



Commission F Triennial Report 2021-2023

Prof. Tullio Tanzi
Chair Commission F

During the period 2021-2023, Commission F has been involved in the organization of one major meeting and some thematic meetings: the 3rd URSI Atlantic / Asia-Pacific Radio Science Meeting – 2022, (AT-AP-RASC) in Gran Canaria (Spain), from 29 May - 3 June 2022.

Of course, this triennium, reduced to years as a result of COVID, has been a difficult time.

Commission F also proposed a “Workshop on Disaster Risk Reduction and Management” for the General Assembly 2023 in Sapporo.

The commission also worked on “Access to the frequency spectrum” in view of the next WRC 2023 (2023-11-20 / 2023-12-15, Dubai UAE).

1. Officers of Commission F

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

Chair: Prof. Tullio Tanzi, Telecom Paris, Institut Polytechnique de Paris, France

Vice Chair: Dr. Motoyuki Sato , Tohoku University, Sendai, Japan

Early Career Representatives:

Dr. Motoharu Sasaki (Japan)

Dr. Fikadu Tafes Dagefu (U.S.A.)

2. Terms of Reference

The Commission encourages :

The study of all frequencies in a non-ionised environment :

- **wave propagation through planetary, neutral atmospheres and surfaces;**
- **wave interaction with the planetary surfaces (including land, ocean and ice), and subsurfaces;**
- **characterisation of the environment as it affects wave phenomena;**

The application of the results of these studies, particularly in the areas of remote sensing and communications;

The appropriate co-operation with other URSI Commissions and other relevant organisations



3. Commission F Working Groups

F.1	Education and Training in Remote Sensing and Related Aspects of Propagation/Next-Generation Radar Remote Sensing	Chair: M. Chandra (Germany); co-Chair: T. Tanzi (France); Members: A. Danklmayer (Germany), S. Paloscia (Italy), T. Rommel (Germany)
FGHJ	RFI Mitigation and Characterization	Chairs for Commission F: A.K. Mishra (South Africa), D. Le Vine (USA) Chair for Commission G: T. Bullett (USA) Chair for Commission H: H. Rothkaehl (Poland) Chairs for Commission J: R. Bradley (USA), W. Baan (Netherlands)
GF	Middle Atmosphere	Co-Chair for Commission G: J. Roettger (Germany) Co-Chair for Commission F: C.H. Liu (China, SRS);
GJFEH	Interdisciplinary Space Weather	Co-Chair for G: I. Stanislawka (Poland) Co-Chair for J: R. Fallows (Netherlands)

4. Commission F related International Activities – URSI Flagship Meetings

3rd URSI Atlantic / Asia-Pacific Radio Science Meeting – 2022, (AT-AP-RASC)

The 3rd URSI Atlantic / Asia-Pacific Radio Science Meeting - 2022, (AT-AP-RASC) was held from May 29 to June 3, 2022, at the ExpoMeloneras convention center, in Gran Canaria.

This was the third edition of URSI Atlantic Radio Science.

Due to the reduction of the triennium to two years, the two conferences AP-RASC and AT-RASC have been combined into a single event.

One of the main features of this event was the withdrawal of some session organizers who decided not to attend the event.



5. Workshop on Disaster Risk Reduction and Management

Initially planned as an inter-union workshop, the Workshop on Disaster Risk Reduction and Management gave rise to more than a year of preparation. During the AT-AP-RASC meeting, its content, already well advanced, gave rise to presentations and discussions with the committees and the board.

The slides below served as a basis for discussions with the office and the commissions, in particular during the AT-AP-RASC 2022.

URSI Standing Committee on Risk Management



Committee concerned: All Commissions

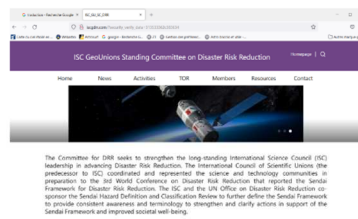
Objectives: Bring together all the skills from the URSI committees and facilitate cross-fertilization

Why: Risk is a polysemic object. It is multifaceted. We cannot approach it from a single aspect. It is necessary to constitute a view on several aspects (a multidisciplinary approach) to manage it.

Expected from each commission: only two inputs are required to initiate discussions
what are the interest and expectations for the WG,
what the commission bring to the WG (if possible)

Contact: Prof. Tullio J. Tanzi, Chair com F tullio.tanzi@telecom-paris.fr

International Science Council Standing Committee on Disaster Risk Reduction



<http://iscgdr.com>

Contact: Prof. Orhan Altan, Istanbul, Turkey
oaltan@itu.edu.tr

6th IFIP WG 5.15 International Conference, Information Technology in Disaster Risk Reduction (ITDRR)



<https://ifip-tc5.org/>

Contact: Prof. Dimitar Velez, Bulgaria
dgvelev@unwe.bg



Proposal for Sapporo on Risk Management

Main Objective: Constitute multidisciplinary knowledge on risk

How: Propose a series of interventions focused on the Risk and presenting the point of view of the speaker

With whom: Our colleagues from other societies (GeoUnion, etc.) or Working Groups

Format: face-to-face and remote interventions



Proposal for Sapporo on Risk Management



- Committee concerned:** All URSI cCommissions,
- External:** International Science Council Standing Committee on Disaster Risk Reduction
- ISPRS Commissions
- GeoUnion Society
- WG:** IFIP WG 5.15, Information Technology in Disaster Risk Reduction
- Pisa University WG on Risk (Cf. Giuliano Manara)

Objectives: Bring together all the skills from all participants and facilitate cross-fertilization

How: Organize a series of interventions¹ focused on Risk from the perspective of each speaker (ICS GeoUnion SC, URSI Commission, ISPRS, AGU, ACI, IUGG, IUGS, IUSS, INQUA, IGU, WGs, etc.)

Format: balance between face-to-face and remote interventions

Frequency: one per day

¹interventions: panel, workshop, presentation, keynote, Joint feedback session, etc.
To be decided later



ISPRS Committee

Proposal for Sapporo on Risk Management



Promotion and scientific dissemination:

Papers and books: Spread knowledge: best practices, white paper, policy brief, etc.

Social Networks: Public dissemination of video in "brief format" (and complete):

- On the URSI site web
- On ISC WG web Site
- Why not in youtube !

Contact: Prof. Tullio J. Tanzi, Chair Com F tullio.tanzi@telecom-paris.fr
Prof. Madhu Chandra madhu.chandra@gmx.de
Prof. Yasuhide Hobara hobara@ee.uec.ac.jp
Dr. Motoyuki Sato, vice-Chair Com F motoyuki.sato.b3@tohoku.ac.jp
Prof Giuliano Manara giuliano.manara@unipi.it

At the end of 2022 Prof. Giuliano Manara, URSI Vice President, takes the initiative to broaden the possible interest in the workshop by rebranding it as an "inter-Commission URSI workshop". This broadening and refocusing has a significant impact on the possible interest as well as on the agenda of the workshop.

To avoid similar situations in the future, a closer interaction with the Commission Chair as well as incorporating previous discussions and results from previous workshops would be advisable.

6. Access to the frequency spectrum : Some scientific applications are in danger

Given its proper objectives URSI embraces all activities related to electromagnetism, the «natural» ones, on the one hand, and the measurements of natural phenomena (Astronomy / radio astronomy, solar emissions, composition of the atmosphere, cryosphere, ...) and, on the other, the «artificial» activities, emissions of all kinds (radio transmitters, teledetection, GNSS, ...). The latter benefit free of charge from the results of the preceding ones.

In fine, all these activities share the same spectrum. Therefore ITU is in charge of determining the rules of sharing. It is the judicial responsibility of ITU members States to determine the sharing, which results from negotiations between the two points of view, one scientific, the other economic; this latter is motivated by considerable economic interest showing the challenge due to the fact that the whole spectrum is full of a great many and various applications.

Therefore URSI is a convenient scientific meeting place for these two types of activities. For a long time ITU has recognized this fact making URSI a full member (free of charge) of its Radiocommunications Sector (UIT-R). Although URSI members rarely participate in Working Parties



(WP) of ITU-R, mainly those of the Commission «Scientific services», one of our members participated during several years in this Commission and now collaborates at distance.

A recent example of this confrontation is point 1.2 of the Agenda of the next WRC 2023 (2023-11-20 / 2023-12-15, Dubai UAE),

"1.2 to consider identification of the frequency bands 3 300-3 400 MHz, 3 600-3 800 MHz, 6 425-7 025 MHz, 7 025-7 125 MHz and 10.0-10.5 GHz for International Mobile Telecommunications (IMT), including possible additional allocations to the mobile service on a primary basis, in accordance with Resolution 245 (WRC-19);"

However in the two bands 6 425-7 025 MHz and 7 025- 7 125 MHz the measures of temperature and salinity of the sea surface (SST) are already made by satellite.

This point leads to question the future of passive measurements of SST (RR 5.458) resulting from a worldwide and massive deployment of mobile equipment (RLAN/WiFi) in the band 6 425-7 125 MHz and later on the whole of the passive observation of the Earth by satellite.

The two presentations of Thibaut Caillet to be made at the GASS of URSI give details on the scientific conditions of this danger,

- «The planned difficulties of Sea Surface Temperature measurements in band 6.9 and 7.3 GHz.»
- «Conditions (technically & regularly) for finding a new access to SST measurements in the microwave area : band sharing is the way.»

In summary, we suggest that the above remarks have to be taken seriously, so as not to impair the scientific aspects of some physical and vital phenomenae.

2023 May, URSI-France Commission F.

7. Commission F related National Activities

Activity Report of Japan URSI-F, May 10, 2023, Reported by Motoyuki Sato (Chair)

1. Commission meetings in the period of 2021-2023

May 13, 2021 Online meeting (Main venue: Center for Northeast Asian Studies, Tohoku University, Sendai, Miyagi)

9 committee members attended

Committee composition

Schedule of meetings in FY 2021

Selection of speakers for special lectures

June 11, 2021, Online meeting

9 committee members attended

Schedule of meetings in FY 2021

Selection of speakers for special lectures

September 2, 2022, Hybrid (Online meeting and Chuo University, Bunkyo-ku, Tokyo)

8 committee members attended

Schedule of meetings in FY 2022



Selection of speakers for special lectures
May 24, 2023, NICT, Koganei, Tokyo (planned)
Schedule of meetings in FY 2023
Selection of speakers for special lectures

2. Meetings

(For more detail, please see <http://ursi-f.nict.go.jp/>)

(1) No. 651 Meeting January 21-22, 2021, Online meeting

This meeting is co-sponsored by IEICE Technical Committee on AP and IEEE AP-S Tokyo Chapter.
Special Lecture

[1] Experimental Study to Estimate the Reduction Range of Transmission Power Control at Client Terminals in IEEE 802.11ax Uplink Multi-User Transmission Using OFDMA

(2) No.652 Meeting

Adjournment

(3) No.653 Meeting

Adjournment

(4) No.654 Meeting 21 May, 2021, Online meeting

This meeting was co-sponsored by IEICE Technical Committee on AP and IEEE AP-S Tokyo Chapter.

(5) No.655 Meeting 21 June, 2021, Online meeting

[1] Radio Propagation Extrapolation Based on Propagation Path Division Using Surrounding Transmitter Information

[2] The Effects of Ground Wind Velocity and Upper Air Rain Area Motion on the Rain Attenuation Characteristics in Satellite Communications Links

[3] Observation of water vapor content near the surface of the earth using terrestrial digital broadcasting waves - preparation status for the Kyushu observation campaign -

(6) No.656 Meeting 28-30 July, 2021, Online meeting

This meeting was co-sponsored by IEICE Technical Committee on AP, SAT, SANE, and IEEE AP-S Tokyo Chapter.

Special Lecture

[1] Research and development of radio wave propagation model in the sky for BVLOS flight of unmanned aircraft

(7) No.657 Meeting 30 September, 2021, Online meeting

[1] Measuring Radio Wave Propagation Characteristics by a Private 5G Radio System in the 4.8 GHz Band Deployed in an Indoor Data Center Environment



(8) No.658 Meeting 7-8 October, 2021, Online meeting

This meeting was co-sponsored by IEICE Technical Committee on AP and IEEE AP-S Tokyo Chapter.

(9) No.659 Meeting 11-12 November, 2021, Online meeting

This meeting was co-sponsored by IEICE Technical Committee on SANE and IEEE AES Society Japan Chapter.

(10) No.660 Meeting

Adjournment

(11) No.661 Meeting 17-18 February, 2022, Online meeting

This meeting was co-sponsored by IEICE Technical Committee on AP and IEEE AP-S Nagoya Chapter.

Special Lecture

[1] Examination of the fundamental propagation loss model of mobile propagation

(12) No.662 Meeting

Adjournment

(13) No.663 Meeting

Adjournment

(14) No.664 Meeting

Adjournment

(15) No.665 Meeting

Adjournment

(16) No.666 Meeting

Adjournment

(17) No.667 Meeting

Adjournment

(18) No.668 Meeting

Adjournment

(19) No.669 Meeting

Adjournment

(20) No.670 Meeting 26 January, 2023, NICT, Koganei, Tokyo



- [1] Prototype of 79 GHz band 786 (Tx24, Rx32) virtual array MIMO type radar
- [2] Vibration measurement by 79 GHz band MIMO radar
- [3] Development of 79 GHz band MIMO type GB-SAR

(21) No.671 Meeting 15-17 February, 2023, Online meeting

This meeting was co-sponsored by IEICE Technical Committee on AP and IEEE AP-S Tokyo Chapter.

Special Lecture

- [1] Point to Area Propagation Research Focusing on Microwave Band

(22) No.672 Meeting

Adjournment

(23) No.673 Meeting 11-12 May, 2023, Tiruru (Okinawa Gender Equality Center), Naha, Okinawa

This meeting is co-sponsored by IEICE Technical Committee on AP and IEEE AP-S Fukuoka Chapter.

(24) No.674 Meeting 24 May, 2023, NICT, Koganei, Tokyo

Planned

3. Others

URSI-JRSM 2022, 1-2 September, 2022, Chuo University, Tokyo

Invited Lecture

- [1] Constitutive effective ray-tracing parameters for mobile propagation prediction

Oral Session

- [1] Scenario-Based Radio Channel Modeling in Cyber-Physical Wireless Emulator
- [2] Study of Radio Environment and Propagation for Low Altitude UAV Communication
- [3] Fundamental Study of Heartbeat and Respiration Rates Estimation with Two Wave Models by Using mm Wave MIMO FM-CW Radar
- [4] Phased Array Weather Radar Observation and Application
- [5] Application of Passive Radar for Current Measurement by Ocean Surface Radar System
- [6] Electromagnetic Wave Propagation Inside the Great Pyramid in Egypt

Poster Papers

- [1] Calibration approach of ground-based weather radar network using dual-frequency precipitation radar on the global precipitation measurement

Events, Seminar etc concerning Commission F held in India during 2021-2023

1. The 2022 URSI Regional Conference on Radio Science (URSI-RCRS 2022) was held from December 01 to 04, 2022, at the Indian Institute Technology in Indore, India. As the flagship biennial conference organized by the Indian Radio Science Society (InRaSS), the event featured a comprehensive scientific program encompassing the research domains of Ten Scientific Commissions of URSI. In total, 440 papers were presented, and 116 of them came from Commission F.
2. The Workshop on Research Tools for Space and Atmospheric Sciences, held during 26 to 30 May



- 2022, organized by the Department of Physics, Dibrugarh University, Dibrugarh, India.
3. The International Workshop on ICTP Regional Climate Model: Applications Over South Asia CORDEX Domain was held on 22-28 February 2021. The workshop was organized by the Department of Physics, Dibrugarh University, Dibrugarh, Assam, India.
 4. The Conference on Frontiers in Space and Atmospheric Sciences (COFSAS-2023) took place on March 15 - 16, 2023, which was jointly organized by the IASE (Kolkata), BR Ambedkar University (Lucknow), KL University (Guntur), and InRaSS. The conference covered different topics of atmospheric and space sciences including, Atmospheric Research Through Radars, Modelling and Simulations in Atmospheric Sciences and Effects on the Atmosphere due to Terrestrial Hazards.

Activities organised or co-organised by Polish Commission F.

1. Special session (Commissions C and F): "Physical Layer Issues in Modern Radio Communication Networks" at National Conference on Radio Communication and Broadcasting (KKRRIT), Warsaw, Poland, 2022;
2. Special session: "FCK1 COST CA15104 IRACON: Measurement & Modelling of Radio Waves Propagation in Body Area Networks" at URSI GASS 2021.
3. Special session: "F06 COST CA20120 INTERACT: Measurement & Modelling of Radio Waves Propagation for Indoor Communications" at URSI GASS 2023.

Activities of USNC-URSI Commission F (2021-2023)

Chair – Thomas Hanley (Johns Hopkins University Applied Physics Laboratory)

Vice Chair – David Kunke (Aerospace Corporation)

Secretary – Chris Ruf (University of Michigan)

Over the past Triennium (2021-2023), the United States National Committee (USNC) of URSI Commission F has focused its efforts on conferences. USNC-URSI held its annual National Radio Science Meeting (NRSM) each January.

The 2021 NRSM was held virtually on 4-9 January 2021 due to the COVID-19 pandemic. This included a special memorial session for Valerian Tatarskii who passed away in April 2020. The 2022 NRSM was held in a hybrid format from 4-8 January 2022, with the 2023 NRSM held fully in-person on 10-14 January 2023. We continue to have the conference at the University of Colorado Boulder, which provides a cost-conscious option in a central location.

Next year will be the 50th anniversary of this meeting. In 2021, Commission F participated in the Joint IEEE AP-S/URSI conference in Singapore from 4-10 December. In 2022, the Joint IEEE AP-S/URSI conference was held in Denver, CO (10-15 July) and in 2023 it will be held in Portland, OR (23-28 July).

Popular conference session topics over the past few years include GNSS and Radio Beacon Remote Sensing (joint with Commissions G and H), Propagation and Scattering in Random Media, Remote Sensing, and Point-to-Point Propagation Measurements and Models. We continue to host a lectureship series at each of the NRSM and Joint IEEE AP-S conferences in memory of Hans Liebe and his microwave and millimeter-wave spectroscopy work.

We hold biannual USNC-URSI Commission F Business Meetings coinciding with each of the conferences and have been having these in a hybrid format for the past few meetings to increase attendance.