



**Commission Triennial Report  
Commission H**

## 1. In Memoriam

**François Lefeuvre** (1944-2022) was involved in the definition and the data analysis of many wave experiments onboard satellites (GEOS-1 and 2, OREOL-3, INTERBALL, CLUSTER, DEMETER, TARANIS). He was Director of the Laboratory of Physics and Chemistry of the Environment from 1994 to 2003. He spent 21 years in the service of URSI (President of URSI in the periods 2005-2008 and 2009-2011). He published more than 100 scientific papers related to the wave and turbulence analysis techniques, and to the natural and artificial ULF to MF emissions in the Earth magnetosphere. An extended CV can be found in the Radio Science Bulletin No 360 (March 2017).

**Yakov Nikolaevich Istomin** (1946-2022) died on October 9, 2022. In early 1970th he made a significant contribution to the theory of resonant wave-particle interactions and triggering emissions. Since 1978 he worked in the Department of Theoretical Physics of the Lebedev Physical Institute. He owns several fundamental results in the theory of the magnetosphere and the radio emission of pulsars. Ya. N. Istomin is Laureate of the Mandelstam Prize for 1994. Yakov Istomin was a cheerful, enthusiastic person. He did everything with passion: worked, traveled, played chess. An emotional argument about science or politics was his forte.

**Nicole Cornilleau-Wehrin** (1945-2023) died on February 2, 2023. She was Directeur de Recherches Emeritus at LPP in Palaiseau, France. She has devoted her entire career to the study of plasma waves and wave-particle interactions in Earth and Planetary magnetospheres with spacecraft. She has been deeply involved in the development, construction and data analysis of many wave experiments in space missions like in the ESA Geos magnetospheric spacecraft or the Ulysses heliospheric probe. But she is best known for the leadership and key role she played in the Cluster mission as the PI of the STAFF experiment, and later as PI of the same experiment on the Chinese Double Star mission. She was also director of the Nançay RadioAstronomy Observatory.

**Tauno Turunen** (1946-2023) died on July 5, 2023. He was the director of Sodankylä Geophysical Observatory in 1992-2011. Since 1971 he was the head of aeronomy unit in SGO and was working with the ionosonde. He played also very important role in EISCAT Scientific Association being its technical deputy director in 1984-1987 and the director in 1998-2002. He got international Beynon medal in 2003.

He was very clever for designing new instruments like the world's most sensitive ELF-VLF receiver, which has been operating since 1992, and he also developed very effective sferics filter and PLHR filter programs for ELF-VLF analysis. In 2005 he build a new ionosonde with one minute sounding, that has been difficult for other ionosondes in the world even recently. Last upgrading he made for SGO's pulsation magnetometers. He had also ideas for new riometer, but he retired before he was able to start this project.

He was very international scientist with a huge number of friends all over the world.



## 2. Meeting Support

During the 2021-2023 'triennium', Commission H was ready to support the following meetings financially (mode B) with a contribution of 2000 EUR:

1. 1st VERSIM VLF/ELF Remote Sensing of Ionospheres and Magnetospheres Workgroup School, Sodankylä, Finland, 5-6 November 2022
2. 10th VERSIM VLF/ELF Remote Sensing of Ionospheres and Magnetospheres Workgroup meeting, Sodankylä, Finland, 7-11 November 2022.

However, VERSIM School and Workshop got so many other support (SCOSTEP, SGO/University of Oulu, IAGA, and ISEE/University of Nagoya) that the organizer finally informed that they do not need financial support from URSI. Furthermore, Commission G was also ready to support these by 500 EUR, but neither that was needed.

Commission H supported the following meeting financially (mode B) with a contribution of 300 EUR:

3. MaSAG23 - MAThematics for Signal processing and applications in Geophysics and other fields, Rome, Italy, 15-20 May 2023.

Commission H also provided support in mode 3B (without financial aid) for the following meetings:

4. HISTELCON (HISTORY of ELECTROTECHNOLOGY CONFERENCE) is IEEE Flagship conference of IEEE Region 8 (Europe, Middle East and Africa) for the history of electrotechnology, Florence, Italy, 7-9 Sep 2023.

## 3. Working Group Activities

### 3.1. Working Group of URSI and IAGA: VLF/ELF remote Sensing of the Ionosphere and Magnetosphere (VERSIM)

Co-Chair for URSI Commissions H and G: M. Clilverd (UK)

Co-chair for IAGA: A. Demekhovk (Russia)

Report received from M. Clilverd

The VLF-ELF Remote Sensing of the Ionosphere and Magnetosphere (VERSIM) working group has remained very active over the reporting period. The group's email list continues to be around 100 people. Regular updates, job adverts, and conference information is provided to the email group by the group leaders (particularly Andrei).

The primary activity of the working group during the reporting period was the 10<sup>th</sup> VERSIM meeting, held in the Sodankylä Geophysical Observatory, Finland, in November 2022. The meeting, lasting 5 days, was held at the same location where the meetings began in 2004. Approximately 40 people attended in person, with a significant proportion being in their early career stage. For the first time in VERSIM history, a VERSIM school was undertaken just prior to the main meeting. This is seen as a key area for future development of the VERSIM community. The feedback from the meeting has been very positive, and the co-chairs would particularly like to thank the principal organiser, Jyrki Manninen, and all of the other members of the organizing committee for making the workshop such a success. The co-chairs acknowledge that some members of the VERSIM community were unable to attend in any form at all, due to current geopolitical circumstances.

VERSIM has also continued to produce and circulate their annual report at the end of each calendar year. The report show-cases the activities of the working group, with summary input from many of the institutes involved in VERSIM, highlighting recent scientific findings and the latest data collection initiatives. The activity of the VERSIM Journal Club is also promoted in the annual report, publicising



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its active and supportive nature for early career scientists. The club's talks are either from students themselves on topics of personal interest, or from senior members of the VERSIM community on VERSIM-related, or space-science related, areas.

The VERSIM community and working group continues to flourish, regularly proposing science topic areas and providing convenors for both URSI and IAGA meetings.

### 3.2. Working Group of Commissions G and H on Active experiments in Space Plasmas

Report by Co-Chair for Commission H: M. Kosch (South Africa)

The Covid pandemic made travel difficult or impossible since 2020, which had a negative impact on research that required travel to various ionospheric modification facilities. However, the HAARP, EISCAT and SURA ionospheric modification facilities continued with their scientific experiments successfully. In the period 2021 to the present, EISCAT Heating produced 30 publications, about half compared to the previous period. At this time, there is no plan to discontinue operations at any of these facilities. Construction of the new EISCAT-3D VHF incoherent scatter radar facility began in late 2022 in three locations in northern Fennoscandinavia and it is hoped operations may begin in late 2023.

In 2022, two important papers were published:

"Review of environmental monitoring by means of radio waves in the (Ant)Arctic: from atmosphere to geospace" by L. Alfonsi et al., *Surveys in Geophysics*, 43, GEOP-D-22-00038, <https://link.springer.com/article/10.1007/s10712-022-09734-z>, 1609-1698, 2022.

"History of the Tromsø ionosphere heating facility" by M.T. Rietveld and P. Stubbe, *Hist. Geo Space. Sci.*, 13, 71–82, <https://doi.org/10.5194/hgss-13-71-2022>, 2022.

No reports received from

- Working Group of Commissions H and J: Computer Simulations in Space Plasmas
- Working Group of Commissions E,G, and H: Seismo- Electromagnetics (Lithosphere-Atmosphere-Ionosphere Coupling)
- Working Group of Commissions E,H, and G on Solar Power Satellites
- Working Group of Commissions E, F, G, H and J on RFI Mitigation and Characterization
- Working Group of Commissions GJFEH Interdisciplinary Space Weather

## 4. Preparations for the XXXIVth URSI General Assembly and Scientific Symposium in Sapporo, Japan, 19-26 August 2023

### 4.1. Scientific Sessions

#### Commission H sessions:

1. Open session – 7 oral papers, 5 posters
2. Wave-particle interactions and radiation belt dynamics – 29 oral presentations, 14 posters
3. Multi-point observations and modeling for comprehensive understandings of the inner magnetosphere – 15 oral presentations, 9 posters



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4. Radio diagnostics of space weather plasma processes – 7 oral presentations, 5 posters
5. Machine learning techniques and their application to plasma waves – 4 oral presentations, 2 posters
6. Analysis of natural boundary layers in terrestrial and planetary environments: Macro/micro scale kinetic approaches – 5 oral presentations, 1 poster
7. Active experiments and radio sounding – 9 oral presentations, 3 posters
8. Computer simulations in space plasmas – 11 oral presentations, 8 posters
9. Small Satellites and observations of the space environment – 10 oral presentations, 4 posters

**Common sessions with other commissions, lead by Commission H:**

1. Joint HJ session on Radio emission from the Sun, Heliosphere, and Planets – 13 oral presentations, 3 posters
2. Joint HGE session on Atmospheric, ionospheric, magnetospheric, and high energy effects of lightning discharges – 12 oral presentations, 4 posters
3. Joint HGE session on Meet the experts – 3 oral presentations
4. Joint HGE session on Meet the experts Panel Discussion

**Other sessions related to Commission H:**

1. Joint WGDJEH session on Women in Radio Science
2. Joint GH session on Meteors, collisional EMPs, and other Highly-Transient Space Plasma Events
3. Joint GH session on Plasma Instabilities in the Ionosphere
4. Joint FCEGH workshop on Radio Science and Engineering of Disaster Risk Reduction and Management
5. Joint GHE session on Seismo Electromagnetics (Litosphere-Atmosphere-Ionosphere Coupling)
6. Joint EFGH session on Natural Electromagnetic Noise & Radio Sensing Applications in Terr. & Planetary Environments

## 4.2. Total number of papers and trends from the last GASS

For the upcoming URSI GASS in Sapporo Commission H accepted 186 papers (129 oral presentations and 57 posters). Every effort has been made to maximize the number of scheduled oral presentations. This means an increase of the total number of papers compared to the last URSI GASS in Rome in 2021 where Commission H accepted 140 papers (120 oral presentations and 20 posters).

## 4.3. Tutorial Lecture

Commission H tutorial lecture on “Multiple roles of plasma waves in geospace: Arase observations” will be given by Prof. Miyoshi Yoshizumi from Nagoya University, Nagoya, Japan.

## 4.4. Young Scientist Awards

Young Scientist Awards will be given to 13 young scientists from Commission H: Trevor Bowen (USA), Winry Ember (USA), Miroslav Hanzelka (USA), Brian Hare (Netherlands), David Hartley (USA), Poorya Hosseini (USA), Devoiyoti Kansabanik (India), Li Li (China), Debrupa Mondal (Japan), Megha Pandya



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(Japan), Antrisha Danera Setiawan (Japan), Steffy Sara Varghese (United Arab Emirates), and Yanan Zhu (USA). Congratulations to all awardees!

### 4.5. Student Paper Competition

The final of the Student Paper Competition will be organised in the beginning of URSI GASS 2023. This time 2 finalists were selected through Commission H: Annelisa Esparza (USA) and Raymond Lau (USA).

## 5. Recipient of the URSI Awards 2023 related to Commission H

### Appleton Prize – Ondrej Santolik

For outstanding contributions to experimental studies on electromagnetic waves in space environment.

The URSI awards will be presented to the awardees during the Opening Ceremony of the 2023 General Assembly and Scientific Symposium. Congratulations to all awardees!

## 6. Commission H Vice Chair Election

The call for nominations for the new Commission H Vice Chair was sent out on January 21, 2023. Two excellent candidates have been nominated. Voting is now in progress. The final vote counting will take place during the Commission coordinating activities, which will be held on Monday 21 August 2023 at the URSI GASS in Sapporo, Japan.

## 7. Election of the Commission H Early Career Representative

The call for nominations for the new Commission H Early Career Representative was sent out on January 21, 2023. Two excellent candidates have been nominated. Voting is now in progress. The final vote counting will take place during the Commission coordinating activities, which will be held on Monday 21 August 2023 at the URSI GASS in Sapporo, Japan.

I would like to take this opportunity to thank the Commission H Vice-Chair Craig Rodger, the Commission H Early Career Representatives Frantisek Nemecek and Evgenii Shirokov (resigned after Russian attack to Ukraine), as well as the Commission H past Chairs Janos Lichtenberger and Ondrej Santolik, and last but not least Inge Heleu, Inge Lievens, and Peter Van Daele in URSI HQ for their valuable advice and support during the last triennium.

Jyrki Manninen, Chair, Commission H