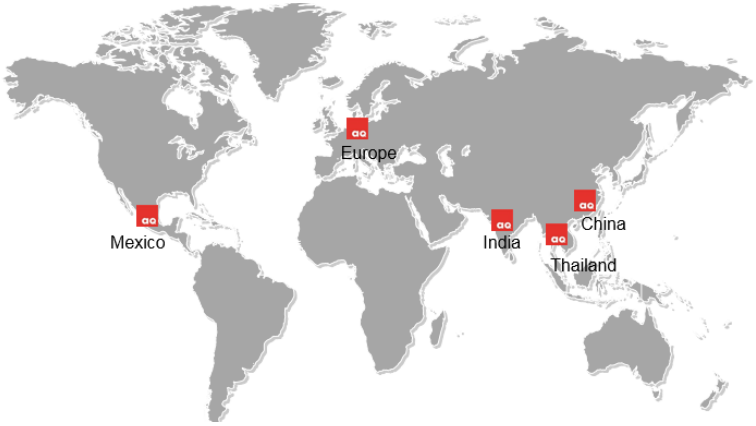
AQ ANTON Kft. – Company presentation

WE ARE RELIABLE

WE ARE RELIABLE

AQ Group

WE ARE RELIABLE



Total: 4900 employees
300 MEUR Sales Turnover

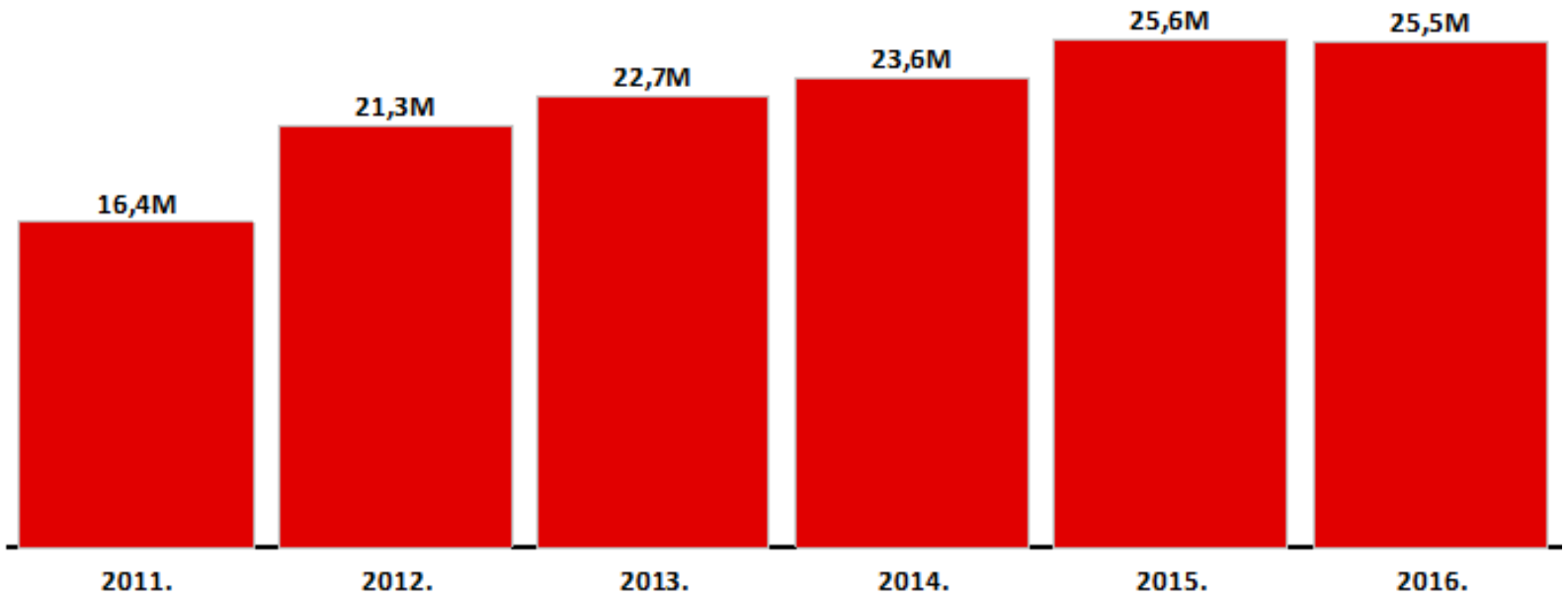
Company Profile

WE ARE RELIABLE

- Foundation: 1992
- Production location: Zalaegerszeg (Hungary)
- Activities: Tooling, Machining, Plastics
- Employees: 450

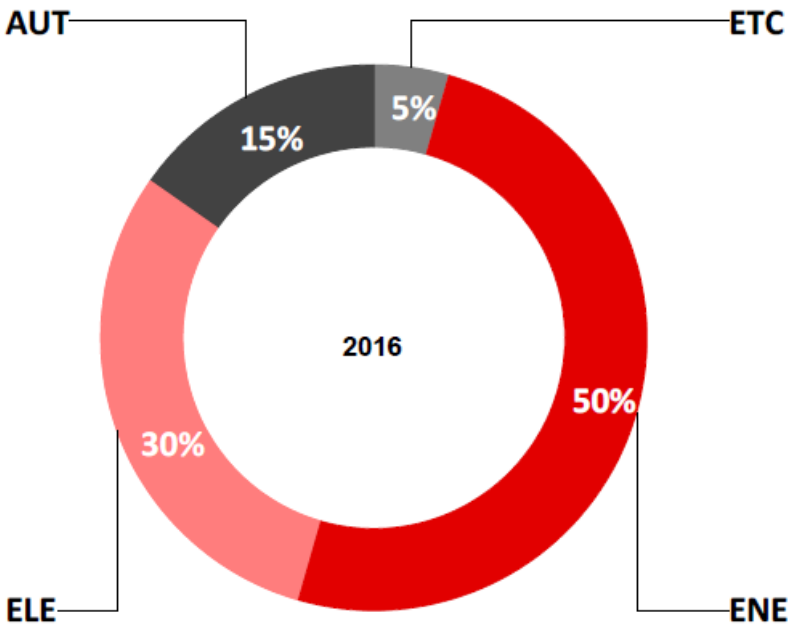
Sales Turnover (MEUR)

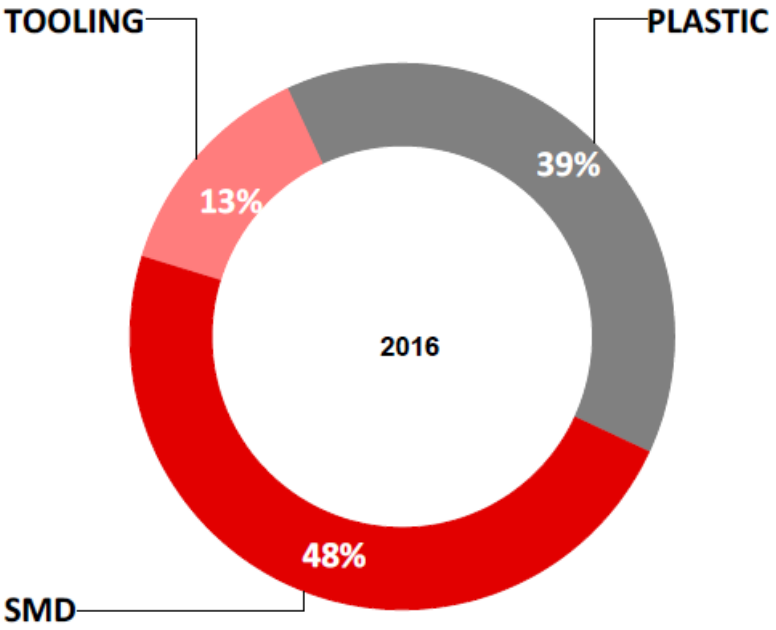
WE ARE RELIABLE



Segments

WE ARE RELIABLE





Management Systems

WE ARE RELIABLE

TOOLING	PLASTIC	SPECIAL MACHINING
ISO 9001	ISO TS 16949 Automotive	EN 9100 Aerospace
OHSAS 18001 Health & Safety		
ISO 14001 Environmental		

Production Area

WE ARE RELIABLE

Special Machining
2 800 m²
(2008-2014)

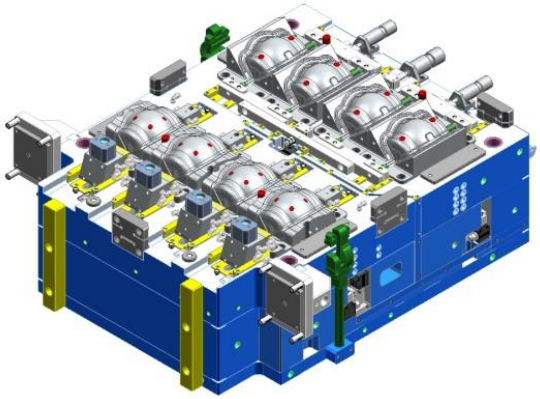
Plastic
2 400 m²
(2004)

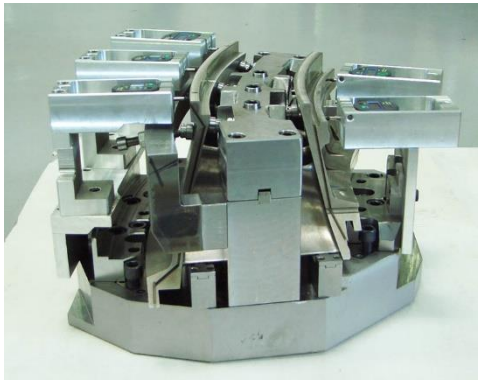
Tooling
2 800 m²
(1999)

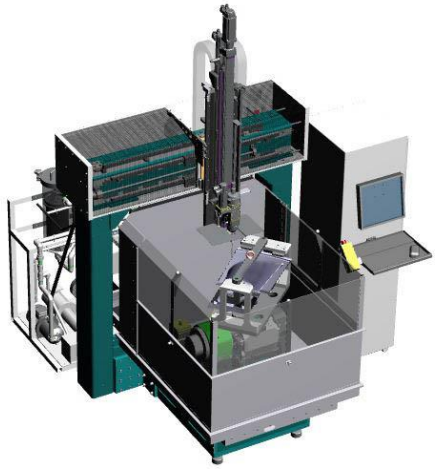
Design & Development

WE ARE RELIABLE

- Part Design Consultancy
- Injection Mould Design
- Machining Fixture Design
- Machining Technologies
- Special Machine Design



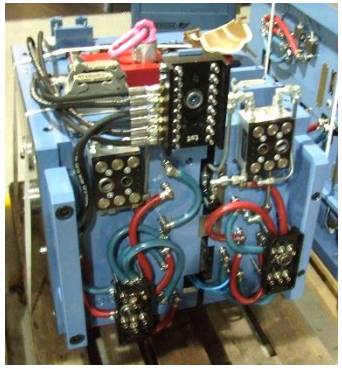




Tool Production

WE ARE RELIABLE

- Multi-component Injection Moulds
- Prototype Tooling
- Machining Fixtures
- Special Machines



Plastic Production

WE ARE RELIABLE

- 1K/2K/3K/4K technology
- Injection molding machines (21)

  1K: 80-350t

  2-4K: 400t
- Metal insert overmoulding
- Weight balanced parts
- Central material dispatching system
- PA, PP, TPE, ABS, PPS, POM, PBT, TPU ...
- Additional technologies:
- Ultrasonic Welding
- Hot Stamping & Tampon Printing
- Conditioning

Special Machining

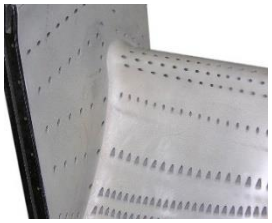
WE ARE RELIABLE

- Conventional machining:
  3 & 5-axis CNC Milling
  3 & 5-axis CNC Grinding
  Hot Forging

- Non-conventional machining:
  3-axis EDM Sinking
  5-axis EDM Fasthole
  EB Welding

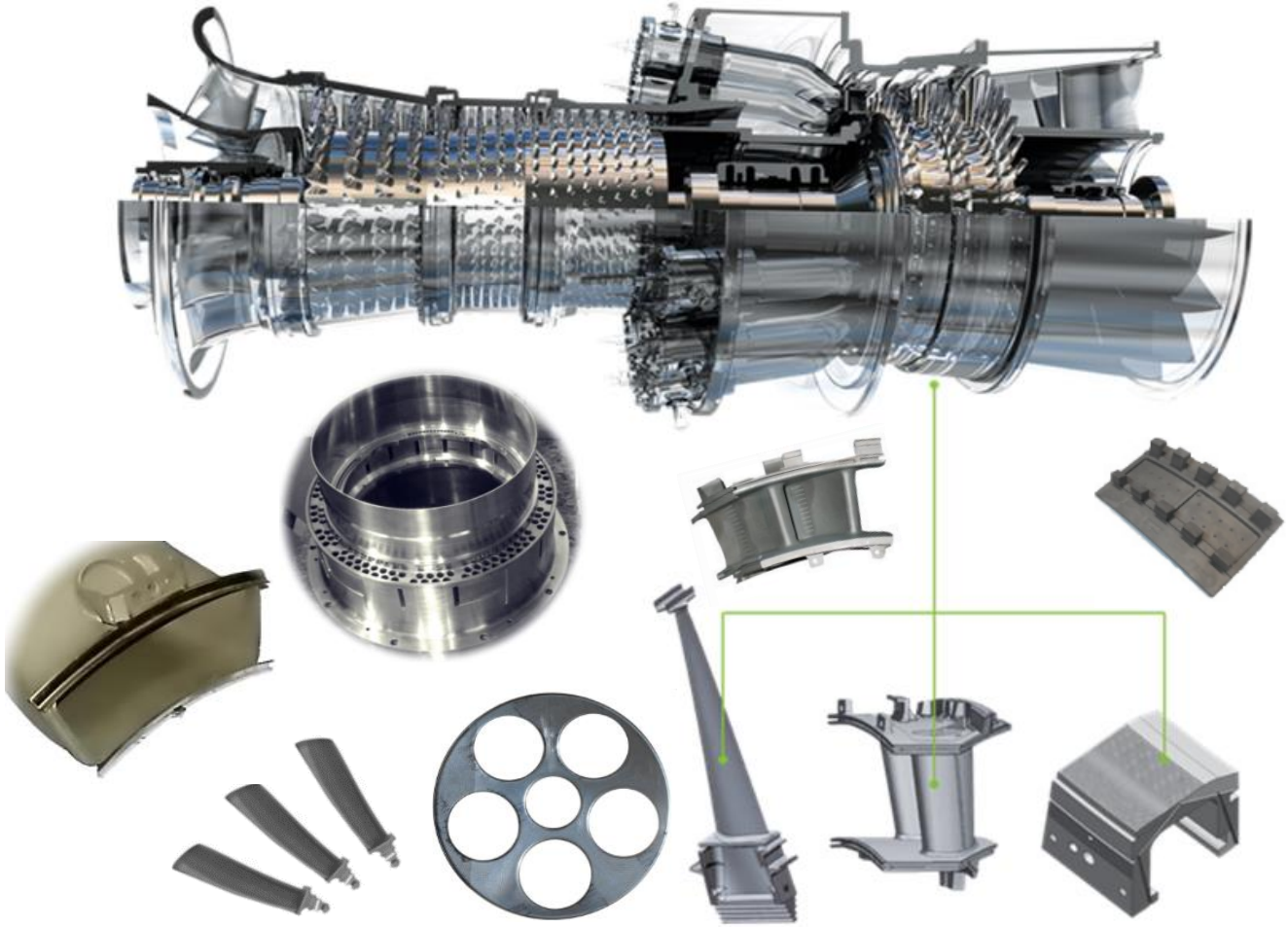
- Inspections:
  Airflow
  FPI
  CMM ...

- Ni Based Materials:
  FSX-414, GTD-222, GTD-241
  GTD-262, Nimonic 263, René 80
  Inconel, Hastelloy ...



Special Machining

WE ARE RELIABLE



OEM Customers

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The **financial risk** of establishing business relationship with the abovementioned business association is **extremely low.**

At the Hungarian market only 0.63 per cent of the companies are entitled to Bisnode "AAA" credit rating which represents excellent financial standing.

CREDIT-WORTHY COMPANIES ARE BETTER

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Thank you!

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OPEL

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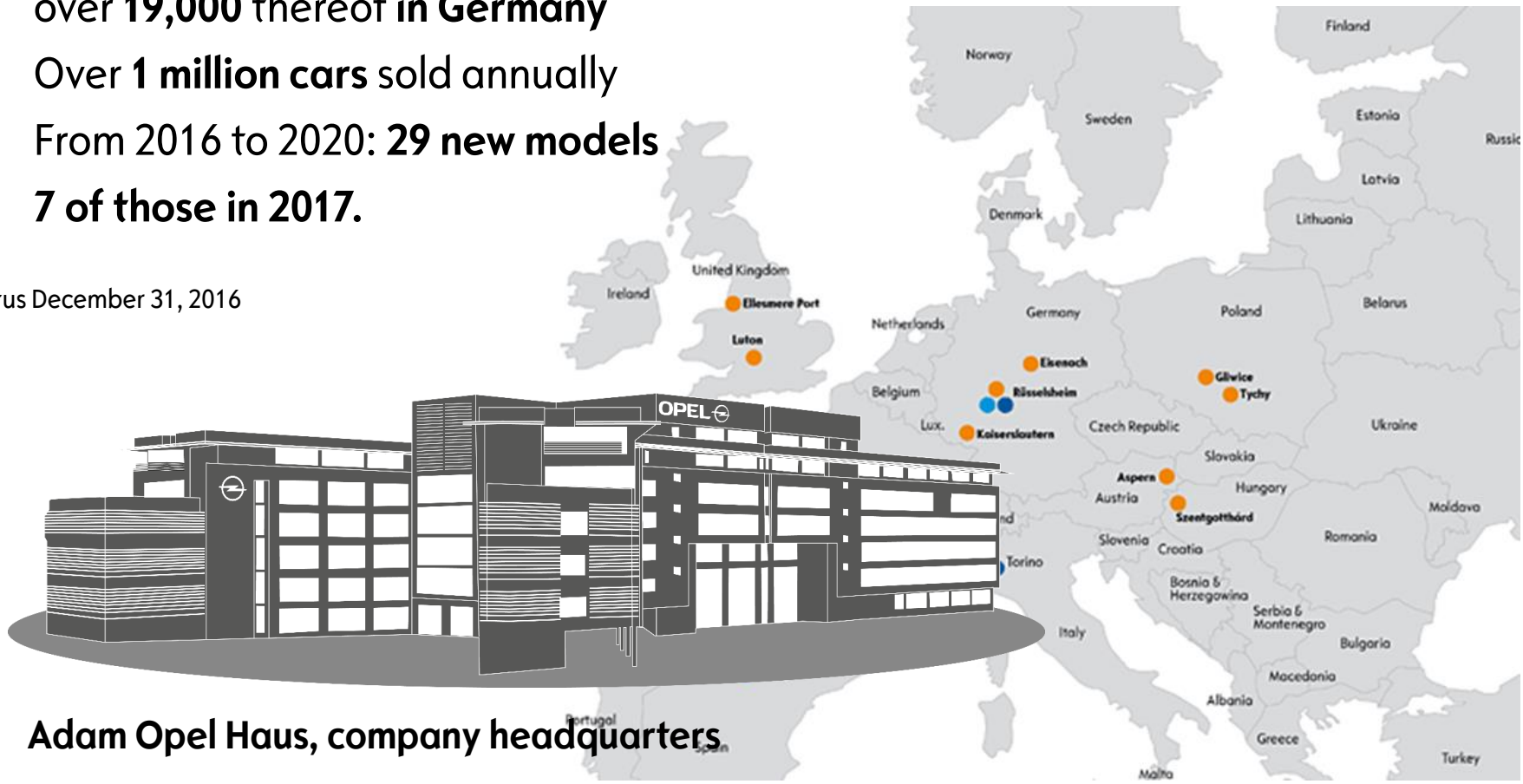
OPEL

OPEL IN EUROPE

- Company **headquarters**: Rüsselsheim
- Around **38,200 employees*** in Europe, over **19,000** thereof **in Germany**
- Over **1 million cars** sold annually
- From 2016 to 2020: **29 new models** **7 of those in 2017.**

* status December 31, 2016



Adam Opel Haus, company headquarters

OPEL IN EUROPE

- 10 Plants
- 1 Design Center
- 2 Engineering Centers
- 2 Test Centers

OPEL IN EUROPE

10 Plants

OPEL IN HUNGARY

- First major OEM in Hungary
- Szentgotthard Plant
  - Car assembly 1992-1999
  - Engine Plant 1992-
  - Major GM engine facility in Europe
- Sales Organization
  - Hungary only 1991-1997
  - Regional responsibilities 1997-

Hungarian President Árpád Göncz with
General Motors President Jack Smith in 1994

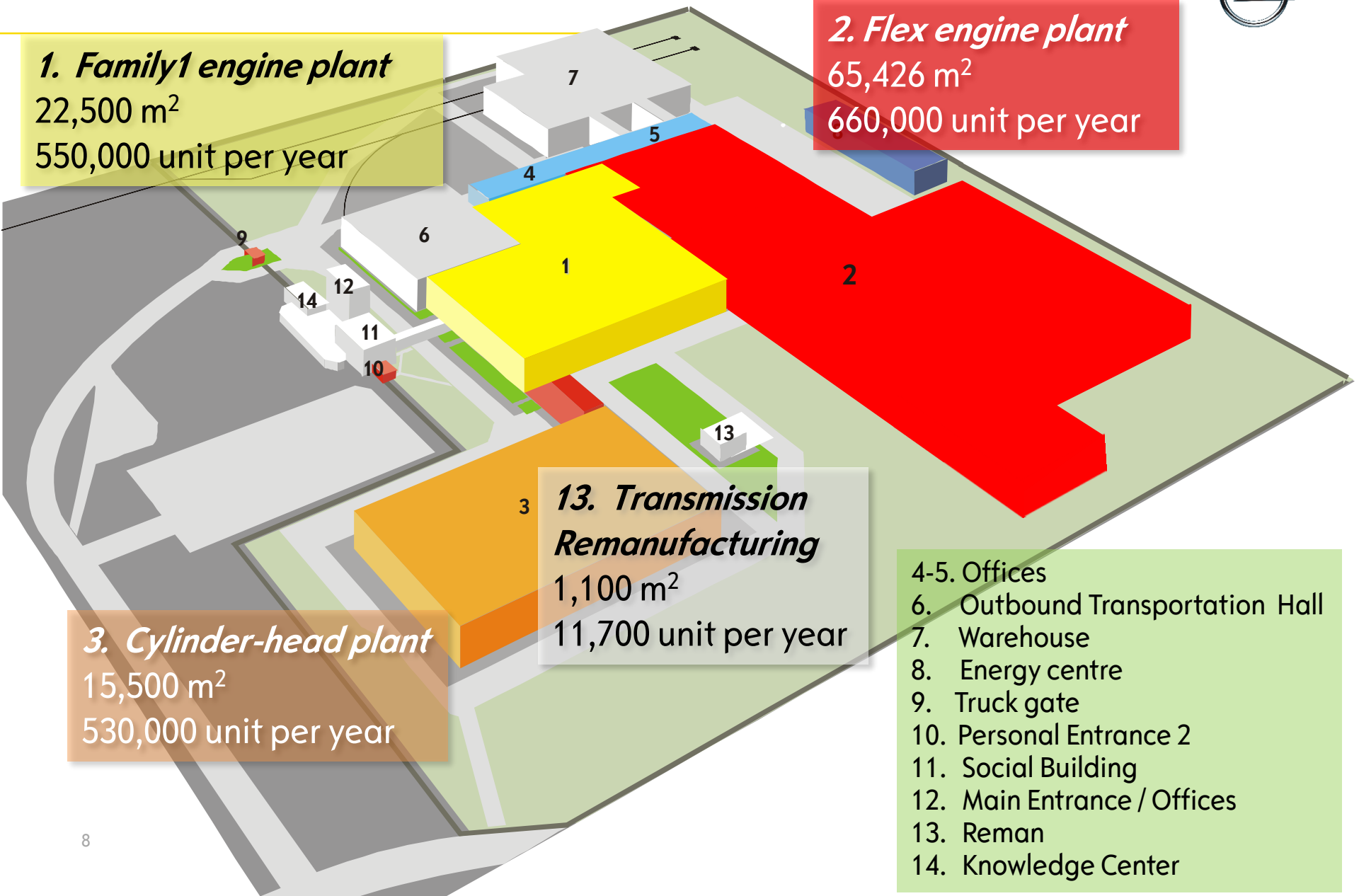
NEW STAR OF HUNGARY

Hungarian Prime Minister József Antal at the Opel Szentgotthard plant opening in March 1992

25 YEARS AUTOMOTIVE PRODUCTION

Celebrating 25 Years of Automotive Production in Hungary with Peter Szijjarto, Hungarian Minister of Foreign Affairs and Trade and Karl-Thomas Neumann, Opel CEO

LAYOUT & CAPACITY



FACT &FIGURES

- **Founded in 1990**
- **350,000 m2 total site area**
- **2,300 employees on site**
- **Total investment of 1.4 billion euros**
- **Profile:**
  - engine production
  - production of engine components
  - production of automatic transmissions
  - transmission remanufacturing
  - spindle repair

RESULTS TO DATE*

- 9.150 000 engines

- 213 000 Allison transmissions

- 62 800 remanufactured transmissions

* May 2017

FAMILY1 ENGINES

- engine layout: in-line
- number of cylinders: 4
- cylinder capacity: 1600-1800 cm3
- emission norm: euro 5 - 6
- performance variants:
  - 16XER: 85 KW (115LE) – 150NM
  - 18XER: 103 KW (140LE) – 175NM
  - 16T: 132 KW (180LE) – 230NM, OPC: 200LE
- technical facts
  - variable cam-phaser
  - variable intake manifold
  - Turbo charger
  - CNG, LPF, E85 & E100 applications

CARS WITH FAMILY1 ENGINES

Chevrolet Aveo/Sonic

Chevrolet Trax

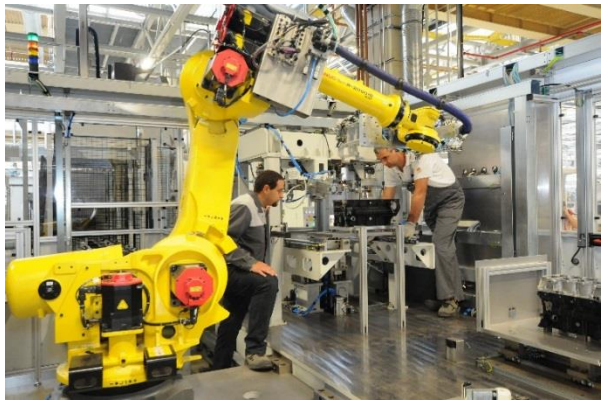
Opel Corsa

Opel Zafira

Opel Astra NB

Opel Mokka

FLEX ENGINE PLANT

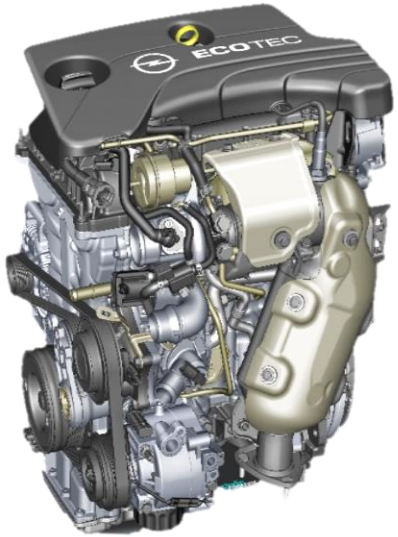


- 700-million-euro investment
- additional 1000 workplaces
- one of the most modern and flexible engine plants in the world
- production of 3 new engine families

FLEX ENGINES

SGE – small gasoline engine

- engine layout: in-line
- number of cylinder: 3 - 4
- cylinder capacity: 999, 1399 and 1498 cm3
- emission norm: Euro 6
- Performance variants:
  - LV7: 73 kW (98 HP) - 128 Nm
  - LE1: 66/77 kW (90/105 HP) – 170 Nm
  - LE2: 92/110 kW (125/150 HP) – 235 Nm
  - LVF: 103/122 kW (140/165 HP) – 250 Nm
- technical facts
  - central direct fuel injections (SIDI)
  - turbo charger
  - dual-cv (continuously variable) cam phaser
  - integrated exhaust manifold



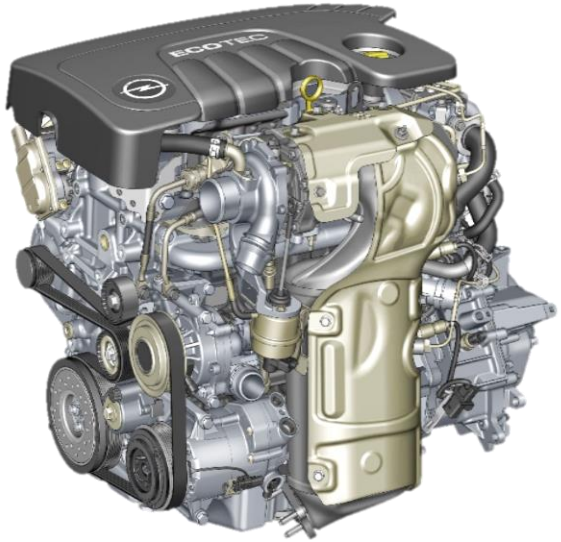
FLEX ENGINES

MGE – midsize gasoline engine

- engine layout: in-line
- number of cylinders: 4
- cylinder capacity: 1598 and 1798 cm3
- emission norm: Euro 6 / ULEV
- performance variants:
  - LKN : 105 kW (145 HP) – 175 Nm
  - SHL: 125 kW (170 HP) – 280 Nm
  - SHT: 150 kW (200 HP) – 300 Nm
- technical facts
  - central direct fuel injection
  - turbo charger (above exhaust manifold)
  - dual-cv (continuously variable) cam phaser
  - integrated fluid module

FLEX ENGINES

MDE – midsize diesel engine



- engine layout: in-line
- number of cylinders: 4
- cylinder capacity: 1598 cm3
- emission norm: Euro 5-6 / ULEV
- performance variants:
  - DTL/E/I/U: 81 kW (110 HP) – 300 Nm
  - DTH: 100 kW (136 HP) – 320 Nm
  - DTR: 118 kW (160 HP) – 350 Nm
- technical facts
  - 2000 bar advanced solenoid fuel injection system
  - Fix – (DTL/E/U), variable geometry turbochargers (DTH/I)
  - Twin-stage turbo (DTR)
  - variable displacement oil pump and switchable oil cooling jets
  - switchable water pump

CARS WITH FLEX ENGINE

Opel Mokka X

Opel Insignia

Opel Zafira

Opel Astra

Chevrolet Equinox

Chevrolet Cruze

Chevrolet Malibu

Opel Adam

Opel Cascada

ALLISON AUTOMATIC TRANSMISSION

3000 & 4000 series™ for medium, heavy duty and off-road vehicles

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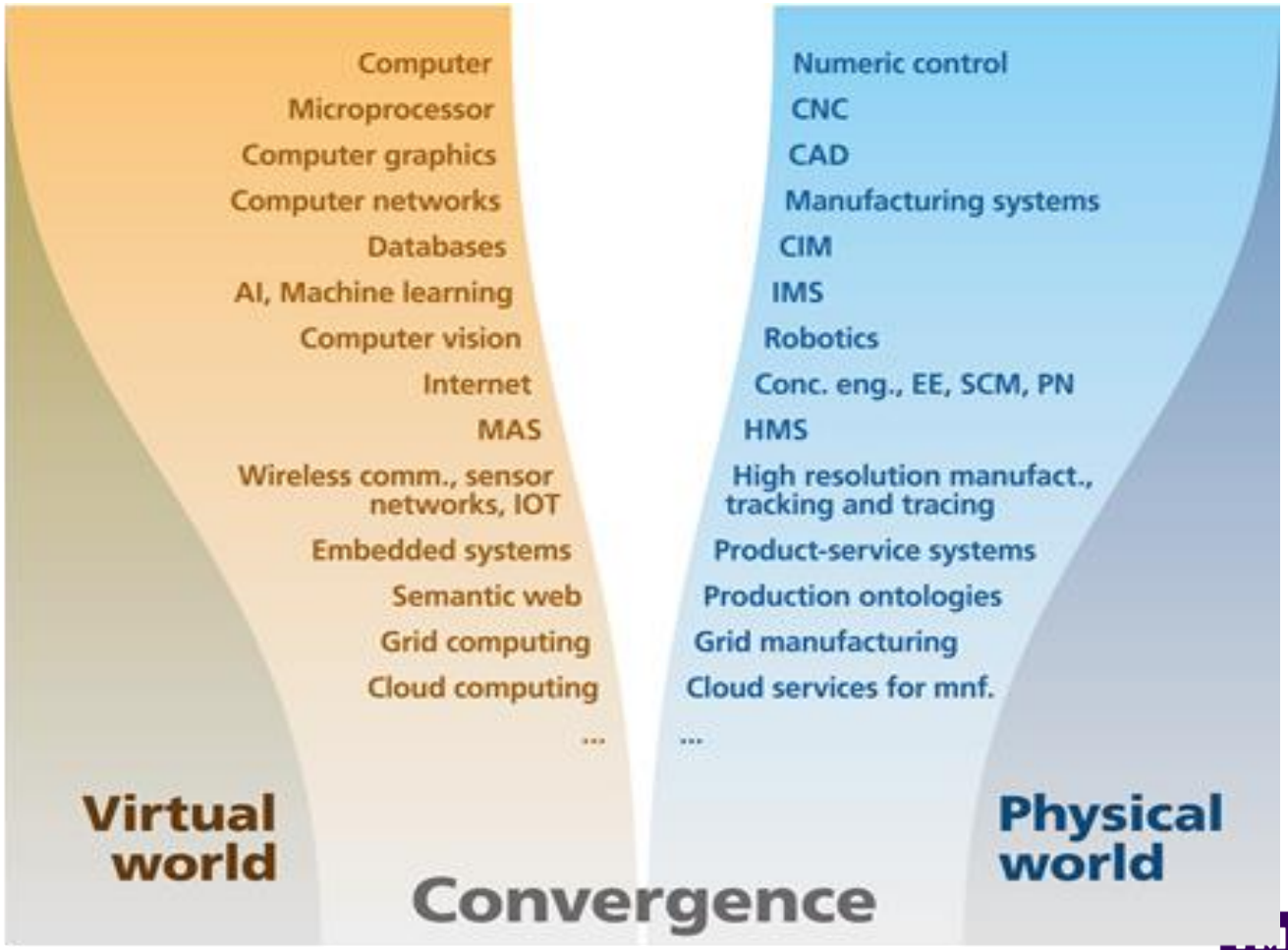
Institute for Computer Science and Control

15th IMEKO TC10 Workshop on Technical Diagnostics: “Technical Diagnostics in Cyber-Physical Era” to be held in Budapest, Hungary, on June 6-7, 2017.

IMEKO

Towards cyber-physical production systems (CPPS)

- **New phase of interacting parallel developments**
  - Manufacturing science
  - Computer science, ICT
  - CNC, CAD, CAPP, PLM, MRP, ERP, BI, CRM, MES, SCM, MOM, EQMS, TQM, BPM, PSS, …
- **Key features**
  - Smart
  - Real and virtual coupled
  - Connected
- *Industrie 4.0*, *Industrial Internet*, *The Robot Revolution*, *Connected Smart Factory*, Ipar 4.0



IMEKO TC10

IMEKO TC10 Workshop on Technical Diagnostics in Cyber-Physical Era

INVITATION

The International Measurement Confederation IMEKO, Technical Committee 10 on Technical Diagnostics, kindly invites you to attend the 15th IMEKO TC10 Workshop on Technical Diagnostics: "Technical Diagnostics in Cyber-Physical Era" to be held in Budapest, Hungary, on June 6-7, 2017. The Workshop is a forum for advancing knowledge and exchange ideas on methods, principles, instruments and tools, standards and industrial applications on Technical Diagnostics as well as their diffusion across the scientific community. Participants have an excellent opportunity to meet top specialists from industry and academia all over the world and to enhance their international co-operation. The programme will feature industry leading keynote speakers and selected presentations.

SPECIAL ISSUE

The presented papers at IMEKO TC10 are eligible for submission to the Measurement and ACTA IMEKO Special Issues. All submitted papers will undergo a regular peer review process. The manuscript MUST be significantly technically extended beyond the proceedings paper.

SCIENTIFIC TOPICS

- Technical diagnostics in the cyber-physical era and in industry 4.0 environment.
- Basic principles and development trends in technical diagnostics.
- Innovative sensors, data acquisition systems and signal processing.
- Condition monitoring and maintenance of industrial processes, plants and complex systems
- Diagnostics for Maintainability, Safety, Risk assessment and Management.
- Safety critical systems.
- System state modelling, change detection.
- Detection and prognosis of failures and damages.
- Artificial intelligence techniques and machine learning for diagnostics.
- Decision support and IT solutions for diagnostics.
- Industrial applications of monitoring and supervision systems, especially in transportation, mechatronics, avionics, automotive, biomedics, IT and in the improvement of quality of life and environment.
- Industrial standards.

Organisation

General Chairs

Zsolt János Viharos
IMEKO TC10 Scientific secretary
Research Laboratory on Engineering and Management Intelligence, Institute for Computer Science and Control of the Hungarian Academy of Sciences
viharos.zsolt@sztaki.mta.hu

Marcantonio Catelani
IMEKO TC10 Chairman
Information Engineering Department, University of Florence
marcantonio.catelani@unifi.it

International Programme Committee Chairs

Piotr Biski (Poland)
Lorenzo Ciani (Italy)

International Programme Committee Members

Jozsef Beinschróth (Hungary)
Oleg Bushuev (Russia)
Wojciech Cholewa (Poland)
Loredana Cristaldi (Italy)
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Lauryna Siaudinyte (Lithuania)
Alexandros Soumelidis (Hungary)
Ephraim Suhir (USA)

WORKSHOP AWARDS

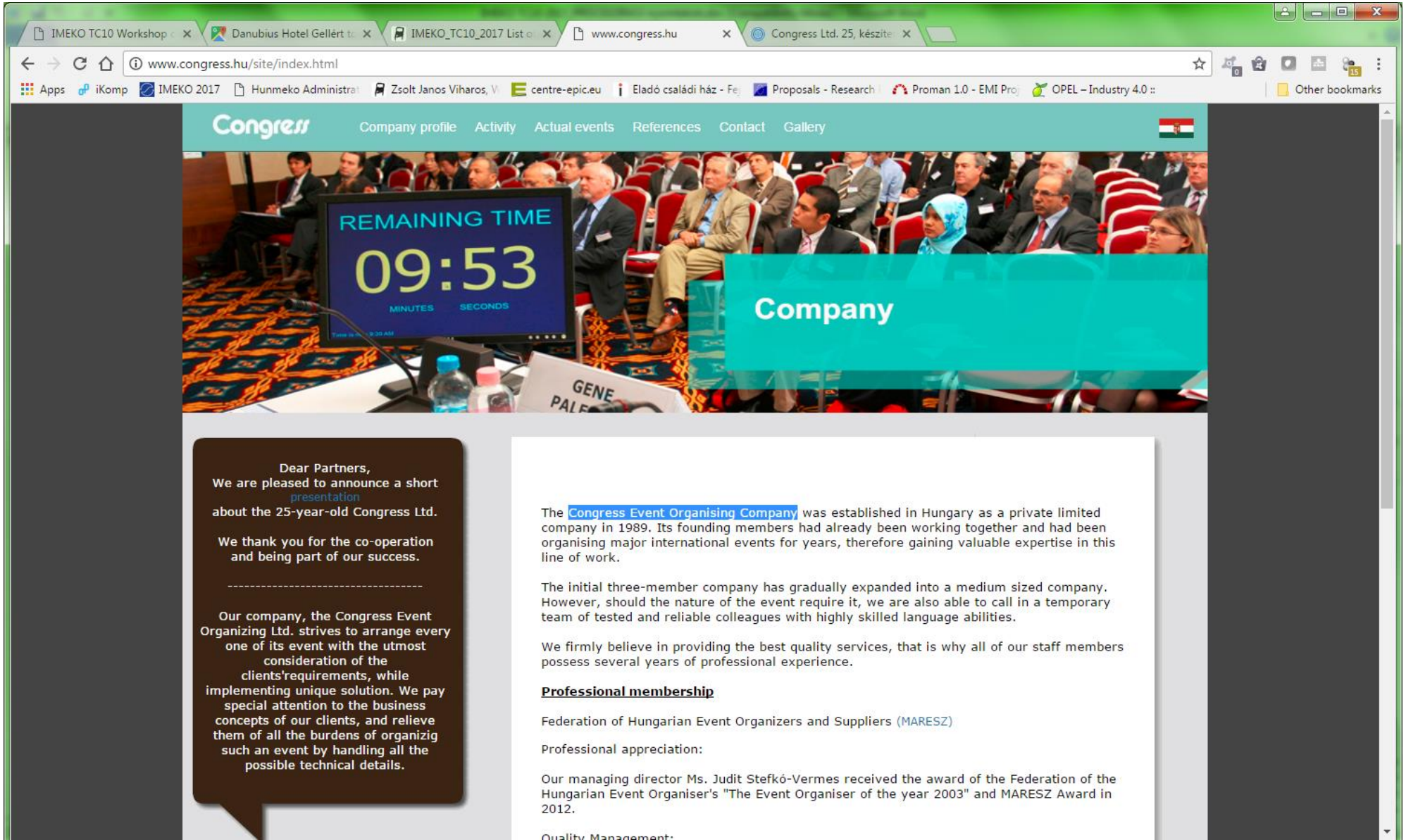
An award will be given for the **Best Scientific Paper & Presentation of the Workshop.**

To encourage the attendance of young researchers, an award will be given for the **Best Paper Authored and Presented by a Researcher Younger than 35 Years in Age.**

ISBN: 978-92-990075-5-6

http://www.imekotc10-2017.sztaki.hu/

Support: Congress Ltd. Event Organising Company



IMEKO

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Support: Gusztáv Hencsey (MTA SZTAKI)

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Venue

The workshop will be held in Danubius Hotel Gellért Budapest.
"Art-nouveau extravagance – the world's most famous spa"

- Noble hotel situated on the Danube riverbank, at the foot of Gellért Hill.
- Impressive Art-Nouveau building with large, light corridors and lots of character.
- Shares its building with the famous Gellért Spa, one of the city's most beautiful thermal bath.
- 10 minutes' walk from Great Market Hall and the downtown shopping area.
- Reach the city centre in the fastest way possible! The new Metro 4 station is just a few steps away from the hotel.
- Excellent business facilities, superb food in the brasserie and a charming coffee shop serving traditional pastries.

Budapest, Hungary

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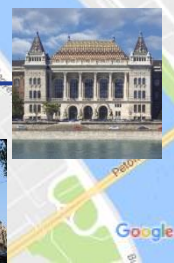

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Programme

JUNE 5 th 2017

18.00 – 19.00	Registration
18.00 – 19.00	Welcome cocktail, Hotel Gellért, Workshop venue

JUNE 6 th 2017

08.30 – 09.00	Registration
09.00 – 09.30	Opening Ceremony: Zsolt János Viharos, Workshop Chair, Research Laboratory on Engineering & Management Intelligence, Institute for Computer Science and Control, Hungarian Academy of Sciences
09.30 – 10.30	***Invited lecture, scientific: Prof. Robert Schmitt, Lab for Machine Tools and Production Engineering, WZL | RWTH Aachen University, Germany: "Reference Systems for a Free Float Assembly Setup"***
10.30 – 11.00	Coffee Break
11.00 – 13.00	*Oral Session, chairman: Marcantonio Catelani, Department of Information Engineering, University of Florence, Florence, Italy*
11:00	Patrick Scholz, Daniel Peters and Florian Thiel: Security Concepts for Software in Measuring Instruments
11:20	Domenico Capriglione, Marco Carratù, Paolo Sommella and Antonio Pietrosanto: ANN-based IFD in Motorcycle Rear Suspension
11:40	Zoltán Rózsás, András Háry and Zsolt Viharos: Multivariable Process Modell For Complex Vehicle Systems Under Extreme Load Environment
12:00	Imre Paniti and Zsolt János Viharos: Fracture diagnostics for Single Point Incremental Forming of thin Aluminum alloy foils
12:20	Zoltán Rózsás and Zsolt Szalay: Extension of telemetry system
12:40	Timotei István Erdei, Zsolt Molnár, Nwachukwu C. Obinna and Géza Husi: A Novel Design of an Augmented Reality Based Navigation System & its Industrial Applications
13.00 – 14.00	Lunch
14.00 – 15.00	***Invited lecture, industrial: Lodovico Menozzi, Business Development Manager Europe - Condition Monitoring, National Instruments, Italy: "Engineering The Industrial Internet of Things for Predictive Maintenance"***
15.00 – 15.30	Coffee Break & *Poster Session*
	Marcantonio Catelani, Lorenzo Ciani and Matteo Venzi: Maintainability Allocation assessment in complex systems
	József Szabó and Péter Bakucz: Embedded integer NARX identification of knocking combustion of large gas engine
15:30 - 17:30	*Oral Session, chairman: Lorenzo Ciani, Department of Information Engineering, University of Florence, Florence, Italy*
15:30	Vladimir V. Sinitsin: Roller bearing fault detection by applying wireless sensor of instantaneous accelerations of mechanisms moving elements
15:50	Gábor Kohlrusz, Krisztián Enisz, Dénes Fodor and Bence Csomós: Integrated model environment for digital controlled power converter analysis and diagnostics
16:10	Mònica Egusquiza, Carme Valero, Alex Presas, David Valentin, Matias Bossio and Eduard Egusquiza: Advanced condition monitoring of Pelton turbines
16:30	Bence Csomos, Gabor Kohlrusz and Denes Fodor: Model parameter estimation of lead-acid battery pack using current impulse excitation
16:50	Balázs Scherer: HIL test based non-intrusive diagnostics of cyber-physical systems
17:10	Giulio D'EMILIA, David di GASBARRO, Antonella GASPARI, Emanuela NATALE: About the role of uncertainty assessment in environmental testing
17:30 - 18:30	IMEKO TC10 Board Meeting
19.00 – 22.00	Workshop Dinner - Trip on a boat along the Danube in Budapest

JUNE 7 th 2017

09.00 – 10.00	***Invited lecture, scientific: Diego Galar, Division of Operation and Maintenance Engineering Luleå University of Technology, Sweden: "Diagnosis and Virtual commissioning of manufacturing assets: A hybrid approach to condition monitoring"***
10.00 – 10.30	Coffee Break
10.30 – 13.00	*Oral Session, chairman: Yukio Hiranaka, Yamagata University, Graduate School of Science and Engineering, Yamagata, Japan*
10:30	Tommaso Addabbo, Ada Fort, Rossella Marino, Carlo Michelassi, Marco Mugnaini and Valerio Vignoli: Modelling of Non-Monotonic Hazard Function for the Early Production Life of Oil and Gas Plants
10:50	Piotr Bilski: Unsupervised learning-based hierarchical diagnosis of analog circuits
11:10	Yi Huang and Clemens Gühmann: Wireless Sensor Network for Temperature Estimations in an Asynchronous Machine Using a Kalman Filter
11:30	Takao Mizusawa, Sinichi Miura, Toshihiro Taketa and Yukio Hiranaka: Distributed Power Usage Control and Estimation of Total Demand
11:50	Loredana Cristaldi and Giacomo Leone: A Statistical Algorithm for Photovoltaic Modules Reliability Assessment
12:10	Bartosz Polok and Piotr Bilski: Optimization of the neural RBF classifier for the diagnostics of electronic circuit
12:30	Marcantonio Catelani, Lorenzo Ciani and Matteo Venzi: Logic Solver Diagnostics in Safety Applications
12:50	János Dobránszky, Balázs Bebők, Balázs Varbai, Attila Szlancsik, Tibor Gerencsér and Árpád Németh: Modeling of welding distortions and flame straightening deformations
13.10 – 14.00	Lunch
14.00 – 15.00	***Invited Lecture, industrial: Jenő Csanaki, Unit manager, machining, OPEL Szentgotthárd Ltd., Hungary: "Production control by Business Intelligence tools, dashboarding in manufacturing"***
15.00 – 15.30	Coffee Break & *Poster Session*
	Ferenc Boronyák and András Háry: Research in the process of burr measurement of metal parts
	László Móricz, Zsolt János Viharos, András Németh and András Szépligeti: Efficient Ceramics Manufacturing through Tool Path and Machining Parameter Optimisation
	Zsolt János Viharos, Szilveszter Soós, Gábor Nick, Richárd Beregi: Non-comparative, Industry 4.0 Readiness Evaluation for Manufacturing Enterprises
15:30 - 17:30	*Oral Session, chairman: Prof. Piotr Bilski, Institute of Radioelectronics and Multimedia Technology, Warsaw University of Technology, Warsaw, Poland*
15:30	Attila Lukacs: Design, Fabrication and Testing of a Prototype Reflow Monitoring System (RMS)
15:50	D.J. Pasadas, A.L. Ribeiro and Helena Maria Geirinhas Ramos: ECT with Uniform Current Distribution for the Inspection of Sub-surface cracks in Conductive Plates
16:10	Krisztina Konrád, Zsolt János Viharos and Gábor Németh: Raw material measurement methods evaluation and ranking for pellet production
16:30	Zsolt Ferenc Kovács, János Kodacsy and Zsolt Janos Viharos: Determination of the optimal working gap of the Magnetic Assisted Roller Burnishing tool
16:50	Szabolcs Szalai and Imre Czinege: Digital Image Analysis of Sheet Metal Testing and Forming
17:10	Tommaso Addabbo, Francesco Bertocci, Ada Fort, Marco Mugnaini, Valerio Vignoli and Chiara Cinelli: On-component multilayer tri-axial capacitive probe for clearance measurement
17:20	István Lakatos and Péter Őri: Diagnostic Measurement for the Effective Performance of Motor Vehicles with free acceleration
17:50	Dammika Senevitanet, Unai Martínez, Shi Boyang: Diagnosis of brakes system in rolling stock: A data driven approach
18:10	Asier Gonzalez, Tecnalia,Shi Boyang: Wind turbine diagnosis using O&M information
18.30 – 19.00	Closing and Award Ceremony

Invited Keynote Lecturers

INVITED KEYNOTE LECTURERS

Invited keynote lecturers´ presentations are available on the workshop website

(http://www.imekotc10-2017.sztaki.hu/invitedkl.php)

Industrial Keynote Lecturers

Jenő Csanaki

Unit manager, machining
OPEL Szentgotthárd Ltd., Hungary
Presentation title: ***Production control by Business Intelligence tools, dashboarding in manufacturing***

Jeno Csanaki was born in 1964 in Hungary. He graduated in heavy current electricity and studied engineering of digital systems. He joined to engine plant of OPEL (General Motors) at Szentgotthard, Hungary in 1991. He fulfilled several positions during his 25 years old employment, mainly at manufacturing and maintenance. Currently he is responsible for all machining lines at Szentgotthard as unit manager.

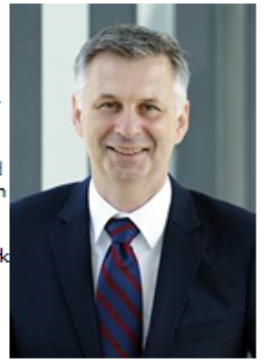
Lodovico Menozzi

Business Development Manager Europe - Condition Monitoring
National Instruments, Italy
Presentation title: ***Engineering The Industrial Internet of Things for Predictive Maintenance***

Lodovico has a Master's degree in Physics. He has been working for National Instruments for 17 years and he is currently covering the position of European Business Development Manager for Condition Monitoring Systems. In the 10 years prior to his current role, he worked in the field as a District Sales Manager and Field Application Engineer. In these roles he worked with customers, partners and research institutes operating in different industries like power generation, oil&gas and heavy machinery to develop on-line monitoring and advanced diagnostics applications.

Scientific Keynote Lecturers

Prof. Robert Schmitt



Director Lab. for Machine Tools and Production Engineering, Director of IPT
RWTH Aachen University, Fraunhofer Institute for Production Technology IPT, Germany
Presentation title: ***Reference Systems for a Free Float Assembly Setup***

Prof. Dr.-Ing. Robert H. Schmitt, born in 1961, completed his studies of Electrical Engineering with the specialisation on Communications Engineering at the Technical University of Aachen and became research associate at the Chair for Metrology and Quality Management. His work there focused on production-related Metrology and Communications Engineering in an automated environment.

In 1997 Professor Schmitt moved on to MAN Nutzfahrzeuge AG (commercial vehicles) in Munich where he took on leading positions in the fields of Quality and Production. In 2002 he assumed responsibility for the commercial vehicle production in Steyr, Austria.

On July 1st, 2004 he was appointed as professor at the Technical University of Aachen. As head of the Chair for Metrology and Quality Management at the Laboratory for Machine he serves as a member of the Board of Directors at the Laboratory for Machine Tools and Production Engineering (WZL) and the Fraunhofer Institute for Production Technology IPT.

Prof. Diego Galar

Professor of Condition Monitoring, Division of Operation and Maintenance Engineering
Luleå University of Technology, Sweden
Presentation title: ***Diagnosis and Virtual commissioning of manufacturing assets: A hybrid approach to condition monitoring***

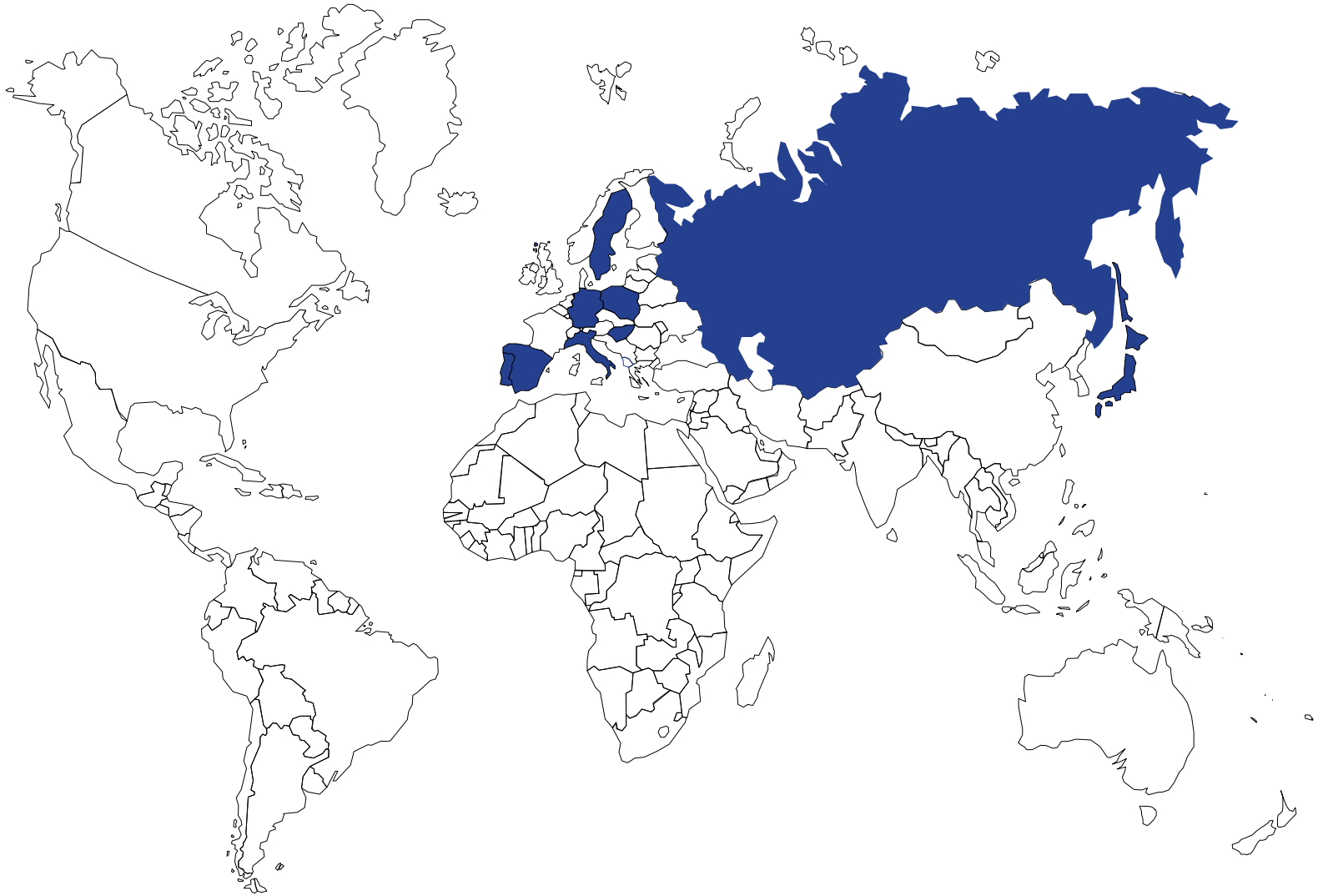
Prof. Diego Galar holds a M.Sc. in Telecommunications and a PhD degree in Design and Manufacturing from the University of Saragossa. He has been Professor in several universities, including the University of Saragossa or the European University of Madrid, researcher in the Department of Design and Manufacturing Engineering in the University of Saragossa, researcher also in I3A, Institute for engineering research in Aragon, director of academic innovation and subsequently pro-vice- chancellor. He has authored more than two hundred journal and conference papers, books and technical reports in the field of maintenance, working also as member of editorial boards, scientific committees and chairing international journals and conferences. In industry, he has been technological director and CBM manager of international companies, and actively participated in national and international committees for standardization and R&D in the topics of reliability and maintenance.

Currently, he is Professor of Condition Monitoring in the Division of Operation and Maintenance Engineering at LTU, Luleå University of Technology, where he is coordinating several EU-FP7 projects related to different maintenance aspects and was also involved in the SKF UTC centre located in Lulea focused in SMART bearings. He is also actively involved in national projects with the Swedish industry and also funded by Swedish national agencies like Vinnova.

In the international arena, he has been visiting Professor in the Polytechnic of Braganza (Portugal), University of Valencia and NIU (USA), currently, University of Sunderland (UK) and University of Maryland (USA). He is also guest professor in the Pontificia Universidad Católica de Chile.

MTA SZTAKI
Hungarian Academy of Sciences
Institute for Computer Science and Control

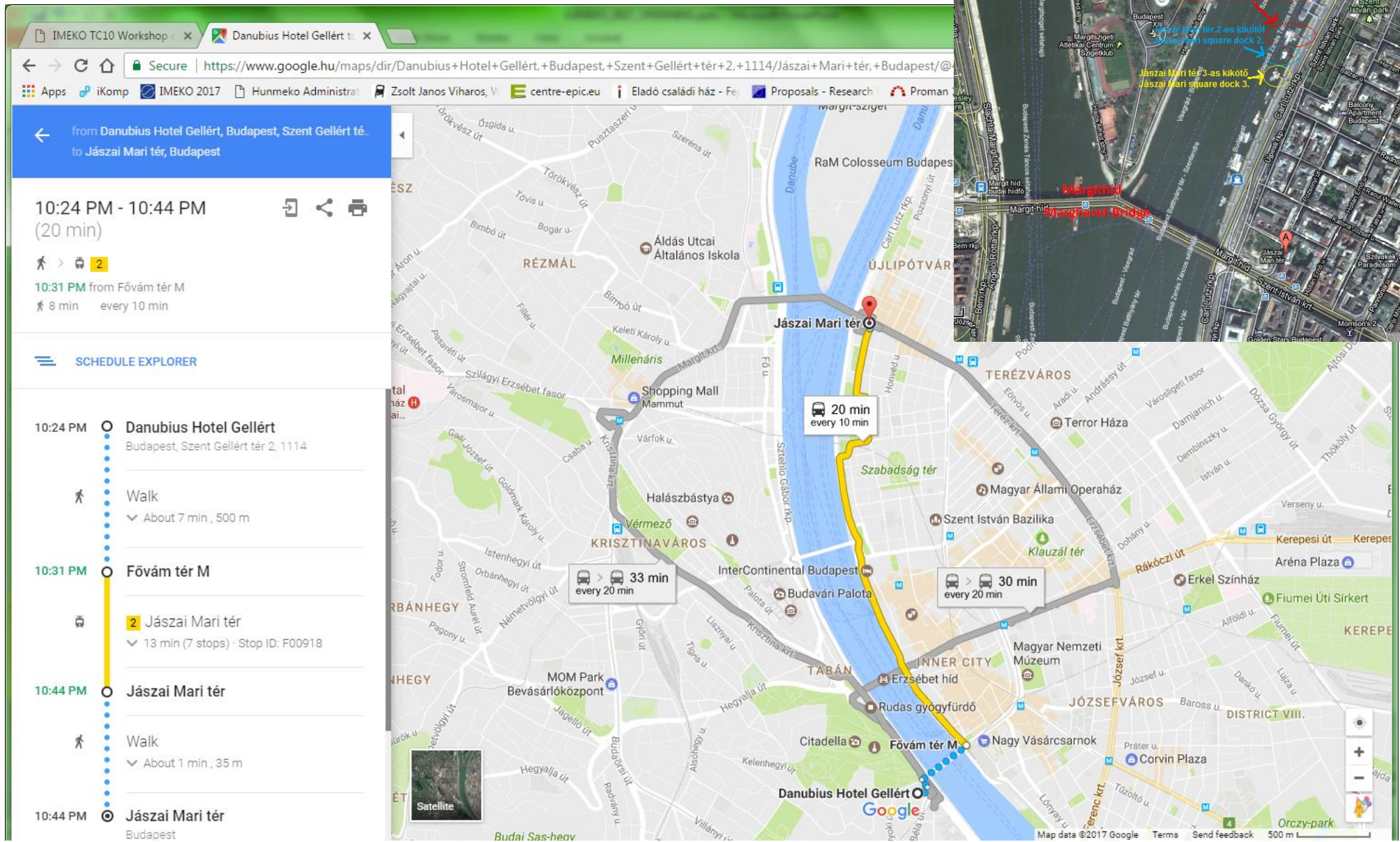
Participants' countries (9)



IMEKO

Workshop Dinner 19:00-22:00

- Walking through the bridge
- **Tram 2**: until the end station (direction Jászai Mari Tér)
- Walking to the dock 1



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Thank you for your attention!

Contact:

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