



Commission GASS 2021 Report
Commission A

1. Elections of Commission Officers

Former Vice-Chair, Prof. Nuno Borges Carvalho, took over the position of Commission A Chair until GASS2023. The new Vice-Chair, Dr. Amitava Sen-Gupta, will work with the new Chair to organize various activities of the Commission A and will become the chair at GASS2023.

Two Early Career Representatives (ECR) work with the Chair and the Vice-Chair to ensure that the Commission is attractive to their early-career peers. Dr. Noshewan Shoaib will continue his term until GASS2023. The new ECR will take over the outgoing ECR of Dr. Pedro Cruz until 2026, and the most voted one was Dr. Giovanna Signorile.

Dr. Amitava Sen Gupta, Dr. Noshewan Shoaib, Dr. Demetrios Matsakis and Dr. Giovanna Signorile are the new RSB Associate editors from commission A.

2. Review of Terms of Reference

The Terms of Reference of the Commission A was reviewed during the 2nd Business Meeting and some changes were proposed and agreed. The revised Terms of Reference were then submitted to the Council and were approved for the triennial term of 2021-2023. The new Terms of Reference are as the following.

ELECTROMAGNETIC METROLOGY, Electromagnetic measurements and standards.

The commission promotes research and development of the field of measurement standards and physical constants, calibration and measurement methodologies, improved traceability, accuracy and reduced uncertainty, and the inter-comparison of such. Areas of emphasis are:

1. the development and refinement of new measurement techniques and calibration standards
2. primary standards, including those based on quantum phenomena
3. realization and dissemination of reference time and frequency standard
4. characterization of electromagnetic properties of materials, physical constants, and properties of engineered materials, including nanotechnology
5. methodology of electromagnetic dosimetry/measurements for health diagnostics, applications, and biotechnology, including bio-sensing
6. measurements in advanced communication systems, space metrology and other applications, including antenna and propagation measurement techniques

The commission fosters the best practices and training for accurate and consistent measurements needed to support research, development, and exploitation of electromagnetic technologies across the spectrum and for all commissions.

3. Working Group

Following the discussions at Business Meeting in GASS2014, a Working Group for Education and Training has been set up. The name and the Terms of Reference of the Working Group were introduced and new members were solicited. Before the GASS2017, the status of the Working Group was ad-hoc, but it was formally established at the GASS2017.



Name of the Working Group

Working Group for Education and Training

Terms of Reference

Electromagnetic metrology attracts students and trained specialists from a wide variety of fields, such as biophysics, electrical engineering, health sciences, materials science, physics, radio science, and statistics. The purpose of this Working Group is to promote the education of both students and actively working professionals by collecting information about available training resources on the techniques and fundamental principles involved in the work of Commission A, and to promote education in metrology by disseminating the information gathered and making it available on a public web page.

Members

Demetrios Matsakis (Chair), Charles Bunting, William Davis, Tian Hong Loh Alreza Motevasselian, Patrizia Tavella, Yasuhiro Koyama, and Amitava Sen Gupta

Commission A, also decided to support the new group proposal on “**URSI Risk and Disaster Management Working Group**”.

4. Technical Advisory Committee

The Technical Advisory Committee of the Commission A was created at the time of GASS2014 following a suggestion by the Board. 21 individuals joined the committee responding to the solicitation. The committee was very helpful in the process of organizing AT-RASC2015, AP-RASC2016, and GASS2017. It was proposed to continue the committee and members will be solicited again from the scratch after the GASS2017, and this proposal was agreed. The list of members of the Technical Advisory Committee for the new triennial term of 2021-2023 is shown in Appendix 1.

5. Preparation of Future Meetings

In the process of organizing GASS2023, the members of Technical Advisory Committee were asked for suggestions of sessions and each member was asked to convene at least one session. The same approach was proposed for the GASS2023 and this proposal was agreed. The list of sessions for AT-RASC2022 was discussed and the list of special sessions with conveners were proposed. After the GASS2021, the coordination of the AT-RASC2022 sessions was continued and finalized.

6. Proposed sessions and conveners for AT-AP-RASC 2022

- A.1 Antenna and Propagation Measurement Techniques (Tian Loh, Pedro Pinho)
- A.2 Measurements in Advanced Communication Systems (Tian Loh)
- A.3 Characterization of Electromagnetic Properties of Materials (Nosherwan Shoaib)
- A.4 Properties of Engineered Materials including Nanotechnology
- A.5 Physical Constants
- A.6 Primary Standards
- A.7 Realization and Dissemination of Time and Frequency Standards (Demetrios Matsakis, Jose Mauricio Lopez, Ashish Agarwal, Amitava Sen Gupta)
- A.8 Methodology of Electromagnetic Dosimetry
- A.9 Measurements for Health Diagnostics, Applications and Biotechnology, including Bio-sensing (Nuno Carvalho)
- A.10 Space Metrology (Liu Min)
- A.11 Calibration, Traceability, and Inter Comparisons of Instruments and Measurements (Demetrios Matsakis)
- A.12 Quantification of Accuracy and Uncertainty



- A 13 Smart City as a measurement hub (Nuno Carvalho)
- A14 Metrology Techniques and Solutions enabled by Artificial Intelligence (Pedro Cruz)
- A15 Quantum Metrology (Alirio Boaventura, Ekkehard Peik (Not confirmed yet), Amitava Sen Gupta)
- A16 Precision Metrology - Practice, Education and Prospects (Demetrios Matsakis, Steven Weiss (Not confirmed yet))
- A17 Microwave and Optical Frequency Standards (Paulo Monteiro, Ekkehard Peik (Not confirmed yet), Amitava Sen Gupta)
- A18 Time and Frequency Metrology (Amitava Sen Gupta, Archita Hati)
- A19 Advanced Time & Frequency Transfer Techniques and Precision Geolocation - (Parameswar Banerjee, Giovanna Signorile and , Amitava Sen Gupta)
- A20 Metrology in Telecommunication Systems (Nuno Carvalho, Tian Loh)

Appendix 1: Commission Officials and Members of Technical Advisory Committee.

Chair: Nuno Borges Carvalho, University of Aveiro, Portugal (nbcarvalho@ua.pt)
Vice-Chair: Amitava Sen-Gupta, National Physical Laboratory (CSIR), New Delhi, INDIA (sengupta53@yahoo.com)
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