

DIVISION 2: PHYSICAL MEASUREMENT OF LIGHT AND RADIATION

QUADRENNIAL REPORT 2003 - 2007

Teresa Goodman

1. TERMS OF REFERENCE

- To study standard procedures for the evaluation of UV, visible and IR radiation, global radiation and optical properties of materials and luminaires.
- To study optical properties and performance of physical detectors and other devices required for this evaluation.

2. ADMINISTRATIVE MATTERS

Teresa Goodman (UK) was appointed for a second term as Division Director at the 2003 CIE Session in San Diego. She has three Associate Directors, whose responsibilities are divided approximately as follows:

- Sources and detectors – Georg Sauter (DE)
- Materials – Norbert Johnson (US)
- Luminaires – Guy Vandermeersch (BE)

Yoshi Ohno is the Division Secretary and Jim Gardner replaced John Moore as Division Editor in 2003.

The following new Technical Committees commenced work during the period 2003-2007:

- TC 2-56(S) *CIE/ISO standard on retroreflection measurements* (chair: C. Miller, USA)
TR: To prepare a CIE/ISO standard on the measurement of retroreflective materials based on CIE Publication 54.2
- TC2-57 (S) *Revision of CIE S014-2* (chair: A. Robertson, Canada)
TR: To revise CIE Standard S014-2 (Colorimetry Part 2: CIE Standard Illuminants) to include Illuminant D50
- TC2-58 *Measurement of LED radiance and luminance* (chair: K. Kohmoto, Japan)
TR: To prepare a CIE Technical Report setting out recommended measurement methods for the luminance and radiance of LEDs, taking particular account of the specific requirements of relevant photobiological safety standards
- TC2-59 *Characterisation of imaging luminance measurement devices* (chair: P. Blattner, Switzerland)
TR: To prepare a Technical Report on methods for the characterization of imaging luminance measurement devices.
- TC2-60 *Effect of instrumental bandpass function and measurement interval on spectral quantities* (chair: D. Gibbs, UK then E. Woolliams, UK)
TR: To prepare a technical report that describes the effect of instrumental bandpass functions and measurement wavelength interval on spectrally resolved quantities and provide recommendations on suitable methods to minimise the error introduced by instrumental bandpass functions on spectrally integrated or weighted quantities.
- TC2-61 *Spectral and Colorimetric Electronic Data Exchange* (chair: M. Pointer, UK)
TR: To write a Technical Report to define a specification for the electronic communication of spectral and colorimetric data from measuring instruments.

The following Technical Committees were dissolved during the period 2003-2007:

- TC2-16 *Characterization of the performance of tristimulus colorimeters* (chair M. L. Rastello, Italy then J. Schanda, Hungary) Report published as CIE 179:2007
- TC2-24 *Users guide for the selection of illuminance and luminance meters* (chair K. Ganesh, India) Closed due to inactivity; no longer considered necessary
- TC2-39 *Geometric tolerances for colorimetry* (chair D. Rich, USA) Report published as CIE 176: 2007
- TC2-45 *Measurement of LEDs - Revision of CIE 127* (chair K. Muray, USA) Report published as CIE 127: 2007
- TC2-55 *Round robin investigation of implementation of CIE photobiological safety standard* (chair K. Kohmoto, Japan) Superseded by work in Division 6 relating to CIE S009
- TC2-61 *Spectral and colorimetric electronic data exchange* (chair M. Pointer, UK) Work transferred to ISO TC 78

There were changes in the chairpersons for the following Technical Committees:

- TC2-16 *Characterisation of the performance of tristimulus colorimeters* (from M.L. Rastello, Italy to J. Schanda, Hungary)
- TC2-28 *Methods of characterising spectrophotometers* (from M. Pointer, UK to T. Goodman, UK)
- TC2-40 *Characterising the performance of illuminance and luminance meters* (from R. Rattunde, Germany (deceased) to P. Blattner, Switzerland)
- TC2-44 *Vocabulary matters* (from J R Moore, UK, to the new Editor, J. Gardner, Australia)
- TC2-47 *Characterization and Calibration Methods of UV Radiometers* (from Xu Gan, Singapore to A. Sperling (Germany))
- TC2-50 *Measurement of the optical properties of LED clusters and arrays* (from G. Sauter, Germany to J. Schuette, Germany)
- TC2-60 *Effect of instrumental bandpass function and measurement interval on spectral quantities* (from D. Gibbs, UK to E. Woolliams, UK)

New reporterships were established in the following areas:

- R2-32 *Visual appearance measurement* (M. Pointer, UK)
- R2-33 *Measurement of laser-based projection displays* (K. Niall, Canada)
- R2-34 *Methods for characterising and calibrating detectors in photon counting regime* (M. L. Rastello, Italy)
- R2-35 *Uncertainties in Distribution Temperature Determination* (A. Robertson, Canada)
- R2-36 *Measurement requirements for solid state light sources* (G. Heidel, Germany)

The following reporterships were dissolved following completion of their work:

- R2-05 *Visual Gloss* (M. Pointer, UK) - Report produced; further work on this topic will be pursued in D1 via a new TC on Visual appearance measurement.
- R2-29 *Characterisation of imaging luminance measurement devices* (P. Blattner, Switzerland) - TC established.
- R2-30 *Problems linked to correct measurement of TL5 fluorescent lamps with existing electronic ballasts* (G. Vandermeersch, Belgium) - work to continue in TC2-23.
- R2-31 *Problems with spectroradiometric measurement of light sources associated with bandpass and sampling intervals* (D Gibbs, UK) – TC established

3. MEETINGS

In order to maximise attendance at Division meetings, and encourage participation by new contributors, these have continued to be linked to symposia or conferences and to be held in conjunction with other Divisions. The following Division meetings were held:

- 2 July 2003, San Diego (USA), during the 25th Quadrennial Session.
- 11 June 2004, Tokyo (Japan), in conjunction with the *CIE Symposium on LEDs* and also linked with a meeting of Division 1. A joint D1/D2 workshop was also held (9 June 2004) at which the subjects debated were colour rendering of LEDs, safety aspects of LEDs, and mesopic photometry.

A number of Technical Committees met in conjunction with each of the Division meetings; details are given in the minutes for the Division meetings.

Future meetings are planned as follows:

- May 2005: Leon, Spain – linked with CIE Mid-term Meeting
- June 2006: Braunschweig, Germany – linked with CIE Symposium on *Uncertainty Evaluation*
- 2007: Beijing, China, in conjunction with the 26th Quadrennial Session

4. SYMPOSIA

Division 2 organised the following CIE Symposia:

- *Third Expert Symposium on LED Measurements*, June 2004, Tokyo, Japan, organised jointly with D1 and D6. The symposium included sessions on visual aspects of LEDs (particularly colour rendering) and photobiological issues (particularly safety evaluation), as well as measurement (including presentations on LEDs as transfer standards, characterisation of photometers for use with LEDs and uncertainty evaluation). A total of 93 participants registered, demonstrating the continued high level of interest in the subject of LEDs.

The Division plans to organise a CIE Symposium on Uncertainty Evaluation in June 2006, in Braunschweig, Germany (the D2 meeting will be linked with this). It is hoped that the final draft of TC2-43 will be ready at that time, so it will also be an opportunity to publicise the new document. Further topics suggested, each as a follow-on to a previous, very successful, symposium, are LEDs and pulsed sources. Of these, LEDs is seen as the highest priority and it has been suggested that it should have a strong focus on LED clusters and arrays, and should also include discussion of temporal aspects (modulation).

5. TECHNICAL REPORTS AND PUBLICATIONS

The transfer of responsibility to the new Editor resulted in a hiatus in the processing of drafts for editing. However a number of TCs are nearing the end of their work and expect to pass documents to the Editor shortly. The following CIE Technical Report was published:

CIE Publication 153: 2003 *Intercomparison of Measurements of the Luminous Flux of High-Pressure Sodium Lamps* (report from TC2-22)

6. LIAISONS

Liaisons were maintained as follows:

Comité Consultatif de Photométrie et Radiométrie – CCPR, Y. Ohno, USA

Division 1, K. Sagawa, Japan

Division 4, N. Johnson, USA

Division 6, T. Goodman, UK

Division 8, Y. Ohno, USA and A. Kravetz, USA

International Association of Lighthouse Authorities – IALA, C. Andersen, USA and I. Tutt (UK)

International Dark Sky Association – IDA, J. Rennilson, USA

IEC TC34 Lamps and related equipment, G. Vandermeersch, BE

IEC TC100 Audio, video and multimedia systems, J. Schanda (HU)

ISO TC6/WG3 Paper, board & pulps – optical properties, J Zwinkels (CA)

ISO on reflectance and transmittance issues, D Rich (US)

OIML, G Sauter (DE)

7. OTHER ACHIEVEMENTS, ISSUES, ETC.

7.1 Website and communications

All current Division activity reports, meeting minutes, membership lists, contact details and circulars are available on the D2 website (<http://cie2.nist.gov>), and there is an excellent archive of past meeting reports, minutes and activity reports. Many of the draft TC documents are available to TC members from the website (these are password protected) and e-mail reflectors have been set up to encourage rapid exchange of ideas and to encourage debate; these have been very successful and are being increasingly widely used. Most communication with Division members is via e-mail and this has helped to ensure that information is distributed quickly and effectively.

7.2 Division officers

I shall come to the end of my second term as Director in 2007 and the Division will therefore need to appoint a new Director. I have informally spoken to Yoshi Ohno, to see whether he would be prepared to stand as a candidate – he has indicated that he would be pleased to do so. I shall explain the procedure for election of the new Director at the D2 meeting and will follow this up with a request for nominations in June – I am not aware at this stage of any other potential candidates. I am sure Yoshi will have a lot of support and I am therefore fairly confident he will be the next DD2. This will leave us without a Secretary – he will be a hard act to follow! The Associate Directors have all served for at least 2 terms (2 have been in post for 4 terms) and I anticipate at least 2 will step down. The Editor was only appointed 2 years ago and has indicated that he is willing to continue. Thus the next D2 Management Team will bring in several new representatives, but will also ensure some continuity with the past.

7.3 Forward look

I have instituted an annual ‘forward look’ at D2 meetings, where we consider what developments might drive the need for new or improved measurements. The idea is to try to anticipate requirements, rather than just react to issues once they arise. Issues raised so far include:

- Recommendations for measurements in the vacuum UV, for lamps which emit below 200 nm
- The need to establish source scales above 2500 nm for safety evaluations on lamps
- Recommendations for standards based on synchrotron radiators
- Measurement recommendations for OLEDs
- Characterisation of fibre optics when used as components in other systems e.g. spectroradiometers (i.e. not for communications purposes)
- Measurement standards for the mesopic range, if a new system for mesopic photometry is established in D1

I would like to ask other DDs to let me know if there are developments in their areas that might lead to the need for work in D2 – again this will allow us to respond in a more timely fashion.

7.4 Other issues

IALA has written requesting guidance on the correct method for determining effective intensity, particularly for LED beacons. TC2-49 is working on recommended measurement techniques, but cannot make recommendations on the effective intensity evaluation – this relates to visual perception and requires input from D1. We need to discuss how to take this forward.

Teresa Goodman (Division Director)
National Physical Laboratory, UK
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