

Questionnaire on activities in radiometry and photometry

Reply from: NMISA

Delegate: Rheinhardt Sieberhagen

1. Summarize the progress in your laboratory in realizing top-level standards of:

(a) *Broad-band radiometric quantities*

UV Responsivity

The current traceability is source-based. A set of deuterium and tungsten halogen spectral irradiance lamps are being used. It is planned to develop a detector-based traceability route. A development project was started to support the calibration of ultraviolet germicidal irradiation lamps and detectors.

(b) *Spectral radiometric quantities*

Spectral Irradiance

A new double monochromator set up is being developed. The goal is to expand the wavelength range from 250 nm – 1 500 nm, to 200 nm – 2 500 nm. In addition to the set of deuterium and tungsten halogen spectral irradiance standard lamps, a laser-driven light source is also being investigated as a possible spectral irradiance standard.

Relative Spectral Responsivity

A new double monochromator set up is being developed that includes new optics and detectors. In addition, a tuneable laser was recently acquired to form part of the spectral responsivity capability.

Absolute Spectral Power Responsivity

A mechanically-cooled cryogenic radiometer will be commissioned during September/October 2016.

Fibre Optics

NMISA participated in the APMP.PR-S8 Supplementary Comparison: Optical length. The fibre optic laboratory maintains the measurement capability of the following parameters on a continuous basis:

- Fibre optic power responsivity
- Wavelength of a source
- Wavelength of an OSA (Optical spectrum analyser)
- Wavelength of a wavelength meter
- OTDR (Optical time domain reflectometer) loss scale deviation
- OTDR Distance and location scale
- Optical length (time of flight measurements for a delay line)

Consultative Committee for Photometry and Radiometry (CCPR)
23rd Meeting (22 - 23 September 2016)

(c) *Photometric quantities*

Luminous Flux

The refurbishment of the NMISA goniophotometer is making good progress. The aim is to be ready for assessment during the second half of 2017.

Luminous Intensity

NMISA participated in the APMP and CCPR comparisons.

LEDs

An LED measurement set-up consisting of an integrating sphere and a goniophotometer were acquired. The integrating sphere has been commissioned and the following parameters can be measured:

- Main parameters: Radiometric flux, luminous flux, chromaticity coordinates, colour temperature and spectral distribution
- Related parameters: Forward current, Forward voltage, scotopic flux
- The system will be verified once calibrated LED standards are available.

The LED goniophotometer still has to be commissioned.

Illuminance

New low intensity luminous intensity standards lamps were procured to address the measurement of illuminance levels below 20 lux. These lamps were calibrated by NRC. A new alignment system will be developed during the next financial year.

Properties of Materials

A new spectrophotometer has been acquired and is characterized for

- Total transmittance (full scale) measurements, region 380 nm to 2500 nm,
- Regular Spectral transmittance (full scale) measurements, region 380 nm to 2500 nm
- Spectral absorbance (0 Abs to 6 Abs) measurements, region 380 nm to 2500 nm
- Spectral reflectance (full scale) measurements, region 250 nm to 2500 nm

2. What other work has taken place in your laboratory in scientific or technological areas relevant to the CCPR?

Measurement Standards for Earth Observation

NMISA P&R is part of a team that is responsible for the development and implementation of a Calibration and Validation capability for South Africa. The aim of this project is to establish a capability to support the local satellite (EO-SAT1). Various Centres of Excellence/Competence will be formed in different Cal/Val areas to service South Africa.

Consultative Committee for Photometry and Radiometry (CCPR)23rd Meeting (22 - 23 September 2016)

3. What work in PR has been/will be terminated in your laboratory, if any, in the past /future few years? Please provide the name of the institution if it has been/will be substituted by a DI or accredited laboratory.
4. What are present, new or emerging needs of users of your services that are not being supported sufficiently by current CCPR activities or initiatives? In the light of this information please suggest desirable changes in the future working program of the CCPR.
5. What priorities do you suggest for new research and development programmes at NMIs in the area of Photometry and Radiometry?
6. Are there any 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?
7. Have you got any other information to place before the CCPR in advance of its next meeting?
8. Bibliography of radiometry and photometry papers of your laboratory since the last CCPR (September 2014)?

“Thermal consequences of increased pelt loft infer an additional utilitarian function for grooming”, AMERICAN JOURNAL OF PRIMATOLOGY, Volume 78, Issue 4, April 2016, Pages: 456–461, Richard McFarland, S. Peter Henzi, Louise Barrett, Anuradha Wanigaratne, Elsie Coetzee, Andrea Fuller, Robyn S. Hetem, Duncan Mitchell and Shane K. Maloney.