

This document provides the activity of Commission D during the triennium 2014 --- 2017. It reports the main international conferences and workshops that received technical sponsorship or financial support from the Commission. The report further provides an overview of the scientific program scheduled for the next General Assembly to be held in Montréal, Canada from August 19 --- 26, 2017.

1. OFFICERS OF COMMISSION D

During the period 2014---2017 the officers of Commission D are as follows:

Chair:

Dr. Günter Steinmeyer, Max--Born--Institute, Berlin, Germany,

steinmey@mbi---berlin.de

Vice Chair:

Prof. Apostolos Georgiadis, Heriot-Watt-University, Edinburgh, UK

apostolos.georgiadis@ieee.org

Past Chair:

Prof. Smail Tedjini, INP, Grenoble, France,

smail.tedjini@grenoble-inp.fr

Early Career Representative:

Prof. Arnaud Vena, Université Montpellier 2, France

arnaud.vena@ies.univ-montp2.fr

2. TERMS OF REFERENCE OF COMMISSION D

Commission D is dedicated for Electronics and Photonics. In more detail, the terms of reference terms were adapted after the AT-RASC Conference on Gran Canaria in 2015 to provide a stronger focus on topics that unite electronics and photonics and to enable a deeper dialogue between these communities:

The commission promotes research and reviews new developments in:

1. Electronic systems that push beyond current frontiers.

-
2. Microwave, millimeter wave and THz devices, circuits and systems
 3. Nanotechnologies and nanoelectronics
 4. Combined and hybrid photonic and electronic systems.
 5. Photonic devices, systems, and their applications.
 6. Photonic signal processing schemes, regardless of frequency of signal processed.
 7. Optoelectronic systems, plasmonics, and electro-optics
 8. Physics, theoretical modeling, and numerical simulation of all of the latter

The Commission focuses on electronics and photonics devices, circuits and systems for the purpose of implementing either previously inaccessible functionalities or of improving the performance of current electronic-only or photonic-only technologies.

3. EVOLUTION OF TOPICS IN COMMISSION D

During the Business Meeting at the AT-RASC conference in 2015, it was realized that too many sessions at the preceding GASS in Beijing either focused on electronics-only aspects or on photonics-only topics. Moreover, only about one third of the sessions appealed to researchers in photonics. The Chair of Commission D received several comments from attendees of the Beijing GASS which indicated some disappointment among photonics experts. The quality of talks in the photonics sessions was considered not overly high. Often enough only the speakers attended the session, and there was essentially no discussion among photonics and electronics experts. In order to prevent further erosion of the photonics attendance, several measures were taken to refocus the activities in Commission D:

1. Concentration on topics that unite electronics and photonics, e.g., optical telecommunications, terahertz waves, plasmonics, and metrology
2. Introduction of new topics from metrology with conveners from national standards institute. Optical methods nowadays play a role for the measurement of electrical signals, e.g., contactless high-voltage measurements or microwave analog-to-digital converters. These developments were not reflected at all in the previous GASS meetings.
3. Active invitation of several famous optics persons to attend the URSI GASS in Montréal. Ideally these experts have a standing both in the Optical Society as well as in radio science.
4. Identification of active conveners to bring in more people from the photonics community to ensure a contiguous one-week program that is reasonably interesting for optics people throughout the entire length of the conference

5. Introduction of a special session on the recent measurement of a gravitational wave by the LIGO initiative
6. Reduction of coverage of electronics-only topics. If possible such topics should be transferred to other commissions or be feature in sessions that run parallel to optics-only topics.

4. Supported Conferences and Workshops

The Commission has received several requests for either technical or financial sponsorship. Each request has been considered and positively agreed when the topic of the event has connection with the terms of commission D.

In total 8 sponsorships have been delivered (including one financial support to the URSI-RCRS 2015) as follows:

1. Metamaterials 2014, Eighth International Congress on Advances Electromagnetic Materials in Microwaves and Optics, Copenhagen, Denmark
2. RADAR 2014, International Radar Conference 2014 - "Catching the invisible," Lille, France
3. International Conference on Foundations and Frontiers of Computer, Electrical Engineering : commemorating 150 years of Maxwell's Equations, Hooghly, West Bengal, India
4. URSI-JRSM 2015, 2015 URSI-Japan Radio Science Meeting, Tokyo, Japan
5. Metamaterials 2015, The Ninth International Congress on Advanced Electromagnetic Materials in Microwaves and Optics, Oxford, U.K.
6. URSI-RCRS 2015 2nd URSI Regional Conference on Radio Science, New Delhi, India (100 Euro financial support)
7. MMET 2016, 16th International Conference on Mathematical Methods in Electromagnetic Theory, Lviv, Ukraine
8. Metamaterials 2016, 10th International Congress on Advanced Electromagnetic Materials in Microwaves and Optics, Chania, Greece

5. Flagship Conferences

Commission D participated in three flagship conferences, namely the AT-RASC on Gran Canaria in 2015, the AP-RASC in Seoul in 2016, and the coming URSI-GASS in Montréal, Canada in 2017.

5a. AT-RASC

The original submission deadline was set to December 15, 2014. By this date, only a total of 178 submissions, of which there were 11 to Commission D, had been received by this date. 8 of the latter were Invited Talks to a Special Session in the International Year of Light, convened by the Chair, Günter Steinmeyer. Only 3 were contributed papers.

It was then decided to extend the deadline to January 12, 2015 and to actively stimulate and invite speakers to participate in this new conference. This effort by the Chairs and the ECR quadrupled the number of papers to a total of 44.

The important lesson learned from the rather low submission number is that several reliable conveners have to be installed well ahead of the deadline as the AT-RASC conference is still a new conference that may not yet be widely known. Moreover, deadlines in close proximity to the holiday season should be carefully avoided in the future.

Overview of Commission D Submissions

Technical Topic	Submitted	Draft	Withdrawn	Total
Commission D:				
D.1: Broadband ubiquitous network	0	0	0	0
D.2: Energy harvesting in wireless systems	3	0	0	3
D.3: Fiber lasers and solid state lasers	0	0	0	0
D.4: Graphene nanoelectronics applications	1	0	0	1
D.5: Multi-physics modeling in radio frequency nanoelectronics	0	0	0	0
D.6: Optical sensors and biosensors	1	0	0	1
D.7: Plasmonics	5	0	1	6
D.8: RF MEMS and NEMS	2	0	0	2
D.9: Signal processing antennas	0	0	0	0
D.10: 60 GHz electronics	0	0	0	0
D.11: Trends in RFID for identification and sensing	6	0	0	6
D.12: Trends in THz communications	3	0	0	3
D.13: Other	0	0	0	0
(ISSSE) 60 GHz electronics	0	0	0	0
(ISSSE) Trends in RFID for identification and sensing	1	0	1	2
(ISSSE) Trends in THz communications	1	0	0	1
(ISSSE) Photonic techniques and systems	0	0	0	0
(ISSSE) Devices and techniques for RF, microwave and photonics	4	0	0	4
S-D: Photonics in the International Year of Light	16	0	1	17
D.14: Latest results	1	0	0	1
Total	44	0	3	47

5b. AP-RASC

The Chairs of Commission D were only loosely involved in the organization of the AP-RASC conference. The submission deadline was April 5, 2016. The conference was held in Seoul, Korea from August 21-26, 2016. No detailed submission statistics were received by the due date of this report.

The conference featured a total of 7 sessions with 45 talks within the topical area of Commission D:

[S-D1] Microwave and THz photonics,	1 keynote +4 invited
[S-D2] Ultrafast Photonics	6 invited talks
[S-D3] Terahertz Electronics and Photonics	6 invited talks
[S-D4] Microwave and mm-wave Integrated Circuits	2 inv. + 3 contrib.
[S-D5] High Power RF Devices and Circuits	4 inv. + 2 contrib.
[S-D6] Low-energy Wireless Sensor Electronics	5 inv. + 1 contrib.
[S-D7] Photonic/Electromagnetic Metamaterials and Metadevices	5 invited
[S-DBC1] Optical, Electrical and Optoelectronic Generation and Distribution of Microwave Signal	6 invited

1 keynote, 38 inv., 6 contrib.

Total: **45 talks**

5b. URSI-GASS 2017

The original submission deadline was set to January, 31, 2017. By this date, only a total of 1360 submissions were received, of which there were 102 to Commission D. It was then decided to extend the deadline to January February 14, 2017, which brought up the total to ~1700, with 138 paper in Commission D. Below is the overview of the Commission D statistics as per April 27, 2017

Overview of Commission D Submissions

Technical Topic	Submitted (o,p,e)	Draft	Withdrawn	Total
Commission D				
Microwave Photonics	10 (8,0,2)	0	0	10
Modeling of Electronic, Photonic and Plasmonic Devices	13 (10,0,3)	0	2	15
Carbon-Based Photonics and Optoelectronics	5 (5,0,0)	0	0	5
Terahertz and Millimeter Waves	5 (4,1,0)	0	0	5
Terahertz Generation and Applications	8 (6,1,1)	0	0	8
Electric Field Synthesis at Photonic Frequencies	6 (6,0,0)	0	0	6
Open Session: Plasmonics and Metamaterials	1 (1,0,0)	0	0	1
Plasmonics	7 (2,1,4)	0	1	8
Material and Metamaterials for Microwave to Optical Wave Applications	6 (5,0,1)	0	0	6
CMOS Compatible Photonics	5 (4,0,1)	0	0	5
Open Session: Recent Advances in Electronics and Photonics	14 (11,0,3)	0	3	17
Optical Frequency Metrology	13 (8,1,4)	0	0	13
Optical Methods for Microwave Metrology	5 (5,0,0)	0	0	5
Fibers and Waveguide Optics	7 (5,0,2)	0	0	7
Microwave and Millimeter Wave Identification and Sensing	12 (7,0,5)	0	0	12
Wireless Power Transmission	10 (8,1,1)	0	2	12
Optical Telecommunications	7 (6,0,1)	0	0	7
Special on Gravitational Wave Detection	4 (4,0,0)	0	0	4
Commission D Tutorial	1 (1,0,0)	0	0	1
Total	139(106,5,28)	0	8	147

The submissions were arranged in a total of 18 sessions, featuring 110 oral presentations and 23 posters. 6 contributions had to be rejected, mostly because they were out of scope of Commission D.

Commission D succeeded with their proposed plenary speaker Bahram Jalali. The tutorial talk will be given by Jürg Leuthold by ETH Zürich. There will be an additional special lecture by Karsten Danzmann on the occasion of gravitational wave detection during 2016 by the LIGO initiative.

Program structure of Commission D:
Overview of Commission D paper placement:

Session	Total	Accepted	Oral	Poster	Rejected	Other
Microwave Photonics	10	10	6	4	0	0
Modeling of Electronic, Photonic and Plasmonic Devices	13	10	6	4	3	0
Carbon-Based Photonics and Optoelectronics	5	5	5	0	0	0
Terahertz and Millimeter Waves	5	5	4	1	0	0
Terahertz Generation and Applications	8	8	7	1	0	0
Electric Field Synthesis at Photonic Frequencies	6	6	6	0	0	0
Open Session: Plasmonics and Metamaterials	1	1	1	0	0	0
Plasmonics	7	7	6	1	0	0
Material and Metamaterials for Microwave to Optical Wave Applications	6	6	6	0	0	0
CMOS Compatible Photonics	5	5	4	1	0	0
Open Session: Recent Advances in Electronics and Photonics	14	12	7	5	2	0
Optical Frequency Metrology	13	13	11	2	0	0
Optical Methods for Microwave Metrology	5	5	5	0	0	0
Fibers and Waveguide Optics	7	6	6	0	1	0
Microwave and Millimeter Wave Identification and Sensing	12	12	9	3	0	0
Wireless Power Transmission	10	10	10	0	0	0
Optical Telecommunications	7	7	6	1	0	0
Special on Gravitational Wave Detection	4	4	4	0	0	0
Commission D Tutorial	1	1	1	0	0	0
Total	139	133	110	23	6	0

6. Working Groups within Commission D

D.1 RFID Technologies and Privacy of Data

 Chair: Dr. S. Tedjini (France); email : smail.tedjini@lcis.grenoble-inp.fr

 Vice-Chair: Dr. G. Marrocco (Italy); email: marrocco@disp.uniroma2.it