Consultative Committee for Photometry and Radiometry (CCPR)

25th Meeting (on-line 10-11 May 2022)

CCPR member report on activities in radiometry and photometry since the last CCPR meeting (2019)

Reply from: VSL

Delegate: Paul Dekker

1. Summarize the recent progress in your laboratory with respect to measurement standards, research projects, and metrology services to fulfill the demands of customers in:

   (a) broad-band radiometric quantities:
   (b) spectral radiometric quantities:
   (c) photometric quantities:
   (d) other area(s) relevant to CCPR:

2. What work in PR has been/will be terminated in your laboratory, if any, in the past /future few years? Please explain the reasons and provide the name of the institution if it has been/will be substituted by a DI or accredited laboratory.

   none

3. Summarize the Capacity Building and Knowledge Transfer activities undertaken by your institute in photometry and radiometry (courses, training, …):

   Stakeholder training of EMPIR PhotoLED project aimed at improvement of the knowledge of laboratory staff working in photometric and radiometric laboratories in the field of calibration and testing devices that emit light primarily in the visible range.

4. Summarize the research projects currently performed within a collaboration with one or more NMIs or DIs (name of the project, participants):

   MAPP

   The overall aim of the project, Metrology for Aerosol Optical Properties (MAPP), is to enable the SI-traceable measurement of column-integrated aerosol optical properties retrieved from the passive remote sensing of the atmosphere using solar and lunar radiation measurements.

   In order to validate and improve the current aerosol optical property retrievals using state-of-the-art inversion models, radiometers of the three largest aerosol monitoring networks (AERONET, SKYNET and GAW-PFR) at NMI laboratories will be calibrated, and portable devices for the in-field calibration of network radiometers will be developed.

The goal is to standardise the retrieval of aerosol optical properties by shortening the calibration chain, reduce calibration downtime of network radiometers and establish their consistent dissemination including their uncertainty.

Global climate assessments require harmonised and quality-controlled datasets. This implies measurements preferably traceable to the SI and cross-network wide implementations of calibration and post-processing procedures.

Participants: SFI Davos, Aalto, CMI, NPL, PTB, VSL

MetTLM

LED-based lighting contributes to energy saving and the reduction of the environmental impact of lighting. However, LED lamps can show fluctuations in the light output known as temporal light modulation (TLM) which could, above certain limits and under certain conditions, impact the health, well-being and safety of people. The new EU Ecodesign 2019/2020 'Single Lighting Regulation' sets limitations on TLM.

The overall aim of this project is to create the metrology infrastructure for the measurement of TLM in LED lighting and the visual effects induced by TLM, known as temporal light artefacts (TLAs). This project will develop and validate measurement methods for quantitative measurement of TLAs, such as flicker and the stroboscopic effect, and it will advance the development of a metric for the phantom array effect.

The project results will underpin the development of standardisation on TLM and will provide the lighting industry, instrument manufacturers and market surveillance authorities with undisputable results of their TLM measurements.MetTLM

Project partners: VSL, Aalto, PTB, RISE

MetEOC3

This EMPIR project applied results from the EMRP projects ENV04 Met-EOC1 and ENV53 Met-EOC2 to improve pre- and post-launch calibration and remote climate sensor validation processes by improving the usability of standards in space and ground-based test sites. The project also established a method for assigning quality metrics to climate data – which will improve the reliability of evidence for the scale and timescale of climate change, and support mitigation and adaptation strategies.

Project partners: NPL, Aalto, PTB, VSL

5. Are there any other research projects where you might be looking for collaborators from other NMIs or are there studies that might be suitable for collaboration or coordination between NMIs?

   Replacement of FEL lamp irradiance standards.

6. Have you got any other information to place before the CCPR in advance of its next meeting?

   none

7. Bibliography of radiometry and photometry papers of your laboratory since the last CCPR (September 2019):

- P. R. Dekker and A. L. van Bloois, 'Facility for calibration of photometers for temporal light modulation', in Proceedings of the Conference CIE 2021, Online (hosted by NC Malaysia), Dec. 2021, pp. 240–244. doi: 10.25039/x48.2021.OP27.
- S. van den Berg, P. Dekker, G. Otter, M. Pelica Páscoa, and N. Dijkhuizen, 'Calibration of a cube-sat spectroradiometer with anarrow-band widely tunable radiance source', Appl. Opt., Feb. 2021, doi: 10.1364/AO.417467.
- S. van den Berg et al., 'Key comparison EURAMET.PR-K2.a.2011—spectral responsivity in the range of 900 nm to 1600 nm', Metrologia, vol. 57, no. 1A, p. 02003, Jan. 2020, doi: 10.1088/0026-1394/57/1A/02003.