

TC-5: High Power Electromagnetics (HPEM)
Annual Meeting at the 2013 IEEE International Symposium on EMC at Denver, CO
Wednesday, 7 August 2013 (Noon – 1:30 pm)

Approved Minutes

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

Chairman Dr. William (Bill) Radasky brought the meeting to order at 12:10 PM. Chairman Radasky welcomed the attendees, reviewed the agenda and asked for suggested changes; none were offered. Dr. Radasky made a motion to approve the agenda. MSC.

The following items were discussed.

2. Minutes—W. Price, Secretary

Secretary Dr. William Price reviewed the minutes of the 2012 meeting in Pittsburgh, PA. No corrections were suggested. A motion was made to approve the minutes as written. MSC.

3. Update TC-5 membership list--All

All attendees introduced themselves. The Secretary circulated a roster, a summary of which is attached.

4. Technical papers—W. Radasky

Dr. Radasky reported that 9 regular papers were submitted for review of which 6 were accepted. There were 4 oral papers accepted. 2 poster papers were accepted. In addition there were 6 papers submitted and accepted for the special session on IEMI.

Of the total 15 papers submitted, 12 papers were accepted: 6 addressed IEMI, 3 lightning, 2 EM information leakage, and 1 ESD.

5. Report on Tutorial, “Introduction to EM Information Leakage from Electronic Devices”—Y. Hayashi

Prof. Hayashi reported on the tutorial session, “Introduction to EM Information Leakage from Electronic Devices,” chaired by Dr. Radasky and co-chaired by Prof. Hayashi. The session presented an overview of research trends related to information leakage. About thirty interested persons attended.

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

Professor Hayashi also reviewed the special section of the IEEE Transactions on Electromagnetic Compatibility, June 2013, on Electromagnetic Information Security. The special section presented six papers reporting research from Asia, Europe, and North America.

Professor Hayashi reported on a technical sessions on EM Information Leakage held at the 2013 Asia-Pacific International Symposium and Exhibition on Electromagnetic Compatibility in May and a special session to be held at EMC Europe 2013 in September. He also notified the committee of a special session on EM Information Leakage to be held at EMC '14 in Tokyo next May.

7. Report from the Lightning Subcommittee—M. Rubinstein

Professor Rubinstein reported on symposia and meetings in which lightning was a significant topic:

- 2013
 - Asia Pacific Conference on Lightning (APL), Seoul, South Korea, June 2013
 - International Conference on Lightning and Static Electricity (ICOLSE), Seattle, WA, USA, September 2013
 - EMC Europe 2013, Brugge, Belgium, September, 2013
 - International Symposium on Lightning Protection (SIPDA), Belo Horizonte, Brazil, October 2013
- 2014
 - American Meteorological Society (AMS) Annual Meeting, Atlanta, GA, February 2014
 - International Lightning Detection Conference/International Lightning Meteorology Conference (ILDC/ILMC), Tucson, AZ, USA, March 2014
 - 2014 International Symposium on Electromagnetic Compatibility (EMC'14), Tokyo, Japan, May 2014
 - International Conference on Atmospheric Electricity (ICAE), Norman, OK, USA, June 2014
 - American Electromagnetics (AMEREM) Conference, Albuquerque, NM, USA, July 2014
 - International Union of Radio Science (URSI) General Assembly and Scientific Symposium, Atlanta, GA, USA, August 2014
 - 2014 IEEE International Symposium on Electromagnetic Compatibility, Raleigh, NC, USA, August 2014
 - International Conference on Lightning Protection (ICLP), Shanghai, China, October 2014

Professor Rubinstein reported the following workshops, tutorials, or special sessions:

- 2013
 - Lightning session at EMC Europe 2013, Brugge, Belgium, September, 2013
 - Tutorial on time reversal for lightning location by Professors Rachidi and

Rubinstein at International Symposium on Lightning Protection (SIPDA), Belo Horizonte, Brazil, October 2013

- 2014
 - A proposed special session or workshop on lightning at the 2014 IEEE International Symposium on Electromagnetic Compatibility, Raleigh, NC, USA, August 2014

Professor Rubinstein reported the following working groups having to do with lightning:

- International project on EM radiation from lightning to tall structures; the next meeting will be at the International Symposium on Lightning Protection (SIPDA), Belo Horizonte, Brazil, October 2013
- Lightning Performance of Overhead Lines Working Group at the 2014 IEEE Power and Energy Society General Meeting, National Harbor, MD, July, 2014

Professor Rubinstein also reported the progress of the following CIGRE working groups:

- Working Group C4.23 “Guide to Procedures for Estimating the Lightning Performance of Transmission Lines” (2013, Chair: Christiaan Engelbrecht)
- Working Group C4.26 “Evaluation of Lightning Shielding Analysis Methods for EHV and UHV DC and AC Transmission Lines” (2011, Chair: Jinliang He)
- 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, Chair: Silverio Visacro)
- Working Group C4.409 “Lightning Protection of Wind Turbine Blades” (2009, Chair: Shigeru Yokoyama)
- Working Group C4.410 “Lightning Striking Characteristics for Very High Structures” (2010, Chair: Takatoshi Shindo)

8. Report from the IEMI Subcommittee—F. Sabath

Dr. Frank Sabath reported on the special session on IEMI held at this conference, “New Developments in Intentional Electromagnetic Interference.” The session was held on Wednesday morning and was chaired by Dr. Radasky and Dr. Sabath. Six papers were presented and up to 74 people attended the session.

Dr. Sabath also reported on several significant IEMI projects in Europe:

- Protection of Critical Infrastructures against High Power Microwave Threats (HIPOW) (www.hipow-project.eu)
 - 3 years (2012-2015)
 - €4.75m
 - 14 partners and 10 countries
- Security of Railways against Electromagnetic Attacks (SECRET) (www.secret-project.eu)
 - 3 years (2012-2015)
 - €4.26m
 - 11 partners and 5 countries

- Strategies for the Improvement of Critical Infrastructure Resilience to Electromagnetic Attacks (STRUCTURES) (www.structures-project.eu)
 - 3 years (2012-2015)
 - €4.8m
 - 12 partners and 5 countries

9. Identification of Point of Contact for iNarte questions

Dr. Radasky stated that the Technical Committees are all to contribute questions for the iNARTE exams. He noted that iNARTE is reorganizing so all correspondence is delayed. Dr. Radasky will remain the TC-5 point of contact until further notice.

10. Coordination with SC-1, Smart Grid

Dr. Radasky reported that SC-1 formed several years ago. It is listed as a Technical Committee but is actually a Special Committee. The charter for SC-1 is to coordinate for EMC Society with IEEE at large and with various standards groups. Don Heirman is the chairman.

11. Status of the IEMI standard practice activities

Dr. Radasky mentioned that for 2 years the P1642 standard was ready to be balloted, but progress has been waylaid by copyright issues.

12. Status of the Special Issue on HEMP and Information Leakage

Dr. Radasky reported on the special issue of the June issue of the IEEE Transactions on EMC dedicated to HEMP. The last special issue on that topic had been in 1978. This special issue was intended to cover accomplishments in the area of HEMP since the 1978 issue. Whereas the focus of the earlier special issue had been effects on military systems, that of the more recent issue is on civil infrastructure worldwide. Included in the special issue are 3 papers from China, 1 each from Germany, Japan, Russia, and Switzerland, 2 from the United Kingdom, and 7 from the USA.

Dr. Radasky mentioned the special section on EM Information Security published in the June issue of the IEEE Transactions on EMC. There were seven papers accepted for publication.

13. Status of the TC-5 web page

Dr. Radasky reported that the TC-5 web page is healthy. The society has developed new procedures for updating and maintaining the web page that work well.

14. Review of HPEM activities since last TC-5 meeting

Dr. Radasky reviewed HPEM activities since the last meeting. This last year there have been several conferences with HPEM papers presented:

- URSI Commission E and ICEAA, Cape Town, September 2012
- EMC Europe, Rome, September 2012
- CIGRE C4, Hakodate, Japan, October, 2012
- CEEM, Shanghai, November, 2012
- 5th Pan-Pacific EMC Joint Meeting, Japan, November, 2012
- DEPS, Albuquerque, November, 2012
- APEMC, Melbourne, Australia, May, 2013
- IEEE EMC, Denver, August, 2013

Dr. Radasky also noted that the US Federal Energy Regulatory Commission is developing reliability standards that address the impact of geomagnetic disturbances on the reliable operation of the bulk-power system. The standards will require owners and operators of the bulk-power system to develop and implement operational procedures to mitigate the effects of GMDs. Further regulation will require analysis and perhaps physical mitigation.

Future conferences of interest for HPEM are:

- EMC Europe 2013, Brugge, Belgium, September, 2013
- GlobeSPACE 2014, Tel Aviv, Israel, March, 2014
- EMC'14 Tokyo, Tokyo, May, 2014
- AMEREM, Albuquerque, July, 2014
- IEEE EMC, Raleigh, August, 2014
- URSI General Assembly, Commission E, Beijing, August, 2014
- EMC Europe, Gothenburg, September, 2014

15. Vote on proposed amendment to TC-5 scope

Dr. Radasky reviewed the scope for TC-5 and indicated that, as we discussed at last year's TC-5 meeting in Pittsburgh, a new proposed scope was to be voted at this year's meeting. No comments were received to change the proposed scope since that meeting, so Dr. Radasky made a motion to approve it. MSC.

Current scope. This committee is concerned with the effects and protection methods for electronic equipment and systems for all types of high power electromagnetic environments. These environments include electromagnetic pulse (EMP), intentional EMI environments (e.g., high power microwaves and ultrawideband), lightning electromagnetic currents and fields, and electrostatic discharge. Interactions with aircraft and other mobile systems are included.

Proposed scope. This committee is concerned with the effects and protection methods for

electronic equipment and systems for all types of high power electromagnetic environments. These environments include electromagnetic pulse (EMP), intentional EMI environments (*i.e., narrowband and wideband*), lightning electromagnetic currents and fields, electrostatic discharge and geomagnetic storms. *In addition this committee deals with the commercial data security issue through electromagnetic information leakage activities. Interactions with subsystems, systems and platforms are included.*

After the approval Dr. Radasky indicated that he would forward this information to the TAC, which would then ask the Board of Directors to approve it.

16. Discussion concerning whether a tutorial, workshop, and/or special session should be organized for next year.

Dr. Radasky noted that there will be no IEMI special session next year. A workshop on lightning is possible.

17. Nomination and election

Dr. Radasky requested nominations for TC-5 officers from the floor; none were offered.

Dr. Sabath offered a motion that the current slate of officers be nominated and elected. MSC

18. Other business

Fred Heather mentioned the junior technical program on ESD, lightning, and p-static was very successful.

Dr. Sabath noted the EMC Society's Presidential Memorial award has gone to Carl Baum.

Dr. Radasky mentioned interest in the recent Black Hat conference in Las Vegas. There was discussion of GPS spoofing in which the results of testing were presented. It also seems possible to hack into an automobile's entertainment system in such a way so as to defeat the braking system.

17. Adjournment

The committee adjourned at 1:32 PM.

ATTENDEES

NAME

AFFILIATION

Mr. William Gjertson	The Boeing Company
Dr. Yu-ichi Hayashi	Tohoku University
Mr. Fred Heather	NAVAIR
Mr. John Hirvela	Hewlett Packard
Dr. Lothar Hoeft	Consultant Emeritus
Mr. J. Russell Hoffman	Honeywell
Mr. Carl Irby	
Mr. William Kimmel	Kimmel Gerke Associates
Mr. Galen Koepke	NIST
Prof. Behzad Kordi	University of Manitoba, Canada
Mr. Robert A. Lawler	L-3 Communications
Dr. Frank Leferink	Thales Communications, Inc.
Mr. Nicolas Mora	Ecole Polytechnique Federale de Lausanne
Mr. Tony Nilsson	Saab AB
Dr. John Norgard	NASA/JSC
Finbarr O'Connor	Alion Science & Technology/NAVAIR
Dr. William Price	The Boeing Company
Prof. Farhad Rachidi	Swiss Federal Institute of Technology
Dr. William Radasky	Metatech Corp.
Mr. Ronald Rambousky	Bundeswehr Research Institute
Dr. Marcos Rubinstein	Univ. of Applied Science, Switzerland
Dr. Frank Sabath	Bundeswehr Research Institute
Mr. Edward Savage	Metatech Corp.
Dr. Henry Soekmadji	UTC Aerospace Systems
Dr. Adrian Sun	Aerospace Corporation
Mr. Hector Torres	Yazaki
Dr. Felix Vega	National University Of Colombia
Dr. Wee Jin Koh	DSO National Laboratories, Singapore