



Commission D Triennial Report 2021-2023

Prof. Naoki Shinohara
Chair Commission D

This document provides the activity of Commission D during the triennium 2021-2023. Due to the COVID-19 pandemic the reporting period has been shorten to cover the 2 year period from 2021 to 2023. The report includes 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 Sapporo, Japan, from August 19 - 26, 2023.

1. Officers of Commission D

During the period 2021-2023 the officers of Commission D are as follows:

Chair:

Prof. Naoki Shinohara, Kyoto University, Kyoto, Japan
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Vice Chair:

Prof. Atsushi Kanno, Nagoya Institute of Technology, Nagoya, Japan
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Past Chair:

Dr. Apostolos Georgiadis, the European Patent Office, Hague, Netherlands
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Early Career Representatives:

Dr. Hossein Asghari, Loyola Marymount University, Los Angeles, USA
Mohammadhossein.Asghari@lmu.edu

Dr. Valentina Palazzi, University of Perugia, Perugia, Italy
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2. Terms of Reference of Commission D

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 and Future Planning in Commission D

During the Business Meeting at GASS 2021 it was decided to focus efforts on attracting more interest on ground breaking topics in electronics and photonics fields and to foster collaboration with IEEE MTT- S.

Several action items were taken to organize activities in Commission D:

1. Focus on topics that unite electronics and photonics, e.g., 6G and beyond, artificial intelligence, IoT sensors, energy harvesting, WPT, quantum technologies, pandemics/disaster management, and other new applications of electronics and photonics.
2. Invitation of world leading researchers to attend the URSI GASS.
3. Strengthen the relation with IEEE and specifically the IEEE MTT-S Society. Efforts led by Prof. Ke Wu in order to formulate a sister society agreement which would involve all possible joint activities such as mutual sponsorship of conferences and joint publications.
4. Encourage Commission members to consider organizing special issues in the Radio Science Bulletin whose publication is rapid, no page charges, open access.

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 10 sponsorships have been delivered as follows:

1. MAREW 2023, Microwave and Radio Electronics Week 2023, Pardubice, Czech Republic, 19-20 Apr. 2023, <https://www.marew.cz/>.
2. APMC 2022, Asia-Pacific Microwave Conference 2022, Nov.29-Dec.2, Yokohama, Japan, <https://apmc-mwe.org/apmc2022/>
3. ISAP 2022, 2022 International Symposium on Antennas and Propagation, 31 Oct. – 3 Nov.. 2022, Sydney, Australia, <https://isap2022.org/>
4. 2022 IEEE RFID-TA, 12th IEEE International Conference on RFID Technology and Applications, 12-14 Sep. 2022, Cagliari, Italy, <https://2022.ieee-rfid-ta.org/>
5. Metamaterials 2022, 16th International Congress on Artificial Materials for Novel Wave Phenomena, Siena, Italy, 12-17 Sep. 2022, <https://congress2022.metamorphose-vi.org/>
6. URSI-JRSM 2022, 2022 URSI-Japan Radio Science Meeting, Sep 1-2, 2022, Tokyo, Japan, <http://www.ursi.jp/conference/jrsm2022/>
7. APMC 2021, Asia-Pacific Microwave Conference 2021, Nov.28-Dec.1, Brisbane, Australia.



- <http://apmc2021.org/>
8. ISAP 2021, 2021 International Symposium on Antennas and Propagation, 19-22 Oct. 2021, Taipei, Taiwan, <http://www.isap2021.org/>
 9. 2021 IEEE RFID-TA, 11th IEEE International Conference on RFID Technology and Applications, 6-8 Oct. 2021, Delhi, India, <https://2021.ieee-rfid-ta.org/>
 10. Metamaterials 2021, 15th International Congress on Artificial Materials for Novel Wave Phenomena, New York, USA, 20-25 Sep. 2021, <https://congress2021.metamorphose-vi.org/>

5. Flagship Conferences

Commission D participated in 2 flagship conferences, namely the AT-AP-RASC in Gran Canaria, Spain in 2022 (merged AT-RASC and AP-RASC due to COVID-19 pandemic) and the 35th URSI-GASS in Sapporo, Japan in 2023.

5a. AT-AP-RASC

The conference was held in Gran Canaria, Spain in May 29 – June 3, 2022. It was hybrid conference due to COVID-19 pandemic. There were a total of 60 papers in Commission D, arranged into 1 tutorial workshop with 10 papers and 50 oral presentations. The table below includes an overview of the Commission D paper submission statistics.

There were 1 workshop “Wireless Power Transfer Technologies and Applications” with 10 papers.

Technical Topic	Number of papers (Invited)
Workshop : Wireless Power Transfer Technologies and Applications	10 (10)
Convergence of photonics and radio systems Towards 6G	7 (1)
Photonic signal processing, real-time instruments and biomedical imaging	12 (10)
Harmonic Transponders	3 (1)
Multiphysics modelling in radio frequency nanoelectronics	7 (3)
Plasmonics	2 (1)
Photonics and electronics for space applications	7 (4)
Electronic and photonic components for THz Communications	3 (0)
Energy Harvesting for IoT Applications	4 (3)
Recent Advances in Electronics and Photonics (Open Session)	4 (0)
Total	60 (33)



5b. URSI-GASS 2023

The 35th URSI General Assembly and Scientific Symposium URSI-GASS Conference is held in Sapporo, Japan in Aug. 19 - 26, 2023.

The original submission deadline of URSI-GASS 2023 was set to Jan. 25, 2023, subsequently extended to Feb. 10, 2023. There were a total of 83 accepted papers in Commission D which included 6 video presentation papers. The table below includes an overview of the Commission D paper submission statistics. The final distribution of the papers into sessions differed slightly from the table below in order to facilitate the organization of the overall technical program of the conference. Approximately 6% of the accepted papers were allocated as flash interactive presentations (FIPs), 7% were assigned as vide presentation, and the rest were distributed into oral sessions.

A tutorial talk will be given by Prof. Cheng Wang, City University of Hong Kong, Hong Kong, China, on “Lithium niobate photonic integrated circuits for future optical and microwave links”.

Technical Topic	Number of papers (Invited)
Tutorial	1 (1)
Electronic devices, circuits and systems for THz communications	5 (2)
Advanced technologies for underwater wireless system	7 (3)
Electronics and photonic systems for vehicular applications	6 (1)
Microwave/millimeter-wave/THz and photonic systems for Beyond 5G/6G communications	16 (0)
Near Field WPT	4 (1)
Far-Field Wireless Power Transfer and Energy Harvesting	6 (2)
Photonic Signal Processing, Real-time Instruments and Biomedical Imaging	11 (8)
Harmonic Transponders	7 (4)
Electronic and photonic technologies for electromagnetic field measurement and their applications	8 (1)
Built-in Self-test for telecommunication systems	2 (1)
Recent Advances in Electronics and Photonics (Open Session)	10 (0)
Wireless Technologies for Extreme Environments (BD)	5 (1)
Smart IoT for Body Area Networks (KD)	4 (3)
Total	83 (24) + 9 (4)



6. Working Groups within Commission D

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

Wireless Power Transfer Technologies and Applications

Chair: Dr. N. Shinohara (Japan); email : shino@rish.kyoto-u.ac.jp

Vice-Chair: Dr. A. Georgiadis (Netherlands); email: apostolos.georgiadis@ieee.org