IEEE Waveform Generation Measurement and Analysis Technical Committee (TC10)
Meeting Agenda
19 July 2022 / 11:00 AM – 1:00 PM (EDT)

1. Call to Order

2. Introductions and Roll Call

3. Approval of the Agenda

4. TC10 business
    a. eTools – questions, comments, concerns
    b. Quarter meetings – notifications, invitations
    c. New standards

5. Working Groups Updates
    a. Revision of IEE Std 181, IEEE Standard for Transitions, Pulses, and Related Waveforms
        i. Lead: Nick Paulter
    b. Revision of IEEE Std 1241, IEEE Standard for Terminology and Test Methods for Analog-to-Digital Converters
        i. Lead: Nick Paulter
    c. Revision of IEEE Std 1658, IEEE Standard for Terminology and Test Methods of Digital-to-Analog Converter Devices
        i. Lead: Luca DeVito
    d. Revision of IEEE Std 1696, IEEE Standard for Terminology and Test Methods for Circuit Probes
        i. Lead: John Jendzurski

6. Guest presentation
    a. KRUNO Miličević (see next page)

7. Adjourn

IEEE SA STANDARDS ASSOCIATION

Information on guest presentation

Title of presentation:

Digital transformation of metrology and possible technical solutions

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Presenter biography:

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Kruno Miličević was born in Lampertheim, Germany in 1980. He received the Dipl. Ing. degree in electrical engineering from the Faculty of Electrical Engineering Osijek in 2003 and PhD degree in electrical engineering in 2008. At the Faculty of Electrical Engineering, Computer Science and IT Osijek he has been working since 2004, as a full professor since 2018.

The areas of scientific work are electrical and magnetic measurements, measurement uncertainty, circuit theory, and the chaotic behaviour of nonlinear systems. Furthermore, he is involved in projects related to digitalization in general (Industry 4.0, smart cities), and the digital transformation of metrology, including the possible application of blockchain technology.

He is a member of:
- Croatian Metrology Society (https://www.hmd.hr/),
- Croatian Academy of Engineering (https://www.hatz.hr/hr/),
- IEEE Circuits and Systems Society, IEEE Instrumentation and Measurement Society
- IEEE Technical Committee TC-10 “Waveform Generation, Measurement and Analysis", IEC Technical Committee TC85 Working Group 22 "Measuring equipment for electrical and electromagnetic quantities"

As an evaluator, he participated in the accreditation of several domestic and international higher education institutions, study programs and scientific projects, and is active as a reviewer for major peer-reviewed international journals indexed in the Current Contents bibliographic database (see https://publons.com/author/489277/kruno-milicevic#profile).

In 2021 he co-founded a company Random Red (https://randomred.eu/).
He fluently speaks English and German language.

Abstract: Metrology is also exposed to the opportunities and challenges of information and communication technology, i.e. digital transformation. Namely, according to [1], some future trends are already apparent:

- the move to an increasingly paperless world;
- continued introduction of digitization in all areas;
- redefinition of the SI is likely to lead to increased availability of intrinsic standards;
- the "internet of things" will lead to increased size and complexity in measuring systems, with a proliferation of sensors; and
- artificial intelligence will become an increasingly important feature in the software of measuring instruments.

Thereby, the so-called FAIR+T approach is recommended for the data. It should be: Findable, Accessible, Interoperable, Re-usable, Traceable. Following those properties, a digital calibration certificate will replace the classic one [2], and it consequently must be defined so that it ensures broad interoperability in the metrology community – including all stakeholders in legal, scientific and industrial metrology.

Storage of this kind of digital recording can be decentralized via distributed ledger – blockchain – comprising some other interesting functionalities like immutability and the smart contracts mechanism typically used to automate an agreement's execution so that all participants can be immediately sure of the outcome, without an intermediary's involvement or time loss [3]. Smart contracts could be used for automated decision-making about (un)successful calibration processes and recording the decision on the blockchain in the form of a digital calibration certificate.

References:

[1] OIML and BIPM, "National Metrology Systems: Developing the institutional and legislative framework", 2021, https://www.bipm.org/documents/20126/42177518/National-Metrology-Systems.pdf

[2] Physikalisch-Technische Bundesanstalt (PTB), Digital Calibration Certificate - DCC, https://www.ptb.de/cms/en/research-development/into-the-future-with-metrology/the-challenges-of-digital-transformation/kernziel1einheitlichkeitim/digital-calibration-certificate-dcc.html, 14.5.2022.

[3] IBM, "Smart contracts defined", 2021, https://www.ibm.com/topics/smart-contracts