

**IEEE TC-5: High Power Electromagnetics (HPEM)
Meeting at the 2016 IEEE International Symposium on EMC in Ottawa, ON
Wednesday, 27 July 2016 (Noon – 1:30 pm)**

Confirmed Minutes

1. Opening of the meeting—W. Radasky, Chairman

Chairman Dr. William (Bill) Radasky brought the meeting to order at 12:00 PM. Dr. Radasky welcomed the attendees, reviewed the agenda and asked for suggested changes; a report from the ESDA was offered and is listed as the new agenda 8 item. Dr. Radasky made a motion to approve the agenda. MSC.

34 people attended the meeting.

The following items were discussed.

2. Review and approve minutes—W. Radasky, Chairman

Dr. Radasky reviewed the minutes of the 2015 meeting in Dresden, Germany. There were no changes to the minutes and a motion was made to approve the minutes. MSC.

3. Update TC-5 membership list--All

The Chairman requested that each member review and update the membership list. TC-5 has a “five-year of inactivity rule.” Each individual remains a member-in-standing for five years since the last time you participated. Participation is not limited solely to symposium meeting attendance. Participation includes activities such as reviewing papers, organizing and/or chairing symposium sessions/tutorials, and chairing subcommittees. The TC-5 membership list has been updated to account for this meeting and is attached as Attachment A. As the list contains email addresses, this version of the attachment will only be sent by email to all members. The version put on the TC-5 website will have the email addresses deleted. If there are errors or updates needed for any of the email addresses, please inform one of the officers of the new email address.

4. Report on the paper review process for Ottawa—W. Radasky

Dr. Radasky reported on the paper review process for Ottawa. There were 21 papers submitted, and all 21 papers were accepted with 5 papers assigned to the poster session and 16 assigned to be presented orally. Of the 21 accepted papers, 10 required mandatory changes, and all required changes were made by the authors. This explains the high level of acceptance in Ottawa.

In Ottawa TC-5 sponsored 1 tutorial and 1 special session:

- Tutorial: SOA Research/Education in EM Information Security (Hayashi)
- Special Session: ESD Testing and Simulation (Gossner/Peachey)

5. Report from the Lightning Subcommittee—M. Rubinstein

Professor Rubinstein reported on symposia and meetings in which lightning is a significant topic for the remainder of 2016 and 2017:

2016

- IEEE Symposium, Ottawa, Canada, July 25-29.
- ICLP, Estoril, Portugal, 25-30 Sep.

2017

- AMS Annual Meeting, Seattle, 22-26 Jan.
- APL, Krabi, Thailand, 16-19 May.
- ASIAEM, Bengaluru, India, 23-27 Jul.
- IEEE EMC & SIPI, Washington, D.C., 7-11 Aug.
- EMC Europe, Angers, France, 4-8 Sep.
- ICOLSE, Nagoya, Japan, 13-15 Sep.
- SIPDA XIV, Natal, Brazil, 2-6 Oct.

In addition there is significant work underway in Cigré Study Committee C4 that deals extensively or partially with lightning:

- Working Group C4.23 “Guide to Procedures for Estimating the Lightning Performance of Transmission Lines” (2013, Chair: Christian Engelbrecht)
- Working Group C4.26 “Evaluation of Lightning Shielding Analysis Methods for EHV and UHV DC and AC Transmission-lines” (2011->2016, Chair: Jinliang He)
- Working Group C4.30 “EMC in Wind Generation Systems” (2013->2016, Chair, WH Siew (UK))
- Working Group C4.39 “Effectiveness of line surge arresters for lightning protection of overhead transmission lines” (2015->2017, Chair: Kenji Tsuge)
- Working Group C4.43 “Lightning problems and lightning risk management for nuclear power plants” (2017->2020, Chair, Takatoshi Shindo)
- Working Group C4.33 “Impact of Soil-Parameter Frequency Dependence on the Response of Grounding Electrodes and on the Lightning Performance of Electrical Systems” (2013->2016, Chair: Silverio Visacro)
- Working Group C4.36 “Winter Lightning – Parameters and Engineering Consequences for Wind Turbines” (2014->2017, Chair: Masaru Ishii)
- Working Group C4.37 “Electromagnetic Computation Methods for Lightning Surge Studies with Emphasis on the FDTD Method” (2014->2018, Chair: Yoshihiro Baba)

Prof. Rubinstein also mentioned another working group dealing with lightning within the IEEE PES Society:

- IEEE PES Lightning Performance of Overhead Lines Working Group:
The annual meeting was held on 19 July 2016 in Boston in conjunction with IEEE PES GM, and the WG will meet again in January 2017 in New Orleans.

There was a short discussion on future lightning related workshops and papers for the IEEE EMC conference in 2017. It was decided after the meeting to organize a half-day workshop on, “Measurement Techniques for Lightning Currents” (now scheduled for Friday morning in WDC.)

6. Report from the EM Information Leakage Subcommittee—Y. Hayashi

Professor Hayashi first reviewed the activities of the subcommittee for 2016. He organized a special session at APEMC in Shenzhen, China in May 2016 dealing with, “EM Information Leakage from Commercial Devices and Its Countermeasure.” He also organized a tutorial during the Ottawa Conference (on Monday) entitled, “State-of-the-art Research and Education in EM Information Security.” In August 2016, he co-chaired a special session on EMC and Information Security at the URSIAP-RASC 2016 in Seoul, South Korea.

Professor Hayashi mentioned plans for a Special Session on “Hardware Security for Information/Communication Devices,” at the APEMC Symposium in Seoul, South Korea in June 2017. IEEE EMC activities are not planned for WDC in 2017 due to the extensive activities in 2016 and early 2017.

7. Report from the IEMI Subcommittee—F. Sabath

Dr. Frank Sabath reported on activities of the IEMI subcommittee.

- During 2016 several conferences have dealt with (or will deal with) the issue of IEMI including: APEMC 2016 in May 2016 in Shenzhen, China; EUROEM 2016 in July 2016 in London, UK; and EMC Europe 2016 in September 2016 in Wroclaw, Poland.
- The EMC-S is developing a public policy position statement on the risk of IEMI attacks to critical infrastructures.
- There will be a special session on critical infrastructure IEMI at EUROEM

8. Report from ESDA—J. Li and N. Peachy

A comprehensive presentation was provided to the group covering the liaison between the IEEE EMC Society and the ESD Association (ESDA). Given that this information is new to many of the members of TC-5, the entire presentation is attached to these minutes as Attachment B.

At the end of the discussion it was agreed to form a subcommittee on ESD. Nate Peachy agreed to be the chair.

9. Coordination with SC-1, Smart Grid—All

The SC-1 committee on Smart Grid is chaired by Don Heirman and Dr. Radasky is the vice chair. The purpose of the committee is to coordinate activities of other committees working on the smart grid. All other technical committees in the EMC Society have been requested to consider Smart Grid topics during their meetings.

Mr. McInerney mentioned that the U.S. Congress is interested in the effects of EMP on SPIDERS. SPIDERS (Smart Power Infrastructure Demonstration for Energy Reliability and Security) is a smart grid design based on a Joint Command Technology Development (JCTD) project between Department of Energy, Department of Defense, and Department of Homeland Security. The objective of the SPIDERS JCTD is to demonstrate that microgrids developed using Sandia's Energy Surety Microgrid (ESM) methodology have the ability to maintain operational surety through secure, reliable, and resilient electric power generation and distribution to mission critical loads. The smart grid design was fully implemented at Camp Smith in Hawaii—the entire base was incorporated into the microgrid and significant renewable energy and storage were implemented.

The DoD is developing an Electromagnetic Environmental Effects (E3) Procedures Manual, DoD NUMBER 3222.03-M.

10. HPEM standards for lightning direct effects on aircraft – F. Heather

Fred proposed development of a new IEEE standard on specific test methods for lightning direct effects to aircraft. MIL-STD-461-G (CS 117) covers indirect effects but Mr. Heather believes there is also a need for direct effects testing. This topic triggered a brief discussion on the need for a standard on lightning direct effects to other structures.

11. Status of the TC-5 web page—M. McInerney

The members were encouraged to examine the TC-5 website and any recommended changes to the TC-5 web pages should be communicated to the vice chairman or chairman. If you would like to place an article on the website it must be open source / not copyrighted. It was noted that the TC-5 scope change requested at our Dresden meeting had not been approved by the BoD as an oversight. That has now been corrected.

12. Review of HPEM activities since the last TC-5 meeting—W. Radasky

Dr. Radasky reviewed the following international HPEM activities:

- 1) Five HPEM Conferences (ICEAA, CEEM, IEEE Global EMC, APEMC, and EUROEM) were held between September 2015 and July 2016, dealing with high power transients (lightning conferences were listed earlier in these minutes).
- 2) New publications were mentioned including IEC 61000-4-24, which deals with the testing of HEMP power filters among other topics.
- 3) Expectations of the completion in the coming year of Edition 2.0 of IEC 61000-4-23 dealing with shielding effectiveness measurement techniques and the publication of IEC 61000-5-10 providing a guide to the application of IEC HPEM standards.
- 4) HEMP and IEMI hardening of portions of the U.S. commercial power grid is being undertaken by some power companies. The results of this work will provide information on the costs and time to perform this type of work. In addition the U.S. Congressional EMP Commission will restart its work in early 2017.

13. Discussion concerning whether a tutorial, workshop, and/or special session should be organized for next year in Washington DC—All

All subcommittees expressed interest in holding either a workshop or a special session: Lightning, Information Leakage, IEMI, and ESD. In early January there will be a call for proposals and these should be coordinated with the officers of TC-5 in order to ensure that the TC-5 sponsorship is properly considered.

14. Officer Election

The three-year term for committee officers expires at the end of this year (2016). The current officers are willing to serve another three-year term. A request for other candidates was made from those in attendance, but there were no other volunteers. The current officers were reaffirmed. MSC

William Radasky – Chairman
Michael McInerney – Vice-Chairman
William Price – Secretary

15. Any other business

The iNARTE organization is in the process of rewriting many of their questions and answers. If there is a need to support the review of these new questions, TC-5 is willing to help.

16. Adjournment

The committee adjourned at 1:23 PM.