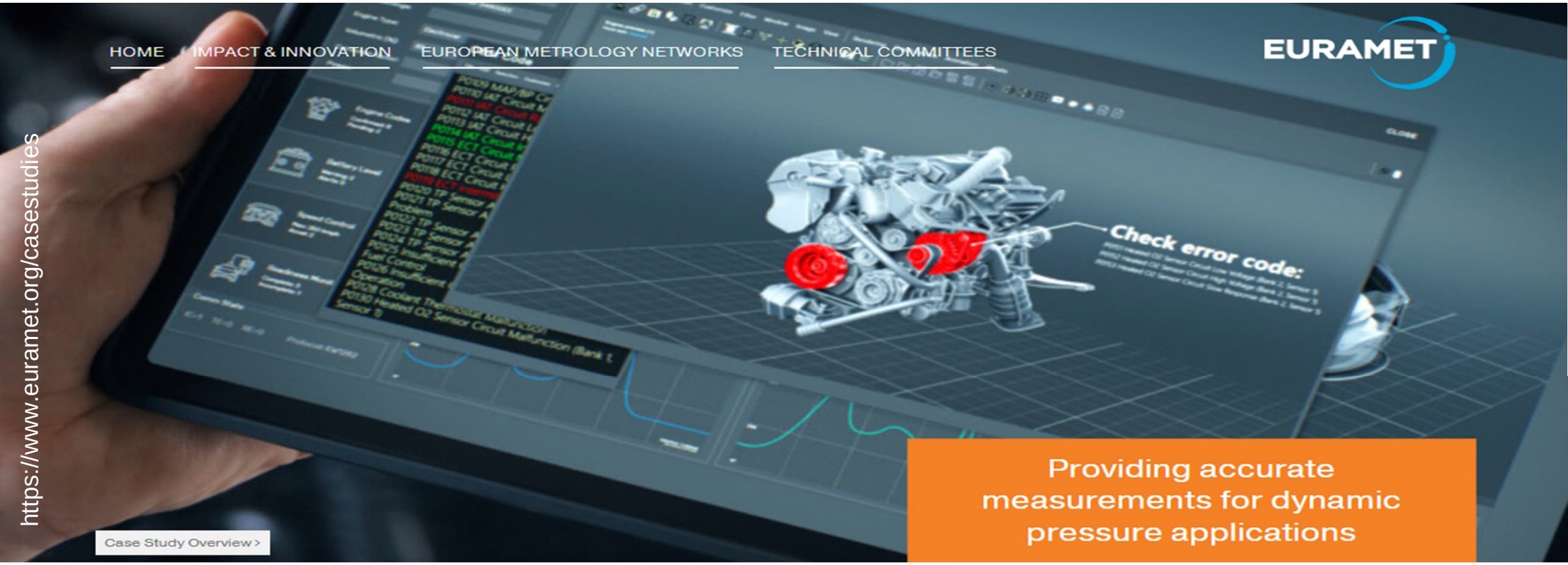
Metrologiatutkimuksen ajankohtaiset asiat

Martti Heinonen, MNK 12.12.2024

Ajankohtaisasiat

- Metrologiatutkimuksen vaikuttavuus
- Metrisopimuksen 150 v. juhlistaminen
- VTT MIKES siirtyy VTT:n organisaatiossa



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Challenge

It has been estimated that improvements in engine designs have the potential to reduce fuel consumption by 30%, representing a significant impact both on cost and the environment.

In industrial settings, pressure sensors are only calibrated with static standards that do **not match the dynamic nature** of ICE – leading to measurement **errors of 10% or more**.

Solution

During the DynPT project VTT MIKES and **Testo Industrial Services** designed and constructed a novel secondary pressure standard for dynamic calibrations

Impact

Testo Industrial services GmbH is an ISO 17025 accredited company that calibrate measurement instruments for a wide range of European industries.

At the end of the DynPT project Testo and VTT continued to work together on the dynamic pressure calibrator, performing tests of various commercial static pressure sensors.

Testo is now offering one of the first services for dynamic calibrations in Europe. Not only will such services lead to improvements in engine efficiencies, safety in areas such as ammunition and explosion testing, but also allow the development of new and improved dynamic sensors.

Standard to certify zero gas purity

Challenge

The 2008 Air Quality Directive and related legislation measurably improved Europe's air quality. For example, a 2018 analysis noted a 54 % reduction in early deaths due to nitrogen dioxide (NO2) pollution. Nonetheless, almost all Europeans remained exposed to polluted air, at the cost of 400,000 premature deaths a year in the EU-28, about 54,000 attributable to NO_2.
About 8000 stations provide guaranteed measurements of gas pollutants, down to extremely low, parts per billion (ppb), levels. **Critical to accuracy are reference 'zero gases'**: nitrogen or (synthetic) air used to set zero-points for analytical instruments, or dilute gas samples. Reliable accuracy could only be as good as the quality of zero gas used; **contaminants even at ppb levels** could compromise comparability, particularly where impurities matched compounds analysed.

Solution

The project team proposed a revision of ISO 19229 withprocedures for accurately determining zero gas impurities that was accepted by ISO Technical Committee TC158 Gas Analysis.

A draft was presented to working group members that, with iterations, was accepted as Committee Draft ISO 19229 in 2017. In February 2018 this was submitted by the TC158 secretariat for voting by member states and accepted for publication.

Impact

In July 2019, the **second edition of ISO 19229 was published** with clear guidance on conducting experiments supporting zero gas preparation and gas analyser calibration quality, with examples from MACPoll..

Likewise, progress was made to enhance CEN standards for measuring air pollution gases.

A formalised Certification Protocol, with examples, enabled the delivery of accurate and unambiguous Zero Gas Calibration Standards, supporting opportunities for gas and equipment suppliers to better serve Europe's air monitoring networks.

Ultimately, increased confidence in the accuracy of monitoring data will enable regulators to apply targeted strategies for air pollution abatement and contribute **to cleaner air for European citizens.**

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Metrology to protect the high voltage grid

Challenge

Electrical losses are one of the main contributors to operational costs in power networks. To minimize this network operators are transitioning from high voltage alternating current (HVAC) to more efficient high voltage direct current (HVDC).

Partial Discharge (PD) measurements, detailed in the international standard IEC 60270, are designed to assess condition of grid components but the applicability of these techniques to HVDC grids had not been examined.

Many modern PD calibrators have a lowest electrical charge level of 0.1 pC. However, no National Metrology Institute could provide traceable calibration services for PD calibrators below 0.5 pC. **If unaddressed this could result in a failure in detecting PD events, potentially disrupting power supplies.**

Solution

To cover lower PD levels below 1 pC, a new approach based on charge sensitive amplifier was developed. Results indicated that for measurements below 100 pC laboratories using the new charge amplifier method were able to significantly lower their calibration uncertainties. In addition, the low noise level of the new technique enabled extending the lowest calibration range from c. 1 pC down to 0.01 pC.

Impact

OMICRON Calibrations is an independent ISO/IEC 17025 accredited laboratory that performs calibrations on OMICRON Electronics testing equipment and provides high-precision multiphase power and AC/DC PD measurements for external clients.

OMICRON Calibrations predict that this work, demonstrating the accuracy and traceability of the company's PD calibrators**, will set them apart from competitors and open new markets.** The improved methods for PD measurements have since **contributed to the revision of IEC 60270, enabling the better detection of PD discharge events in HVDC electricity networks.**

Metre Convention 150 years - Suomessa

- Tapahtuma MIKES-talossa to 15.5.2025
  - Kohderyhmänä erityisesti MIKESin (ja DI:n) asiakkaat ja sidosryhmät
  - Ohjelma

    9.30 – 12.00 Seminaari

    12.00 – 13.00 Omakustanteinen lounas

    13.00 – 16.00 Monimuotoista tapahtumaa (mm. suurekohtaisia keskusteluja)
- Tiedotus
  - Lehdistotiedote
  - Martin blogi
  - VTT MIKES Newsletter
  - SOME-kampanja (yhdessä DI:n kanssa?)
    - sarja juttuja, joissa esitellään suureita ja niiden realisointia ja palveluja
    - koko toukokuun ajan
  - Tiedotus CEMIS-juhlaseminaarissa 27.5.2025, Martti
- Muuta?

Metre Convention 150 years - Ranskassa

CELEBRATING BIPM 150 1875 – 2025

Join the Celebration – 150 Years of the Metre Convention!

In 2025, the global metrology community is coming together to celebrate the 150th anniversary of the Metre Convention, which established the BIPM, one of the world's oldest international organizations.

We invite you to join us for this historic milestone!

20 May 2025 Programme
UNESCO Headquarters, Paris

21-22 May 2025 Programme
Palais des Congrès, Versailles

VTT MIKES siirtyy VTT:n organisaatiossa
Tällä hetkellä

Sustainable products and materials

Carbon neutral solutions

Digital technologies

VTT MIKES

VTT MIKES siirtyy VTT:n organisaatiossa 1.1.2025 alkaen

Sustainable products and materials

Carbon neutral solutions

Digital technologies

VTT MIKES

- Toiminnan suunnittelu fokusoidaan puhtaasti kansalliseen metrologiatehtävään
- Selkeä toiminnan ja rahoituksen kommunikointi