Commission GASS 2026 Report

Commission E

1. Elections of Commission Officers

The voting for the positions of Vice Chair and Early Career Representative (ECR) of Commission E for the upcoming triennium was conducted online and has closed with the following results.

For the position of Commission E Vice Chair, two candidates were available: Dr. Gabriele Gradoni (United Kingdom) and Dr. Biagio Forte (United Kingdom). A total of 15 Member Committees participated in the vote, namely Australia, Belgium, Canada, Czech Republic, Denmark, France, Germany, India, Israel, Italy, Japan, the Netherlands, Spain, Sweden, and Ukraine. Dr. Gabriele Gradoni received 24 votes, while Dr. Biagio Forte received 20 votes. Subject to Council ratification, Dr. Gabriele Gradoni is therefore currently elected for the position of Vice Chair of Commission E for the upcoming triennium.

For the position of Commission E Early Career Representative, two candidates were available: Dr. Nastaran Soleimani (Italy) and Dr. Paul Monferran (France). Dr. Nastaran Soleimani received 20 votes, while Dr. Paul Monferran received 19 votes. Dr. Nastaran Soleimani is therefore the candidate elected for the position of Early Career Representative of Commission E for the upcoming triennium.

As a result, the Commission Officers for the next triennium will be:

Chair: Dr. Chaouki Kasmi, France

Affiliation: Technology Innovation Institute, United Arab Emirates

Vice-Chair: Dr. Gabriele Gradoni, Italy

Affiliation: Institute for Communication Systems, University of Surrey, Guildford, United-Kingdom

ECR 1 : Dr. Flávio Miguel da Silva Jorge, Portugal

Affiliation: OQ Technology, Portugal

ECR 2 : Dr. Nastaran Soleimani, Italy

Affiliation: Hitachi Rail STS, Italy

2. Review of Terms of Reference

Following the update in the previous triennium, the commission has decided to maintain the formulation of the Terms of Reference agreed on as:

The Commission deals with the study, modelling and characterization of:

electromagnetic noise of natural origin;

- man-made electromagnetic noise, both intentional and unintentional;
- complex electromagnetic systems and environment;

by using measurement, deterministic, statistical, stochastic and machine learning

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techniques.

Further, the Commission promotes research and development in:

- the effects of noise on system performance;
- electromagnetic eavesdropping and EM cybersecurity;
- hardware and software techniques for the suppression and mitigation of electromagnetic interference;
- the scientific basis, standardization and metrology of electromagnetic compatibility;
- the efficient use and management of radiofrequency spectrum.

3. Any changes/confirmation in Working Groups and other organizations

In line with the URSI's request to undertake a substantial review and rationalization of its Working Groups, Commission E is initiating a comprehensive restructuring of its current Working Group structure. This process is an important step towards maintaining the dynamism of the Commission as a scientific organization and ensuring that its activities remain aligned with current and emerging research priorities.

The objective is not simply to reduce the number of Working Groups, but to establish a more focused, active, and scientifically relevant structure. The review will consider the current activity and relevance of each Working Group, its scientific scope, level of participation, and contribution to the objectives of Commission E. Working Groups whose scientific scope has become less active or overlaps significantly with other groups may therefore be merged, redefined, or discontinued, while new groups may be established where emerging scientific topics require dedicated attention. This is why Working Group 1 to 7 have been dissolved for the time being and will be re-established in case of an increase of interest of the scientific communities and contributions to URSI increases. The remaining working groups promote inter-disciplinary research. The following working group will be running for the next triennium:

1. **EBCFJ/ Spectrum Management**

   Co-Chair Com. E: F. Miguel da Silva Jorge (Portugal), Co-Chair Com. B: S. Bojja Venkatakrishnan (USA), Co-Chair Com. C: K.V. Mishra (USA)

   The E6 focus is on sound scientific spectrum management for improved utilization of the radio frequencies for protection wireless communications service and radio sciences. The goal is to assure further development of radio sciences and communication services, unobstructed by potential radio interference due to unwanted energy in the form of out-of-band and in-band encroaching and deleterious in-band and out-of-band emissions. The electromagnetic spectrum is treated as a limited natural resource with a multitude of competing demands for access to it and use of it. Spectrum management seeks innovative means and technologies for adequate co-existence of all of them considering the need of protection of new and incumbent wireless and wired communication services, systems and equipment, with special focus on science services and those that use passive technologies.

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2. EB/ Chaos and Complexity in EM

Co-Chairs: G. Gradoni (UK), and A. Sihvola (Finland)

Wave complexity underpinned by fully developed, partial and transient chaos is becoming permanent in multi-component electromagnetic systems operating at electrically large scales. Statistical methods have been developed to tackle those systems and their specific engineering structures occurring in electromagnetic compatibility, electronics circuits as complex sources of radiated emissions, wireless communications including massive MIMO systems, etc. Recent studies in wave chaos have attracted researchers in electromagnetic theory and universal statistical properties have been used to study large electromagnetic systems without solving the full-wave problem. Hybrid methods combining full wave algorithms with newborn statistical methods are emerging in the EM wave modelling arena. System specific components need detailed treatment while deformed and irregular parts of EM environments can be treated statistically because of their mixing behaviour. Furthermore, statistical sources can be treated through semi-classical as well as random matrix theories. Novel theoretical models have been developed describing fields through complicated electromagnetic environments – including electromagnetic reverberation chambers - also accounting for coupling through apertures and including losses at both microwave and mmWave regimes, as well as complex placement of wires and cables within EM environments. Uncertainties arising within cabling and radiating systems can be described through the polynomial chaos method.

3. EJ/ RFI Mitigation and Characterization on Remote Sensing and Radio Astronomy

Co-Chair Com. E: Biagio Forte (UK)

The Joint Working Group RFI Mitigation and Characterization on Remote Sensing and Radio Astronomy addresses the issues caused by Radio Frequency Interference (RFI) from the side of the operators of microwave instruments used for remote sensing of the Earth and radio astronomy. The goal is to address application-specific technologies and techniques for RFI processing by the affected users of microwave remote sensing and radio astronomy science services to tackle the impact of RFI on these systems. The referred technologies and techniques shall be treated separately and independently from co-existence between interferer and interfered systems and shall not relate with the spectrum sharing or co-existence scenarios and conditions. Albeit they may be of interest to this working group, these spectrum management issues are the purview of another working group. Studies, including assessments and reports of the electromagnetic environment and RFI, as well as aspects of managing and reducing the impact of RFI from regulatory point of view are also out of the scope of this Joint WG.

4. **URSI/IAGA/ URSI/IAGA VLF/ELF Remote Sensing of the Ionosphere and Magnetosphere (VERSIM)**.

The VERSIM Working Group is a Joint URSI / IAGA Div. II & III Working Group. Website: https://versim.matfyz.cz/

Co-Chair for URSI Commissions: Claudia Martinez-Calderon (Japan), Co-chair for IAGA: František Němec (Czech Republic)

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4. Technical Advisory Committee

The Technical Advisory Committee (TAC) plays an important role in shaping the scientific activities and future direction of Commission E. Bringing together experts from across the broad field of Electromagnetic Environment and Interference, the TAC provides advice and guidance to the Commission Officers on key scientific issues, emerging research directions, and priorities for the Commission.

A central role of the TAC is to contribute to the development of high-quality scientific program for URSI flagship conferences. The Committee helps identify timely and emerging topics, encourages broad participation from the international research community, and promotes strong contributions from Commission E members. TAC members also support the scientific quality of these events through the review and evaluation of contributed papers.

Beyond these specific activities, the TAC provides an important forum for scientific exchange and collaboration within Commission E. Its members bring complementary expertise, perspectives, and connections across the different areas of Radio Science, helping the Commission remain responsive to new scientific challenges and opportunities.

The strength of the TAC lies in the active engagement of its members and their commitment to advancing the scientific mission of Commission E. For the current triennium, several Commission E colleagues have volunteered to contribute their expertise and experience to this effort. Together, they form the Technical Advisory Committee that will support Commission E in developing ambitious, inclusive, and forward-looking scientific sessions. The following individuals will constitute the TAC for the next triennium:

- Luk Arnaut (United Kingdom) - l.arnaut@qmul.ac.uk
- Philippe Besnier France - philippe.besnier@insa-rennes.fr
- Jose Borego (Portugal) - jose.borrego@anacom.pt
- Carlo Carobbi (Italy) – carlo.carobbi@unifi.it
- Virginie Deniau (France) - virginie.deniau@univ-eiffel.fr
- Lopes Esteves (France) - jose.lopes-esteves@ssi.gouv.fr
- Frank Gronwald (Germany) - frank.gronwald@uni-siegen.de
- Yasuhide Hobara (Japan) - hobara@ee.uec.ac.jp
- Sergio Pignari (Italy) - sergio.pignari@polimi.it
- Felix Vega (United Arab Emirates) - felix.vega@tii.ae
- Riccardo Trinchero, riccardo.trinchero@polito.it

5. Preparation of Future Meetings/Identification of meetings to be supported (cf. Commission budget)

Commission E will support the following meetings in the current triennium:

- 5th URSI Atlantic Radio Science Meeting – 2027, 23 – 28 May 2027, to be held in the ExpoMeloneras Convention Centre, Gran Canaria, Spain.

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- 2028 URSI Asia-Pacific Radio Science Conference, 20 – 25 August 2028, Toyama, Japan
- URSI General Assembly and Scientific Symposium 2029, 11 - 18 August 2029, Singapore

During the triennium, the Commission E might be solicited to sponsor event, conferences and seminars, that could lead to financial support as per the URSI rules and guidelines.

6. Proposed sessions and conveners for AT-RASC 2027

The following structure is proposed as a strategic framework for the AT-RASC 2027 scientific program Rather than representing a fixed program, it is intended to provide an agile and adaptable foundation that can respond rapidly to the evolving scientific landscape and to the priorities emerging within the Radio Science community.

AT-RASC 2027 should provide a strong platform for established areas of research while placing particular emphasis on emerging scientific frontiers, disruptive technologies, interdisciplinary research, and new challenges arising from the rapidly changing electromagnetic environment. The program will therefore be refined continuously to ensure that it remains relevant, forward-looking, and closely connected to developments in science and technology.

Short courses, tutorials, and workshops will be selected and updated to address emerging topics, new methodologies, and skills of strategic importance to the next generation of researchers. Technical sessions will likewise be shaped to encourage scientific exchange across traditional disciplinary boundaries, stimulate new collaborations, and provide space for emerging research directions.

With this approach, the proposed sessions and conveners presented below should be considered a starting point for the development of the AT-RASC 2027 program. The structure will remain sufficiently flexible to accommodate new scientific priorities and opportunities as they emerge.

Commission E Sessions

- E01: EMC Analytical and Numerical Modelling in Complex Systems (Christophe Guiffaut, Chaouki Kasmi, Riccardo Trinchero)
- E02: EMC Measurement Techniques and Standards (Carlo Carobbi, Ramiro Serra)
- E03: Stochastic/Statistical Techniques in EMC (Luk Arnaut, Sebastien Lalléchère)
- E04: HPEM and Intentional EMI (Anna Grytsko, Piotr Slobodzian, Felix Vega)
- E05: EMC and EMI in Wired and Wireless Communications (Virginie Deniau, Artur Nogueira, Lopes Esteves)
- E06: Time Reversal in Electromagnetics (Hamidreza Karami, Sebastien Lalléchère, Farhad Rachidi)
- E07: Lightning and Related Phenomena (Rafael Alipio, Takeshi Morimoto, Davide Pavanello)
- E08: Open Session (Gabriele Gradoni, Chaouki Kasmi)

Joint Sessions

- EAB: Wave Chaos of Complex Systems (Steve Anlage, Luca Bastianelli, Gabriele Gradoni)
- EABK: Field homogeneity in test and calibration environments (Satyakesh Dubey, Chaouki Kasmi, Ludger Klinkenbusch)
- EBC: Wave Modelling of Novel Wireless Systems (Luca Bastianelli, Gabriele Gradoni, Alain Sibille)

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- EFGH: Natural Electromagnetic Noise and Radio Sensing Applications in Terrestrial and Planetary Environment (Yasuhide Hobara, Sujay Pal, Tomoo Ushio)
- EC: EM Security of Cyber-Physical Systems and Wireless Technologies (Virginie Deniau, Yuichi Hayashi, Felix Vega, Giulio Antonini)
- EBCFJ: Spectrum management and Utilization (Flávio Miguel da Silva Jorge, Paolo de Matthaeis, Tasso Tzioumis, Satheesh Bojja Venkatakrishnan, Kumar Vijay Mishra)
- EFJ: RFI Detection, Characterization and Mitigation in Remote Sensing and Radio Astronomy (Biagio Forte, Flávio Miguel da Silva Jorge, Paolo de Matthaeis, Braam Otto, Tasso Tzioumis)
- EFGJ: Machine Learning and Signal Processing to Analyse and Mitigate EMI and RFI (Kaushal Buch, Paolo de Matthaeis, Liroy Lourenco, Kevin Vinsen)

7. Closing remarks from the former Commission E Chair Prof. Carlo Carrobi

As we begin this new triennium, we look forward to an exciting and forward-looking period for URSI GASS and Commission E. The rapidly evolving scientific landscape calls for an organization that is agile, open to new ideas, and ready to embrace emerging fields while maintaining the strong scientific foundations of Radio Science. Through a dynamic Working Group structure, an engaged Technical Advisory Committee, and an ambitious program of conferences, workshops, and scientific activities, we hope to foster new collaborations, encourage the participation of the next generation of researchers, and strengthen connections across disciplines and communities.

We wish URSI GASS and all its Commissions a successful and inspiring triennium, marked by scientific excellence, openness, collaboration, and a shared commitment to shaping the future of Radio Science. May the coming years bring new ideas, new partnerships, and new opportunities to advance our field and to ensure that URSI continues to serve as a vibrant and forward-looking international scientific community.

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