



IMEKO

International Measurement Confederation

Technical
Committee

TC10

Testing, Diagnostics & Inspection

eurolab aisbl



MTA SZTAKI

Hungarian Academy of Sciences
Computer and Automation Research Institute

16th IMEKO TC10 Conference: “Testing, Diagnostics & Inspection as a comprehensive value chain for Quality & Safety” to be held in Berlin, Germany, on September 3-4, 2019.

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

Chairperson, IMEKO TC10 on Testing, Diagnostics & Inspection

16th IMEKO TC10 Conference: “Testing, Diagnostics & Inspection as a comprehensive value chain for Quality & Safety”

INVITATION

The **International Measurement Confederation IMEKO**, Technical Committee **10 on Testing, Diagnostics & Inspection** and **Eurolab aisbl** [kindly invites you](#) to attend the **16th IMEKO TC10 Conference**:

“Testing, Diagnostics & Inspection as a comprehensive value chain for Quality & Safety”

to be held in **Berlin**, Germany, on September 3-4, **2019**.

It is the **first conference jointly organized by IMEKO & EUROLAB**.

The Conference is **a forum** for advancing knowledge and exchange ideas on methods, principles, instruments, technologies and IT tools, standards, industrial applications, conformity assessment, quality management and measurement challenges on Testing, Diagnostics & Inspection as well as their diffusion across the scientific community. Participants have an excellent opportunity to meet top specialists from industry, the TIC Sector (Testing, Inspection & Certification) and academia all over the world and to enhance their international co-operation. The programme will feature scientists and experts as leading keynote speakers for selected presentations on the main topics of the Conference.



16th IMEKO TC10 Conference: "Testing, Diagnostics & Inspection as a comprehensive value chain for Quality & Safety"

Organisers & Sponsors

IMEKO TC10



**Technical Committee
on
Testing, Diagnostics
& Inspection**

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DESIGN TECHNOLOGY



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**



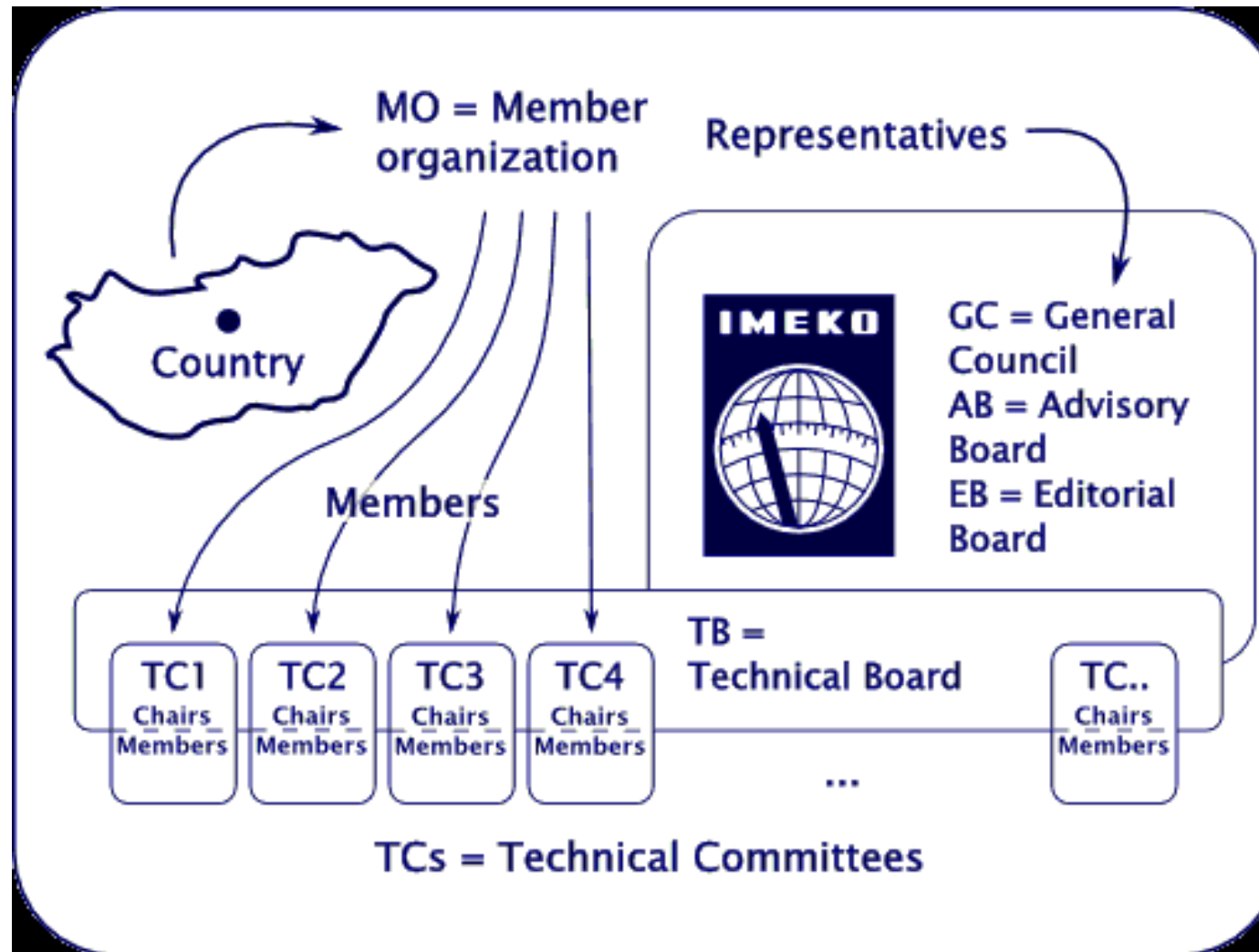
An example from the history: 2nd IMEKO World Congress



Budapest, Hungary, 1961

About IMEKO

International Measurement Confederation





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 Testing, Diagnostics & Inspection (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)

TC10-Aims

imeko.org/index.php/tc10-homepage/tc10-aims

AppsProman 1.0 - EMI P...Fájlok - SZTAKI Nex...GOOGLE_HOMEPA...Neptun.Net PE_OW...Kecskeméti Egyete...Sci-Hub: removing...Projektcsapatok és...5_oktatas | MI Koalf...

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

Testing, Diagnostics & Inspection

You are here: [IMEKO](#) ▶ [TC10](#) ▶ Aims

TC10

About

Aims

Members

Events

Documents

Links

Contact

Log in / Log out

TC10 - Testing, Diagnostics and Inspection - Aims

Aimes and objectives of [IMEKO TC10 on Testing, Diagnostics and Inspection](#) are to facilitate the exchange of scientific and technical information on testing, diagnostic & inspection methods, measurement, instrumentation and systems by organizing symposia, discussion meetings and encouraging the publication of scientific papers. Also, the co-operation between scientists and engineers in different subject areas in solving various testing, diagnostic & inspection problems is supported.

Topics:

- T1 - Basic principles and development trends in testing, diagnostics and inspection
- T2 - Condition monitoring and maintenance of industrial processes, plants and complex systems: measurements and methods
- T3 - Testing, diagnostics, inspection and prognostics for maintainability, safety, risk assessment and management
- T4 - Regulatory framework (for safety of industrial products, food protection, environmental protection, health protection, customer protection, information security etc.)
- T5 - Artificial intelligence techniques and machine learning for testing, diagnostics and inspection
- T6 - Testing, diagnostics and inspection applications in industry, transportation, mechatronics, avionics, automotive, food and biomedical fields
- T7 - Decision support and IT solutions for testing, diagnostics and inspection
- T8 - Testing, diagnostics and inspection for the improvement of quality of life and environment
- T9 - Product conformity assessment and process analysis
- T10 - Certification (products, management systems, persons) and accreditation
- T11 - Traceability in testing, diagnostics and inspection
- T12 - Measurements and methods for TQM (Total Quality Management);
- T13 - Technical testing, diagnostics and inspection for Cyber security
- T14 - Non destructive testing, diagnostics and inspection

14 Topics

21 Members

+3 new member candidates

- [Prof. Giulio D’Emilia \(ITA\)](#)
- [Marco Carratù \(ITA\)](#)
- [David Delaux \(FR\)](#)

Neptun.Net PE_OW...Kecskeméti Egyete...Sci-Hub: removing...Projektcsapatok és...5_oktatas | MI Koalf...Deep Lea

IMEKO

International Measurement Confederation

Technical Committee

TC10

Testing, Diagnostics & Inspection

[TC10](#) ▶ Members

IMEKO TC10 Members

Display # 50 ▼

Name	Position	Country
Dr. Zsolt Janos Viharos	TC10 Chairperson	HUNGARY
Dr. Lorenzo Ciani	Scientific secretary	ITALY
Prof. Laszlo Monostori		HUNGARY
Prof. Marcantonio Catelani	Honorary member	ITALY
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. Oleksandr I. Shevchenko		UKRAINE
Mr Balázs Scherer		HUNGARY

Encouraging new members

- The main responsibilities for current and future IMEKO TC10 members:
 - Do research in our TC10 fields, send papers and participate (with presentations) on (all) the TC10 conferences, workshops and the IMEKO Word Congresses
 - Explore, get in contacts and build relationship with researchers in his/her own country doing research in our TC10 fields – call attention to IMEKO TC10 results, conferences, papers
 - Do networking inside our TC10, do common projects, expert exchange, common scientific collaborations, etc.
 - Enjoy the scientific life inside our IMEKO TC10 on Testing, Diagnostics & Inspection
 - Sending an
 - (preferred Europass) CV and
 - a short motivation letter
- to TC10 Chairperson (viharos.zsolt@sztaki.mta.hu) with cc. to imeko@t-online.hu and
- the TC10 Chairperson (Dr. Zsolt János Viharos) will organise the next steps:
 - approval from the relevant NMO presidents and
 - nomination to IMEKO secretary
 - Having all the documents, the approval will be in next IMEKO GC meeting
 - This will be the starting day of the membership

IMEKO TC10 History (16/20 Conferences + 23/17 World Congresses)

<u>Name</u>	<u>Year</u>	<u>Place</u>	<u>Country</u>
16th IMEKO TC10 Conference 2019	2019	Berlin	GERMANY
15th IMEKO TC10 Workshop on Technical Diagnostics 2017	2017	Budapest	HUNGARY
14th IMEKO TC10 Workshop on Technical Diagnostics 2016	2016	Milano	ITALY
13th IMEKO TC10 Workshop on Technical Diagnostics 2014	2014	Warsaw	POLAND
TC10 Workshop 2013	2013	Florence	ITALY
TC10 Workshop 2010	2010	Krakow	POLAND
TC10 Conference 2005	2005	Budapest	HUNGARY
TC10 Symposium 2001	2001	Compiègne	FRANCE
TC10 Symposium 1999	1999	Wroclaw	POLAND
TC10 Workshop 1995	1995	Trondheim	NORWAY
TC10 Symposium 1992	1992	Dresden	GERMANY
TC10 Workshop 1991	1991	Warsaw	POLAND
TC10 Symposium 1990	1990	Helsinki	FINLAND
TC10 Conference 1989	1989	Prague	CZECHOSLOVAKIA
TC10 Workshop 1988	1988	Budapest	HUNGARY
TC10 Conference 1987	1987	Paderborn	F. R. GERMANY
TC10 Conference 1986	1986	Dubrovnik	YUGOSLAVIA
TC10 Conference 1981	1981	London	UNITED KINGDOM
2-day Meeting of TC10 1980	1980	Nienwagen	THE NETHERLANDS
TC10 Conference 1979	1979	Karlovy Vary	CZECHOSLOVAKIA

I IMEKO World Congress	1958	Budapest	HUNGARY
II IMEKO World Congress	1961	Budapest	HUNGARY
III IMEKO World Congress	1964	Stockholm	SWEDEN
IV IMEKO World Congress	1967	Warsaw	POLAND
V IMEKO World Congress	1970	Versailles	FRANCE
VI IMEKO World Congress	1973	Dresden	GERMAN D. R.
VII IMEKO World Congress	1976	London	UNITED KINGDOM
VIII IMEKO World Congress	1979	Moscow	SOVIET UNION
IX IMEKO World Congress	1982	Berlin (West)	F. R. GERMANY
X IMEKO World Congress	1985	Prague	CZECHOSLOVAKIA
XI IMEKO World Congress	1988	Houston/Texas	USA
XII IMEKO World Congress	1991	Beijing	P. R. CHINA
XIII IMEKO World Congress	1994	Torino	ITALY
XIV IMEKO World Congress	1997	Tampere	FINLAND
XV IMEKO World Congress	1999	Osaka	JAPAN
XVI IMEKO World Congress	2000	Vienna	AUSTRIA
XVII IMEKO World Congress	2003	Dubrovnik	CROATIA
XVIII IMEKO World Congress	2006	Rio de Janeiro	BRAZIL
XIX IMEKO World Congress	2009	Lisbon	PORTUGAL
XX IMEKO World Congress	2012	Busan	REPUBLIC of KOREA
XXI IMEKO World Congress	2015	Prague	CZECH REPUBLIC
XXII IMEKO World Congress	2018	Belfast	UNITED KINGDOM
XXIII IMEKO World Congress	2021	Yokohama	JAPAN

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eurolab aisb



IMEKO TC10 Conference
Fraunhofer IPK, Berlin,
3-4 Sept. 2019
Álvaro S. Ribeiro

 **Full members**

-  Austria
-  Belgium
-  Bulgaria
-  Croatia
-  Cyprus
-  Czech Republic
-  Denmark
-  Finland
-  France
-  Germany
-  Greece
-  Iceland
-  Italy
-  Netherlands
-  Poland
-  Portugal
-  Romania
-  Spain
-  Sweden
-  Switzerland
-  UK

 **Associated members**

-  FYROM
-  Turkey
-  Lebanon

 **International affiliates**

-  South Africa
-  USA

 **Observer members**

-  HMD (Croatia)

eurolab

**Representing since 1990
Testing, Measurement and
Calibration Laboratories.**

**21 Full Members,
3 Associated Members,
1 Observer Member and
2 International Affiliates**

The background of the slide features a blurred image of several laboratory glassware items, including Erlenmeyer flasks and graduated cylinders, some containing liquids. The glassware has various markings and labels, such as '1733' and '10/12'.

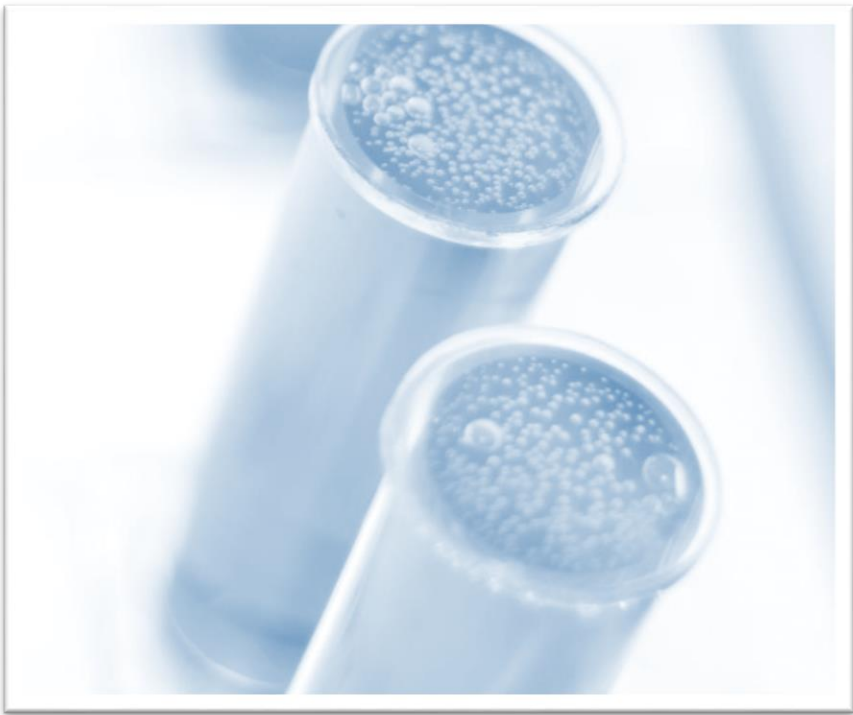
eurolab

Grouping over 3 000 conformity
assessment bodies and representing
over 150 000 technical experts
and laboratory practitioners.

Objectives

- ✓ Representation of laboratories regarding political and technical issues on the European scene and worldwide
- ✓ Coordination by interfacing with European organisations striving to avoid duplication of efforts and activities.
- ✓ Exchange of information and experience
- ✓ Promoting cost-effective testing, calibration and measurement services, with adjusted accuracy and quality assurance





EUROLAB Members Activities

Environment

Construction and built environment

Metrology & Calibration

Agriculture & Food

Consumer goods

Manufacturing

Energy

Transportation

Clinical

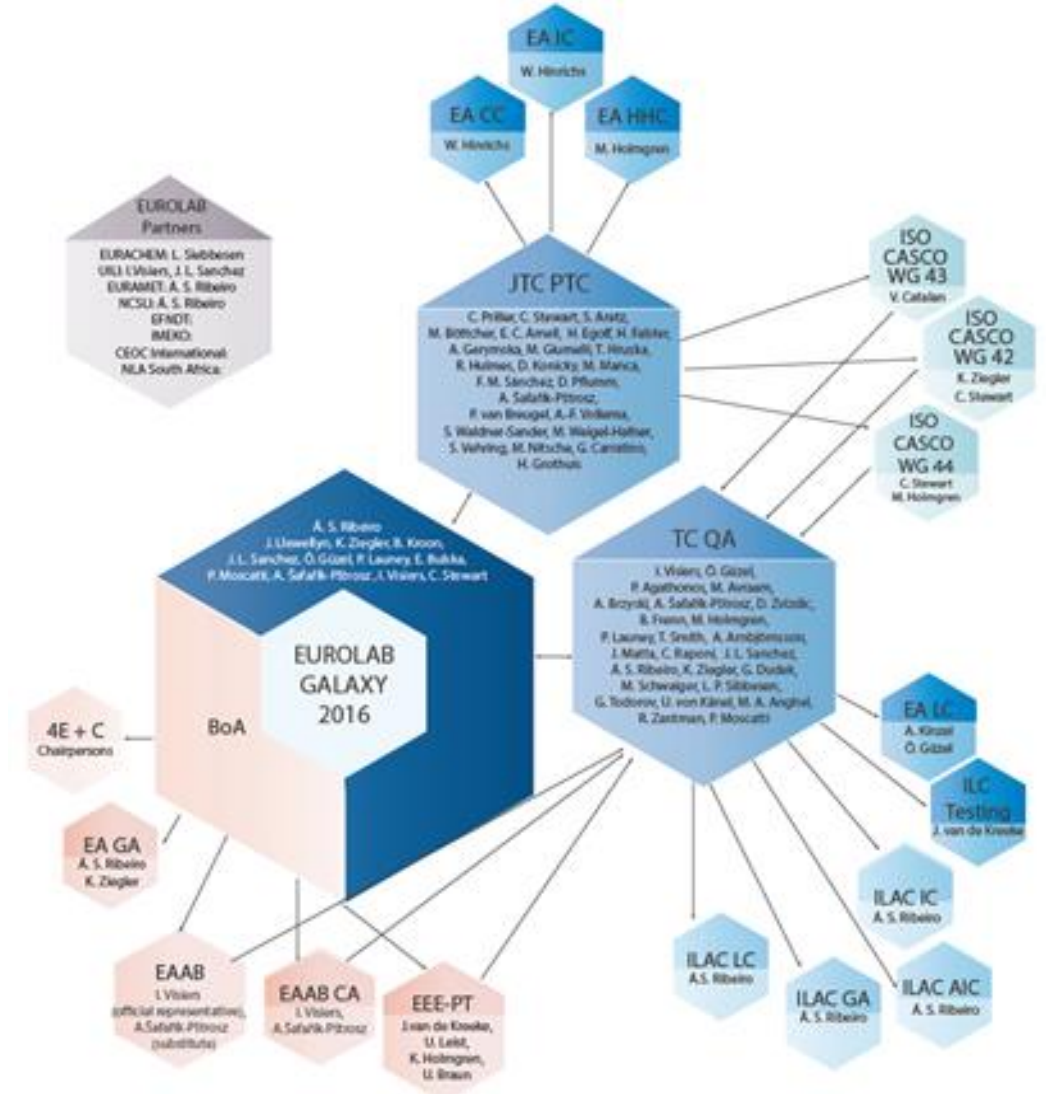
Pharmaceutical

Forensic

Biomedical



euro lab



euro lab

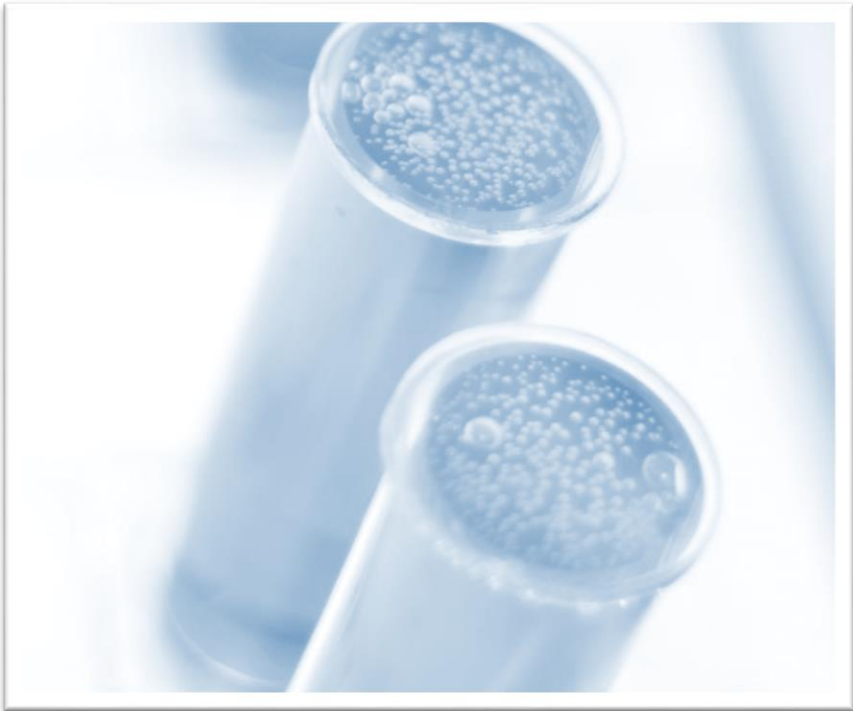


Image & Communication

Projects & Events sponsored



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**Testing & Measurement
provide Safety
and Quality of Life.**

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Thank you for your attention!

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CENTRE OF
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Excellence in Research and Innovation

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

MTA SZTAKI – Introduction

- **Established in 1964**
- **EU Centre of Excellence in IT, Computer Science and Control**
- Basic and applied research
- Contract-based **R&D&I** activity mainly on complex systems, turnkey realizations
- Transferring up-to-date results to industry and universities
- **Centre of Excellence for Production Informatics and Control (EPIC)**
- **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
- **Key figures**
- **Budget**
 - **11** MEuros/year
 - **~30%** basic funding
- **Staff**
 - **~250** (FTE)
 - **~110** with scientific degree, **~60** MSc., **~60** BSc.
 - **6** members of the Hungarian Academy of Sciences
 - **12** with DSc degree
 - **70+** with PhD degree
 - **~15** members in Hungarian Academy of Engineering

Organizational structure

Laboratories

- **Computational Optical Sensing and Processing Laboratory**
- **Systems and Control Laboratory**
- **Laboratory of Parallel and Distributed Systems**
- **Machine Perception Research Laboratory**
 - *Group of Shared Virtual Reality*
- **Research Laboratory on Engineering & Management Intelligence**
 - *Group of Operations Research and Decision Systems*
- **Informatics Laboratory**
 - *Data Warehousing and Business Intelligence Group*
 - *Research Group for Human Language Technologies*
 - *Research Group for Parameterized Algorithms and Complexity*
 - *Theory of Computing Research Group*

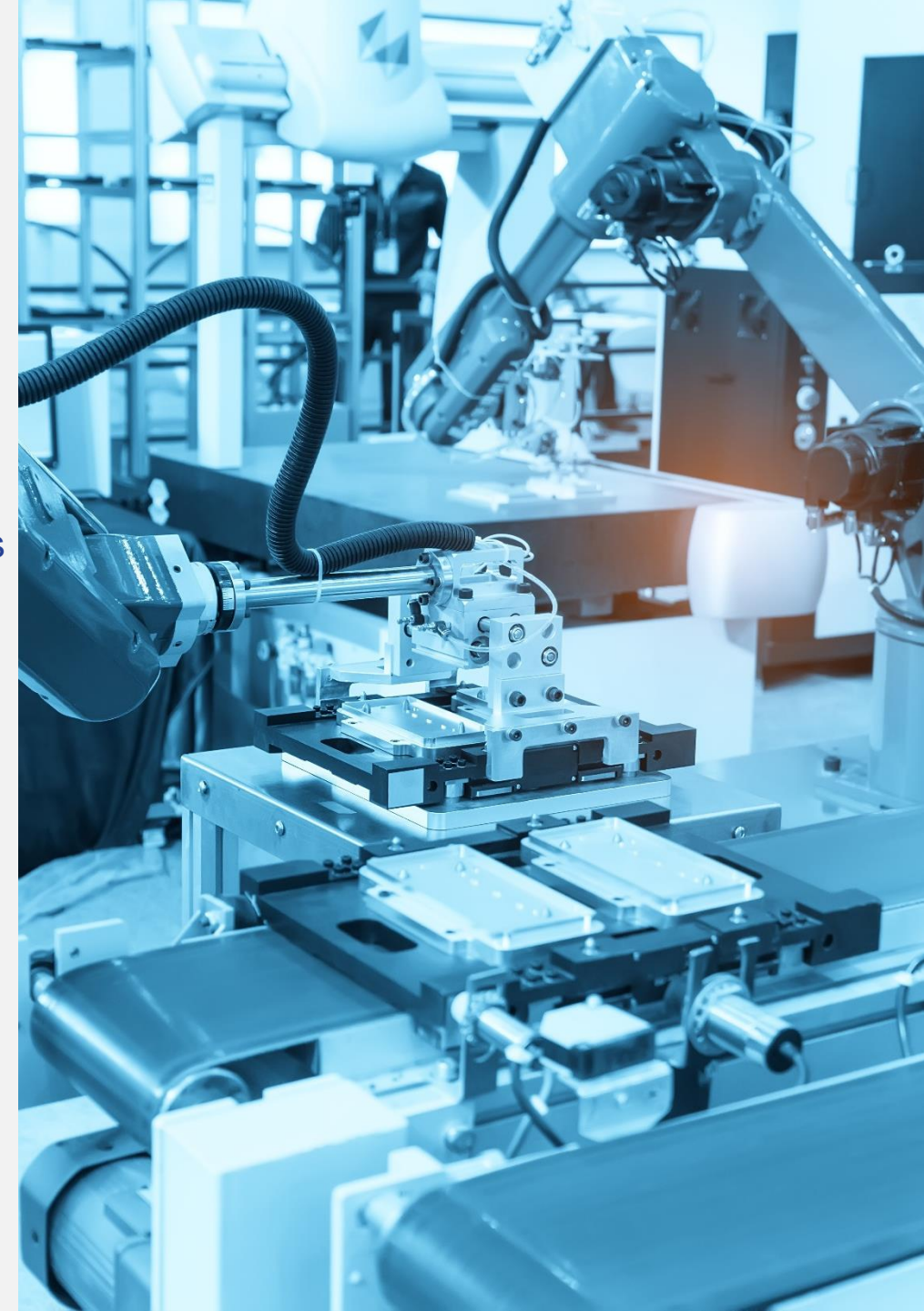
Departments

- **Department of Distributed Systems**
- **Department of Network Security and Internet Technologies**
- **eLearning Department**



Engineering and Business Intelligence

- Operations research and scheduling theory
- Cooperative planning and control
- Mathematical and constraint programming
- Adaptive, stochastic resource management
- Artificial intelligence and machine learning
- Agent-based (holonic) systems
- Complex geometrical reasoning
- CIM, IMS
- Robotics
- Process planning
- Production planning and logistics
- Production network management
- Logistics and inventory management
- Manufacturing Execution Systems (MES)
- Digital Factories
- Diagnosis and maintenance



Industry 4.0 National Technology Platform in Hungary

Organization:

- 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

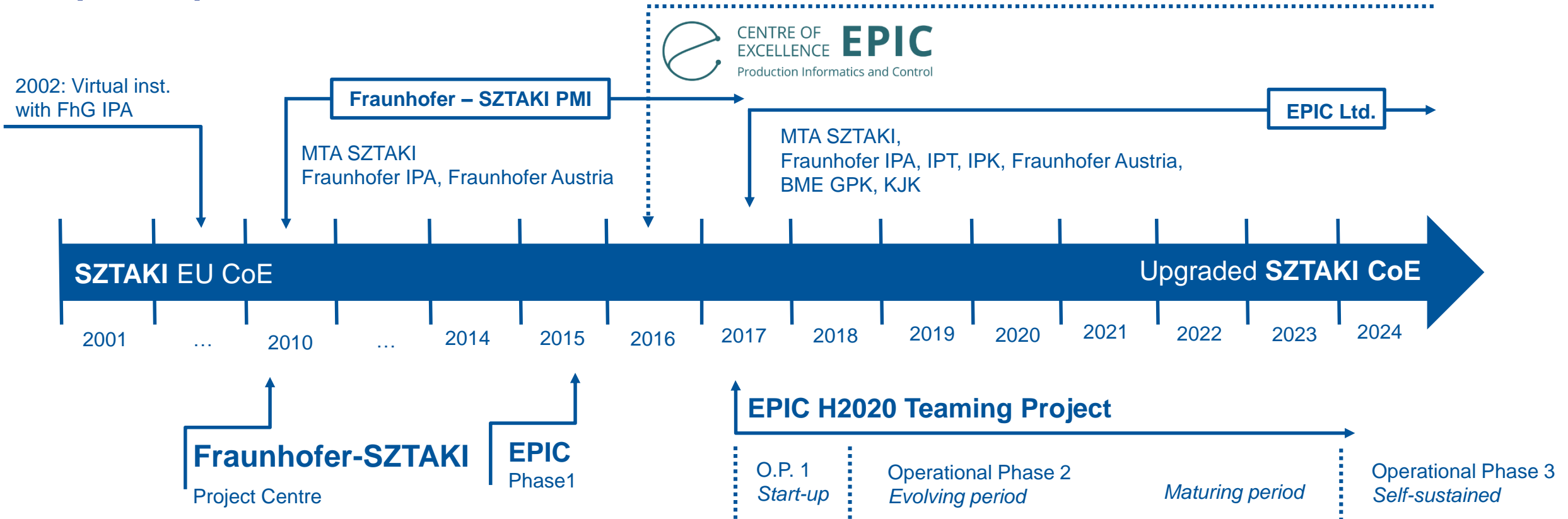
Membership:

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

IPAR 4.0
NATIONAL TECHNOLOGY PLATFORM

www.i40platform.hu/en

Centre of Excellence for Production Informatics and Control (EPIC)



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Hosting Institute





Tuesday, 3rd of September, 2019

16th IMEKO TC10 Conference

Welcome to Production Technology Center Berlin

Eckhard Hohwieler

Head of Department Production Machines
and Systems Management

Director Head Office »Berlin Center for
Digital Transformation«

Fraunhofer Institute for Production
Systems and Design Technology IPK

PTZ BERLIN
Two Institutes - One Roof

Application-oriented
research

Fundamental research





Corporate Management



Virtual Product Creation



Production Systems



Joining and Coating Technology



Automation Technology

Sustainable Corporate Development



Industrial Information
Technology



Machine Tools and
Manufacturing Technology



Joining Technology



Industrial Automation
Technology





Prof. Dr.-Ing. H. Kohl



Prof. Dr.-Ing. H. Kohl



Prof. Dr.-Ing. R. Stark



Prof. Dr.-Ing. R. Stark



Prof. Dr. h. c. Dr.-Ing.
E. Uhlmann



Prof. Dr. h. c. Dr.-Ing.
E. Uhlmann



Prof. Dr.-Ing.
M. Rethmeier



Prof. Dr.-Ing.
M. Rethmeier



Prof. Dr.-Ing. J. Krüger



Prof. Dr.-Ing. J. Krüger





Corporate Management



Virtual Product Creation



Production Systems



Joining and
Coating Technology



Automation Technology

**Managing
companies**

Developing products

**Manufacturing products ...
... with innovative
manufacturing technologies,**

**... machine tools and
tools,**

**... and automated
methods**

Sustainable
Corporate Development

Industrial
Information Technology

Machine Tools and
Manufacturing Technology

Joining Technology

Industrial Automation
Technology





Production Technology Center

Facts and figures

- 1986 IWF and IPK move into PTZ
- > 650 employees
- More than 90 test areas and 10 special laboratories on about 9 500 m²
- Budget of 33 million Euros
- Spin-offs and start-ups by 12 % of former staff members





The Fraunhofer-Gesellschaft undertakes applied research of direct utility to private and public enterprise and of wide benefit to society.

Our Customers:

- Industry
- Service sector
- Public administration



The Fraunhofer-Gesellschaft

Europe's Largest Organization for Applied Research



Headquarters in Munich

- Founded in 1949 in Munich
- 73 institutes and research units in Germany
- More than 26,500 employees
- Annual budget is about € 2.3 billion.
Of this sum, more than € 2 billion is generated through contract research.
- Representative offices, research units, and subsidiaries worldwide



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DESIGN TECHNOLOGY

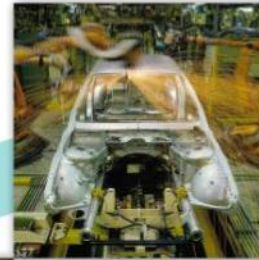


INSTITUTE MACHINE TOOLS
AND FACTORY MANAGEMENT
TECHNISCHE UNIVERSITÄT BERLIN

From Idea to Practice : Who stands wherefore?

3. Industrial application

■ **Companies**



implements application-ready solutions in the **economy**.

2. Application-oriented research

■ **Industrial research centers**

■ **Fraunhofer Institutes**



transfers basic innovations to the **application stage** and creates **prototypical solutions**.

1. Basic research

■ **Universities**

■ **Helmholtz Centers**

■ **Max Planck Institutes**



creates **basic innovations**.

The Research Profile of Fraunhofer



- Innovation Research (new in 2017)
- Information and Communication Technology
- Life Sciences
- Microelectronics
- Light & Surfaces
- **Production**
- Materials and Components
- Defense and Security

Berlin Center for Digital Transformation

**Pioneers
for new business models**

**Enabler
for Startups**

**Business transformation
along the entire
digitization chain**

**Technological basis
for digitization in Berlin,
Germany and worldwide**

Internet of Things



**IoT-Showroom,
IoT Lab
IoT Test Center**

FOKUS

5G Testbed



**Development and test
environment for
5G-Technologies**

HHI

Industrie 4.0 Lab



**Digitally integrated
Production**

IPK

Hardware for CPS



**System Kit for
Cyber Physical Systems**

IZM

**Thank you
for your kind attention!**

I wish us all interesting lectures and stimulating discussions!



Dipl.-Ing. Eckhard Hohwieler

Fraunhofer Institute for
Production Systems and Design Technology
Pascalstr. 8-9
10587 Berlin
eckhard.hohwieler@ipk.fraunhofer.de





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Operational conference information

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

Chairperson, IMEKO TC10 on Testing, Diagnostics & Inspection

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SPECIAL ISSUE

Selected papers of the conference will be invited to the Measurement and ACTA IMEKO Special Issues. All submitted papers will undergo a regular peer review process. The manuscript MUST be significantly extended beyond the IMEKO TC10 conference paper.

ISBN: 978-92-990084-1-6

<http://www.imekotc10-2019.sztaki.hu/>

Editors: Dr. Zsolt János Viharos and Prof. Lorenzo Ciani

SCIENTIFIC TOPICS

- T1 - Basic principles and development trends in testing, diagnostics and inspection
- T2 - Condition monitoring and maintenance of industrial processes, plants and complex systems: measurements and methods
- T3 - Testing, diagnostics, inspection and prognostics for maintainability, safety, risk assessment and management
- T4 - Regulatory framework (for safety of industrial products, food protection, environmental protection, health protection, customer protection, information security etc.)
- T5 - Data Analytics, artificial intelligence techniques and machine learning for testing, diagnostics and inspection
- T6 - Testing, diagnostics and inspection applications in industry, transportation, mechatronics, avionics, automotive, food and biomedical fields
- T7 - Decision support and IT solutions for testing, diagnostics and inspection
- T8 - Testing, diagnostics and inspection for the improvement of quality of life and environment
- T9 - Product conformity assessment and process analysis
- T10 - Certification (products, management systems, persons) and accreditation
- T11 - Traceability in testing, diagnostics and inspection
- T12 - Measurements and methods for TQM (Total Quality Management);
- T13 - Technical testing, diagnostics and inspection for Cyber security
- T14 - Non-destructive testing, diagnostics and inspection
- T15 - Diagnostics and Monitoring with Cyber Physical Systems
- T16 - Fog, Edge and Cloud infrastructure for distributed diagnostics, inspection and monitoring
- T17 - Industry 4.0 foundations, applications, trends and novelties

16th IMEKO TC10 Conference

“Testing, Diagnostics & Inspection as a comprehensive value chain for Quality & Safety”

ORGANISATION

General Chairs

Dr. Zsolt János Viharos

Chairperson of the IMEKO TC10 on Testing, Diagnostics & Inspection
President of the Hungarian National IMEKO Committee
Centre of Excellence in Production Informatics and Control, Institute for Computer Science and Control of the Hungarian Academy of Sciences (MTA SZTAKI), Budapest, Hungary
Research Laboratory on Engineering and Management Intelligence
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Prof. Álvaro Silva Ribeiro

President EUROLAB aisbl, Brussels, Belgium
Head of Hydraulics Metrology Laboratory, National Laboratory for Civil Engineering (LNEC), Lisbon, Portugal
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16th IMEKO TC10 Conference

“Testing, Diagnostics & Inspection as a comprehensive value chain for Quality & Safety”

TECHNICAL PROGRAMME CHAIRS

General Chair

Prof. Lorenzo Ciani

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Prof. Kurt Ziegler

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16th IMEKO TC10 Conference

“Testing, Diagnostics & Inspection as a comprehensive value chain for Quality & Safety”

International, Technical Programme Committee Members

MSc. Biserka Bajzek Brezak	(CRO)
Dr. Jozsef Beinschroth	(HUN)
Prof. Yakov BenHaim	(ISR)
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Dr. Oleg Bushuev	(RUS)
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Dr. Justinas Janulevicius	(LTU)
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Prof. Laszlo Monostori	(HUN)
Dr. Emanuela Natale	(ITA)
Dr. Michael Nitsche	(DEU)
Ing. Gabriele Patrizi	(ITA)

16th IMEKO TC10 Conference

“Testing, Diagnostics & Inspection as a comprehensive value chain for Quality & Safety”

Prof. Armin Pavic	(CRO)
Prof. Nedjeljko Peric	(CRO)
Prof. Helena Geirinhas Ramos	(PRT)
Prof. BKN. Rao	(GBR)
Prof. Artur Lopes Ribeiro	(PRT)
MSc. Balázs Scherer	(HUN)
Dr. Oleksandr I Shevchenko	(UKR)
Dr. Lauryna Siaudinyte	(LIT)
Prof. Ephraim Suhir	(USA)
Dr. Zsolt Szalay	(HUN)
Prof. He Zhengjia	(CHN)
Prof. Romauld Zielonko	(POL)

16th IMEKO TC10 Conference “Testing, Diagnostics & Inspection as a comprehensive value chain for Quality & Safety”

Local organisers

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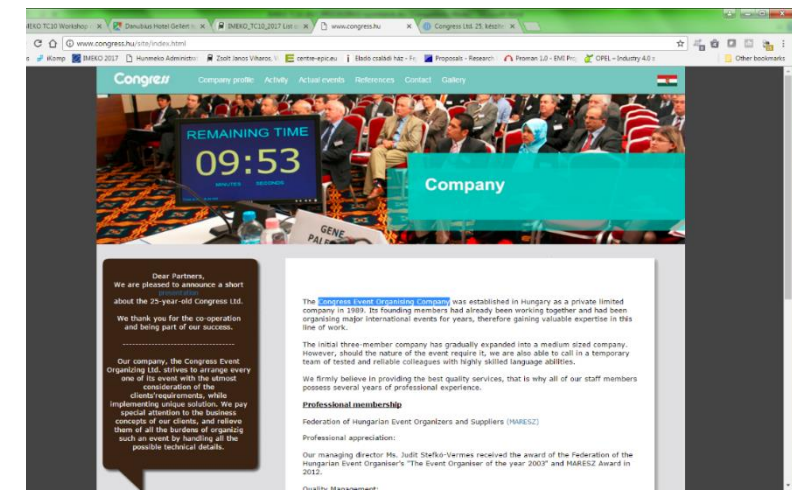
saskia.waldenburger@ipk.fraunhofer.de

Financial coordination

Stefkóné Vermes Judit

Congress Rendezvényszervező Kft., Budakeszi, Hungary

stefko.judit@congress.hu



16th IMEKO TC10 Conference

“Testing, Diagnostics & Inspection as a comprehensive value chain for Quality & Safety”

Scientific Keynote Lecturer

Prof. Dr. Horst Czichos

Professor of Mechatronics
University of Applied Sciences, BHT Berlin,
Germany



Presentation title: ***Fundamentals of Testing: the Role of Metrology, Sensors and Standards***

Horst Czichos, formerly President of BAM and EUROLAB, graduated in Precision Engineering and worked as design engineer in the optical industry. He holds degrees in Physics and in Materials Science. The University KU Leuven awarded him an honorary doctorate for his research in Tribology and in Technology Studies for European Research Programmes. Currently, he is Professor for Mechatronics at the University of Applied Sciences, BHT Berlin. He authored and edited several books, including the Springer Handbook of Metrology and Testing (Springer 2011), the Handbook of Technical Diagnostics (Springer 2013) and the Textbook Measurement, Testing and Sensor Technology (Springer 2018).

16th IMEKO TC10 Conference

“Testing, Diagnostics & Inspection as a comprehensive value chain for Quality & Safety”

INVITED KEYNOTE LECTURERS

Industrial Keynote Lecturer

Dr. Álvaro Silva Ribeiro

PhD in Tech. Physics
President of the BoA of EUROLAB aisbl and RELACRE
Vice-President of UILI
Head of the Metrology Division and Quality Manager at LNEC



Presentation title: ***Measurement uncertainty added value for experimental research and testing in civil engineering***

Álvaro Silva Ribeiro, President of the BoA of EUROLAB aisbl and RELACRE (Eurolab Portugal), Vice-President of UILI, graduated in Tech. Physics, MSc in Instrumentation, Industrial Maintenance and Quality and PhD in Tech. Physics. Currently, he is Head of Metrology Division and Quality Manager at LNEC (National Institute for Civil Engineering, Research Institute in Lisbon), with interests in Metrology (flow, temperature and humidity, geometric dimensions, force, mass and pressure), quality management systems, accreditation, mathematical modelling, numerical simulation and measurement uncertainty, and measurement quality of testing in civil engineering domains (bridges, dams, seismic infrastructures and others). He is founder of the Portuguese Society for Metrology and member of the Portuguese Society of Physics, being author of a large number of publications in these fields of knowledge. He is member of several international committees and member of EURAMET Research Council.

16th IMEKO TC10 Conference “Testing, Diagnostics & Inspection as a comprehensive value chain for Quality & Safety”

VENUE

The conference is held in [Fraunhofer IPK, Institute for Production Systems and Design Technology](#), Pascalstraße 8-9, 10587 Berlin, Germany



16th IMEKO TC10 Conference “Testing, Diagnostics & Inspection as a comprehensive value chain for Quality & Safety”



Global trends in Testing, Diagnostics & Inspection for 2030.

Dubrovnik
Oct 19 - 22, 2020

Conference news

1. Call for abstracts published on our website. [Read and download!](#)
2. Our [first keynotes](#) released!
3. Imeko TC 10

Dear guests,

The International Measurement Confederation IMEKO, Technical Committee 10 on Testing, Diagnostics & Inspection and EUROLAB aisbl kindly invite you to attend the

17th IMEKO TC 10 Conference: "Global trends in testing, diagnostics & inspection for 2030" to be held in Dubrovnik, Croatia, on October 19-22, 2020.

It is the second conference jointly organized by IMEKO and EUROLAB aisbl with the aim to enhance the co-operation on global level. The participants will have an excellent opportunity to meet top specialists from all over the world with professional experience in industry, universities, research & development as well as in metrology, testing, inspection, diagnostics and certification. The conference is a forum for exchanging ideas



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Measurement, Testing and Analytical Laboratories

Invitation to next conference 2020

MSc Mladen Jakovčić
Croatian Metrology Society





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17th IMEKO TC 10 Conference

“Global trends in Testing, Diagnostics & Inspection for 2030”

Dubrovnik, Croatia, October 19-22, 2020.

<https://www.imekotc10-2020.com/>
info@imekotc10-2020.com

Global trends in Testing,
Diagnostics & Inspection
for 2030.

Dubrovnik, 2020.



Local organizer

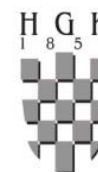


- founded 1980., >200 members
- XVII IMEKO World Congress Dubrovnik 2003.
- Activities (example 2018.)
 - 31 seminars in Croatia
 - 5 international seminars
 - four books
 - bulletin
 - two congresses
 - one conference...

With the support of:



REPUBLIC OF CROATIA
MINISTRY OF ECONOMY,
ENTREPRENEURSHIP
AND CRAFTS



HRVATSKA GOSPODARSKA KOMORA
CROATIAN CHAMBER OF ECONOMY



Global trends in Testing,
Diagnostics & Inspection
for 2030.

Dubrovnik, 2020.



Why Dubrovnik



- One of the most famous tourist destinations in the world - a stunning city with an amazing Old Town
- UNESCO World Heritage site since 1979.
- Average temperature in October: 22°C
- Average sea temperature in October: 20°C
- International airport with direct connections to all major European cities

Global trends in Testing,
Diagnostics & Inspection
for 2030.

Dubrovnik, 2020.





Dubrovnik Republic (1358 –1808)



Palace Sponza (1516.)

**„Fallere nostra vetant et falli pondera.
Meque pondero cum merces
ponderat ipse deus.”
("Our weights do not permit cheating.
When I measure goods, God
measures with me.")**

Global trends in Testing,
Diagnostics & Inspection
for 2030.

Dubrovnik, 2020.



Why Dubrovnik



- Orlando's Column (1418)
- Measuring 51.2 cm from the tip of the finger to the elbow, the right arm of the statue of Orlando was used a unit of measurement.
- 51.2 cm, so it is value slightly shorter than the ancient Nipur elbow of 51.83 cm (about 2650 BC)
- prof. Andrew J. Wallard (BIPM Director from 2004 to 2010) comparing his to Dubrovnik's elbow at the foot of the Orlando Pillar while visiting Dubrovnik in 2010.

Ruđer Bošković



Ruđer Bošković (1711 - 1787), was a Croatian mathematician, astronomer, surveyor, physicist and philosopher.



Nobel laureate and physicist Werner Heisenberg called him „Croatian Leibniz”.



Scientific topics

18 topics in three main group:

- testing
- diagnostics
- inspection

Global trends in Testing,
Diagnostics & Inspection
for 2030.

Dubrovnik, 2020.



Scientific topics

Group – Common

- Basic principles and development trends in testing, diagnostics and inspection
- Global market novelties and challenges for metrology and the TIC sector (Testing, Inspection and Certification)
- Competence and quality management in the TIC sector, scientific community and industry, and accreditation
- Risk management in the TIC sector
- Metrological traceability in testing, inspection and diagnostics
- Measurements, testing, inspection and diagnostics for industry 4.0
- Data analytics, artificial intelligence techniques and machine learning for testing, diagnostics and inspection
- Novelties and trends in digital transformation of processes
- Testing, diagnostics and inspection for the improvement of quality of life and environment
- Technical testing, diagnostics and inspection for cyber security

Global trends in Testing,
Diagnostics & Inspection
for 2030.

Dubrovnik, 2020.



Scientific topics

Group – Testing

- Measurement uncertainty
- Verification and validation of methods
- Inter-laboratory comparisons (ILC) and proficiency testing (PT) schemes

Group – Diagnostic

- Condition monitoring and maintenance of industrial processes, plants and complex systems: measurements and methods
- Condition monitoring training as a part of the university curriculum
- Quality assurance in condition monitoring

Group – Inspection

- New regulatory framework, standards and other normative documents for safety of industrial products, food safety, health and environmental protection
- Information management and privacy protection

Preliminary program

MONDAY Oct 19, 2020	TUESDAY Oct 20, 2020	WEDNESDAY Oct 21, 2020	THURSDAY Oct 22, 2020
Arrivals	Opening ceremony and plenary session	Parallel sessions	Parallel sessions
Workshops	Parallel sessions	Parallel sessions	Departures
Welcome cocktail	City tour	Conference dinner	

Registration fees

Global trends in Testing,
Diagnostics & Inspection
for 2030.
Dubrovnik, 2020.



	EARLY REGISTRATION FEE Before July 01, 2020	LATE REGISTRATION FEE After July 02, 2020
PARTICIPANTS	350,00 €	400,00 €
STUDENTS	180,00 €	220,00 €
ACCOMPANYING PERSONS	250,00 €	300,00 €

Extra paper fee: € 50.00

Additional on-site registration fee: € 100.00

Sponsorship & exhibitors opportunities

Sponsorship packages

- General sponsor : 8.000 €
- Golden sponsor : 5.000 €
- Silver sponsors : 3.000 €
- Bronze sponsors : 2.000 €
- Various advertising and branding opportunities (ADS, Bags, Lanyards, Flyers, Coffee Breaks, Presentations)

Packages include:

- Exhibition area
- Free entrance passes
- Branding possibilities
(Logo Display, Roll-Up Display, Printed ADS)



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Diagnostics & Inspection
for 2030.

Dubrovnik, 2020.



Accompanying Persons Programs

EXCURSION TO KONAVLE

Tradition and heritage



EXCURSION TO STON

The city of salt and oysters



Global trends in Testing,
Diagnostics & Inspection
for 2030.

Dubrovnik, 2020.



Hotel KOMPAS DUBROVNIK

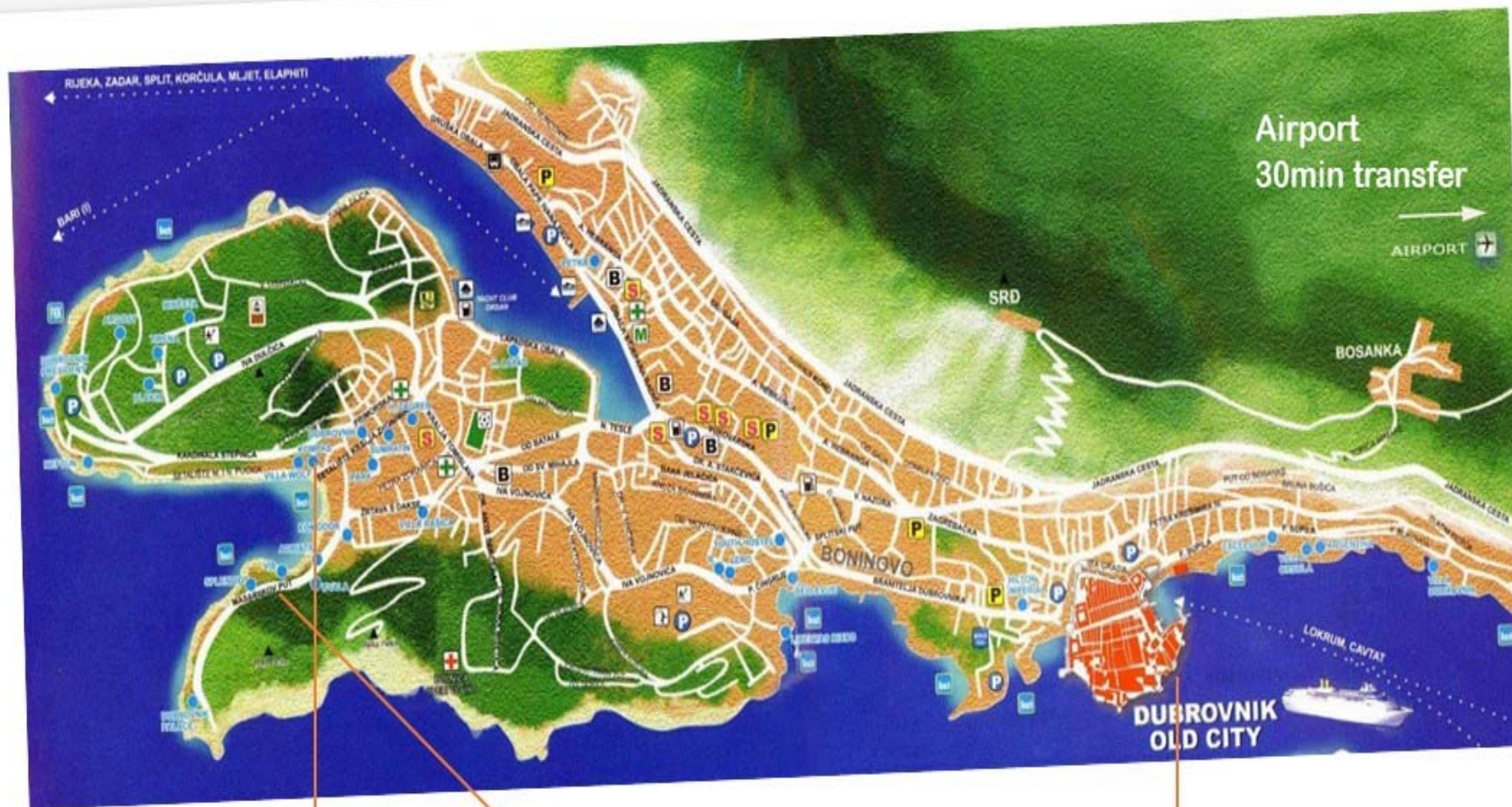


- a sensational seafront setting overlooking Lapad beach and the blue-green Adriatic
- great contemporary design
- a luxury spa
- outstanding dining and conference facilities

Global trends in Testing,
Diagnostics & Inspection
for 2030.

Dubrovnik, 2020.





HOTEL KOMPAS
 single room: EUR 135,00
 twin room: EUR 90,00
 (per person)

HOTELS: VIS, UVALA, ADRIATIC, KOMODOR
 single room: from EUR 60,00
 twin room: from EUR 40,00
 (per person)

DUBROVNIK OLD CITY
 10min by bus
 *BUS LINE NUMBER 6
 departing every 15 min.
 05:30 – 02:00



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Thank You for Your attention!!

<https://www.imekotc10-2020.com/>
info@imekotc10-2020.com



Global trends in Testing,
Diagnostics & Inspection
for 2030.

Dubrovnik, 2020.



Programme (<http://www.imekotec10-2019.sztaki.hu/programme.php>)

8:30-9:00	Registration
9:00-10:00	Welcome & Opening - IMEKO TC10 & EUROLAB aisbl leaders, Conference organisers
10:00-11:00	<i>Keynote presentation</i> Fundamentals of Testing: the Role of Metrology, Sensors and Standards Prof. Dr. Horst Czichos Professor of Mechatronics University of Applied Sciences, BHT Berlin, Germany
11:00-11:30	Coffee break
11:30-13:30	<i>Scientific session</i> Testing, diagnostics and inspection applications in industry, transportation, mechatronics, avionics, automotive, food and biomedical fields <i>Chair: Balázs Scherer</i>
	6 presentations
13:30-14:30	Lunch
14:30-16:10	<i>Scientific session</i> Industry 4.0 foundations, applications, trends and novelties, Certification and accreditation, Measurements and methods for TQM <i>Chair: Prof. Lorenzo Ciani</i>
	5 presentations
16:10-16:20	Coffee break
16:20-17:45	IMEKO TC10 on Testing, Diagnostics & Inspection Members Meeting - IMEKO TC10 Members and All interested participants
18:30-~21:00	Gala Dinner <i>Schnitzerei Charlottenburg Röntgenstraße 7b</i> 10587 Berlin (1000 m from the Conference Venue)

9:00-10:00	<i>Keynote presentation</i> Measurement uncertainty added value for experimental research and testing in civil engineering Dr. Álvaro Silva Ribeiro PhD in Tech. Physics President of the BoA of EUROLAB aisbl and RELACRE, Vice-President of UILI, Head of the Metrology Division and Quality Manager at LNEC
10:00-10:30	Coffee break
10:30-13:10	<i>Scientific session</i> Condition monitoring and maintenance of industrial processes, plants and complex systems: measurements and methods <i>Chair: Prof. Giulio D'Emilia</i>
	8 presentations
13:10-14:00	Lunch
14:00-16:20	<i>Scientific session</i> Data Analytics, artificial intelligence techniques and machine learning for testing, diagnostics and inspection, Traceability and Maintainability, safety, risk assessment and management <i>Chair: Prof. Eduard Egusquiza</i>
14:00-14:20	7 presentations
16:20-17:00	Closing and Award Ceremony - IMEKO TC10 & EUROLAB aisbl leaders, Conference organisers

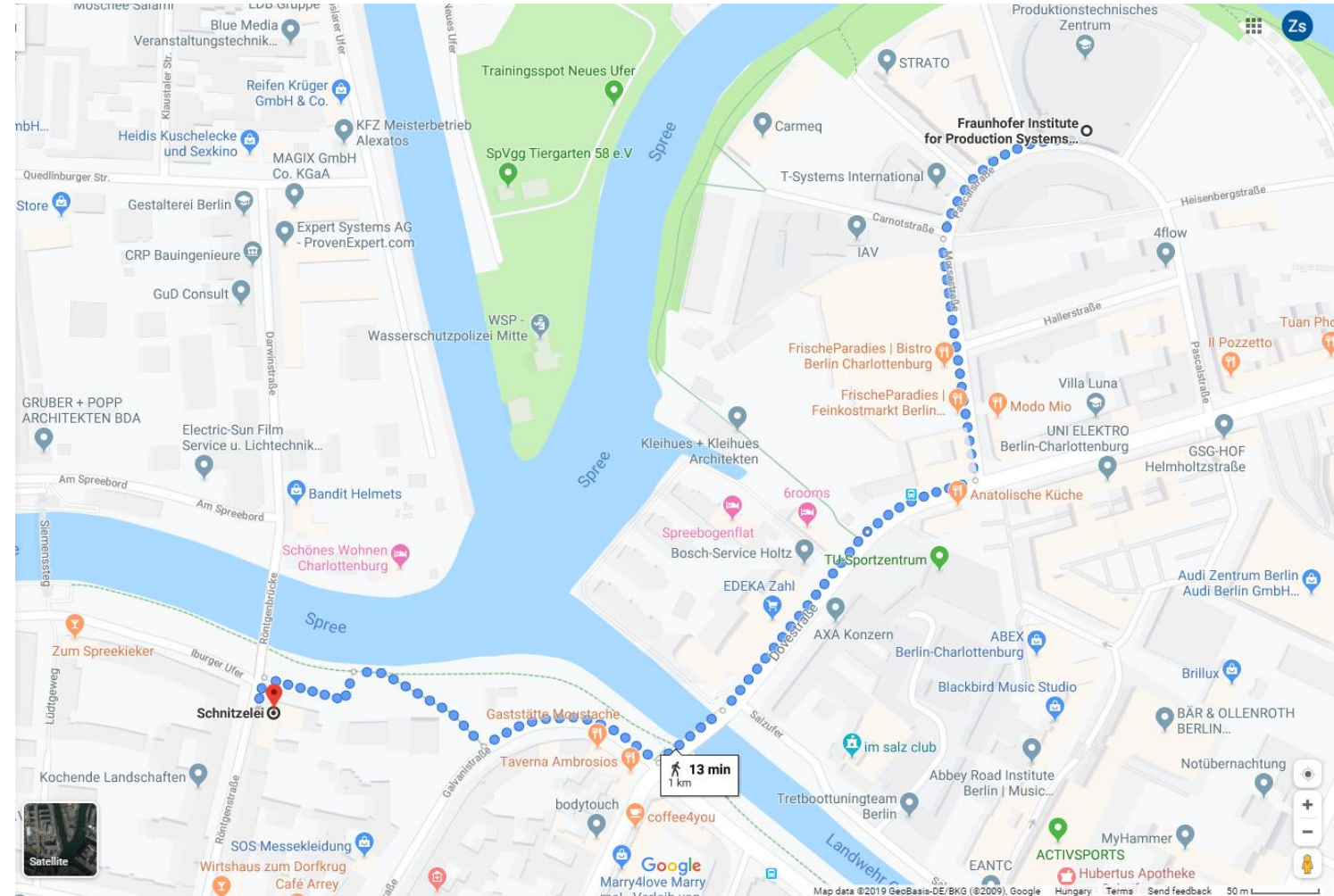
Time provided for the presentations is 15 minutes, followed by 5 minute discussion

16th IMEKO TC10 Conference “Testing, Diagnostics & Inspection as a comprehensive value chain for Quality & Safety”

GALA DINNER

Schnitzerei Charlottenburg

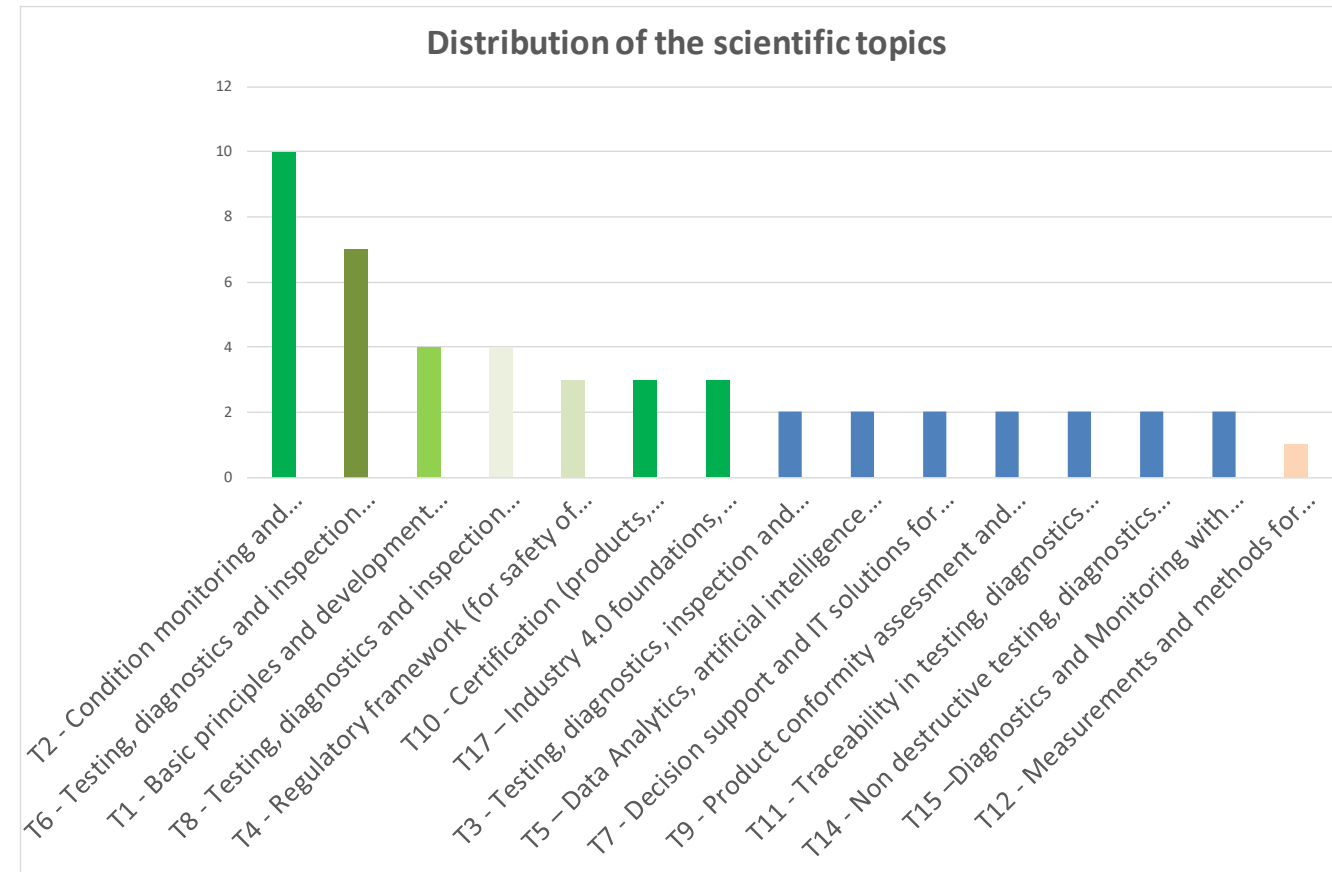
Röntgenstraße 7b, 10587 Berlin



Key scientific topics

(25 published papers, 10% rejection rate)

- **Condition monitoring and maintenance of industrial processes, plants and complex systems: measurements and methods**
- **Testing, diagnostics and inspection applications in industry, transportation, mechatronics, avionics, automotive, food and biomedical fields**
- **Data Analytics, artificial intelligence techniques and machine learning for testing, diagnostics and inspection, Traceability and Maintainability, safety, risk assessment and management**
- **Industry 4.0 foundations, applications, trends and novelties, Certification and accreditation, Measurements and methods for TQM**

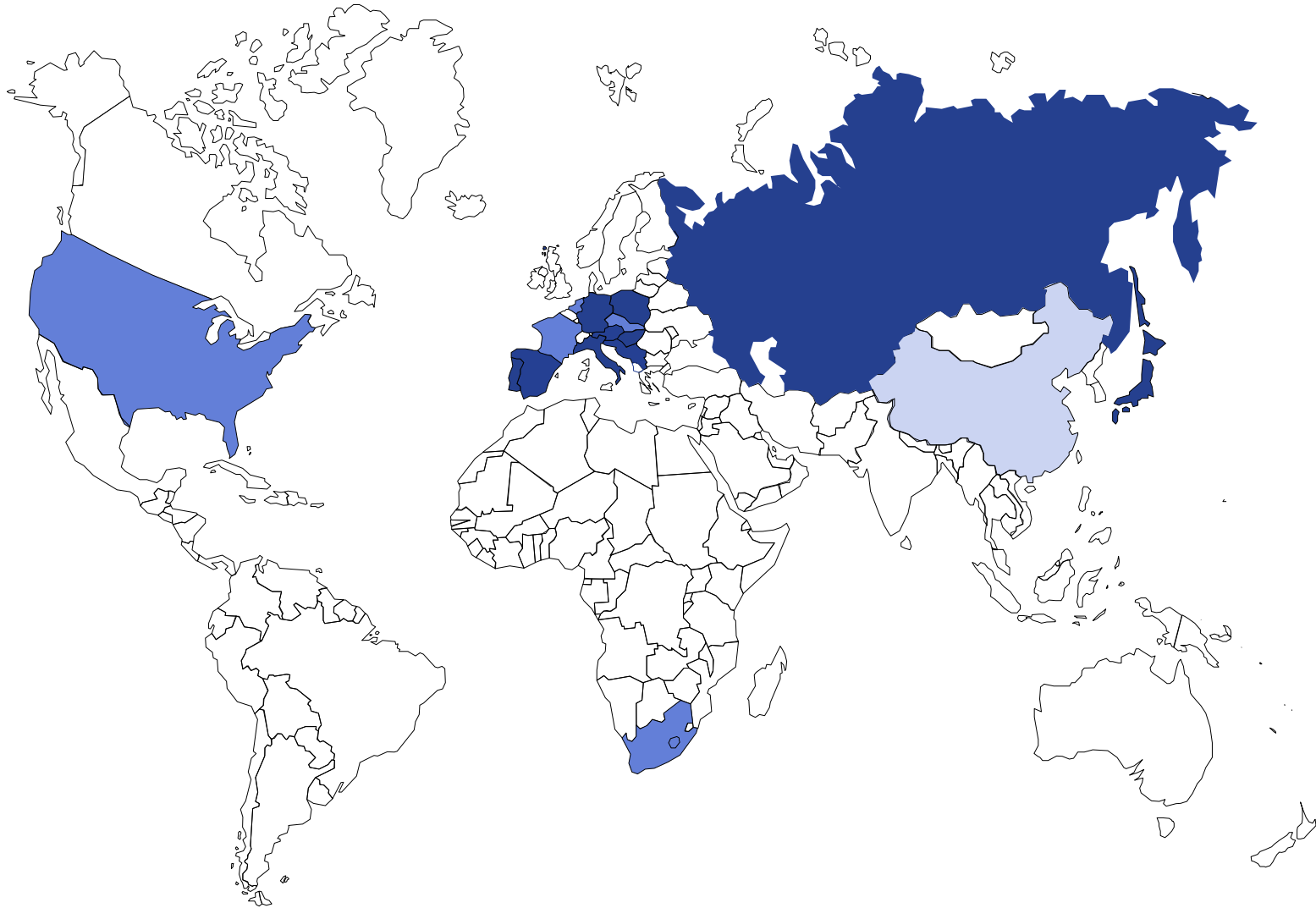


- Increase impact
- Collaboration potential
- Follow others' results

Participants (10 countries) – 45 participants

Authors (14 countries)

Visitors (1 country)



16th IMEKO TC10 Conference “Testing, Diagnostics & Inspection as a comprehensive value chain for Quality & Safety”

WORKSHOP AWARDS

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

To encourage the attendance of young researchers, an award will be given for the **Best Paper Authored and Presented by a Student**.



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TC10

Testing, Diagnostics & Inspection

03/09/2019
Tuesday



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

8:30-9:00	Registration
9:00-10:00	Welcome & Opening - IMEKO TC10 & EUROLAB aisbl leaders, Conference organisers
10:00-11:00	<i>Keynote presentation</i> Fundamentals of Testing: the Role of Metrology, Sensors and Standards Prof. Dr. Horst Czichos Professor of Mechatronics University of Applied Sciences, BHT Berlin, Germany
11:00-11:30	Coffee break
11:30-13:30	<i>Scientific session</i> Testing, diagnostics and inspection applications in industry, transportation, mechatronics, avionics, automotive, food and biomedical fields <i>Chair: Balázs Scherer</i>
11:30-11:50	RTOS aware non-intrusive testing of cyber-physical systems in HIL (Hardware In the Loop) environment - Balázs Scherer
11:50-12:10	Experimental analysis of IMU under vibration - Domenico Capriglione, Marco Carratù, Marcantonio Catelani, Lorenzo Ciani, Gabriele Patrizi, Roberto Singuaroli and Paolo Sommella
12:10-12:30	Magnetic Assisted Ball Burnishing of Magnetizable and Non-Magnetizable Materials - Zsolt Kovács, Zsolt Janos Viharos, János Kodacsy and Roland Sándor
12:30-12:50	Condition Monitoring of Wind Farm based on Wireless Mesh Network - Lorenzo Ciani, Alessandro Bartolini, Giulia Guidi and Gabriele Patrizi
12:50-13:10	Evaluation of material structure changing after ultrasonic milling of aluminium foam by Computed Tomography -CT - Janos Liska, Zsolt Ferenc Kovács, Ladislav Morovic, Ivan Buransky, Marcel Kuruc, Zsolt Janos Viharos and Michaela Kritikos
13:10-13:30	Experimental Investigation of Single Point Incremental Forming of Aluminium Alloy Foils - Imre Paniti, Zsolt Janos Viharos and Dora Harangozo
13:30-14:30	Lunch

14:30-16:10	<i>Scientific session</i> Industry 4.0 foundations, applications, trends and novelties, Certification and accreditation, Measurements and methods for TQM <i>Chair: Prof. Lorenzo Ciani</i>
14:30-14:50	The role of laboratories in the international development of accreditation - Álvaro Silva Ribeiro, Jeff Gust, A. Vilhena and J. Wilson
14:50-15:10	A New Perspective of the Cyber-Physical Production Planning System - Viola Gallina, Lukas Lingitz and Matthias Karner
15:10-15:30	Review of Methodologies for the Assessment of the Technological Capability of RTOs - Fabian Hecklau, Florian Kidschun, Sokol Tominaj and Holger Kohl
15:30-15:50	Industry 4.0 in Germany, Austria and Hungary: interpretation, strategies and readiness models - Gábor Nick, Viola Gallina, Ádám Szaller, Tamás Várgedő and Andreas Schumacher
15:50-16:10	Application of modern software engineering principles for continuous quality (CQ) management in research - Sascha Eichstädt, Bram van der Waaji, Björn Ludwig and Erik Langius
16:10-16:20	Coffee break
16:20-17:45	IMEKO TC10 on Testing, Diagnostics & Inspection Members Meeting - IMEKO TC10 Members and All interested participants
18:30-~21:00	Gala Dinner <i>Schnitzerei Charlottenburg</i> Röntgenstraße 7b 10587 Berlin 030 347 02 777 (950m from the Conference Venue)





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TC10

Testing, Diagnostics & Inspection

04/09/2019
Wednesday



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

9:00-10:00	<i>Keynote presentation</i> Measurement uncertainty added value for experimental research and testing in civil engineering Dr. Álvaro Silva Ribeiro PhD in Tech. Physics President of the BoA of EUROLAB aisbl and RELACRE, Vice-President of UILI, Head of the Metrology Division and Quality Manager at LNEC
10:00-10:30	Coffee break
10:30-13:10	<i>Scientific session</i> Condition monitoring and maintenance of industrial processes, plants and complex systems: measurements and methods <i>Chair: Prof. Giulio D'Emilia</i>
10:30-10:50	The long way to reliable inline production measurement in metal wire products manufacture - Wilfried Hinrichs
10:50-11:10	Hybrid approach and sensor fusion for reliable condition monitoring of a mechatronic apparatus - Giulio D'Emilia, Antonella Gaspari and Emanuela Natale
11:10-11:30	Product quality and cutting tool analysis for micro-milling of ceramics - László Móricz, Zsolt János Viharos, András Németh and András Szépligeti
11:30-11:50	Metrological Performances of Current Transformers Under Amplitude Modulated Currents - Yeying Chen, Giovanni D'Avanzo, Antonio Delle Femine, Daniele Gallo, Carmine Landi, Mario Luiso and Enrico Mohns
11:50-12:10	Design Approach for a Stand Alone Merging Unit - Giuliano Cipolletta, Antonio Delle Femine, Daniele Gallo, Carmine Landi and Mario Luiso
12:10-12:30	Multiple Heat Source Estimation by using Backward Simulator - Yukio Hiranaka
12:30-12:50	Challenges of dimensional quantification in CCTV inspection in drain and sewer systems - L. L. Martins, M. C. Almeida and A. S. Ribeiro
12:50-13:10	Application of Uncertainty Analysis to Experimental Reliability of Sensors by Thermal Shock Test - Giulio D'Emilia and David Delaux
13:10-14:00	Lunch

14:00-16:20	<i>Scientific session</i> Data Analytics, artificial intelligence techniques and machine learning for testing, diagnostics and inspection, Traceability and Maintainability, safety, risk assessment and management <i>Chair: Prof. Eduard Egusquiza</i>
14:00-14:20	A consensus ranking based proposal for combining data in adjustment of the fundamental physical constant values - Sergey Muravyov and Liudmila Khudonogova
14:20-14:40	Improving the Planning Quality in Production Planning and Control with Machine Learning - Lukas Lingitz, Alexander Gaal, Thomas Ryback and Viola Gallina
14:40-15:00	Remaining Useful Life Estimation of Industrial Circuit Breakers by Data-Driven Prognostic Algorithms Based on Statistical Similarity and Copula Correlation - Michy Alice, Dejan Pejovski and Loredana Cristaldi
15:00-15:20	Quality Improvement of Milling Processes Using Machine Learning-Algorithms - Maik Frye and Robert Heinrich Schmitt
15:20-15:40	Integration of Automated Structure Mechanic Analyses into Production Process Simulation - Michael Schmitz and Rainer Stark
15:40-16:00	A Novel Condition Monitoring Methodology Based on Neural Network of Pump-Turbines with Extended Operating Range - Weiqiang Zhao, Eduard Egusquiza, Carme Valero, Mònica Egusquiza, David Valentín and Alexandre Presa
16:00-16:20	Application of the fusion of regression machines for the analog circuit state identification - Piotr Bilski
16:20-17:00	Closing and Award Ceremony - IMEKO TC10 & EUROLAB aisbl leaders, Conference organisers





Enjoy our IMEKO TC10 conference

Contact:

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

Chairperson, IMEKO TC10 on Technical Diagnostics

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