COMMISSION INTERNATIONALE DE L'ÉCLAIRAGE
INTERNATIONAL COMMISSION ON ILLUMINATION
INTERNATIONALE BELEUCHTUNGSKOMMISSION

Canadian National Committee Comité National Canadien

CNC/CIE Annual Report 2014

Minutes of 59th Annual Meeting
2014-December-01

and

Canadian Division Members' Reports

NRC·CNRC
Measurement Science and Standards • Science des mesures et étalons • Ottawa, Canada, K1A 0R6

COMMISSION INTERNATIONALE DE L'ÉCLAIRAGE
INTERNATIONAL COMMISSION ON ILLUMINATION
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Canadian National Committee Comité National Canadien

MINUTES OF THE 59th ANNUAL CNC/CIE MEETING

2014-December-01

The 59th annual meeting of the Canadian National Committee of the Commission Internationale de l'Éclairage (CNC/CIE) was held on Monday, December 1, 2014 at the National Research Council of Canada, building M-36, 1200 Montreal Road, Ottawa, ON.

Note: the following acronyms may be used in this report:

CIE	Commission Internationale de l'Éclairage
CIE-BA	CIE Board of Administration
CIE-CB	CIE Central Bureau
CIE-DD	CIE Division Director
CISET	NRC Advisory Committee on International Science, Engineering and Technology
CNC/CIE	Canadian National Committee of the CIE
CIE/USA	US National Committee of the CIE
DRDC	Defence Research and Development Canada
ICSU	International Council for Science
IESNA	Illuminating Engineering Society of North America
ISO	International Organization for Standardization
M/AM	Members and Advisory Members of the CNC/CIE
NC	CIE National Committee
NRC	National Research Council of Canada
NRC-IRO	NRC Government and International Relations office
NRC-MSS	NRC Measurement Science and Standards portfolio
NRC-CONST	NRC Construction portfolio
NRCan	Natural Resources Canada
TC	CIE Technical Committee

CNC/CIE Officer and Canadian Division Member reports were submitted electronically and distributed to members (2014-November-27) prior to the CNC/CIE annual meeting for the purpose of presentation and discussion at this meeting.

1. Call-to-Order and Approval of Agenda:

The 59th annual meeting of the CNC/CIE was called to order at 10:33 EST on Monday, December 1, 2014 by V. Venkataramanan, President.

The agenda is attached as Appendix A. The agenda was approved with no changes.

In attendance were 13 Members, 2 Advisory Members, 2 persons from the Expert Network and 1 guest, in person or by teleconference. The meeting had a quorum according to the Code of Procedure. The list of all attendees is attached as Appendix B. Teleconferencing using the Government of Canada teleconference system was arranged and hosted by W. Neil and J. Veitch.

2. Action Items and Matters Arising from the Minutes of the 58th CNC/CIE Annual Meeting:

Minutes of the 58th Annual Meeting (AM) were distributed electronically in the 2013 Annual Report and posted on the CNC/CIE webpage. The Minutes were accepted without changes.

It was agreed that action items from the 58th AM minutes, attached as Appendix C, would be discussed throughout the agenda as appropriate. New and carried over action items are listed in Appendix D and are noted in these minutes as they occurred.

The following Officer Reports are available at the CNC/CIE web site and will be included as appendices in the 2014 Annual Report.

3. President's Report:

V. Venkataramanan presented his report with discussion. This report is attached as Appendix E.

4. Vice-President's Report:

J.A. Veitch presented her report with discussion and offered her congratulations to Lorne Whitehead on his appointment to the position of Treasurer of the CIE. This report is attached as Appendix F.

5. Secretary's Report:

W.S. Neil briefly summarized each item in his report. This report is attached as Appendix G.

6. Financial and Publications Report:

V. Venkataramanan began, and K.F. Lin completed, the presentation of this report. K.F. Lin noted that the quarterly credit notes sent to the secretary from the CIE-CB should be forwarded to the Treasurer to help track bank account transfers. This report was discussed and is attached as Appendix H. J.A. Veitch noted that although the income from CIE publications sales is down from last year, CIE publication sales generally were also lower last year.

7. Division Member Reports:

The following Division Member reports are available at the CNC/CIE web site and will be included as appendices in the 2014 Annual Report.

Division Members presented, with discussion, reports for divisions 1-6, and 8.

During his Division 8 report A. Laperrière offered his compliments to V. Venkataramanan for organizing the Smart Sustainable Lighting Network (SSLNet) workshop in Toronto last August.

8. Subcommittee Reports:

8.1 Website Report:

J.A. Veitch presented her report, with discussion and noted that hits on our new URL have rebounded from last year when it was found that the URL was taken by someone else. It was also mentioned that the web hosting invoice was received for an amount of $190 for 2 years. Both V. Venkataramanan and J. Veitch thanked S. McFadden and H. Ulfig (at the University of Toronto) for their work on the website. This report is attached as Appendix I.

8.2 Membership Report:

V. Venkataramanan reported that approximately 10 new contacts for the Expert Network were recruited in an effort to increase the participation in the CNC/CIE from industry and universities. J. Zwinkels mentioned that there was also a new contact from the University of Waterloo who is now part of the Expert Network and might be interested in serving in the CNC/CIE is some capacity due to their expertise.

ACTION ITEM (AI-01): for V. Venkataramanan to supply new contact information to the Secretary.

It was noted that a new chairperson is required for the Membership Committee. After some discussion Michele Mossman agreed to be nominated.

MOTION: Moved by J. Veitch, seconded by V. Venkataramanan, that M. Mossman be nominated as chair of the Membership Committee. PASSED, with all in favour.

J. Veitch recommended that the President, Vice-President, Secretary and new Membership Committee chair have a teleconference in the following few weeks.
ACTION ITEM (AI-02): the executive members to have a teleconference in the next few weeks.

8.3 International Year of Light 2015 Report:

V. Venkataramanan reported that the CNC/CIE has permission to use the IYL 2015 logo for the CNC/CIE activities for this event. He has also reached out to various groups looking for interest in participation and the organization of IYL 2015 activities in Canada, and has requested that members also pass-on any contact information to him for organizations that might have an interest in participating. A meeting will be taking place within a few weeks in Toronto for interested participants in that region. Members were reminded that an IYL 2015 planning meeting will be held this afternoon following the CAC-ISO-TC 274 annual meeting.

ACTION ITEM (AI-03): The website committee to ensure that the CNC/CIE website is updated to include V. Venkataramanan as contact for the Canadian IYL 2015 committee.

9. CISET Annual Performance Review (APR) of the CNC/CIE:

J.A. Veitch mentioned that the 2014 APR form had not yet been received and is late compared to last year when the submission date was in mid-December. In order to improve the APR score the CNC/CIE needs to improve reach out efforts to small lighting companies and to capture new contacts that will promote needed interaction. It was mentioned by S. McFadden, with general agreement, that the website should have updated links for companies and there was concern that the website might require a statement that specifies that the CNC/CIE is not endorsing these companies.

ACTION ITEM (AI-04): The Website Committee will update company information and make a non-endorsement statement if required.

ACTION ITEM (AI-05): J. Veitch will prepare this year's APR and circulate for comment.

10. Revision of the CNC/CIE Code of Procedure

Guest G. Macdonald, MSS R&D Director, discussed the current and future status of the code of procedure. She reported that the current agreement between NRC International Relations and MSS (signed in 2011), even though out-of-date, will not be renegotiated until the end of the current agreement term which is in 2016. Also, the MSS management and General Manager would continue in the role as described for the INMS and Director General in the code of procedure although communications should go through her. This would continue at least until the current agreement terminates in 2016. G. Macdonald also suggested that the wording in the code of procedure referring to INMS and the INMS Director General be left unchanged, as this is what is written in the current agreement.

J. Veitch suggested that the Code of Procedure Revision Committee move ahead with plans to update the document, making required changes other than wording related to the current agreement (such as INMS and Director General).

ACTION ITEM (AI-06): Code of Procedure Revision Committee to proceed on revision as discussed.

S. McFadden agreed to continue as chair of the Code of Procedure Revision Committee. All were in favour.

ACTION ITEM (AI-07): S. McFadden to contact a past committee member, N. Renaud for suggestions for another potential committee member.

11. Nominations and Appointments (CNC/CIE):

The current list of CNC/CIE Members and Advisory Members is given in Appendix J.

11.1 CNC/CIE Officers:

K.F. Lin confirms his wish to resign as Treasurer. V. Venkataramanan offers his thanks for his many years of service in that office. J. Veitch suggests that the Treasurer position should be filled on a short term basis by a current member. S. McFadden agrees to be nominated for this position for a two year term.

MOTION: Moved by J. Veitch, seconded by V. Venkataramanan, that S. McFadden be nominated as Treasurer and Publications Officer for a term of two years. PASSED, with all in favour.

F. Lin confirms he will continue in his term as a Member. He mentions that as Publications Officer he has possession of a number of printed copies of past CIE publications. J. Veitch suggested that these documents should be transferred to MSS.

ACTION ITEM (AI-08): V. Venkataramanan will obtain these documents from F. Lin and transfer them to the CNC/CIE Secretary at MSS.

J. Veitch suggests that W. Neil be nominated as Secretary as he has held the interim office for the last year. W. Neil agrees to be nominated as Secretary.

MOTION: Moved by J. Zwinkels, seconded by M. Timmings, that W. Neil be nominated as Secretary for a 4 year term. PASSED, with all in favour.

ACTION ITEM (AI-09): W. Neil will solicit any outstanding appointment letters from MSS for nominated Officers and Members.

11.2 Canadian CIE Division Members:

The past Secretary, R. Baribeau confirms he will continue his term as the Division 8 Member.

Noting that most of the CNC/CIE Members terms expire next year, J. Veitch suggests that the Code of Procedure Revision Committee consider including wording in the code for the adoption of staggered Member and Division Member terms.

11.3 CNC/CIE Members and Advisory Members:

M. Mossman mentioned that the Membership Committee would review the current Advisory Members list and the draft letter to the Advisory members (see AI-6, 2013) that had not yet been completed or sent, to confirm if these contacts have continued interest in remaining as Advisory Members.

12. Other Business:

12.1 Correspondence:

J. Zwinkels mentioned that the CNC/CIE letterhead and logo still has the previous version of the CIE logo and asked if it should be replaced by the new CIE logo. This will require a usable graphic image file. J. Veitch offered to help.

ACTION ITEM (AI-10): The website committee will review the CNC/CIE letterhead for possible incorporation of the new CIE logo.

ACTION ITEM (AI-11): J. Veitch will liaise with the CIE-CB to determine acceptable uses of the new CIE logo by NCs and obtain suitable graphics file(s) for CNC use.

12.2 Date and place for next year's meeting:

J. Veitch proposed Montreal as a potential location for the joint USNC/CNC annual meeting to take place in Canada in 2015. She suggested a self-imposed deadline of 2015-Jan-15 to be able to obtain sufficient support for having the meeting located there. There was discussion as to

what dates the meeting should be held and that it should not conflict with other meetings such as the IES annual meeting. It was also noted that there should be local industry support for the meeting and a potential host. J. Zwinkels volunteered as organizer for the technical sessions and to solicit papers for presentation. She also offered to determine potential dates where there would be minimal conflict with other meetings and communicate this with the USNC/CIE.
ACTION ITEM (AI-12): J. Zwinkels to organize technical sessions, solicit papers and determine minimal conflicting date for the joint annual meeting in 2015.

12.3 Any Other Business:

V. Venkataramanan reported that he was gathering information on accounts at other banks in order to start up a new CNC/CIE account to replace the current one. Discussion followed and it was generally agreed that the account should be opened in Ottawa, preferably at a branch near NRC-MSS. It was also agreed that signing authority should require two signatures of a possible three which would be the members occupying the positions of President, Treasurer and Secretary.

ACTION ITEM (AI-13): V. Venkataramanan to gather information from various banks and pass on to the Secretary.

ACTION ITEM (AI-14): W. Neil will initiate the opening of a new account at a branch near the NRC-MSS in Ottawa following review of the information from the President.

It was proposed and accepted that the start of the ISO TC 274 meeting be delayed until 13:45.

13. Adjournment

V. Venkataramanan expressed his thanks to all attendees for their participation in the meeting.
The meeting was adjourned at approximately 13:08 EST.

William S. Neil
Secretary, Canadian National Committee of the CIE
Email: CNC-CIE-Secretariat@nrc-cnrc.gc.ca

LIST OF APPENDICES

APPENDIX A

CNC/CIE 59th Annual Meeting

Agenda

DATE: Monday, 2014-December-01

TIME: 10:30 to 12:30

LOCATION: National Research Council of Canada
Building M-36, Planck Room
1200 Montreal Road,
Ottawa, ON

Teleconferencing Dial-In : 613-960-7519 / 888-265-0903

Teleconference Participant Password: 999149

HOST: National Research Council of Canada,
Measurement Science and Standards
Host contact: CNC/CIE Secretary

RSVP: W.S. Neil
Interim Secretary, CNC/CIE
Tel: 613-993-2555
Fax: 613-952-1394
Email: CNC-CIE-Secretariat@nrc-cnrc.gc.ca

http://www.cnc-cie.ca/

Continued next page >

1. Call to Order and Approval of Agenda — V. Venkataramanan
2. Minutes of the 58th Annual CNC/CIE meeting — V. Venkataramanan
   - Action items
   - Matters arising
3. President's report — V. Venkataramanan
4. Vice-President's report — J.A. Veitch
5. Secretary's report — W.S. Neil
6. Financial and Publications report — K.F. Lin
7. Reports from Division Members
   - Division 1: Vision and Colour — S.M. McFadden
   - Division 2: Physical Measurement of Light and Radiation — J.C. Zwinkels
   - Division 3: Interior Environment and Lighting Design — J.A. Veitch
   - Division 4: Lighting and Signaling for Transport — A. Laperrière
   - Division 5: Exterior and Other Lighting Applications — M.K. Timmings
   - Division 6: Photobiology and Photochemistry — S.Qutob
   - Division 8: Image Technology — R. Baribeau
8. CNC/CIE Subcommittee reports:
   - 8.1 CNC/CIE website report — J.A. Veitch
   - 8.2 CNC/CIE Membership — V. Venkataramanan
   - 8.3 International Year of Light 2015 Planning — V. Venkataramanan
9. CISET Annual Performance Review of the CNC/CIE — J.A. Veitch
10. Revision of CNC/CIE Code of Procedure — S. M. McFadden
11. Nominations and Appointments (CNC/CIE) — V. Venkataramanan
    - 11.1 CNC/CIE Officers
    - 11.2 Canadian CIE Division Members
    - 11.3 CNC/CIE Members and Advisory Members
12. Other Business — V. Venkataramanan
    - 12.1 Correspondence
    - 12.2 Date and Place for next year's meeting
    - 12.3 Any other business
13. Adjournment — V. Venkataramanan

The annual meeting of CAC-ISO-TC 274 will be held in the same location at 13:30 on 2014-December-01. See separate agenda.
A meeting of the International Year of Light Planning Committee will be held in the same location at 15:00 on 2014-December-01. Volunteers willing to contribute to the work are welcome to attend.

APPENDIX B
CNC/CIE 59th Annual Meeting

Attendees

Venkat Venkataramanan	President, CNC/CIE	U of Toronto
Jennifer Veitch	Vice-President, Division 3 Member	NRC-Construction
Frank Lin*	Treasurer and Publications, CNC/CIE	Lighting Sciences
William Neil	Interim-Secretary, CNC/CIE	NRC-MSS
Sharon McFadden*	Division 1 Member	
Joanne Zwinkels	Division 2 Member	NRC-MSS
André Laperriére*	Division 4 Member	Hydro Quebec
Martyn Timmings	Division 5 Member	Studio Four Technical Services
Sami Qutob	Division 6 Member	Health Canada
Réjean Baribeau	Division 8 Member	NRC-MSS
Arnold Gaertner	ex-officio Member	NRC-MSS
James Love*	Member, CNC/CIE	U of Calgary
Lorne Whitehead*	Member, CNC/CIE	U of British Columbia
Cristian Suvagau*	Member, CNC/CIE	BC Hydro
Barbara Kolesnik*	Advisory Member, CNC/CIE	AECOM
Michele Mossman*	Expert Network	U of British Columbia
Don McLean*	Expert Network	
Georgette Macdonald	Director, NRC-MSS	NRC-MSS

*** attended via teleconference**

Regrets

Robert White, Adam Chaffey, Mankajee Shrestha, Ralph Smith, Tim Moggridge, Andrew Silbiger

APPENDIX C

Action Items from the 58th Annual Meeting of the CNC/CIE

Action Item Number	58th Meeting AI No.	Responsible	Action	Status
AI-1	1	A.A. Gaertner, S.M. McFadden, J.A. Love	Nominate a Div. 1 member	complete
AI-2	3	V. Venkataramanan	Solve signing authority issues with the bank	complete
AI-3	6	A.A. Gaertner, S.M. McFadden, R. Baribeau, N. Renaud	Revise the Code of Procedure	Modified. Re-actioned at the 59th AM
AI-4	7	R. Baribeau, W.S. Neil	Communicate K.F Lin nomination to GM of MSS	Modified. Re-actioned at the 59th AM
AI-5	8	R. Baribeau, W.S. Neil	Advise K.F. Lin of acceptance by GM	Modified. Re-actioned at the 59th AM
AI-6		Membership sub-committee	Correspond with Advisory Members to confirm willingness to serve.	Modified. Re-actioned at the 59th AM
AI-7		J.A. Veitch, W.S. Neil	Send out email ballot to determine support for sponsorship of CNC mirror to TC113	complete
AI-8		J.A. Veitch	To prepare this year's APR and circulate for comment.	complete
AI-9		S.M. McFadden	To prepare a common report software template and circulate for comment.	complete
AI-10		W.S. Neil	Contact CIE-CB re Canadian contact for IYL	complete

APPENDIX D

Action Items from the 59th Annual Meeting of the CNC/CIE

59th Meeting AI No.	Responsible	Action	Status
AI-1	V. Venkataramanan	Supply new Expert Network contact information to the Secretary	
AI-2	Executive Committee	Hold a teleconference in the following few weeks	
AI-3	Website Committee	Ensure that the website is updated to include V. Venkataramanan as the contact for the Canadian IYL 2015 committee	
AI-4	Website Committee	To update company information on the website and add a non-endorsement statement if required	
AI-5	J. Veitch	To prepare this year's APR and circulate for comment.	
AI-6	Code of Procedure Revision Committee	Proceed with Code of Procedure revision limited as discussed at the annual meeting	
AI-7	S. McFadden	Contact a past member N. Renaud, of the Code of Procedure Revision Committee for suggestions for another potential member	
AI-8	V. Venkataramanan	Obtain printed copies of past CIE publications from F. Lin and transfer them to the Secretary	
AI-9	W. Neil	Solicit any outstanding appointment letters from MSS for nominated Officers and Members	
AI-10	Website Committee	Review CNC/CIE letterhead for possible incorporation of the new CIE logo	
AI-11	J. Veitch	Will liaise with the CIE-CB to determine acceptable uses of the new CIE logo by NCs and obtain suitable graphics file(s) for CNC use.	
AI-12	J. Zwinkels	Organize technical sessions, solicit papers and determine minimal conflicting date for the joint annual meeting in 2015	
AI-13	V. Venkataramanan	To gather information on bank account types for a potential new account for the CNC/CIE and pass this information on to the Secretary	
AI-14	W. Neil	Initiate opening of a new CNC/CIE bank account at a branch near the NRC-MSS in Ottawa	

APPENDIX E

CNC/CIE President's Report
November 2014

Venkat Venkataramanan
vvenkat@optics.utoronto.ca

I am pleased to present this brief report on my activities this year as CNC President.

I attended the 58th AGM of CNC/CIE concurrent with the 9th Biannual Joint Meeting of the CIE/USA in California Lighting Technology Centre, UC Davis, CA on November 7 and 8, 2013.

I also attended the CIE 2014 Lighting Quality & Energy Efficiency, Kuala Lumpur, Malaysia during April 23-26, 2014. I participated in various Webex meetings of CIE during the past year, representing Canada.

I have been active in TC-2 63 - Optical Measurements of High Power LEDs.

I have been continuing my activities as a lighting researcher and educator at the University of Toronto:

- We continue to strengthen the Smart Sustainable Lighting Network (SSLNet) with increasing participation from the industry and academia.
- I hosted a two-day conference and concurrent workshops on the theme of Smart and Sustainable Lighting at my university during August 18-20, 2014.
- In partnership with OLED Research Group at Philips and OTI Lumionics, Toronto my laboratory is continuing to develop a photometric characterization facility for lighting-class OLED devices.

I thank the collegial National Advisory Committee for smooth and efficient conduct of affairs and for their continued efforts in popularizing lighting and advancement of lighting research.

APPENDIX F

CNC/CIE Vice-President's Report
December 2014

Jennifer A. Veitch, Ph.D.
jennifer.veitch@nrc-cnrc.gc.ca

In my capacity as Vice-President of the CNC, this year I undertook four tasks.

1. I led the preparation of the annual report to the NRC International Relations Office. This was submitted on time. We were successful and I am pleased to report that our rating had improved over 2012. We are again scoring higher than the mean score (we scored 40/45; the mean was 37.84). Thank you to everyone who contributed.

2. I served as Chair of the Canadian mirror committee to CAC-ISO-TC 274. This was the first year of existence for both the mirror committee and the parent ISO TC 274. Details of this committee's work will be discussed at the meeting of CAC-ISO-TC 274 this afternoon. Highlights of the year are:

- Thanks to financial support from Natural Resources Canada we were able to send a Canadian delegate (Mrs. Sharon McFadden) to the plenary meeting of TC 274 in Paris in March 2014.
- We cast all our ballots on time.
- We recruited a new member for CAC-ISO-TC 274 and a delegate for the newly created Joint Working Group on Energy Requirements for Lighting in Buildings (Mr. Toby Lau).
- Financial support from the U. of Toronto Impact Centre will assist us in sending a delegate to the plenary meeting and JWG1 meeting in Beijing in April 2015. We expect also to receive funds directly from the Standards Council of Canada. (The funds received for this fiscal year were returned because no meeting was held during FY2014-15.)

3. Discussions have continued between the CNC/CIE (represented by Dr. Joanne Zwinkels, Dr. Arnold Gaertner, and me) and NRC Measurement Science and Standards (NRC-MSS) (represented by Mrs. Georgette Macdonald) concerning the place for the CNC/CIE in the new NRC program structure. At issue is the continuing participation of NRC-MSS as the partner organization with NRC International Relations Office for the purpose of hosting the secretariat for the CNC/CIE. We believe this is important and warranted as part of NRC's program of Scientific Support for National Measurement Standards. At the last meeting to discuss this matter (held in July 2014), the next step was to have been for Mrs. Macdonald to meet with the NRC-IRO. We have not heard back yet concerning the result..

4. I assisted as needed to support the President and Secretary in the ongoing work of CNC business.

APPENDIX G

CNC/CIE Secretary's Report
December 2014

W.S. Neil
CNC-CIE-Secretariat@nrc-cnrc.gc.ca

The following acronyms may be used in this report:

CEN:	Comité Européen de Normalisation
CIE-CB:	CIE Central Bureau in Vienna, Austria
CIE-BA:	CIE Board of Administration
CIE/USA:	US National Committee of the CIE
CISET:	NRC advisory Committee on International Science, Engineering and Technology
CNC/CIE:	Canadian National Committee of CIE
GA:	General Assembly
ISO:	International Organization for Standardization
MSS:	NRC Measurement Science and Standards portfolio
NC:	National Committee
NCLB:	National Committee Letter Ballot
NRC:	National Research Council of Canada
NRC-IRO:	NRC International Relations Office
NRC-IRC:	NRC Institute for Research in Construction
NRCan:	Natural Resources Canada

This report covers the period from 09Nov2013 to 21Nov2014.

CIE MATTERS:

1. Mailings:
   CIE notifications, announcements and Press Releases were distributed by the CIE-CB to the NC's via email. These documents are available on the CIE website (www.cie.co.at) using collaboration tools. Some of these documents are downloaded and redistributed to members and the Expert Network by the CNC-CIE secretary.
2. NCLBs:
   National Committee Letter Ballots were distributed to members for voting. A resulting ballot representing Canada was returned to the CIE-CB for each NCLB. Letter ballots for 2014 were:
   NCLB1401: Nomination of CIE Vice President; CNC response: approve; Vote Result: approved
   NCLB1402: CIE budget 2014; CNC response: approve; Vote Result: approved
   NCLB1403: Publication of document FDIS 024/E:2014; CNC response: abstain; Vote Result:approved

CNC/CIE MATTERS:

1. New NRC structure:
   Our Code of Procedures needs to be reviewed and updated, in part to reflect the changes in NRC structure. The most recent agreement between NRC Corporate Services and the NRC INMS was signed in 2011 and is up for renewal after 5 years from signing. It has been decided that this agreement will not be updated to reflect changes to NRC structure until the end of the agreement

term.

2. CNC-CIE Secretary:
   In communication with the secretary use the NRC email address CNC-CIE-Secretariat@nrc-cnrc.gc.ca. W. Neil is presently acting as Interim Secretary and this position should be filled at this general meeting.
3. CNC/CIE 2014 Annual Meeting:
   The 59th annual CNC-CIE meeting will be on Monday, December 1, in Ottawa, Ontario from 10:30 – 12:30 (EST) at the NRC building M-36. It will be followed at 13:30 by the Annual Meeting of the Canadian mirror committee to ISO TC 274, Light and lighting (known by its Standards Council of Canada number, CAC-ISO-TC274). A meeting of the International Year of Light Planning Committee will be held at the same location at 15:00.
4. Annual Performance Review of the CNC/CIE:
   The Annual Performance Review (APR) questionnaire from the NRC International Relations Office was submitted for 2013 and notice of a successful review of the questionnaire was received from the NRC Advisory Committee on International Science, Engineering and Technology (CISET). The score (40/45) continued to be above the average (37.84/45) for the other CNC's assessed and improved upon the previous score (38/45). This successful review ensured that the CIE affiliation dues would be paid on behalf of the CNC-CIE for the year 2014 by a grant from the NRC.
5. Executive Committee Actions:
   - Lorne Whitehead nominated for the position of Treasurer of the CIE for the next 5 year term
   - Sponsorship of the IEC/TC 113 networking session
6. Requests for Funding:
   There was one request for funding by the Canadian Mirror Committee of IEC/TC113 for sponsorship of a networking session in June of 2014.
7. CNC/CIE website:
   The website operates at the web address of www.cnc-cie.ca. If anyone has suggestions for corrections, updates, or additions, please contact the Secretary, J.A. Veitch or our website coordinator Sharon McFadden. A report on the website will be given at the annual meeting.
8. Mailing Lists:
   At present we maintain 3 mailing lists: Members, Advisory Members, and Expert Network. In general, the difference between the first two and the third is that the third list tends to receive only CIE material (press releases of CIE publications, *CIE NEWS*) and notices of international conferences. Members and Advisory Members receive, in addition to the CIE material, more CNC information such as various ballots, and the Minutes of the annual meeting and related information. Currently a new mailing list is being developed which includes only those that have given consent to mailings with possible commercial content (consent requested email June 26, 2014).Those that did not respond "yes" to the request for consent to receive general mailings will be removed from the mailing lists.
9. Membership:
   A list of our Members and Advisory Members is available and will be discussed during the annual meeting for the purposes of making any changes.

   9.1 Officers: The positions of Secretary and Treasurer need to be filled.
   9.2 Members:
   9.3 Advisory Members:
   9.4 Expert Network:
   9.5 Removals:

APPENDIX H

CNC/CIE Treasurer's Report
November 2014

K.F. Lin

CNC/CIE 2014 financial statement:

1. 2013 bank balance	28395.74	Sep 30-13
2. Income, CIECB	322.83	
3. 2013 outstanding exp.	-1263.31	
3a 2012 outstanding exp.	-1613.63	UT catering
4. Bank monthly charge	-77.35	@5.95 X 13
5. 2014 Bank balance	25764.28	Oct 31-14

6. Outstanding:
K. Frank Lin -500.00 subtotal: -500.00
prepaid for CSA group.

CNC/CIE 2013 financial statement:

1. 2012 bank balance	27106.35	
2. Income, CIECB	1429.84	
3. Web service	-75.00	
4. Bank monthly charge	-65.45	@5.95 X 11
5. 2013 Bank balance	28395.74	

6. Outstanding: Web ser. -75.00
McGowan -552.90
Wolfman -635.41 subtotal: -1263.31

APPENDIX I

CNC/CIE Web Site Report
December 2014

Jennifer A. Veitch, Ph.D.
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Domain
Our new-in-2013 domain is set up for perpetual renewal, so we are and will remain www.cnc-cie.ca.

Usage
Our usage in most months is in the range of 200-500 visits, with occasional months of higher activity. In February 2014 there was abnormally high activity over two days that resulted in a total of 4578 unique visits in that month. We can't tell why. I have corrected for this outlier in reporting here that our monthly average number of unique visitors during the first 10 months of 2014 is 318, with 431 visits on average. This is a considerable increase over past years: for example, 219 in 2012, 172 in 2009. I am especially pleased that the numbers have rebounded after last year's change in URL.

Top countries of origin, in order: Brazil, China, USA, Canada.

Content
Sharon McFadden has taken on the job of content co-ordinator, for which we owe her a debt of thanks! In this she is assisted by Harim Ulfig of the U. of Toronto Impact Centre, who works with the content management system to post the material. We are working out a system in which I receive the notices of press releases and download them from the CollTool, and then Sharon and Harim work to post them on the front page regularly.

History of Lighting in Canada
For the International Year of Light in 2015, it would be a nice project to develop the content on the history of lighting in Canada. I wonder if we might consider giving a small contract to a student who would edit the material we already have?

Maintenance
The cost for the domain registration, site hosting, and maintenance remains low, at $95 per year. I recommend we keep our current arrangement, which seems to be working well.

APPENDIX J

CNC/CIE MEMBERS

CNC/CIE			TERM (expiry)	CIE
President	V. Venkataramanan	Ontario	2015-12-31	
Vice President	J.A. Veitch	Ontario	2015-12-31	Division 3
Secretary	W.S. Neil	Ontario	2018-12-31*	
Publications/Treasurer	S.M. McFadden	Ontario	2016-12-31*	Division 1
	R. Baribeau	Ontario	2017-12-31*	Division 8
	J. Bastianpillai	Ontario	2015-12-31	
ex officio	A.A. Gaertner	Ontario		INMS DG delegate
	André Laperrière	Québec	2015-12-31	Division 4
	K.F. Lin	Ontario	2016-12-31*	
	J.A. Love	Alberta	2015-12-31	
	S.S. Qutob	Ontario	2015-12-31	Division 6
	C. Suvagau	British Columbia	2015-12-31	
	M.K. Timmings	Ontario	2015-12-31	Division 5
	L.A. Whitehead	British Columbia	2015-12-31	
	J.C. Zwinkels	Ontario	2015-12-31	Division 2

* signifies Members awaiting official term appointment from NRC-MSS

CNC/CIE ADVISORY MEMBERS

Martin Aitkenhead	Ontario	Ken Loach	Ontario
Santo Aguanno	Ontario	P. Manning	Nova Scotia
Eduard Alf	Ontario	S.W. McKnight	Ontario
Chantal Arsenault	Ontario	Arthur H. Mendel	Québec
Ian Ashdown	British Columbia	Tim Moggridge	Ontario
M.G. Bassett	Ontario	Guy Newsham	Ontario
Chrisnel Blot	Québec	Keith Niall	Ontario
Mario Bucci	Ontario	Thomy Nilsson	P.E.I.
J. Allyson Chrysler	Ontario	Karen Pero	Ontario
Vince Cimino	Ontario	Jacques B.Roberge	Québec
William B.Cowan	Ontario	Alan R.Robertson	Ontario
Biman Das	Nova Scotia	Alexander Rosemann	British Columbia
R.V. Day	Ontario	Shrestha Mankajee	British Columbia
Walter T. Delpero	Ontario	Andrew D. Silbiger	Ontario
Marie Dumont	Québec	Dyoni Smith	Ontario
Marcin Gorzkowski	Ontario	Ralph A. Smith	New Brunswick
John W. Harron	Ontario	Nikolay Stoev	Ontario
Kurt Ising	British Columbia	Eli Szamosi	Ontario
S.M. Kaye	Manitoba	Brian W.Tansley	Ontario
Donald Kline	Alberta	Thanos Tzempelikos	Ontario
Barbara Kolesnik	Ontario	Robert W.White	Québec
R. Lakowski	British Columbia	Ernest Wotton	Ontario
Denis Lavoie	Québec		

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Canadian Division Members' Reports

CNC/CIE 59th Annual Meeting

2014-December-01

COMMISSION INTERNATIONALE DE L'ÉCLAIRAGE
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Division 1: Vision and Colour

Report to CNC/CIE 59th Annual Meeting
National Research Council of Canada, Ottawa, Ontario

Sharon McFadden
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1 Introduction

The annual meeting of Division 1 was held 16-17 June 2014 in Gaithersburg, Maryland, USA in conjunction with "Colour and Appearance Week at NIST". The meeting was attended by 5 officers, 19 country representatives (including 4 via internet and 1 by proxy), 14 TC Chairs, and several guests. Sharon McFadden represented Canada. Twelve Technical Committees (TC) met in conjunction with the meeting. The Division meeting was followed by a symposium organized by the Inter-Society Color Council (June 18) and a meeting of ASTM E12 Color and Appearance (June 19-20).

2 Highlights

2.1 New Technical Committees and Reporterships

Two new TCs were proposed at the Division meeting. They are:

Principle and Use of Equivalent Luminance (Proposed by Ken Sagawa JP)

Terms of Reference: To develop a report describing the concept, definition, and background of equivalent luminance and providing guidelines for its use in the photometric field.

Metric for Consistent Colour Appearance (Proposed by Yasuki Yamauchi JP)

Terms of Reference: To recommend guidelines and a quantitative assessment method for consistent colour appearance with different colour gamuts.

Division approval of these proposals will be carried out by email ballot once the proper forms have been submitted. However, it was felt that the first proposal might be carried out under a Reportership since it is a revision of an existing document and the work will primarily be carried out by one person.

Two new Reporterships were approved at the meeting:

R1-61 Source Whiteness Metric (Aurelien David US)

Terms of Reference:

1. To review the literature on the impact of white objects containing Fluorescent Whitening Agents.

2. To report on the activity of the IES (Illuminating Engineering Society of North America) Whiteness Group which will propose a metric for the whiteness- rendering capability of light sources.

R1-62 Typical LED Spectra (Sophie Jost FR)

Terms of Reference:

1. To collect available LED spectra.

2. To analyse the difference among the spectra with the aim of finding possible typical spectra for various classes, e.g. cool white, warm white.

2.2 Division publications

208:2014: Effect of Stimulus size on Colour Appearance

211: 2014 Colour Appearance in Peripheral Vision.

212: 2014 Guidance Towards Best Practice In Psychophysical Procedures Used When Measuring Relative Spatial Brightness.

2.3 Future meetings

The next meeting will be held during the 28th Session of the CIE, 28 June to 3 July 2015 in Manchester.

3 Canadian participation in Division 1 activities

Activity	Title	Canadian Members
TC1-55	Uniform Colour Space for Industrial Colour Difference Evaluation	A. Robertson
TC1-64	Terminology for Vision, Colour and Appearance	S. McFadden (Chair)
TC1-67	The Effects of Dynamic and Stereo Visual Images on Human Health	B. Tansley
TC1-71	Tristimulus Integration	B. Jordan, A. Robertson
TC1-77	Improvement of the CIE Whiteness and Tint Equations	B. Jordan, J. Zwinkels
TC1-83	Visual Aspects of Time-Modulated Lighting Systems	L. Whitehead
TC1-85	Update CIE Publication 15:2004 Colorimetry	A. Robertson
TC1-90	Colour Fidelity Index	L. Whitehead
Liaison	L1-03 ISO/TC6/WG3 Paper, Board and Pulp – Optical Properties	J. Zwinkels

4 Highlights of Division work programme

4.1 Overview of the status of TCs and Reporterships

The following summaries of activities in the various TCs of Division 1 are based on the minutes from the 2014 Division 1 meeting. Additional information on some of the TCs can be found in the minutes as well as the Activity Report for 2014. These are available in PDF format on the Division 1 website at http://div1.cie.co.at/. The activity report includes the terms of reference and membership for all TCs and Reporterships.

4.1.1 Progress in Vision Section (M. Ayama, Associate Director (AD))

TC1-36 Fundamental Chromaticity Diagram with Physiologically Significant Axes (F. Viénot) A TC ballot of the final draft of Part II of the Technical Report has been completed, and the Report will now be submitted to the Division for onward submission to the CB.

TC1-67 The Effects of Dynamic and Stereo Visual Images on Human Health (H. Ujike) The second revision of the draft TR was circulated to all the TC members and also to some other CIE members in D6, in 2013. Based on the comments obtained, a third revision was produced and was circulated to all the TC members and other members in D6 in June, 2014. The TC Chair (TCC) will finalize the document, and will start the TC ballot as soon as responses are obtained.

TC1-82 The Calculation of Colour Matching Functions as a Function of Age and Field Size (J. H. Wold) The TC met in Gaithersburg. The TCC reported on the status of the committee work. A preliminary stand-alone version of a Python computer program which can calculate cone-fundamental colour matching functions for a particular age and field size (from 1° to 10° in 0.1 step intervals) was demonstrated. New options are as follows:

- Comparisons with existing standards, CIE 1931 and CIE 1964, can be indicated,
- Wavelength domain and wavelength step can be chosen from given choices,
- Tables and plots can be saved in several different file formats.

A preliminary web-application for the CIE web-site was also demonstrated. Investigation of the data for elderly people is still needed to determine the cut off with respect to the age range. The TCC will contact members of D6 on this issue.

TC1-83 Visual Aspects of Time-Modulated Lighting Systems (D. Sekulovski) A TC meeting was held at the CIE Kuala Lumpur conference in 2014. At that meeting, the following items were accepted:

- A more general set of definitions of temporal properties of visual perception.
- A draft proposal on methodologies for experiments.

The next meeting will be held on WebEx, and the TCC will show the draft of a TR.

TC1-84 Definition of the Visual Field for Conspicuity (N. Itoh) A TC meeting was held in Gaithersburg. The framework for guidelines on how to consider visual fields function to increase the visibility of visual information and the examples of how to use the data of visual field were explained in the TC meeting. All attendees agreed to continue efforts to make guidelines. The TCC will collect more references about the performing tasks, e.g. "vection" and will check the ILV definition of the term "visual field", and reconsider an alternative term if necessary. The goal is to complete the first draft of the TR by the next D1 meeting.

TC1-88 Scene Brightness Estimation (Y. Nakamura) A TC meeting was held in Kuala Lumpur in 2014.

The work programme is as follows:

- In 2013, 2014, members investigated current research on brightness estimation methods using a calibrated luminance image of a real indoor scene.
- In 2015, several members in different laboratories will carry out experiments to compare brightness estimations of real indoor scenes with those predicted by different estimation methods.
- In 2016, the TC will finalize the activity and recommend a method to predict the brightness of specified regions of a scene from a luminance image of that scene.

TC1-89 Enhancement of Images for Colour Defective Observes (Po-Chieh Hung) An informal TC meeting was held during the Division meeting in Gaithersburg. The TCC showed the planned structure of the Technical Report (TR) (see D1 minutes for an outline).

TC1-93 Calculation of Self-luminous Neutral Scale (Robert Carter) This new TC met in Gaithersburg. It was approved in 2013. Its goal is to recommend a formula or computational method for an achromatic, neutral or gray scale for self-luminous (i.e. non-reflective) surfaces. (This computation complements CIE Lightness, L*, which serves a similar purpose for reflective surfaces.). The four tasks currently ongoing are:

- Specify a calculation of self-luminous neutral scale
- Define the meaning of "neutral" in neutral scale
- Integrate the neutral scale calculation with color space and color difference calculations
- Consider the specified calculation and alternatives in various contexts

All interested persons are invited to contribute to the last task.

TC1-94 Visually Meaningful Spectral Luminous Efficiency Functions (Ferenc Szabó) This TC was proposed and accepted by the Division, and established officially in 2013. The work of this TC will commence after the completion of the updating of CIE 15 Colorimetry, scheduled for the 2015 CIE Session. It was agreed unanimously at this meeting to change the TC Chairman from Janos Schanda (HU) to Ferenc Szabó (HU).

JTC-1 Implementation of CIE 191 Mesopic Photometry in Outdoor Lighting (L. Halonen) Both the Chair and the secretary have resigned from the Joint Technical Committee (JTC). A meeting was held at the CIE Kuala Lumpur Conference, 2014, chaired by Ron Gibbons from D4. The TC has been divided into two sub-TCs, one for Task 1 (investigation of adaptation and viewing conditions, definition of visual adaptation fields), and the other for Task 2 (lighting applications of mesopic photometry) and Task 3 (provision of guidelines for implementation).

R1-49 Above-threshold Pulsed Lights (M. Nicholson & D. Couzin) Malcolm Nicholson submitted a report written by Dr. Peter Rhodes (University of Leeds) entitled "Apparent Intensity of Flashing Light." This report is in the D1 minutes. The report was written independently from Dennis Couzin, and his comments will be sent to Malcolm Nicholson and the Division officers. It was agreed to close this Reportership.

R1-51 Reconciling Maxwell vs Maximum Saturation Colour Matches (M. Brill) The Reporter informed the meeting that he cannot continue the Reportership. Since no one else was willing to undertake this work, it was agreed to close this Reportership.

4.1.2 Progress in Colour Section (E. Carter, Associate Director)

TC1-55 Uniform Colour Space for Industrial Colour Difference Evaluation (M. Melgosa) The TC chair apologized for the current delay in the preparation of the first draft of the intended TR. He proposed to finish this first draft before the end of 2014. During the past months two tasks were accomplished. First, the chair analyzed the paper from E. Kirchner, N. Dekker, J. Opt. Soc. Am. A 9, 1841-1848 (2011) criticizing the STRESS index as an appropriate measurement for evaluating color-difference equations, and proposing as an alternative the use of Pearson's linear correlation coefficient in combination with graphical and diagnostics analyses. This publication is thought to be compatible with the proposal of the STRESS index intended in the TR. Second, Dong-Ho Kim (Korea) published a new color space named ULAB (see Color Res. Appl.) which will be added to the analyses presented in the intended TR.

TC1-61 Categorical Colour Identification (T. Ishida) An updated third draft with an additional chapter was sent to the members in June 2014. A list of the recommendations is provided in the minutes.

TC1-63 Validity of the Range of CIEDE2000 (K. Richter) The TC met in Gaithersburg at NIST. The contents of a first draft of the TR were discussed. An outline of this draft is available in the minutes.

TC 1-64 Terminology for Vision, Colour and Appearance (S. McFadden) The third draft of a Technical Note on terminology was tentatively approved by the members and then forwarded to Division 2 for their comments on those terms of interest to them. The comments from Division 2 have been received and reviewed by TC members. A fourth draft is expected by the end of 2014.

TC1-70 Metameric Samples for Indoor Daylight Evaluation (B. Kranicz) Balázs Kranicz did not submit a report for this TC. However, during discussions at the Division meeting it was commented that the work for this TC was really completed a couple of years ago except for the TR. Janos Schanda said he would try to get a report started by September 2014.

TC1-71 Tristimulus Integration (C. Li) A meeting was held in Gaithersburg at NIST during which the work was discussed. A detailed summary of the current status of the work is available in the minutes.

TC1-73 Real Colour Gamut (C. Li) Since the formation of this TC, members have accumulated more reflectance data, which are the basis for comparing the available gamuts and deriving a new gamut and surveyed available gamuts. A summary of this work is available in the minutes.

TC1-75 A Comprehensive Model of Colour Appearance (R. Luo) C. Fu's PhD data (Unrelated colours under photopic and mesopic regions) and K. Xiao's PhD data (Same colours under 6 different sizes) have been collected. In April 2014 the forward model was derived. A manuscript entitled 'Extension of CIECAM02 for varying-sized objects and unrelated colours', was submitted to Color Res and Appl., and the paper and an Excel version of the software were circulated to TC members for feedback. A meeting was held in Gaithersburg at NIST to discuss that feedback. The current approach is an extension of the CIECAM02 but new proposals are welcome.

TC1-76 Unique Hue Data (S. Wuerger) While the Chair was unable to attend the division meeting, she provided data for self-luminous stimuli which is included in the minutes.

TC1-77 Improvement of the CIE Whiteness and Tint Equations (R. Hirschler) Research has been started on the performance of whiteness formulae under D50 illumination.

TC 1-81 Validity of Formulae for Predicting Small Colour Differences (K. Richter) This TC met in Gaithersburg at NIST where a second draft of a TR was discussed The TC decided to discontinue the investigation on the Avramopoulos data and aim to complete the TC report by the end of this year. Three topics should be covered:

- To focus on the study of new data collected by this TC in addition to the four subsets of BFD, Witt, Leeds and RIT-Dupont. The new datasets are ZJU-perceptibility, ZJU-acceptability, Wang et al, BIGC-SCD, BIGC-TCD, Kittelmann, Richter and AUDI2000.

- To test the available colour difference equations and uniform colour spaces and to report the test performance.
- To plan a new TC or Reportership to study threshold data.

TC1-85 Update CIE Publication 15:2004 Colorimetry (J. Schanda) This TC met in Gaithersburg at NIST. Draft 4 of the TR had been circulated. At the meeting, discussion concentrated on the following sections that are either not yet complete or need input on some aspect of the section:

- Standard observers
- New section on cone fundamental based colorimetry
- Discussion how deeply the MacLoad-Boynton chromaticity diagram should be discussed in the
- Colorimetry document
- Illuminants and sources
- New sub-sections on smoothed illuminants and Illuminant E
- Standards of reflectance and geometric conditions
- New parts by D. Rich
- Calculations & colour spaces
- More details on CIEDE2000

The work that remains to be done includes an important section (still missing) on CIECAM02 updating of the Tables, and finalization of a draft before the 2015 Session.

TC1-86 Models of Colour Emotion and Harmony (Li-Chen Ou) TC members have submitted existing psychophysical data of colour emotion and colour harmony. All submitted data can be accessed using the CollTool. The first version of colour emotion models based on the submitted data has been developed and is summarized in the minutes.

TC1-90 Colour Fidelity Index (H. Yaguchi) This TC had 2 meetings this year. The first in Kuala Lumpur included presentations on correlation between Ra and CIR2012 by H. Yaguchi and modifications of CRI2012 by L. Whitehead. Then the Guidelines for visual experiments were discussed by H. Yaguchi, R. Luo, and E de Beer. The who, where, and when of the visual experiment of assessing color fidelity were also discussed. The second meeting was held in Gaithersburg at NIST. The meeting covered Analysis of CRI2012 by Y Ohno, the design of the new test color samples for CRI2012 by L Whitehead, reports of the visual experiments so far including those by R. Luo, Y Mizokami, S Jost, and O da Pos. L Whitehead responded to frequently asked questions about CRI, and then a guest, Prof. Michael Shur from Rensselaer Polytechnic Institute, gave a short presentation on Statistical Color Rendering Evaluation including Color Fidelity, Color Dulling, Color Saturation, and Hue Distortion. The future plans involve carrying out the visual experiments; making minute investigations of CFIs, analysing the visual experimental data and writing the TR.

TC1-91 New Methods for Evaluating the Colour Quality of White-Light Sources (Y. Lin) This TC met in Gaithersburg at NIST. The second round of data collection is completed. Available indices include: FCI, CQS, MCRI, & PS. Colour Harmony rendering index is proposed to be included (and Ferenc Szabó just submitted HRI data). Other contributions include: 1) Minchen Wei has summarized 22 measures based on 401 SPDs and proposed a 2-dimension system, 2) Yandan Lin has conducted a pilot study to explore the effect of application on the metric and 3) and 4) Contributions from Sophie Jost and Peter Bodrogi, respectfully. The future activities are 1) to continue work on the draft technical report, 2) a parallel experiment to verify the existing indices with the same experimental settings 3) future meetings in Sept 2014 via CIE WebEx, and 2015 in Manchester, United Kingdom.

TC1-92 Skin Colour Database (K. Xiao) This TC met in Gaithersburg at NIST. The discussions included the uncertainty tests conducted at the Universities of Liverpool, Leeds, and Hangzhou. They are: 1) Uncertainty of skin measurement by a spectroradiometer; 2) Uncertainty of skin measurement by a spectrophotometer; 3) Uncertainty of skin measurement by a digital camera; 4) Agreement of skin measurement between instruments; and 5) Uncertainty of visual assessment of skin colours. A protocol for colour measurement will be developed based on those tests. Data were already collected using a spectrophotometer at Manchester Metropolitan University, UK, and Chulalongkorn University, TH. Data collection is in preparation at the University of Liverpool; Zhejing University, CN; and the University of

Alicante, ES using spectrophotometers, spectroradiometers, and digital cameras. New research partners are very welcome.

R1-42 Extensions of CIECAM02 (C. Li) With the terms of reference of evaluating potential additions to CIECAM02 in liaison with D8, C Li reports that the yellow-blue and purple problems [Li CJ, Ji CJ, Luo MR, Melgosa M, Brill MH. CAT02 and HPE Triangles. Color Res Appl, and Li CJ, Luo MR and Wang ZF, Different Matrices for CIECAM02, Color Res Appl 2014;39: 143–153; and Jun Jiang, Changjie Ji, M. R. Luo, Manuel Melgosa, Michael H. Brill and Changjun Li, An Optimum Solution to the CIECAM02 Yellow-Blue and Purple Problems, submitted to Color Research and Applications] for the CIECAM02 are solved. Further results may be available at the D8 TC meeting.

R1-52 Spectral Data Interpolation (H. Fairman) Reporter Fairman stated at the meeting that he has not made progress on this Reportership and suggested looking for a new reporter to take up the work. D Rich volunteered and was selected by a unanimous ballot at the meeting.

R1-53 Gloss Perception and Measurement (F. Leloup) The report from this Reportership has been published as Leloup, FB, Obein, G, Pointer, MR and Hanselaer, P (2013), Toward the soft metrology of surface gloss. Since then new experiments are planned that relate to gloss perception and measurements within a 3-year European project that started in early 2014. Gaël Obein presented a report entitled “xDReflect, a European Joint Research Project devoted to the metrology of the appearance of surfaces” at the ISCC symposium on June 17th, 2014. An annual update will be provided that includes other work related to the field, for example performed by vision scientists.

R1-58 Liaison with ISO TC130 Graphic Technology (P. Green) P Green reported on the progress to date:

- Issues raised in TC130 liaison reports were investigated and a workshop held in Leeds in 2013
- Greater understanding of TC 130 needs in D1
- Substantial progress on application of CIEDE2000

Further issues awaiting action by CIE include:

- L* > 100 - This is limited to highly-fluorescent materials; L*=100 is typically only exceeded by a small amount; although there is no psychophysical data, it may be reasonable to apply the cube-root function to Y/Yn in such values, rather than assume a discontinuity.
- Metrics for quality of LED light – Requires more research, which concerns TC1-70, TC1-90, and TC 1-91, as well as the closed TCs 1-69 and 1-78.

4.2 Dissolution of and changes to Technical Committees and Reporterships

4.2.1 Technical Committees and Reporterships closed

TC1-78 Evaluation of Visual Performance in the Real Lit Environment

TC1-68 Effect of Stimulus Size on Colour Appearance

TC1-69 Colour Rendition of White Light Sources

R1-49 Above-threshold Pulsed Lights

R1-51 Reconciling Maxwell vs Maximum Saturation Colour Matches

4.2.2 Changes

TC1-94 Visually meaningful spectral luminous efficiency functions: It was agreed to change the TC Chairman from Janos Schanda (HU) to Ferenc Szabó (HU).

R1-52 Spectral Data Interpolation: It was agreed to change the Reporter from Hugh Fairman (US) to Danny Rich (US)

5 Other Division News

5.1 Board of Directors Meeting in Kuala Lumpur – Items relevant to Division 1

- TC1-90 Colour Fidelity Index was identified as a high priority project
- A report from a Reporter will in future go through a review process and be published either as a Technical Note or on the Division website
- Two joint TCs were proposed:
    - D3/D1: Discomfort caused by glare from luminaires with a non-uniform source luminance
    - D4/D1: To review the CIE 143:2001 International Recommendations for Colour Vision Requirements for Transport

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Division 2: Physical Measurement of Light and Radiation

Report to CNC/CIE 59th Annual Meeting
NRC, Ottawa
1 December 2014

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1 Introduction

The most recent CIE Division 2 (D2) General and TC meetings were held in Kuala Lumpur, Malaysia, 28-30 April 2014, in conjunction with the CIE Conference and Workshop on *Lighting Quality and Energy Efficiency*.

D2 has 37 country members. At the D2 meeting, there were 24 official country members or proxies present. I attended this meeting as country member for Canada and as one of the three D2 Associate Division Directors (ADDs). There are no changes in the D2 management since 2013 but there will be an election this year for DD for the period 2015-2019.

Fifteen Technical Committees (TCs) met in Kuala Lumpur: **TC 2-29** *Measurement of Detector Linearity* (Eppeldauer), **TC2-51** *Calibration, characterization and use of array spectroradiometers* (Young); **TC2-59** *Characterization of imaging luminance measurement devices* (Krüger); **TC2-63** *Optical measurement of high-power LEDs* (Zong); **TC 2-64** High speed testing methods for LEDs (Heidel); **TC 2-68** Optical measurement methods for OLEDs used for lighting (Gerloff); **TC2-71** *CIE standards on test methods for LED lamps, luminaires and modules* (Ohno); **TC2-73** *Measurement of quantities relating to photobiological safety of lighting products* (Mou); **TC 2-74** *Goniospectroradiometry of optical radiation sources* (Pan); **TC 2-76** *Characterization of AC-driven LED products for SSL applications* (Chou); **TC 2-77** *Fundamental Concepts* (Bergen); **TC 2-78** *The Goniophotometry of Lamps and Luminaires* (Bergen); **TC 2-79** *Integrating sphere photometry and spectroradiometry* (Lee); **TC 2-80** *Spectroradiometric measurement of light sources* (Young); and **JTC2** *CIE-CCPR Principles Governing Photometry*(Ohno)

Additional information can be found at the following link: http://div2.cie.co.at/

2 Highlights

2.1 New Technical Committees and Reporterships

Proposals for Two (2) New Technical Committees:

(1) Technical Committee

Title: *Advances in Absolute Radiometry*

Proposer: Maria-Luisa Rastello (Italy)

Motivation: The scope is an update of the existing TR CIE 065-1985 on the operating principle of absolute detectors of optical radiation. The new report will update their main components, list their sources of uncertainties, suggest experimental procedures to determine their systematic errors and discusses their main applications. An extensive list of references will be included to

enable the reader to refer to the specialist literature for more detailed information. The report is intended as a guide for non-specialists, giving them the background required for using absolute radiometers and objective means for assessing their performance. The proposed TC complements CIE JTC-2. Here, the focus will be on technical requirements for detectors.

Decision: Proposer is to update her TC proposal and re-submit by 2014-06-30.

(2) Technical Committee

Title: *Glare Measurement by Imaging Luminance Measurement Device (ILMD)*

Proposer: Shau-Wei Hsu (represented by Kuei-Neng (Gilbert) Wu)

Motivation: Refer to Report on R2-53

Decision: DD2 to approach D1, D3 and the Board to include D2 in that joint TC that is being created for redefining the UGR by glare (UGR) measurement by ILMD.

Proposals for Three (3) new Reporterships:

(1) Title: *Life testing of LED chips, packages, modules and products*

Proposer: David Chan

Motivation: There are many questions on the determination of MU for life testing of LEDs. LED companies are raising the issue that this is causing a barrier to market for them. Currently what exists is LM-80 for the measurement set up and method but this doesn't go into detail for MU determination. There are also many things to consider or prove negligible dependent on the test set up. The areas of MU are divided into four main categories of electrical, temperature, optical and time. It is proposed to assess the method and MU used in an EU FP7 project with OSRAM for the life testing equipment; in particular, to run ALT experiments with LED companies to investigate the conditions that prove best to carry out ALT testing and to see if a joint TC with IEC would be suitable.

Decision: Proposer to provide additional details and re-submit by 2014-06-30

(2) Title: *UV measurement of lamps and products containing UV*

Proposer: David Chan

Motivation: In the past 18 months, the Proposer has had a project to measure UV and carry out life testing. They were not able to find out any guidance documents so they developed the life test in conjunction with the client taking best practice from other types of life testing. However for the UV tests, they came across a few issues that could not be resolved by using best practice from other standards for light sources. These issues involved the measurement equipment, calibration and measurement method. The proposer would like to put forward the method they developed for a TN, TR or Standard.

Decision: Proposer to provide additional details and re-submit by 2014-06-30

(3) Title: *Guide for the Field Photometric Measurements for the Verification of Lighting Systems*

Proposer/Reporter: Roman Dubnicka

Motivation: Reportership in D2 should provide guidelines for carrying out field photometric measurements for verifying the calculated parameters of lighting system designs, including the uncertainty of measurement that underpin the work of **TC3-34** – *Guide to Protocols for Describing Lighting (*Veitch). The most important parameters are uniformity of the illuminance in the workplace and the level of (maintained) illuminance of the task area and on the surrounding area; other parameters are:

luminous distribution, discomfort glare, CCT, CRI, directionality of light, LMF etc. There is also the possibility to create JTC between D2 and D3.

Decision: After the meeting, this Reportership was given the number, **R2-70**.

2.2 Division publications:

Three D2 reports have been published since the 2013 D2 meeting in Paris:

- CIE S 023/E:2013 *Characterization of the Performance of Illuminance Meters and Luminance Meters*
- ISO/CIE 19476:2014 *Characterization of the performance of illuminance meters and luminance meters*
- CIE DIS 024/E:2013 *Light Emitting Diodes (LEDs) and LED Assemblies – Terms and Definitions*

2.3 Future D2 meetings and Symposia:

2014 CIE Tutorial and Expert Symposium on Measurement Uncertainty, September 11-12, 2014, Vienna

2015 Manchester, UK, 25 June – 4 July 2015, in conjunction with CIE Quadrenniel meeting.

2016 Australia in conjunction with D4 and D5 meetings

2017 South Korea in conjunction with CIE Mid-term meetings

3 Current Canadian participation in Division 2 activities

Activity	Title	Canadian Members
TC2-57	Revision of CIE S014-2	J. Zwinkels (NRC) -member
TC2-59	Characterisation of Imaging Luminance Measurement Devices	T. Moggridge (Westboro Photonics) -member
TC2-60	Effect of Instrumental Bandpass Function and Measurement Interval on Spectral Quantities	J. Zwinkels, R. Baribeau -members
TC2-63	Optical Measurement of High Power LEDs	V. Venkatarananan (UofT), M.M. Sisto (INO) -members
TC2-65	Photometric Measurements in the Mesopic Range	J. Zwinkels (NRC) – member
TC2-70	Standards for the Measurement of Reflectance and Transmittance Properties of Materials	J. Zwinkels, N. Rowell (NRC) – members
TC2-71	CIE Standard on Test Methods for LED Lamps, Luminaires and Modules	R. Li (Lumentra) – member
TC2-77	Fundamental Concepts	J. Zwinkels (NRC) – member
TC2-80	Spectroradiometric measurement of light sources	J. Zwinkels (NRC) – member

R2-59	Discussion on ILV definition of BRDF	J. Zwinkels (NRC) – Reporter
L2-3	ISO TC6 Paper, board & pulps	J. Zwinkels (NRC) – liaison
L2-8	ISO TC145/SC2 N519 Safety colours and safety signs	J. Zwinkels (NRC) – liaison
Officers	Associate Division Director, D2	J. Zwinkels - ADD

4 Highlights of Division 2 Work Programme

4.1 Overview of the status of TCs and Reporterships

TC2-17 *Simulated solar radiation* (Myers). The DMT decided to clarify open issues in the report with the assistance of a task force (Daryl Myers, Tony Bergen, Joanne Zwinkels, Peter Blattner), Peter Zwick). On 2014-02-27 a Webex meeting was held with TCC where most open issues were fixed. It was decided that Peter Zwick will send revised draft by 2014-03-03 to TCC who will then implement all additional changes by 2014-03-17.

TC2-29 *Measurement of Detector Linearity* (Eppeldauer). The first part of the document that describes how to avoid nonlinearity in detector systems has been finished by the TCC. The Draft-3 has been sent to the D2D and D2S. It is also on the D2 web page. The second half of the document describes definitions and terminology and also measurement methods of detector nonlinearity. At the moment, the two parts are being combined and the Table of Contents together with the text have been restructured. The plan is to finish the 4th draft by September 30, 2014. Then the document will be ready for editing by D2E.

TC2-37 *Photometry using Detectors as Transfer Standards* (Ohno). The CD was circulated to TC on March 21, 2013 - had 6 approval votes. The ED was circulated to Div/BA on April 25, 2013 with Deadline 2013-06-25 – received 37 comments. Responses and a new draft have been prepared including improvements of figures. The AD was circulated to Div/BA on March 12, 2014 with Deadline 2014-04-12 (BA voted: 5 Yes, 0 No, 0 Abstention; D2 voted: 10 Yes, 0 No, 0 Abstention). The Publication is currently being prepared by CB.

TC2-47 *Characterization and Calibration Methods of UV Radiometers* (Sperling). At the 2013 TC meeting in Paris where Draft 5.2 was discussed, it was decided to introduce an additional chapter on industrial calibration. Toni Bergen sent a proposal and Teresa Goodman sent a commented version of the draft with some major inputs on industrial calibration and a number of additional comments on the other chapters of the draft.

This draft was also commented by four other members and Peter Sperfeld now volunteers to reorganize/rewrite chapter 6 on Calibration of UV Radiometers to improve its readability. As the concepts of fixed reference sources and adapted calibration sources used in this document seem to be often misunderstood, this is one of the most important tasks during the next months. The TCC will treat all comments in the remaining document. Besides this, it appears that some characteristics of UV-meters defined in Chapter 3, like f_1 or f_1' are no more applicable/necessary for "Calibration by direct comparison", as proposed in the new chapter 6.3, or in other words, spectral characteristics defined in Chapter 3 are

disregarded in the calibration procedure/uncertainty of UV meters. Therefore, in this case, an additional "spectral" index, easy to prove by test laboratories, will be proposed for chapter 3 with the next It is planned to develop and circulate the final draft technical report 6.0 for WD Ballot by 2014-6-30.

TC2-49 ***Flashing lights*** **(Ohno).** The WD was circulated to TC on Feb. 15, 2013 - 8 comments received. Comments were all minor and the panel members decided to skip CD. ED was prepared addressing these comments and circulated to Div/BA on April 9, 2013 with Deadline 2013-06-09 – 32 comments were received. Responses and a new draft have been prepared including improvements of figures. One of the comments (on the inconsistency when measuring more than one pulse) was discussed with two key TC members, and section 3.4 was rewritten. This section is being edited. AD is to be distributed to Div/BA in May 2014.

TC2-50 ***Measurement of the optical properties of LED assemblies*** **(Distl).** The TCC reported that he has not made progress in the past year because of changes in his company. He has received contributions from two TC members (Menno Schakel and Richard Young). TCC is now working on a new draft and had planned to have a TCC meeting in Kuala Lumpur but this did not happen.

TC2-51 ***Calibration, characterisation and use of array spectroradiometers*** **(Young).** The TC met in Paris (April 2013) and in Bled (October 2013). The changes to the draft suggested at the meetings and email communications have been implemented. The draft has been streamlined, contributions on calibrations have been received from most volunteers (Peter Sperfeld and Teresa Goodman) . The lack of measurement examples submitted means that section 7 has been deleted. The current draft (6.2) is approaching completion and will shortly be circulated to members for comments. Two contributions for the calibration section are still outstanding. Following receipt of comments and contributions, draft 6.3 will be created and sent for full editorial review. A TC meeting was also held in Kuala Lumpur to discuss comments received on draft 6.2.

TC2-57 ***Revision of CIE S014-2*** **(Kránicz).** There has not been a report from the TCC for a few years. It was decided at the D2 meeting in Kuala Lumpur to change the TCC – see above re Changes in TCs and Reporterships.

TC2-59 ***Characterization of imaging luminance measurement devices*** **(Krüger).** The TCC has prepared a new draft including all comments from the DIN meeting at the beginning of March 2014. There are three main problems in the current work: 1) For the new characteristic values the TCC has no feedback from other members until now. So it is difficult to know whether these characteristic values can work or not; 2) The calibration of ILMDs – a new draft has been prepared for the German DIN and the TCC will include this information in the next draft; and 3)Finishing the discussion about the luminance definition. The TC met in Kuala Lumpur.

TC2-60 ***Effect of instrumental bandpass function and measurement interval on spectral quantities (*****Gardner).** Draft 9.6 was circulated to members on 17 December 2013 for ballot. 10 members voted within the (extended) time frame. All voted to accept the document. Some editorial comments were made and minor corrections applied to the draft. Version 9.7 was sent to CIE CB for processing beyond the CD stage.

Subsequent to meeting: This was published in November 2014 as: **CIE 214:2014** (Baribeau and Zwinkels are authors of this report)

TC2-62 ***Imaging-photometer-based near-field goniophotometry*** **(Steudtner).** Most of the progress achieved up to now in TC 2−62 has come from the German Standardization

Team Photometry at DIN there was nearly no progress of 2−62 since the Paris meeting. Furthermore, TC 2−62 needs the TR of TC 2−59 as a prerequisite and a common understanding of the quantity – luminance - between the NMIs and the industry. To achieve this, a small team was formed within the German Standardization Team Photometry at DIN at the last meeting in Karlsruhe. This team will meet after the Kuala Lumpur meeting. The TC will not meet in Kuala Lumpur but plans a meeting at the Vienna Workshop in September 2014 to achieve the enquiry draft.

TC2-63 ***Optical measurement of high power LEDs*** **(Zong).** The TC members developed 3th draft technical report in March 2013 and held a fruitful meeting on April 18, 2013 in Paris, France. The 4th draft of the TR was sent to TC members on February 27, 2014, where all comments/suggestions from individual TC members have been addressed. The TCC chair is very pleased that Dr. Markus Schneider, OSRAM Opto Semiconductors GmbH, Germany has joined the TC who is a world-class expert on LEDs. The 5th draft TR was discussed at the TC meeting in Kuala Lumpur and it is planned to prepare the final (6th) TR by May 2014.

TC2-64 ***High speed testing methods for LEDs*** **(Heidel).** New draft 4.1 has been prepared which has sections on: high speed testing of LED chips on wafer level (to be checked by specialists outside of TC); high speed testing of LED devices; ZTH measurement (description to be put in an annex); conversion of pulse measurement to application driving conditions. TC met in Kuala Lumpur to discuss this draft and to polish the English; Richard Young has volunteered to help with this.

TC2-65 ***Photometric measurements in the mesopic range*** **(Goodman).** A 2nd draft of the planned TN on photometric quantities and units is in preparation and will be circulated for comment before end March 2014. An updated draft of the TN giving guidance for manufacturers regarding the specification of the “mesopic performance” of products is also being prepared and will be circulated before the meeting in Kuala Lumpur. The remaining work planned in this TC cannot proceed far until JTC-1 has made its recommendations on the size of the adaptation field and how to allow for factors such as line of sight movements or the presence of point sources within the visual field. However manufacturers are already beginning to produce instrumentation specifically for mesopic photometry and the next action of the TC (after finalising the TNs) will therefore be to begin preparing recommendations regarding the calibration and use of such instrumentation, and the associated uncertainties, in parallel with the work of JTC-1.

TC 2-67 ***Photometry of lighting and light-signalling devices for road vehicles*** **(Manz).** No report.

TC2-68 ***Optical measurement methods for OLEDs used for lighting*** **(Gerloff).** The TC is finalizing the “Terminology of OLEDs”-proposal. Draft 1.1 which was presented in Paris. Some overlapping terms between CIE TC2-68 and IEC SC 34A/working group PRESCO OLED PT were harmonized. The TCS (reported about the last IEC SC 34A/working group PRESCO OLED PT meeting and the TCS (Yasuki Yamauchi) was elected as CIE Liaison Officer to the IEC. A comprehensive talk about recent activities in STC1 was given by TCC and a a comprehensive talk about recent activities in STC2 was given by Yasuki Yamauchi. The next steps are to: 1) finalise terminology draft within the TC. Before publishing it has to be discussed and distributed to all relevant industrial OLED manufacturers and also to relevant standardization bodies such as IEC and IESNA which are working in the field of OLEDs used for lighting; and 2) continue working within the Sub TCs. First topic is luminous flux related issues.

TC2-69 ***CIE classification system of illuminance and luminance meters*** **(Blattner).** Draft 1 of the TR includes contributions from different members (H. Shitomi, G. Sauter, G. Rossi, and J. Pan) on different

national standards. It was distributed on 2014-04-24 to the TC members. It is intended to have a Webex meeting in June 2014 and a physical meeting in September 2014. Depending on the feedback the reports will go to TC ballot in October 2014.

TC2-70 *Standards for the measurement of reflection and transmittance properties of materials (*Rich). Since the Paris 2013 meetings, there have been several email exchanges but no further submissions or edits to the draft standards. Some TC members are suggesting that there is no need for standards of spectral transmittance factor. Others are now concerned that the Terms of Reference are too broad and the spectral range should be restricted to only the visible wavelengths as used in colorimetry. The TCC has acknowledged that a single standard document that covers requirements for the ultraviolet, visible and infrared would be difficult to draft and to use. There has also been some discussion about how the section on uncertainty should be written, since recent work has shown that uncertainty is very dependent on the nature of the specimen being characterized. The 3 draft standards will be revised to focus on the visible spectral region, provide guidance on uncertainty for spectrally nonselective materials only with warnings that strong spectral transitions in reflectance or transmittance will produce significant increases in the uncertainty of the measurements. Ballots should be out by mid-year 2014.
Subsequent to meeting: TCC has resigned citing lack of urgent need for these Standards.

TC2-71 *CIE Standard on test methods for LED lamps, luminaires and modules* (Ohno). WD2 was circulated on Aug. 1, 2013 with deadline Sep. 1, 2013. There were 19 votes: 4 approvals, 14 approvals with comments, 1 disapproval (on description of standard conditions and tolerance interval). It was distributed also to IEC TC34 LED panel. Total 108 comments were received. Nov. 2013, over 200 comments were received in CEN TC169 commenting of prEN 13032-4. Responses to all TC comments were posted on ColTool on Feb. 24, 2014. A major change was the new definitions of tolerance interval and acceptance interval following ISO/IEC 98-4. WD3 was circulated on Feb. 24, 2014 with deadline March 17, 2014. It was distributed also to IEC TC34 PRESCO -14 votes; 4 approvals, 1 disapproval (on treatment of near-field goniophotometer); 85 comments were received. All comments have been examined and Responses and a new draft have been prepared. A few detailed requirements are being finalized with WG7 inputs. CIE TC2-71 draft and CEN EN 13032-4 draft are still fully harmonized in their technical contents. Next draft (ED) will be circulated to Div/BA in May 2014. DIS expected in Sep. 2014. The Task Group is developing CIE Technical Note “Guide to Practical Uncertainty Evaluation for Measurement of LED lamps and LED luminaires for Testing”. A TG meeting was held in Slovenia, Oct. 2013. New draft is being prepared. TG will meet in KL.

Subsequent to meeting: This was published in September 2014 as: **CIE DIS 025:2014**

TC 2-72 *The evaluation of uncertainties in measurements of the optical properties of solid state lighting devices, including coloured LEDs* (Young). The first TC meeting was held in Bled (October 2013). In the meeting it was proposed that 3 addenda be created: 1) Spectroradiometry and derivative quantities; 2) Distribution photometry and partial flux; and 3) Gonio-spectroradiometry and derivative quantities. An initial straw-man draft of the first addendum on *Spectroradiometry and derivative quantities* will be drawn up before the D2 meetings in Kuala Lumpur but the TC will have its 2nd meeting in September 2014 in Vienna at the CIE D2 Uncertainty Workshop.

TC 2-73 *Measurement of quantities relating to photobiological safety of lighting products* (Mou). In the past year, the TR has been modified based on a number of issues discussed at the last TC meeting. The main points are the following:1) the quantities that are considered are the 6 quantities relating to photobiological safety in CIE S009 (actinic UV hazard, near-UV hazard, retinal blue light hazard, retinal thermal hazard, infrared radiation hazard for the eye and thermal hazard for the skin) and 2 new emerging quantities of photobiological effects (circadian melatonin disruption and flicker); ii) Weighted irradiance measurement:- spectral irradiance measurements based on the double-

monochromator and single-monochromator are recommended. However, a wide-band detector can be suitable in the relative measurement. For actinic UV hazard measurement, the emission limit is 4~5 orders of magnitude lower than the limit of infrared radiation hazard, and it is similar for retinal blue light hazard and retinal thermal hazard. Therefore, the detector's sensitivity of the measurement system should be considered to match the emission level of the source in corresponding quantity of the photobiological effect; iii) Weighted radiance measurement: this is important for effective classification of the risk to find potential hazard of optical radiation of lighting sources. It is recommended to use goniophotometry and radiance imaging measurements and the appropriate the FOV of the measurement related to the risk classification; iv) Measurement uncertainty: this comes from the instrument (wavelength, bandwidth, response variation, measuring field, aperture, linearity, stability and stray light), calibration (reference sources, distance, alignment, power sources) and measurement (alignment, distance, sources under test). How high of an uncertainty is permissible in the safety classification and how to express this uncertainty quantity are very important, but to be determined.

TC 2-74 *Goniospectroradiometry of optical radiation sources* (Pan). The TC had a meeting in Bled on Oct. 7, 2013 and discussed draft 3.00 of the TR and established two task groups to modify two parts of the TR, "terms and definitions" and "the calibration and traceability". The attendees proposed that the discussion on sampling theory and signal recovery was long and complex, more references should be quoted instead of direct description. Moreover, the depolarization and the uncertainty budget were discussed. Based on the discussions of Bled meeting and the feedbacks from task groups, a draft 4.00 TR will be prepared and discussed at the TC meeting in Kuala Lumpur.

TC 2-75 *Photometry of curved and flexible OLED and LED sources* (Yu). The TC had a meeting in Hangzhou and Webex meetings. In these meetings, they shared preliminary results of the point method and sphere method for luminance, uniformity, color, and flux measurement as well as experiments of human perception of color change for flat source. They also discussed the definition of viewing angle and new research results including the reflectance measurement with the integrating sphere and the theory analysis of the image method are also disclosed. The next step is to focus on gonio method and human perception. The TC does not have a meeting scheduled for Kuala Lumpur. As the measurements for curved sources are quite different from that for flat sources, a lot of theory analysis, experiments, and simulation are required to support the methods recommended in this TC. It is expected that the TC needs two more years to finish this work.

TC 2-76 *Characterization of AC-driven LED products for SSL applications* (Chou). The TC met in Paris in 2013 and discussed draft 2.0 of the TR. One of the issues raised was to define the scope of TC2-76 related to TC2-50, 2-63, 2-64, and 2-71. It is planned to have a meeting in Kuala Lumpur and to discuss draft 3.0 of the TR.

TC 2-77 *Fundamental Concepts* (Bergen). The TC had its second meeting in Kuala Lumpur where the topic of discussion was Electrical measurements of SSL devices. Tuomas Poikonen (FI) kicked off the discussion with a summary of the issues that are faced with these measurements and how his team is using an adjustable power line

impedance emulator. This led into a very interesting discussion for about 20 minutes with many speakers providing a variety of opinions. The after-dinner meeting was attended by 30 persons from 16 countries.

TC 2-78 *The Goniophotometry of Lamps and Luminaires* (Bergen). This TC was established following the D2 meeting in Paris in April 2013 and became active in CollTool in December 2013. The TCC sent out an initial call for contributions from members in late December 2013. The TCC has summarized this information and sent out to TC members ahead of its first face-to-face meeting scheduled for Kuala Lumpur. It is also planned to have a TC meeting in Vienna in September 2014, followed by some Webex

meetings. The DD2 has indicated that it is a priority TC and the TCC is working to finish the working draft by the end of 2015, nearly a year ahead of schedule.

TC 2-79 *Integrating sphere photometry and spectroradiometry* (Lee).This TC was established following the D2 meeting in Paris in April 2013. The TCC has prepared a draft of the TR outline and rough content based on the old TR and other up-to-date literature. This has been distributed to the TC members and will be discussed at the first face-to-face TC meeting in Kuala Lumpur where task assignments will also be mad for preparing draft 1.0 of the TR.

TC 2-80 *Spectroradiometric measurement of light sources* (Young).This TC was established following the D2 meeting in Paris in April 2013 and became active in ColTook in February 2014. The TC will have its first meeting in Kuala Lumpur.

JTC 2 (CIE/CCPR) *Principles Governing Photometry* (Ohno, Goodman). This TC met in Paris in April 2013 and discussed many comments made to the first draft. The agreed changes were implemented in a 2nd draft (incomplete) and distributed to the TC members in Oct. 2013 for comment. Based on this input a 3rd draft was prepared; this is a complete version except for an Annex on Explanatory note on the interpretation of the definition of luminance (agreed at Paris meeting). The TC met in Kuala Lumpur to discuss the 3rd draft. The agreed changes were implemented in a draft 3.2 (incomplete) and distributed to TC member in May 2014. The missing Annex was prepared by T. Goodman (NPL) and distributed to the TC members on August 27, 2014. Since then, there has been extensive e-mail discussion by TC members regarding this Annex but no decision to-date on how to reconcile the different views.

4.2 Progress of Selected Reporterships

Reportership reports are posted at ColTool.

The following Reportership reports were presented orally at the meeting in Kuala Lumpur:

R2-52: Flicker measurement and flicker index study on solid state lighting

Reporter: Kuei-Neng (Gilbert) Wu

Gilbert spoke to a presentation (tabled). More input is needed before it can be concluded.

TC1-83 is already discussing flicker. Another document from the IEEE is already proposing a flicker index (will be tabled).

R2-53: Glare Rating Measurement by Image Luminance Measuring Device (ILMD)

Reporter: Shau-Wei Hsu (represented by Kuei-Neng (Gilbert) Wu)

Gilbert spoke to a presentation (tabled). Glare (UGR) measurement by ILMD is being studied. New TC proposal was tabled. D3 already proposed a new TC for redefining the UGR as a joint TC with D1. The deadline has already been finished to join their TC but we may have the possibility to expand the TC to include D2.

R2-54: Internal quantum efficiency measurement (IQE) for SSL products

Reporter: Cong Chen

The reporter spoke to a presentation (tabled). There are many methods of measuring IQE and they are not consistent. IEC TC113 is also working on this. Is this actually a measurement issue or more of a

theoretical issue? Fluorescence QE measurement is very common in the chemical industry. Traceability is an issue.

Decision at meeting: Cong Chen is to prepare an application for new TC and recruit initial members; Deadline: 2014-08-31.

R2-56: Monitoring Progress in Regional Metrology Organizations (RMOs)

Reporter: Maria Luisa Rastello

The reporter spoke to a presentation (tabled). There are many opportunities for fundamental research projects within the scope of D2 in the European Metrology Programme for Innovation and Research – called EMPIR. Possibility to have collaborative projects to progress our TC work. Possibility to have a Memorandum of Understanding between CIE and EURAMET.

R2-57: Monitoring Progress of IEC TR 62778

Reporter: Hiroshi Shitomi

The reporter spoke to a presentation (tabled). There are some worrying comments coming from this IEC TC that they consider the Photobiological Safety (PBS) measurement issues are not metrology.

Decision at meeting: A Task Group (H. Shitomi, P. Blattner, M. Schakel, D. Chan and J. Pan) was created to give feedback on the metrological issues relating to PBS and submit to IEC: Deadline: 2014-05-31.

R2-65: Multi-Geometry Colour Measurements of Effect Materials

Reporter: Gaël Obein

The reporter spoke to his report (tabled). Possibility to establish a TC next year.

Need to have more collaboration with D1.

Decisions at meeting: The reporter is to email a list of questions for distribution to D2 that he would like to receive feedback; Deadline: 2014-06-30; All D2 members, especially outside Europe, to give feedback to Gaël; Deadline: 2014-08-31.

4.3 Dissolution of and changes to TCs and Reporterships

The following 2 TCs have been closed because of decisions at the Kuala Lumpur meeting:

- **TC2-40** *Characterizing the Performance of Illuminance and Luminance Meters* (Blattner*)*
- **TC2-48** *Spectral Responsivity Measurement of Detectors, Radiometers and Photometers* (Eppeldauer)

There was a change in TCC for **TC2-53** *Revision of CIE S014-2* from Balázs Kránicz (HU) to Péter Csuti (HU).

There was a change of Reportership of **R2-55** *Simple Practical Guide for Measurement Uncertainty Estimations (supplement to CIE 198)* from Teresa Goodman (UK) to David Chan (UK)

Subsequent to the meeting, there was a further change in TCC for **TC2-67** *Photometry of Lighting and Light Signalling Devices for Road Vehicles* from Gosta Werner (DE) to Thomas Reiners (DE)

5.0 Other Division News

5.1 D2 Strategy/ Technical Discussions

New Liaisons: ADD Armin Sperling made a proposal to have a liaison with ISO TC12 WG 19 responsible for renewing and revising ISO 80000 “International System of Quantities (ISQ)” and specifically part 7 “Light”. Next meeting will be 10th - 11th July this year, first draft aimed to be finished end of this year.

Decision at meeting: To establish a liaison with ISO TC12 WG 19 with Armin Sperling as Liaison Officer

Review of D1 terminology document TC1-64: D2 experts have been asked by D1 to provide feedback on a draft Technical Note on Terminology for Vision Colour and Appearance. DS2 received the draft and posted it on CollTool with notification to division members and TCCs. Feedback is sought by 2014-05-08.

5.2 D2 Director’s Report

P. Blattner (DD2) also reported on the following items:

- CIE TC2-71 *CIE Standard on Test Methods for LED Lamps, Luminaires and Modules*
    - New: refers to JCGM 106: *Evaluation of measurement data — The role of measurement uncertainty in conformity assessment*
    - WD 3 ballot is on-going
    - TN in preparation that gives guidance to the evaluation of uncertainty
- 10 TCs close to final reports (i.e. within 1 year): TC2-17, 2-37, 2-49, 2-51, 2-60, 2-63, 2-64, 2-66, 2-69, and 2-71
- Expert Workshop in October 2013 in Slovenia
    - Topic: measurement uncertainties
    - 50 participants (many from industry)
    - Contributions through webex

COMMISSION INTERNATIONALE DE L'ÉCLAIRAGE
INTERNATIONAL COMMISSION ON ILLUMINATION
INTERNATIONALE BELEUCHTUNGSKOMMISSION

Canadian National Committee Comité National Canadien

Division 3: Interior Environment and Lighting Design

Report to CNC/CIE 59th Annual Meeting
Ottawa, Ontario, 1-Dec-2014

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1 Introduction

The 2014 meeting of Division 3 was held via Webex on June 11, 2014. I represented Canada (and also served in the role of Division Director). Minutes of the meeting are available online at: http://div3.cie.co.at/?i_ca_id=568.

2 Highlights

2.1 New Technical Committees and Reporterships

Division 3 voted to create a joint TC with D1, which the Board of Administration subsequently approved. The committee will begin its work as soon as the required 5 members have completed the membership forms. A Canadian representative would be welcome.

> JTC 6 (D3/D1) "Discomfort caused by glare from luminaires with a non-uniform source luminance"
> Terms of Reference:
> 1. To review the literature on glare from non-uniform light sources to identify the parameters that influence the discomfort prediction (UGR) and define limits to the applicability of the UGR formula.
> 2. To propose a correction to the UGR formula that takes into account the non-uniformity of glare sources.
> TCC - D3: Naoya Hara, JP
> TC co-chair - D1: Myoshi Ayama, JP

D3 also created a new Reportership:

> R 3-31: Available Daylighting Metrics
> Terms of Reference:
> - to determine definitions and categories for existing or proposed daylight metrics
> - to describe how daylight metrics are employed in rating schemes
> - to identify data, software and skills requirements to predict daylight metrics
>
> Reporter: John Mardaljevic

2.2 Division publications

D3 completed one publication during the past year: CIE 213:2014: *Guide to Protocols for Describing Lighting*. This is the report of TC 3-34, which I chaired. Canadian Dyoni Smith also contributed. The TC will be closed at the 2015 meeting.

2.3 Future meetings

The 2015 meeting will be held in Manchester at the 28th Session of the CIE.

3 Current Canadian participation in Division 3 activities

List Canadians who Chair or participate in Technical Committees, handle a Reportership, act as a Division Officer or act as a liaison.

Activity	Title	Canadian Members
TC3-34	Protocols for describing lighting (work completed, to be closed)	J. Veitch (Chairman); D. Smith (Corresponding Member)
TC3-46	Research roadmap for healthful interior lighting applications	J. Veitch (Chairman)
TC3-47	Climate-based daylight modelling	I. Ashdown (Member)
TC3-49	Decision scheme for lighting controls for tertiary lighting in buildings	C. Suvagau (Member); J. Veitch (Corresponding)
TC3-53	Revision of CIE S 008 Joint ISO*CIE Standard: Lighting of Work Places - Part 1: Indoor	J. Veitch (Member)
JWG x	*"Energy Performance of Lighting in Buildings"*	*T. Lau (member)*
Officer	Division Director	J. Veitch

4 Highlights of Division Work Programme

Because of the creation of ISO TC 274, Light and Lighting, the structure of certain committees that will write standards has changed. This has affected Division 3 work on energy performance of lighting in buildings. The former TC 3-52 was closed, and is being reconstituted as a Joint Working Group with the ISO committee. The chair has not changed, remaining Mr. Sohéil Moghtader of Germany. At the same time, the former Canadian representative on TC 3-52 moved to a new post in Europe and no longer can represent Canada. We have recruited a new Canadian representative, Mr. Toby Lau, through the mirror committee (CAC-ISO-TC274). I've listed him here in order that our records be complete.

Another highlight of the 2014 meeting was a decision to hold an expert workshop on "Research Methods for the Effects of Lighting", possibly in concert with D1. This is still under discussion at the BA level; we expect a decision will be taken in the winter of 2014.

4.1 Overview of the status of TCs and Reporterships

D3 has adopted a standard template for reporting TC status. Reports on each TC are available as part of the 2014 Division Meeting minutes at http://div3.cie.co.at/?i_ca_id=568.

Activity	*Title*	*Chairman*	*Status*
JTC4 (D3/D6)	*Visual, health, and environmental benefits of windows in buildings during daylight hours*	*M. Knoop (D3) F. Bisegna (D6)*	Behind schedule; additional volunteers to take on tasks would be beneficial.
3-34	Protocols for describing lighting	J. Veitch	Report published. Will be closed 2015.
3-39	Discomfort glare from daylight in buildings	W. Osterhaus	WD deadline 31-Dec-2014, aimed to be with CB prior to Manchester meeting
3-44	Lighting for the elderly	Y. Akashi	WD deadline 31-Dec-2014, aimed to be with CB prior to Manchester meeting
3-45	Luminance-based design approach	Y. Nakamura	WD deadline 31-Dec-2014, aimed to be with CB prior to Manchester meeting
3-46	Research roadmap for healthful interior lighting applications	J. Veitch	WD deadline 31-Dec-2014, aimed to be with CB prior to Manchester meeting
3-47	Climate-based daylight modelling	J. Mardaljevic	WD deadline 31-Dec-2014, aimed to be with CB prior to Manchester meeting
3-48	CIE standard method of UF table	P. Thorns	Report passed WD but CB reports it

Activity	*Title*	*Chairman*	*Status*
	calculation for indoor luminaires		needs further editing. With TCC for revision prior to CD ballot.
3-49	Decision scheme for lighting controls for tertiary lighting in buildings	P. Dehoff	WD deadline 31-Dec-2014, aimed to be with CB prior to Manchester meeting
3-51	CIE standard general sky guide	S. Darula	AD ballot closes 05-Dec-2014
3-53	Revision of CIE S 008 Joint ISO*CIE Standard: Lighting of Work Places - Part 1: Indoor	Y. Koga	The status of this TC will probably change during the coming year, as the new standards structure is established.
3-54	Revision of CIE 16-1970: Daylight	A. Pellegrino	WD expected 30-Sep-2015
3-55	Metrics for sunlighting and daylight passing through sunshading devices	M. Fontoynont	TC is active. A Canadian representative would be welcome.

4.2 Dissolution of and changes to TCs and Reporterships

At the 2014 meeting, the following activities were closed. TC 3-50 and the two Reporterships had been completed. TC 3-52 was closed for administrative reasons (see above).

Activity	*Title*	*Chair*
TC3-50	Lighting quality measures for interior lighting with LED lighting systems	M. Knoop
TC3-52	Energy performance of buildings – Energy requirements for lighting	S. Moghtader
R3-29	Variable Transmission Glazing (VTG): Current Trends and Future Prospects for Uptake by the Building Sector	J. Mardaljevic
R3-30	Daylight Systems Metrics - Evaluation of Daylight Systems and Products	M. Fontoynont

5 Other Division News

Division 3 has made a conscious decision to have its meetings in even-numbered years by Webex, and odd-numbered years primarily together with CIE Sessions and mid-quadrennial events. This seems to promote participation from more regions, and members appreciate both the reduction in costs and the ability to reduce the carbon footprint associated with participation.

With the end of the quadrennium, there was a call for nominations for Division Officers. My name was put forward for a second (and last) term as Division Director. There were no other nominations, therefore I was acclaimed to this position at the Division level. The Board of Administration will consider the nominations and make appointments in early December. Thus, barring any unexpected turns of events, I expect to serve as DD3 for the period 2015-2019.

Division 4: Lighting and Signaling for Transport
Report to CNC/CIE Annual Meeting

André Laperrière
Email: laperriere.andre@lte.ireq.ca

CIE DIVISION 4 MEETING –2014
Date: 28-04 -2014 30-04-2014
HOTEL ISTANA KUALA LUMPUR
73 JALAN RAJA CHULAN, 50200 KUALA LUMPUR, MALAYSIA
Room: Berlian & Baiduri

Technical Committees

TC 4-15: Road Lighting Calculations
TC 4-21: Interference by Light with Astronomical Observations
TC 4-32: Surface Colours for Traffic Signs
TC 4-33: Discomfort Glare in Road Lighting
TC 4-36: Visibility Design for Roadway Lighting
TC 4-40: Requirements for Retroreflective Traffic Signs
TC 4-45: Performance Assessment Method for Vehicle Headlamps
TC 4-46: 300 mm Roundel Signals
TC 4-47: Application of LEDs in Transport Signalling and Lighting
TC 4-48: White Light on Road Lighting
TC 4-49 Guide to the Properties and Uses of Retroreflectors at Night
TC 4-50 Road Surface Characterization for Lighting Applications
TC 4-51 Optimization of Road Lighting

The present minutes is written using some parts of the meeting report from Ad de Visser, chair of the Division 4.

A) Division strategy:

The meeting started with a short discussion on the division strategy. Several suggestions were made. It was suggested that Division 4 should expand its scope beyond the roadway, considering the entire environment, as e.g. LED billboards can significantly influence road users e.g. causing issues around discomfort and disability glare and transient adaptation. Next to this tunnel Lighting deserves more attention, starting with a review and revision of CIE document 88, including the application of LED luminaires and lighting control systems in tunnels.

Also the potential for energy savings using advanced control systems should be dealt with, including the possibility of lowering light levels depending on traffic density. In a different approach we should ask ourselves 'When is too much'? Too much light, too much uniformity, too much (retro) reflectivity, too much adaptiveness, too much dynamics? Another upcoming theme is the communication between vehicles and infrastructure, particularly between automotive and street lighting..Ron Gibbon conveyed the pressure on speed put on the divisions by the CIE Board. TCs should use the colltool and WebEx's more and produce documents faster.

B) Symposiums and Workshops :

During this CIE Meeting two workshops were held, in preparation for a new TC « *Lighting levels for pedestrian streets* » (28 April 2014) and for a new TC on « Lighting for Elderly » (29 April 2014)

C) TC meeting :

1) TC4-15 Road Lighting calculations

The report of TC4-15 was edited in February 2014. Axel Stockmar gave a comment, encouraging the TC to continue to produce a document containing realistic test cases and test values to allow to check correctness of calculation of eye values. An updated report was expected in 2 months, and after TC ballot it would be submitted for editing

The annex B of the draft *TC4-15 Road Lighting calculations* provides TEST DATA for assessment of the accuracy of computer programs. Several type of situation (seven) are provided (spacing of luminaires, number of lanes, mounting position,…). Input data files of specific luminaires are provided and then the several photometric quantities can be benchmarked such as average luminance, average illuminance, uniformity.

2) TC4-21 – Impact of Roadway Lighting on Astronomical Observation

No longer active

3) TC4-32 - Surface Colours for Traffic Signs

Did not meet in Kuala Lumpur

4) TC4-33 Fundamentals of Disability Glare

Chair: Ronald B. Gibbons
Vice-Chair: Stephan Völker

The terms of reference for this group are: "*To study the known mathematical description of the discomfort glare in road and vehicle lighting, its scaling and comparisons with field studies and to condense the outcome in a report that should result in methods for discomfort glare assessment.*"

TC4-33 saw three presentations on glare (from Philips Research, Stephan Völker and Yandan Lin).

5) TC4-36 Visibility Metric in Roadway Lighting

Chair a/i: Ron Gibbons
Secr: Otto Letamandi

The report from TC4-36 was edited in June 2013 and finally, the report from TC4-46 was being edited.

6) TC4-40 Requirements for Retro reflective Traffic Signs

Chair a/i: Paul Carlson
Secr: Gernot Sauter

Did not meet in Kuala Lumpur

7) TC4-46 300 mm Roundel Signal

Chair: Carl Andersen, USA
Meeting chaired by: Ron Gibbons

Report is with editor

8) TC4-48

Chair: Stephan Völker

TC4-48 delivered its final publication, CIE 206: 2014: The Effect of Spectral Power Distribution on Lighting for Urban and Pedestrian Areas. Division 4 will announce to the Board of Administration that TC4-48 will be abolished with many thanks to Steve Fotios and Stephan Völker.

This technical report shows a possible reduction in light level with a CRI greater than 60. A British standard and an Italian standard already take into account the possible reduction when using a CRI greater than 60. The new LED technology allows then a possible reduction in light levels as compared to HPS.

9) TC4-49 Guide to the Properties and Uses of Retro reflectors at Night

Chair: Gernot Sauter

Did not meet in Kuala Lumpur

10) TC4-50 Road Surface Characterization for Lighting Applications

Giuseppi Rossi: split road marking and road surface in 2 separate documents, because these are 2 total different things. Technical report 44 is marking and 47 is about road reflections aspects. Giuseppe asks permission on the new proposal of the terms of reference. Wet road surfaces will also be included.

11) TC 4-51 Report – Optimization of Roadway Lighting

Chair: Carl Andersen
Meeting Chaired by Ron Gibbons

Terms of reference:

« *Develop guidance on optimization of road lighting to balance the benefits and costs. Primary issues include accident risk and energy consumption* »

a) Literature review on lighting and lighting levels, and accident risk

   i) Ron Gibbons has provided a document
   ii) Steve Fotios has completed some work

iii) Additional effort needed to link the pedestrian work of Steve with the Motorway work of Ron Gibbons

b) Analysis on lighting quality and accident risk

i) Review of efforts that have been completed after the work with CIE 93

c) Receive reports on enabling technologies

d) Draft of Technical Report or Update of CIE Publ. 93

i) Possibly incorporate 93 in as a document with the additional Cost Benefit Analysis from the committee work
ii) Ron has requested a copy of CIE 93 to incorporate into the new technical report

e) Draft of Optimization Guidelines

Interesting on going effort from Virginia Tech Transportation Institute on « *Impact of Lighting on Vehicule safety* ».

Capturing light and crash date from 7 states

Data analysis summary: « Increasing Illuminance has a limited impact on crash rate »

- Considered over 64,000 day crashes and 23,000 night crashes over at least 5 years.
- Considered over 1,600 kms of Roadway
- Lighting over 4 classes of road.

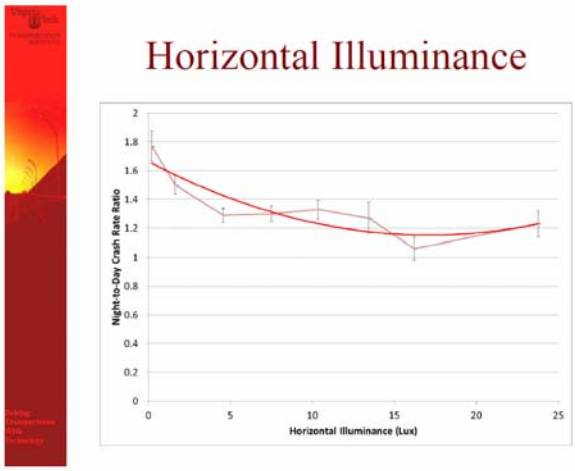

Figure 1: Night to day crash ratio rate

Study from Laborelec (6 test cases 14 experienced lighting designers)

The interpretation differences are quite large from each designer

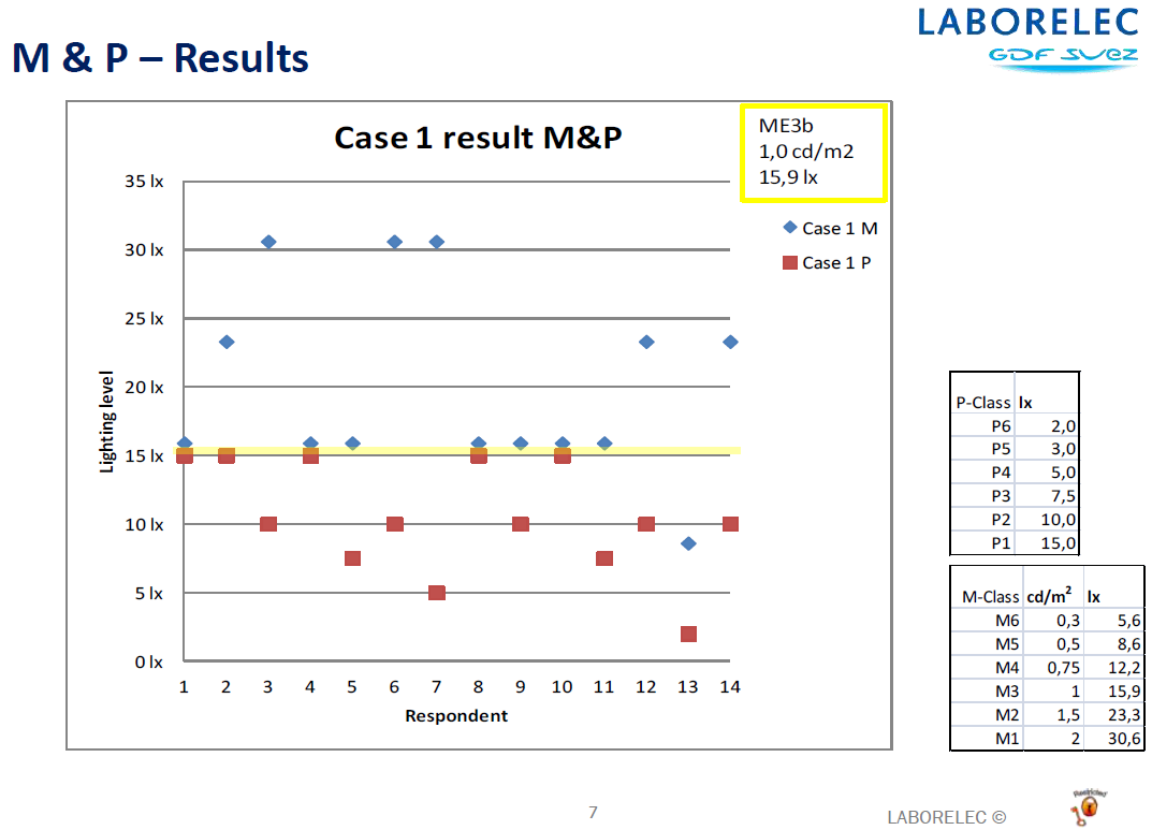

Figure 1: Light levels from several designer on case study no 1

12) JTC001 - Implementation of CIE 191 Mesopic Photometry in Outdoor Lighting

As both the TC chair and secretary left the TC, their replacement was discussed. The technical presentations focused on both adaptation field and adaptation light levels in relevant scenes. It was decided to split the TC in two working groups. The first is to continue the work on establishing the adaptation field. The second working group is to produce a document soon, clearly communicating the TCs conclusion to the market as soon as possible. This working group will be lead by Stuart Mucklejohn, who will also act as the new TCC. Tatsu Ushida will lead working group 1 and will take over as TC chair after the completion of the task of working group 2. Other divisions will be notified and this proposal will be put up for voting on the colltool. Discussions were around trying to define a short way to use mesopic photometry in outdoor lighting since a lot of user are waiting for the approach to be define.

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Division 5 Exterior Lighting

Report to CNC/CIE 59th Annual Meeting
Ottawa Dec 1 2014

Martyn K Timmings
Email: Martynt@sympatico.ca

1 Introduction

The CIE Division 5 meeting was held in Kuala Lumpur, Malaysia April 29 2014 in conjunction with the Div 4 meetings. I did not attend. Minutes for the meeting have not been posted yet.

2 Highlights

2.1 Division publications

2.2 Future meetings

Not Known

3 Current Canadian participation in Division 5 activities

None at this time

Activity	Title	Canadian Members
TCx-xx		Name (position)
Rx-xx		
Liaison		
Officer		

3.1 Publications in Review

No	Year	Title	Status *
013.3-1995	1995	Method of Measuring and Specifying Colour Rendering Properties of Light Sources (incl. CD-ROM CD008-1995)	
015:2004	2004	Colorimetry, 3rd ed. (incl. CD-ROM)	
019.21-1981	1981	An Analytic Model for Describing the Influence of Lighting Parameters upon Visual Performance, 2nd ed., Vol. 1: Technical Foundations	
019.22-1981	1981	An Analytic Model for Describing the Influence of Lighting Parameters upon Visual Performance, 2nd ed., Vol. 2: Summary and Application Guidelines	
041-1978	1978	Light as a True Visual Quantity: Principles of Measurement	

051.2-1999	1999	A Method for Assessing the Quality of Daylight Simulators for Colorimetry	
075-1988	1988	Spectral Luminous Efficiency Functions based upon Brightness Matching for Monochromatic Point Sources, 2° and 10° Fields	
078-1988	1988	Brightness-Luminance Relations: Classified Bibliography	
080-1989	1989	Special Metamerism Index: Change in Observer	
081-1989	1989	Mesopic Photometry: History, Special Problems and Practical Solutions	
086-1990	1990	CIE 1988 2° Spectral Luminous Efficiency Function for Photopic Vision	
087-1990	1990	Colorimetry of Self-luminous Displays – A Bibliography	
095-1992	1992	Contrast and Visibility	
101-1993	1993	Parametric Effects in Colour-Difference Evaluation	
109-1994	1994	A Method of Predicting Corresponding Colours under Different Chromatic and Illuminance Adaptations	
116-1995	1995	Industrial Colour-Difference Evaluation	
118-1995	1995	CIE Collection in Colour and Vision:	
123-1997	1997	Low Vision – Lighting Needs for the Partially Sighted	
124-1997	1997	CIE Collection in Colour and Vision, 1997:	
135-1999	1999	CIE Collection 1999: Vision and Colour, Physical Measurement of Light and Radiation:	
141-2001	2001	Testing of Supplementary Systems of Photometry	
142-2001	2001	Improvement to Industrial Colour-Difference Evaluation	
145:2002	2002	The Correlation of Models for Vision and Visual Performance	
146/147:2002	2002	CIE Collection on Glare 2002:	
160:2004	2004	A Review of Chromatic Adaptation Transforms	
165:2005	2005	CIE 10 Degree Photopic Photometric Observer	
166:2005	2005	Cognitive Colour	
167:2005	2005	Recommended Practice for Tabulating Spectral Data for Use in Colour Computations	
170-1:2006	2006	Fundamental Chromaticity Diagram with Physiological Axes – Part 1	
175:2006	2006	A Framework for the Measurement of Visual Appearance	
177:2007	2007	Colour Rendering of White LED Light Sources	
184:2009	2009	Indoor Daylight Illuminants	

185:2009	2009	Reappraisal of Colour Matching and Grassmann's Laws	
191:2010	2010	Recommended System for Mesopic Photometry based on Visual Performance	
192:2010	2010	Practical Daylight Sources for Colorimetry	
195:2011	2011	Specification of Colour Appearance for Reflective Media and Self-Luminous Display Comparisons	
200:2011	2011	CIE Supplementary System of Photometry	
204:2013	2013	Methods for Re-defining CIE D Illuminants	
D001-2006	2006	Disc version of CIE Photometric and Colorimetric Data (Tables to Publ. CIE 18.2-1983, and CIE 86-1990)	
D002-2004	2004	Disc version of CIE Colorimetric and Colour Rendering Data (Tables to Publ. 13.3-1995 and CIE 15:2004)	
D007-1994	1994	A Method of Predicting Corresponding Colours under Different Chromatic and Illuminance Adaptations (Computer Program to Publ. CIE 109-1994)	
D008-1995	1995	Computer Program to Calculate CRIs (according to Publ. CIE 13.3-1995)	
ISO 23603:2005(E)/CIE S 012/E:2004	2004	Standard Method of Assessing the Spectral Quality of Daylight Simulators for Visual Appraisal and Measurement of Colour (incl. CD-ROM)	
ISO 11664-3:2012(E)/CIE S 014-3/E:2011	2011	Colorimetry - Part 3: CIE Tristimulus Values	
ISO 11664-4:2008(E)/CIE S 014-4/E:2007	2007	Colorimetry - Part 4: CIE 1976 L*a*b* Colour Space	
ISO 11664-5:2009(E)/CIE S 014-5/E:2009	2009	Colorimetry - Part 5: CIE 1976 L*u*v* Colour Space and u', v' Uniform Chromaticity Scale Diagram	
ISO/CIE 11664-6:2014(E) (former CIE S 014-6/E:2013)	2013	Colorimetry – Part 6: CIEDE2000 Colour-Difference Formula	

PUBLICTIONS IN DRAFT

TC 5-18

(Draft 7a: April 2013)

Practical Design Guidelines for the Lighting of Exterior Work Areas.

1. Introduction

The aim of this document is to provide practical design guidance towards achieving good quality lighting installations for Exterior Working Area applications.

Detailed information regarding basic lighting criteria (Illuminance levels, Uniformities and Glare Rating limits) are provided separately in CIE Publication No. 129: 1998 and CIE Standard No. CIE S 015/E: 2005.

The guidelines do not represent prescriptive advise, but offer detailed considerations and recommendations to ensure safe and efficient good lighting practice

TC 5-21

A GUIDE TO URBAN LIGHTING MASTERPLANNING

Summary

The purpose of this publication is to provide guidance about the objectives and underlying principles relating to the lighting aspects of the urban nightscape. It deals with the visual, organizational, environmental, and technical elements of this aspect of urban planning.

This guide identifies the lighting planning criteria that should be considered when initiatives are being taken in relation to new or existing lighting in urban areas or newly planned conurbations. Guidance is provided to both the functional and expressive aspects of lighting.

This publication is intended to support those decision makers who are required to initiate, promote, and manage the night time image of their city and who require a masterplan to provide a sound basis for long term lighting developments.

TC 5-22 FORTH DRAFT, April, 2009

EXTERIOR LUMINAIRE BEAM PATTERNS & PERFORMANCE

1.0 INTRODUCTION

This Technical Report will address the issues related to exterior floodlight beam patterns and performance and establish an international basis to identify the performance of floodlights and floodlighting installations. In addition the report will review the IESNA TM-15-07 *Luminaire Classification System for Outdoor Luminaires* and make recommendations about its use by the CIE as well as review CIE 43-1979 *Photometry of Floodlights* to identify required revisions.

TC 5-26 Lamps for Sports Lighting

5.1 Introduction

Television coverage of sports events, out of necessity, requires appropriate lighting in particular with respect to illuminance and uniformity towards the camera. Additionally it is essential to include vertical illuminance requirements which influence the visibility of players. Lighting that fails to meet the requirements of broadcasting authorities is likely to result in failure when attempting to give slow motion replays and close-up shots. In addition the resulting small depth of field could mean that players in different planes will not necessarily be in focus at the same time.

The performance characteristics of light sources influence their suitability for applications within sports lighting installations and in particular for those events that are to be televised where the performance characteristics of the broadcast equipment has to be considered in combination. Broadcast cameras are able to adjust colour quality, but only if the light source contains a sufficiently broad colour spectrum. As a consequence white light sources tend to be preferred, particularly metal halide and solid state light sources (light emitting diodes; LEDs) both of which satisfy the requirements of broadcasting organisations

TC5-28

GUIDE ON THE LIMITATION OF THE EFFECTS OF OBTRUSIVE LIGHT FROM OUTDOOR LIGHTING INSTALLATIONS

Summary

The purpose of this Guide is to help formulate guidelines for assessing the environmental impacts of outdoor lighting and to give recommended limits for relevant lighting parameters to contain the obtrusive effects of outdoor lighting within tolerable levels. As the obtrusive effects of outdoor lighting are best controlled initially by appropriate design, the guidance given is primarily applicable to new installations; however, some advice is also provided on remedial measures which may be taken for existing installations.

This Guide refers to the potentially adverse effects of outdoor lighting on both natural and man-made environments for people in most aspects of daily life, from residents, sightseers, transport users to environmentalists and astronomers. (Astronomers also see CIE 126-1997.)

The daytime appearance of the lighting installation is important. The size and nature of the lighting support structures may be intrusive by day although this subject is not addressed in this Guide.

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Division 6: PHOTOBIOLOGY AND PHOTOCHEMISTRY

Report to CNC/CIE 59th Annual Meeting
Location: 1200 Montreal Road, Ottawa, ON **Date**: December 1st, 2014

Dr. Sami Qutob
Email: Sami.Qutob@hc-sc.gc.ca

1 Introduction

Terms of Reference of Division 6: To study and evaluate the effects of optical radiation on biological and photochemical systems (exclusive of vision). The list of TCs, their terms of reference and current status is available on the Division web page: http://www.cie.co.at/div6/tcs.htm

Division Officers.

Director:	Dr. John O'Hagan (UK)
Associate Director, Photobiological Standards:	Dr. Kohtaro Kohmoto (JP)
Associate Director, Photobiological Measurements and Dosimetry:	Dr. Karl Schulmeister (AT)
Secretary:	Dr. Luke Price (UK)
Editor:	Dr. Andy Pearson (UK)

The Division 6 Annual Meeting "Lighting Quality & Energy Efficiency" was held from 23rd to 26th April 2014 in Kuala Lumpur, Malaysia.

The 2014 meeting was jointly organised by CIE and Malaysia CIE (MyCIE) and hosted by Standards Malaysia under the Ministry of Science, Technology and Innovation (MOSTI). Local Organising Committee Chairman, Mr Narendren Rengasamy delivered the welcome address, which was followed by the opening address by CIE President, Prof Ann Webb. YB Datuk Dr. Abu Bakar Bin Mohamad Diah, Deputy Minister of MOSTI who represented the Minister of Science, Technology & Innovation, YB Datuk Dr. Ewon Ebin, officiated the conference by hitting the gong. The conference opened with a keynote by YBhg Datuk Ir Ahmad Fauzi Bin Hasan, Chairman of Malaysian Electrotechnical National Committee. The keynote was titled "Promoting Efficient use of Electrical Energy – Malaysia's Experience".

Several top lighting experts were invited to speak at the conference including George C. Brainard, Tran Quoc Khanh, Thorsten Vehoff, Martine Knoop, Janos Schanda & David H. Sliney. CIE 2014 recorded the highest volumes of abstract submission compared to previous conferences. In six keynote speeches, 66 oral presentations and 87 posters experts from all over the world presented the latest research results and survey lectures on various subjects related to light and lighting.

The conference focused on the following topics:

Daylight, Lighting Systems and Energy Saving

Light and the Visual Perception of Quality

Photobiological Effects

Characterizing lighting systems

The 3-day event provided a conducive learning and sharing platform for lighting experts. It also offered an invaluable opportunity to have an intensified exchange and technical interaction among the lighting experts on the development of lighting in Malaysia and ASEAN as well as to discover the latest developments of energy efficient lighting technologies and standards. This conference also provided a unique opportunity for the worldwide community of engineers, scientists, and designers from the lighting industry, research organisations and academia to meet, present and discuss their work on light sources and lighting. The event highlighted new directions in lighting for commercial and public applications, both locally and globally and seeks to elevate public awareness of the importance of lighting quality. One of the hottest topics at the conference was light emitting diodes (LEDs), which offer significant environmental and energy-efficiency benefits compared with conventional lamps.

The Proceedings of this Conference include invited papers and papers of the oral and poster presentations.

The publication consists of 981 pages including 126 contributions. CIE x039:2014 is readily available at the National Committees of the CIE or via the CIE Webshop. ISBN 978-3-902842-49-7.

Canadians in attendance included: Cheng, Li; Mou, Tongsheng; Xiaoming, Fan.

2 Highlights

Progress Report from Director

General Secretary (GS), Martina Paul spoke about Central Bureau (CB) issues, at the invitation of the Director:

There is a new Code of Procedure, as the previous version needed some edits. There will be an annual review and update, so an editorial board has been set up and each division can communicate any updates that might be required through their Division Director (DD).

Central Bureau (CB) have decided that CIE has undergone severe changes recently and that CB should be empowering and monitoring the divisions. They are going to monitor progress individually within each division and division officers, including DDs on an annual basis. It was stressed that this was intended to provide support, rather than simply a control mechanism.

The biggest changes have been the publications, reporterships, introduction of Technical Notes (TN) and that there was now an ability to produce and circulate scientific documents on the Collaboration Tools intranet (CollTools) that are available within our division.

Secretary's Report

The new Division Secretary (DS), Luke Price, explained he had taken over as DS from Andrew Smedley during the year, having attended the 2011 and 2013 meetings. Although efforts had been made to find other candidates, the division officers are still 100% UK and now 100% from one organization.

As 2013, there are around 300 contacts in Div6, but very few updates received. Outside of official roles, it is not clear that the contact list is truly up to date. DD proposes to find a way to reach and update this list regularly.

DS reviewed the Division 6 pages of the CIE website - div6.cie.co.at - earlier in the month. These pages need the following updates, which are planned to follow the meeting through co-operation of D6 and CB:

- Meetings page

- Contact, as already requested
- Publications
- Links
- Other pages subject to the meeting

DS proposes to include the Links page in the review of maintaining the contacts; but notes that his own organization's details need updating. DS would welcome details of any updates required that others have spotted. GS noted that changes were planned to the layout of the CIE website that would include the Division pages.

CIE Poland has provided the only been change to D6 National Committee (NC) representatives during the year, with Urszula Blaszczak replacing Jan Grzonkowski. In their absence, DS welcomed the new NC representative to the Division and thanked the outgoing NC rep for his service.

As 2013, DS noted that D6 has no NC representatives from the Czech Republic, France, Greece, India, Israel, New Zealand, Singapore, the Slovak Republic and Ukraine.

Editor's report

Director read Editor's report in his absence.

"CIE Division 6 Editor's report (April 2013 – March 2014)

R6-37 Short-hand Notations of UV selected Bands in Photobiology and Photochemistry (M Sasaki)

This document had previously been edited in 2012/13. It was received by the editor for final check of author's changes on 8th April 2013, and sent on to P Zwick on 30th April 2013.

R6-41 Mismatch between the in vivo and in vitro vitamin D synthesis action spectra:cause-and-effect relation (I Terenetskaya)

This document was received by the editor on 30th June 2013 and returned to the author with comments on 2nd October 2013. The revised document was returned for further editing on 14th November 2013 and returned to the author on 26th November for changes to figures. The document was finally returned to the editor on 19th December 2013. Following discussion with Irina and John O'Hagan, it was decided that it should only be published internally to Division 6 in its current form, and that Irina would produce a paper for external publication. The edited draft was sent on to P Zwick on 30th January 2014 with a request that Irina receive the pre-publication proofs.

Noted was the sad loss of Janusz Beer, US, when he died in October about 2-3 months before his TC report was published. The co-chair has seen this report through to publication. The obituary should be published in the next CIE news. Janusz served on a number of CIE Technical Committees including the Development of Action Spectra for Carcinogenesis and Connective Tissue Damage and for Testing Protocols for Photocarcinogenesis and the report on Typical Minimal Erythemal Doses which was published last year.

Progress reports from Liaisons with ICNIRP, WHO, IEC and ISO

DD presented the progress report from Dr Schulmeister (ADD6):

"In July 2013, ICNIRP published the updated exposure limit guidelines for incoherent broadband optical radiation (HEALTH PHYSICS 105(1):74-96; 2013, download from www.icnirp.org). The development of the update of the exposure limits as well as drafting of the guidelines was a process that started as early as 2005 when new data on the retinal thermal injury threshold dependence for varying spot sizes and

pulse duration became available. The 2013 update is the first update since the first edition of the guidelines published in 1997.

The updated guidelines feature exposure limits for retinal thermal injury which are based on a full scientific understanding of all the relevant dependencies: wavelength, pulse duration, multiple pulses as well as spot size; the exposure limits were updated in all of these aspects. As a consequence, for pulsed sources such as flashlamps, the exposure limits overall were made less critical, as well as for cw sources with high colour temperatures. For cw sources with low colour temperature, and exposure durations of 0,25 s together with the assumption of a pupil diameter of 7 mm, it was necessary to make the exposure limits somewhat more critical. However, for situations where it is known that the pupil has a smaller diameter, the ICNIRP guidelines permit to increase the exposure limits accordingly. For the retinal photochemical limit, the averaging field of view of 110 mrad for exposure durations of 10 000 s and longer is given, which was already used in CIE S009 Edition 1.

A video of a presentation on the changes from the ICNIRP Workshop 2012 can be found in: http://www.icnirp.de/NIR2012/NIR2012videoKarl.html
It also should be noted that the broadband exposure limits for both photochemical as well as thermal retinal injury are now in very good harmonisation with the respective exposure limits for laser radiation.

Based on information of the exposure limits from draft ICNIRP guidelines, the update of CIE S009 could start in parallel while the ICNIRP guidelines were finalised, so that a mature CIE draft was available already at the time when the ICNIRP limits were published.

It should be noted that ICNIRP does not envisage developing guidelines regarding effects of light on the circadian rhythm and from my point of view there is no basis to include this in CIE S009."

DD confirmed that ADD had not mentioned the change in IR action spectrum. This related to the bump in the retinal thermal action spectrum which has been removed.

DD noted there was nothing to report on the WHO liaison, but there is a meeting on 2-3 June 2014 in Geneva to discuss possible WHO standards for countries drafting their own regulations in the non-ionising radiation field, with DD to attend.

DD explained D6 work with the IEC is mainly around JTC 5 but DD and GS had also met the IEC General Secretary and IEC members to discuss recognition for CIE from the conformity assessment board, when IEC publish documents based on work with the CIE. Positive discussions are ongoing.

GS set out the work with ISO on TC 274 (Light and lighting) for which she is the Chairperson. ISO's work is complementary to CIE's. CIE still does the basic and fundamental work and ISO's role relates to applications of the CIE work. There are lots of links from the TC with CIE as the lighting community is involved in general. However, CIE did not have the linkage to the National Standardisation bodies. There is a coordination committee installed (membership includes CIE) to determine the allocation of roles and responsibilities between the organizations.

2.1 Overview of the status of Technical Committees and Reporterships

Explanatory notes:
TC ballots are by spreadsheet, recording yes or no against each name. The report must be unanimously agreed. If someone votes against, the TCC can produce a minority report.

Where a final report is never produced, using CollTools is a way to avoid the CIE losing its IP from TCs. There is a more open room in CollTools, which can include Division Associates, who do not need to be Division Members.

Technical Notes can also be produced, and are usually free, and can often be developed into a Technical Report.

The Division 6 website can also host Materials, with a notice for the front to stress the status.

Dr David Sliney, as chair of several TCs, had sent his reports but DS noted he had not received them, and Dr Sliney resent them during the meeting.

6-08 Guidelines for Obtaining Action Spectra (TCC: Sliney). A meeting was arranged to discuss plant action spectra, which has been postponed, but there are prepared paragraphs. Plan is to circulate the report for voting in June, followed by the D6 ballot.

6-21 Low Level UV-A Cataract (TCC: Sliney). The report was returned by DE6 a couple of years ago, but TCC had not understood the problem of missing references at the time. DD noted new studies make that report out of date. One study suggests age-related proteins in the lens may be phototoxic. TCC thinks that can be included without controversy, and proposes to continue discussions within the TC.

6-25 Spectral Weighting of Solar Ultraviolet Radiation (TCC: Wengraitis). DS had received no details on this TC, and has none. DD noted this was originally published as 151-2003 and arose as it just needed updating. Dr Sliney spoke to TCC Wengraitis following the Paris meeting; TCC's email address changes have made chasing this difficult. Dr Sliney is to pass the TCC's new email address to DS to chase.

Dr Sliney noted the official non-melanoma photocarcinogenesis action spectrum has been published since the last update, so this is the only change other than to provide the related spreadsheet program in a suitable modern format(s). Dr Sliney is to contact CB and ask for their advice.

6-28 Standardization of Sunscreen Testing (TCC: Osterwalder). To DD it was not clear what happened to the original plan for a CIE proposal to be adopted by ISO. Apparently the TCC took it through ISO without going through CIE; so there is now no need for CIE TC.

Dr Sliney accepted this unless there existed CIE rationale material that didn't end up in the ISO report. DD had asked the TCC last year for all the paperwork to be submitted to CB for archiving.

6-37 Light and Retinal Disease (TCC: Sliney). It was decided after a minority opinion of one member, the TCC proposed to list this member as an adviser and will now seek to publish as a minority report in summer 2014.

6-42 Lighting Aspects for Plant Growth in Controlled Environments (ATCC: Navvab). It is proposed to complete measurements over the next few months, draft a report by September and work towards submitting a final report to Division by February 2015. The TC ballot stage needed to be added to the proposal, so final deadline might a little after the next D6 meeting (July 2015).

6-44 Illuminators for Treatment of Infant Hyperbilirubinemia. *Closed, see Reportership R6-43 for further details.*

6-45 Optical Radiation Hazard Measurements in the Workplace (TCC: Angelo). DS noted that no report had been received since positive D6 ballot results in November 2013. DD had many comments from ADD6 Dr Karl Schulmeister who felt that the report did not take into account the revisions ICNIRP exposure level guidelines, which it is likely just requires a comment in the report concerning the change to the retinal thermal spectrum. DS to contact Bob Angelo for this (noting Dr Sliney or DD may be able to help).

6-48 Typical Minimal Erythema Doses (ATCC: Miller). *The report was published in February 2014 as CIE 207:2014 Sensitivity of Human Skin to Ultraviolet Radiation, Expressed as Minimal Erythema Dose (MED). TC Closed.*

6-49 Infrared Cataract (TCC: Okuno). Three further meeting had been held in the year. The final meeting for this TC was planned for 30 April, immediately following the CIE conference in Japan, following which it is proposed to produce the final draft report. DD noted he was impressed by the commitment to face to face meetings in this TC.

6-52 Proper Measurement of Passive UV Air Disinfection Sources (TCC: Vincent). Significant input from TC members was provided following the Paris 2013 meeting. Division 6 is to vote presently on the final report which had just been received.

6-61 Measurement of Radiation Using the Phytometric System for Plant Applications (TCC: da Costa). There had been no change since last meeting and the report has been fairly complete since June 2012. Last meeting he was looking for support as he had no TC members, and Sweden, Netherlands and Finland offered support. DD is to suggest the TCC might like to provide a TN if progress is still a difficultly. Alternatively this could be a Division 6 note instead, if this is easier.

6-62 Action Spectra and Dosimetric Quantities for Circadian and Related Neurobiological Effects (TCC: Cooper). DS noted the last meaningful update from the TCC was in 2009, who had also spoken to DD in January 2013 expressing his concern over charging for Technical Reports. DD said we had to decide whether this TC should continue or not. GS suggested that an offer is made to distribute this on the Division website using CollTools, stressing that the status is neither a report nor a TN. DS or DD will contact TCC with this or a similar proposal.Dr Sliney recalled the report the TCC gave in Budapest, which he found interesting, and probably should be a TN as it included controversial subjects; the TCC seemed to be trying to be objective.

6-63 Photobiological Strategies for Adjusting Circadian Phase to Minimize the Impact of Shift Work and Jet Lag (TCC: Lockley). DD had related in Paris the TCC's system for helping people with jet-lag. TCC had asked for Dr Sliney to help as he didn't know the CIE process, so Dr Sliney decided to send an email from this meeting. DD thinks this could impact on a huge number of people travelling around the world, and potentially with shift work too.

It was agreed that DS would contact the TCC to offer to get involved in both 6-62 & 6-63.

6-xx/1-67 The Effects of Dynamic and Stereo Visual Images on Human Health (D6 rep: Sliney) There was a proposal to abandon this if 1-67 has been deleted from the Division 1 list. [DS has contacted DS1 for an update.]

6-64 Optical Safety of Infrared Eye Trackers Applied for Extended-Durations (TCC: Sliney). The report was ready but not all of the votes were returned, in fact very few Yes votes were received. GS confirmed that unanimity requires all the votes to be returned, and in favour. TCC is to propose a way forward to DD. GS confirmed the last communication they received from the TC secretary was in 2011, the report was near to conclusion. TCC is to contact the secretary and one of them will take the next steps.

JTC-3 Rationalising UV Units (TCC: McKenzie). *Now closed. The report is freely available because funded externally. [This was actually discussed out of turn, after TC6-66]*

6-66 Maintaining summer levels of 25OH vitamin D during winter by minimal exposure to artificial UV sources; requirements and weighing the (dis)advantages (TCC: Webb) Has met several times and made good use of Webex to meet and is progressing. The activity report proposed to work towards final approval at TC level by June 2015. DD felt this report might cause some issues if it recommends that people use artificial UV for Vitamin D production and has concerns about it being published in its current form/content, but proposed to wait and see what the final report looks like, as it is a very early draft.

JTC-4 Visual, Health, and Environmental Benefits of Windows in Buildings during Daylight Hours (TCCs: Knoop D3, Bisegna D6). JTC met in Paris. Work was delayed owing to the workload of the D3

TCC, Martine Knoop. There were detailed proposals for actions starting in April 2014 towards up to three TNs with the first TN proposed to be published in December 2014, leading up to a final report in 2017.

JTC-5 Joint Technical Committee to Revise CIE S009/IEC 62471 (TCC: O'Hagan). The JTC is joint with D2 and with IEC's TCs 34 and 76. They met in Frankfurt last September and are meeting in September and on 29 April[the day after the D6 meeting] in 2014. There is not much more to do in theory. Being realistic, the plan is to publish by the end of next year. The plans are on track, which depending on how much D6 and D2 members agree.

Progress reports from Reporters

Explanatory notes:
There were a number of D6 reporterships where BA felt the report may not be appropriate as a CIE report, and which may be published using CollTools or as a Technical Note (TN).

R 6-37 Definition of UV wavebands (Sasaki). *This report was complete and ready to be published on CollTools within a few days.*

R 6-40 A survey of action spectra in the scientific literature: 19XX – 200X (Schmalwieser). This reportership was closed on the basis that the information had been published elsewhere. The first draft was literally a catalogue of all the published action spectra, and had hundreds of action spectra, with a page each, which had a special arrangement for the pricing structure in CIE (usually per page). DD agreed to contact Schmalwieser for any supporting material not published that could be shared on CollTools.

R 6-41 The issues of vitamin D kinetics (Terenetskaya). *This report was complete and ready to be published on CollTools within a few days.*

R 6-42 Report on the 1st International Workshop for Action Spectra of Non-Image Forming Photobiological Effects of Light, IWAS 2013 (Price). This report was complete in November, following the Workshop's article acceptance in Trends in Neurosciences, but had been with VPP to recast it as a TN 003, and was now in press. Price had suggested the CIE publish a SI convention compliant version of the toolbox with the TN, and is to contact the key Advisers about this proposal, and agree a final TN to put forward for the BA vote. One of the Advisers, Howard Cooper, wants to ensure that the publication is free, similar to his own TC discussed earlier.

R 6-43 Illuminators for Treatment of Infant Hyperbilirubinemia (Hart and Lynn). This relates to the close TC 6-44, and was still intended to be published as a CIE report. DD noted that these reporters are the experts within the UK and have many years of experience. They hoped to present their final report by the end of summer this year.

Proposals for new TCs and Reporterships

No proposals were brought forward.

2.2 Dissolution of and changes to TCs and Reporterships

These were all included earlier in the meeting, and summarized here:
TC 6-28, TC 6-48, JTC 3, R 6-37, R 6-40 and R 6-41.

[For the record, the following were closed at the Paris meeting in April 2013:
TC 6-36 TC 6-44, TC 6-50 TC 6-55 TC 6-65.]

2.3 Future meetings

The next quadrennial Session of the CIE at Manchester, in July 2015 was proposed. It takes place on 28 June to 3 July at Manchester University in University Place, a large complex centre on the campus. There will be the Conference, technical meetings and workshops. More details should be available following the 8 May 2014 planning meeting. The Conference Banquet will be at Manchester United Football Club's Old Trafford stadium. Manchester is a vibrant metropolitan city, with a fast rail link from London as well as its own large international airport.

The meeting for 2016 was discussed. D6 has an outstanding invitation from Professor Mou to meet in China. DD noted that it would be easy for employers to criticise or oppose delegates travelling so far for a meeting with a small number of people. Therefore, DD suggested to try using WebEx for the 2016 meeting, with suitable timing.

The dates and venues 2017, 2018 meeting(s) can be discussed in 2016.

3 Current Canadian participation in Division X activities

Technical Committee	Title and Terms of Reference	CNC/CIE Member
TC6-49	Infrared Cataract: To evaluate current biophysical data related to infrared and heat-induced cataractogeneses and report on the potential mechanisms - both thermal and photochemical.	A.P. Cullen
TC6-62	Photobiological Strategies for Adjusting Circadian Phase to Minimize the Impact of Shift Work and Jet Lag: Terms of reference: To evaluate currently available biological research data relating to chronobiological effects and neurorendocrine effects, to include alerting effects with the aim of develop strategies for countering the effects of shift work and jet lag, as well as other sleep-wake disorders.	M. Dumont

4 Other Division News

Dr Sliney noted a website called photobiology online, sponsored by American Society for Photobiology, which meets in June in San Diego, as a source of photobiological reviews. D6 has tried in the past to meet with them during off years (even number years). DS noted the CIE D6 pages included a link to this website and to ASP. DD and DS welcome suggestions for the website, which CIE proposes to update.

Tongsheng Mou explained that advances in LED and new technology lighting are moving quickly in developing countries, and there is interest in CIE to support this progress. There is interest not only in visual aspects but also the circadian aspects of using LED lighting. How to relate this to lighting practice is the question they are looking for guidance about.

DD reiterated that the Workshop's publication is out and available free online and the CIE will have a TN about this warning people about hoping for a standard. In the place where you were born, the natural light is helpful for you (with exceptions). But moving long distances and artificial light may alter this positively or negatively, or even negligibly.

Mr Werner Horak said that, amongst others, SCENIHR had raised concerns about sources of blue light. As a result there is naturally a demand for an action spectrum for circadian responses to compare with this type of risk.

DS said it was recommended that people look at the Workshop review article, which sets out what possibilities there are for contributions to non-visual effects to come from five different action spectra.

Dr Sliney said our clocks can relate lighting to time, so it seems logical that all of the sensors are involved. A diurnal message is the main outcome, but [broadband] blue measurements alone cannot provide data about the spectrum. He felt researchers were disturbed about relying on just measuring the blue content, as the spectrum is required. He referenced a study where subjects estimated daytime from photographs using their memory of spectral distributions; there are data to show that the melanopsin weighting doesn't fit to all scenarios where melatonin is suppressed. He also noted there was controversy about the role of rods and about opponency, and that is why it not [or not yet] simply a matter of the blue and there could be some adverse effects of this information being published as a standard. Dr Brainard's presentation at the Conference didn't mention the action spectrum bump towards the red end of the spectrum.

DS said that some of these questions were addressed in the Workshop review article.

DD noted that common sense suggests we have an evolved preference [for light exposure timing cues].

GS said she appreciated the requirements of industry in seeking a reliable standard, even if it meant waiting. If the advice went wrong it would jeopardized their business. She felt it would help to have a statement that there is fundamental evidence [that light affects circadian rhythms and well-being] for the ISO TC that could form the basis of discussion, and there would be a danger if we don't say something.

There followed a discussion about the DIN pre-standard and its context. The standard had been abandoned following the workshop had explained different responses may have different action spectra and these may be context dependent too. GS noted it was important to try to have a TN from, e.g. from Dr Howard Cooper's report, although it was felt it might be difficult to get consensus.

GS favoured a broad political statement rather than a scientific statement, along the lines of "We don't think the science is mature enough to give specific advice" Dr Sliney suggested adding "Don't give up quality by over-emphasising energy efficiency". GS and others agreed and also thought we could use this statement in the International Year of Light.

Mr Horak added there were other damaging blue light effects, such as lipofuscin degredation. The action spectrum is similar to the blue light hazard (BLH) function, and there is a concern that Age-releated Macular Degeneration (AMD) is related to this. WH asked what D6 doing on this?

Dr Sliney responded. Lipofuscin is in layer getting clogged up and fluid transport is blocked. The question to ask is "Is this [pathology] characteristic of AMD or just an ageing issue"? We have a standard for BLH as this is an effect that can be measured, but it is not the only effect from short wavelength light. It is argued that ICNIRP doesn't truly address the other possible damage mechanisms of short wavelength light.

DS noted that it has not been shown that avoiding short wavelength light is the best advice for health. He noted that long-standing dietary advice has recently been reversed, and may take a decade for people to know this; in other words there is a risk in giving lifestyle advice without complete evidence.

Professor Mou noted that China has a national standard for night lighting. There is a CCT limit for indoor lighting and advice that the lower the CCT the better. There is another standard for desk lamp for limiting the blue light content.

DD said in answer to Mr Horak's question that many of the bodies raising concerns about blue light, such as SCNEIHR and others, had no experts working in the field on the issue, so the statements from these types of advisory bodies need to be treated with caution.

The CIE Division 8 "Image Technology" and its Activities in 2013/2014

Report to the CNC-CIE, 1 December, 2014

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1- Highlights

Dr. Jan Morovic and Dr. Ann McCarthy resigned from Division Director and Division Editor. On April 22, Dr. Po-Chieh Hung was appointed and was approved by the Board to be Interim Division 8 Director. New Division Secretary Dr. Alessandro Rizzi and new Division Editor Dr. Danny Rich were then appointed. CIE Div.8 held an informal meeting in conjunction with CIC in Boston on Nov 5, 2014. After reviewing the current activities of each TC and Reportership, participants brainstormed for future activities.

Details about TC and Reportership activities are given in Paragraph 3 and 4 below.

2- Organization

Terms of Reference:

To study procedures and prepare guides and standards for the optical, visual and metrological aspects of the communication, processing, and reproduction of images, using all types of analogue and digital imaging devices, storage media and imaging media.

Domaine d'activité:

Etudier les méthodes et préparer des recommandations et des normes, relative aux aspects optiques, visuels et métrologiques de la communication, du traitement et de la reproduction des images, applicables à tous les types de dispositifs d'acquisition, de conservation et de restitution, aussi bien analogiques que numériques.

Web sitehttp://div8.cie.co.at/

2.1 Division Officers

Director of Division	Po-Chieh Hung
Secretary of Division	Alessandro Rizzi
Editor of Division	Danny Rich

2.2 Official Division Members

Canadian Member: Réjean Baribeau

2.3 Liaisons

CIE Division 8 has liaisons with the following organizations and liaison officers:

ISC/TC42: Photography (Mike Pointer)
ISO/TC130: Graphic Technology (Danny Rich)
ISO/IEC/JTAG2: Joint Technical Advisory Group (JTAG) 2 for Imagery (J. Schanda)
ICC -- International Colour Consortium (Cacant)
IEC/TC100 Multimedia Equipment and (Danny Rich)
ASTM/E12 Color and Appearance (Mike Pointer)

2.4 Publications and Technical Reports from Division 8

CIE 156-2004, Guidelines for the Evaluation of Gamut Mapping Algorithms (TC8-03)
CIE 159:2004, A Colour Appearance Model for Colour Management Systems:
CIECAM02. (TC8-01)
CIE 162:2004, Chromatic Adaptation under Mixed Illumination Condition When
Comparing Softcopy and Hardcopy Images (TC8-04)
CIE 163-2004, The Effects of Fluorescence in the Characterization of Imaging Media (R8-05)
CIE 168:2005, Criteria for the evaluation of extended-gamut colour encodings (TC8-05)
The work of TC8-06, Vocabulary, has become part of the revision of CIE Publication 17, International Lighting Vocabulary.
CIE 162:2010: (incl. Erratum 1): Chromatic Adaptation under Mixed Illumination Condition when Comparing Softcopy and Hardcopy Images.
199:2011: Methods for Evaluating Colour Differences in Images.

2.5 Technical Committees

TC8-07: Multispectral Imaging
TC8-09: Archival Color Imaging
TC8-10: Office Illumination for Imaging
TC8-11: CIECAM02 Mathematics
TC8-12: Video Compression Assessment
TC8-13: Colour Gamuts for Output Media

2.6 Reporterships

R8-09: Output Linearization Methods for Display and Printers (Klaus Richter)
R8-10: Full-Reference Image Quality Metrics: Classification and Evaluation
R8-11: Colour Image Reproduction for 3D Printing
R8-12: 3D Multi-view Image/Video Colour Data Format Conversion and Quality Control

3- Technical Committees work in progress

TC8-07: Multispectral Imaging

Terms of Reference:
To study, develop, and recommend encoding techniques and data formats for the exchange of multispectral images, and to provide test procedures for the evaluation of multispectral imaging systems...

Chair: Dr. Masahiro Yamaguchi
Web Site: http://www.multispectral.org

A Technical Report on Multispectral Format was approved by Ballot in 2014. This technical report describes the basic model of multispectral imaging technology followed by the requirements and the

examples of multispectral image formats suitable for colour imaging applications. Four example formats: JPEG2000, Spectral Binary File Format, Natural Vision, and Multispectral image file format AIX, are introduced and compared in typical use cases. The specifications of those formats except for JPEG2000 are provided in the Appendix.

TC8-09: Image Archiving

Proposed Terms of Reference:
To recommend a set of techniques for the accurate capture, encoding and long-term preservation of colour descriptions of digital images that are either born digital or the result of digitizing 2D static physical objects, including documents, maps, photographic materials and paintings.

Chair: Robert Buckley

This TC is undertaking a study to assess the color accuracy of different color capture and encoding approaches with a view to establishing a knowledge base and set of techniques which an institution can reference to either select or confirm the approach to color capture that is most compatible with its goals and capabilities. 17 institutions have contributed TIFF files along with details on capture methodology. Analysis of image capture data remains to be completed.

A Technical Report is planned for 2015.

TC8-10: Office lighting for imaging

Terms of Reference:
To report on the spectral power distribution and illuminations levels used to view images in office lighting conditions. The report is to be based on empirical research.

Chair: Dr. Yasuki Yamauchi

The report of the TC activity has been under preparation and is intended to be published as a Technical Note.

TC8-11: CIECAM02 Mathematics

Terms of Reference:
To improve CIECAM02 model to avoid the mathematical inconsistencies; to enable CIECAM02 to work in colour management applications.

Chair: Changjun Li (GB).

Two solutions were found that solve the Yellow-Blue-Purple computational failure. These however worsen the accuracy for predicting the visual data. The TC is pursuing to repair the model with at least the same accuracy as the original model and this may take time to complete.

TC8-12: HVS-based quality assessment for video imaging Video Compression Assessment

Terms of Reference:
To establish and report on the display and viewing conditions and materials for video compression quality evaluation in different applications including, but not limited to, web, mobile phones, HDTV, home cinema and digital cinema.

Chair: Christine Fernadez-Maloigne (FR).

A report about Benchmark of quality metrics on compressed images databases is in preparation.

TC8-13: Colour Gamuts for Output Media

Terms of Reference:
To study and recommend methods for computing and communicating colour gamuts for output colour reproduction media.

Chair: Kiran Deshpande (GB)

This TC was created in 2013 and the work plan is:

Investigate best practices for obtaining gamut boundary
For the purpose of reporting – investigate minimum criteria to describe the gamut boundary unambiguously
Recommend a method of calculating a gamut volume from a set of vertices and triangulation faces – in device space & colour space
Define the format for describing and communicating gamuts.

The Chair is seeking for more participants, in particular experts from the display industry.

4- Reporterships work in progress

R: 8-09 Output Linearization Methods for Display and Printers

Terms of Reference:
To make proposals for the application of Output Linearization Methods and for the content of CIE Technical Reports. The reports may cover the device and the elementary hue output on displays and printers.

Prof... Klaus Richter

A draft report has been produced and will be revised before April 2015. Three experts shall then further develop the content of that report for displays, offset and printers. Divisions 1 and 8 shall decide to work on the definition of a device-independent RGB* colour space for linearization.

R8-10: Full-Reference Image Quality Metrics: Classification and Evaluation

Terms of Reference:
To provide a survey of full-reference image quality metrics, where metrics are classified and evaluated against perceptual data, and to make a recommendation about the feasibility of a TC being formed about this topic.

Reporter: Marius Pedersen (NO).

200+ metrics have been found as well as existing databases for their evaluation. Calculation of 60 selected metrics on one database has been done. Analysis is currently ongoing.

R8-11: Colour image reproduction for 3D printing

Terms of Reference:
To report methodology of colour image reproduction for 3D printing system in multi-disciplinary applications including computer graphic, rapid prototyping and medicine.

Reporter: Kaida Xiao (UK)

Existing colour profiling methods have been identified for powder binder printers and for paper binder printers. Their limitations have to do with viewing condition dependency, lack of colour measurement techniques for 3D objects, and lack of standard method to evaluate performance.

R8-12: 3D Multi-view Image/Video Colour Data Format Conversion and Quality Control

Terms of Reference:
To report on methodologies of colour data format conversion of 3D multi-view image/video for 2D/3D display and their effect on 2D/3D image and colour quality, with the aim to identify opportunities for future CIE Division 8 activity in this field.

Reporter: Hezerul Abdul Karim (MY)

Industry specific 2D/3D file formats and the some potential benefits of the merging of technology have been identified.

5- Canadian Participation

J. A. Veitch TC8-10