



## Union Radio-Scientifique Internationale (URSI)

### Activities' Report – Year 2022

Prof. Carlo Carobbi

#### 1. Introduction

The URSI ([www.ursi.org](http://www.ursi.org)) mission statement is as follows: “Radio science encompasses the knowledge and study of all aspects of electromagnetic fields and waves. The International Union of Radio Science (Union Radio-Scientifique Internationale), a non-governmental and non-profit organization under the International Council for Science, is responsible for stimulating and coordinating, on an international basis, studies, research, applications, scientific exchange, and communication in the fields of radio science.” Included within the objectives are the following:

- To encourage and promote international activity in radio science and its applications, for the benefit of humanity;
- To encourage the adoption of common methods of measurement, and the intercomparison and standardization of the measuring instruments used in scientific work;
- To stimulate and co-ordinate studies of:
  - o the scientific aspects of telecommunications using electromagnetic waves, guided and unguided;
  - o the generation, emission, radiation, propagation, reception, and detection of fields and waves, and the processing of the signals embedded in them.
- To represent radio science to the general public, and to public and private organizations.

The first General Assembly of URSI was held in July 1922 in Brussels. At that time, only four National Committees had been formed officially: Belgium, France, United Kingdom and the USA. However, the following new Committees adhered to the Union during the same year: Australia, Spain, Italy, Japan and the Netherlands. The Italian URSI Committee operates under the umbrella of the National Research Council (CNR) which pays the fee for Italian participation in URSI.

The range of scientific activities covered by URSI is reflected by the scope of its scientific commissions, namely

- Commission A: Electromagnetic Metrology
- Commission B: Fields and waves
- Commission C: Radiocommunication systems and signal processing
- Commission D: Electronics and photonics
- Commission E: Electromagnetic environment and interference
- Commission F: Wave propagation and remote sensing
- Commission G: Ionospheric radio and propagation
- Commission H: Waves in plasmas
- Commission J: Radio astronomy
- Commission K: Electromagnetics in biology and medicine

The CNR-URSI Committee has ten mirror commissions fully reflecting the scopes of the international URSI scientific commissions. Officers and their substitutes of the CNR-URSI scientific commissions can be found [here](#).

URSI organizes three flagship international conferences where all the scientific commissions are involved:

- The “General Assembly of the International Union of Radio Science” (URSI GASS)
- The “Atlantic Radio Science Conference” (URSI AT-RASC)
- The “Asia-Pacific Radio Science Conference” (URSI AP-RASC)

The three flagship conferences take place on a three-year basis (2017 URSI GASS, 2018 URSI AT-RASC, 2019 URSI AP-RASC, 2020 URSI GASS. However, due to COVID-19, URSI GASS was postponed to 2021. Consequently, URSI AT-RASC was organized in 2022, and integrated with URSI AP-RASC).

## **2. Main activities carried on by URSI during 2022 relevant for Italy and for CNR**

In 2022 URSI organized URSI AT-AP RASC 2022. The triennial URSI Atlantic Radio Science Conference (URSI AT-RASC) is one of the URSI flagship conferences besides the URSI General Assembly and Scientific Symposium (URSI GASS) and the URSI AP RASC conference (Asia-Pacific Radio Science Conference). Due to the COVID-19 pandemic, this 3<sup>rd</sup> URSI AT-RASC was moved from 2021 to 2022 and URSI AP-RASC could not be held in Australia as planned due to travel restrictions. The URSI AT-RASC and URSI AP-RASC were therefore combined in a single URSI AT-AP RASC hosted in Gran Canaria (Spain), from May 29 to June 3, 2022. On-site as well as online participation was allowed, aiming to receive submissions from worldwide within the domains covered by all ten Commissions of URSI.

URSI AT-AP RASC 2022 saw a large participation from Italian radioscience, with about 75 registrants (the second country with largest attendance after US) who had the opportunity to present their scientific activities and strengthen international relationships. URSI AT-AP RASC 2022 was also the first test bench of scientific coordinating activities by the Italian radioscience elected for Vice-Chair and ECR positions during URSI GASS 2021 in Rome. During URSI AT-AP RASC 2022 was put the basis for the creation of the national Women in Radio Science (WIRS) chapters (more on WIRS is presented below in this report).

## **3. Activities carried on by the Italian Delegate Prof. Carlo Carobbi within the Union during 2022 and impact on the Italian scientific community**

I organized, in collaboration with the Secretary of CNR-URSI Committee, Prof. Giuliano Manara, a meeting of the Italian radioscience attending URSI AT-AP RASC 2022. The meeting was held on the 2<sup>nd</sup> of June, from 12:45 to 13:30 and it was attended by 47 Italian radioscience, some of them working in foreign scientific institutions. It is important to stress the importance of these meetings of Italian radioscience, that the CNR-URSI Committee traditionally organizes during URSI flagship conferences, in order to strengthen relationships between Italian radioscience and the CNR-URSI Committee. The activities of the CNR-URSI Committee were indeed presented, in particular the CNR-URSI Committee annual meeting and the “Roberto Sorrentino” award for Young Scientists.

In collaboration with Prof. Manara, I organized the annual Meeting of the Italian URSI Committee, which was held on September 20-21, 2022 jointly with the XXIV Riunione Nazionale di Elettromagnetismo (RiNEM) of the Società Italiana di Elettromagnetismo. The meeting was held in Catania at the “Complesso Edilizio Le Verginelle” (Dipartimento di Scienze della Formazione, DISFOR, University of Catania) and at the “Monastero dei Benedettini di San Nicolò l'Arena” (Dipartimento di Scienze Umanistiche, DISUM, University of Catania). Three tutorial presentations were given:

- Prof. Micaela Liberti (Commission K: Electromagnetics in Biology and Medicine), “Bioelectromagnetic research based on lessons learned, reliable techniques and microscopic models: the challenge of new emerging technologies”
- Dr. Simonetta Paloscia (Commission F: Wave Propagation and Remote Sensing), “Microwave remote sensing of natural surfaces: experimental and modeling results”
- Dr. Grazia Umata (Commission J: Radio Astronomy), “The Impact of SKA on Galactic Science: a glimpse at the Galactic plane with SKA precursors”

During the CNR-URSI annual meeting, the presentations of the three finalists of the “Roberto Sorrentino” award for Young Scientists were also given and the jury selected Dr. Matteo Bruno Lodi as the winner of the 2022 edition. The winner was awarded by myself during the gala dinner event of the XXIV RiNEM.

Finally, during the CNR-URSI annual meeting in Catania, the Chapter Women in Radio Science (WIRS) was formed within the URSI Italian Commission. The link to the html page of the Italian Chapter of WIRS is <http://www.ursi.cnr.it/wirs.html>. The Chair of WIRS Italy is Prof. Micaela Liberti (Sapienza Università di Roma), the Co.Chair is Prof. Alessandra Costanzo (Alma Mater Studiorum - Università di Bologna), the Secretary is Prof. Paola Russo (Università Politecnica delle Marche), and the Treasurer is Prof. Francesca Apollonio (Sapienza Università di Roma). A workshop of WIRS Italy was held in February 2023 (the 21st), which I had the pleasure and honor to introduce with Prof. Sana Salous (Durham University, UK, Chair of URSI WIRS).

To strengthen international relationships of the CNR-URSI Committee with URSI Member Committees I attended the annual meeting of the German URSI Member Committee (Kleinheubacher Tagung 2022), which was held from September 27 to 29 in Altes Rathaus, Miltenberg, Germany. The Kleinheubacher Tagung is a very well-organized meeting during which presentations covering the scientific research areas of the ten URSI Scientific Commissions are given (mainly by PhD students and young researchers), along with a nice social event. Kleinheubacher Tagung is undoubtedly a valid model for URSI national meetings in Europe. In order to implement this model in Italy it would be however required the establishment of a new URSI organization

in Italy, which parallels the CNR-URSI Committee, and provides the administrative tools for organizing meetings and conferences. See the conclusion section of this report for further considerations on that.

#### **4. Evaluation of the participation in terms of benefits and membership cost**

The organization of URSI GASS 2021 in Rome had undoubtedly a positive impact on nominations of Italian radioscientists to URSI apical positions. In particular, the following Italian radioscientists were elected for the years 2021-2023:

1. Giuliano Manara, Vice-President URSI
2. Giorgiana De Franceschi, Chair Commission G
3. Carlo Carobbi, Vice-Chair Commission E
4. Francesca Apollonio, Vice-Chair Commission K
5. Andrea Michel, Early Career Representative 1 Commission B
6. Giovanna Signorile, Early Career Representative 2 Commission A
7. Valentina Palazzi, Early Career Representative 2 Commission D
8. Riccardo Trincherò, Early Career Representative 2 Commission E
9. Dario Sabbagh, Early Career Representative 2 Commission G

In the next triennium (2023-2026), vice-chairs will be promoted to chairs and early career representatives 2 to early career representative 1. Moreover, chairs will be promoted to the grade of URSI fellows. It will be also possible to nominate the vice-president for the same position or for URSI president.

#### **5. Evaluation of Italians' attendance and how to improve interest and involvement**

The participation of Italian radioscientists in international events has always been strong but, at the same time, it should be noted that in the past that Italian radio-scientists did not reach a proportional number of apical positions within URSI. Thanks to the organization of URSI GASS 2021 in Rome, the involvement of young and senior Italian radioscientists has significantly increased.

Moreover, actions have been undertaken to promote URSI in Italy through information about the advantages deriving from individual membership. In particular, we hope that the recent activation of the mailing list of URSI affiliated and sympathizers under the responsibility of CNR will provide a significant benefit in this respect. The mailing list was already successfully employed to spread information about URSI GASS 2023 in Sapporo (August 19 to 26) and the newborn Italian WIRS Chapter.

#### **6. Italian experts with important roles within the Union or within related Commissions and Programs (if known)**

Please, refer to the list reported in clause 4.

#### **7. Union with CNR Commission, short summary about the 2022 CNR Commission activities**

The CNR-URSI Committee met on May 6, 2022 online. The minutes of these meetings are available on the website of the CNR-URSI Committee <http://www.ursi.cnr.it>. The annual 2022 meeting of the CNR-URSI Committee was held in Catania, jointly with RiNEM. See section 3 of this report for details.

#### **8. Conclusions**

The CNR-URSI Committee is one of the most active URSI Member Committees in promoting scientific activities within URSI both at international and national levels. A great achievement and opportunity, obtained in 2017, was the responsibility for the organization of the 2021 URSI GASS conference in Rome. The CNR-URSI Committee successfully carried out this task, thus significantly improving the visibility of Italian radioscientists. The main regret is that the economic benefits that derived from this massive effort are not in the availability of the CNR-URSI committee because, due to its structure, the committee could not take over any financial responsibility (and relevant risks) in the organization of URSI GASS 2021. All the benefits were shared among the following organizations: Società Italiana di Elettromagnetismo (SIEM) and the professional conference organizer AIM International. The same applies for future events organized under the responsibility of the CNR-URSI committee. This state of affairs should be changed because it discourages the CNR-URSI Committee from undertaking similar efforts in the future and leaves few margins to increase the involvement of the Italian scientific community to URSI.

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Prof. Carlo Carobbi

(in cooperation with Prof. Giuliano Manara)