



## Commission GASS 2023 Report

### Commission H

#### 1. Elections of Commission Officers

The call for nominations for the new Commission H Vice Chair and new Early Career Representative was initially sent out by the outgoing Commission H Chair on 24 January 2023.

Two candidates were nominated for Commission H Vice Chairs. These were (in alphabetical order):

Patrick Galopeau (France) and Robert Marshall (USA)

After the election closed on Monday 21 August 2023, and following the confirmation from the URSI Council meeting on Tuesday 22 August 2023, the result was announced.

The Results:	Patrick Galopeau	33
	<u>Robert Marshall</u>	30

As the voting is done through a ranking process, the candidate with the smallest number is successful. As such, Robert Marshall was elected the new Commission H Vice Chair.

There were also two candidates for Commission H Early Career Representative role:

David Hartley (USA) and Kuldeep Singh (UAE)

The Results:	<u>David Hartley</u>	22
	Kuldeep Singh	41

Thus, David Hartley was elected the new Early Career Representative.

Note that the Commission H Early Career Representative role elected at the URSI GASS 2021 (Rome) resigned due to the Russian invasion of Ukraine. The "senior" Commission H Early Career Representative, František Němec (Czechia), agreed to stay on for the next triennium.

#### 2. Review of Terms of Reference

The goals of the Commission are:

- To study waves in plasmas in the broadest sense, and in particular :
  - the generation (e.g. plasma instabilities), propagation, and detection of waves in plasmas,
  - wave-wave and wave-particle interactions,
  - plasma turbulence and chaos,
  - spacecraft-plasma interaction,
  - instabilities, heating, and diagnostics of laboratory plasmas;
- To encourage the application of these studies, particularly in the areas of solar/planetary plasma interactions, space weather, and an increased exploitation of space as a research laboratory.

During our business meetings there were no proposed changes to above mentioned text.

However, František points out that Commission H website says the last goal is listed as: "instabilities, heating, and diagnosis of laboratory plasmas", we think the word "diagnosis" should be "diagnostics", which is how Commission H people describe our goals.

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

There were a limited number of reports received in the last 2 years (full reports were received from the Working Group of URSI and IAGA: VLF/ELF remote Sensing of the Ionosphere and Magnetosphere (VERSIM) and the Working Group of Commissions G and H on Active experiments in Space Plasmas). The out-going Commission H chair believed this was due to the continuing impact of COVID-19, and that some kindness should be extended to the unresponsive working group. However, before the 2021 GASS the H co-chair of the Working Group of Commissions E, H, and G on Solar



Power Satellites (K Hashimoto) indicated a lack of activity. As far as we can tell this working group should now be disbanded. Also, the Commission H co-chair of the Working Group of Commissions H and J: Computer Simulations in Space Plasma told the incoming Commission H chair to disband the working group (note, Commission J also suggested it should be disbanded at the last URSI Council meeting during the 2023 Sapporo GASS).

The other working groups with named Commission H representatives are given on the website. These are:

VLF/ELF Remote Sensing of the Ionosphere and Magnetosphere (VERSIM)

URSI Co Chair (Commissions E, G, H): Claudia Martinez-Calderon (Japan), IAGA Co Chair: Frantisek Nemecek (Czech Republic)

NOTE the change in the URSI co-chair for VERSIM.

Active experiments in Space Plasmas

Co-chair for Commission H: Mike Kosch (South Africa)

NOTE. The Active Experiments working group is missing from the Commission G and H websites. We are unclear why!

Working Group of Commissions E, G, and H: Seismo-Electromagnetics (Lithosphere-Atmosphere-Ionosphere Coupling)

Co-chair for Commission H: Hannah Rothkaehl (Poland)

Working Group of Commissions E, F, G, H and J on RFI Mitigation and Characterization

Co-chair for Commission H: Hannah Rothkaehl (Poland)

Working Group of Commissions H, G, and E: Radio Diagnostics of Space Weather Plasma Processes

Co-chair for Commission H: Mauro Messerotti (Italy)

#### 4. Technical Advisory Committee

Some time ago Commission H decided that this committee would be formed of:

- (1) Past Chairs of Commission
- (2) Past Early Career Representatives
- (3) Current Candidates for Vice-Chair and ECR which were not elected this time
- (4) Current GASS Commission H Session conveners and tutorial/general lecturers

The members are:

##### (1) Past chairs

Robert Benson <robert.f.benson@nasa.gov>  
Gordon James <james@phys.ucalgary.ca>  
Uman Inan <UINAN@ku.edu.tr>  
Richard Horne <r.horne@bas.ac.uk>  
Yoshiharu Omura <omura@rish.kyoto-u.ac.jp>  
Ondrej Santolik <os@ufa.cas.cz>  
János Lichtenberger <lityi@sas.elte.hu>  
Jyrki Manninen <Jyrki.Manninen@oulu.fi>

##### (2) Past ECRs

Wen Li <wenli77@bu.edu>

##### (3) Current Candidates for Vice-Chair and ECR which were not elected this time

Patrick Galopeau <patrick.galopeau@latmos.ipsl.fr>  
Kuldeep Singh <Singh.kdeep07@gmail.com>

##### (4) Current Commission H Session conveners and tutorial/general lecturers

Jyrki Manninen <jyrki.manninen@oulu.fi>



Craig J. Rodger <craig.rodger@otago.ac.nz>  
Vania Jordanova <vania@lanl.gov>  
David Hartley <david-hartley@uiowa.edu>  
Yoshi Miyoshi <miyoshi@isee.nagoya-u.ac.jp>  
Yoshiya Kasahara <kasahara@is.t.kanazawa-u.ac.jp>  
Jean-Francois Ripoll <jean-francois.ripoll@cea.fr>  
Mauro Messerotti <mauro.messerotti@inaf.it>  
Tomoko Nakagawa <nakagawa@tohtech.ac.jp>  
Drew Turner <drew.lawson.turner@gmail.com>  
Katariina Nykyri <katariina.nykyri@erau.edu>  
David Malaspina <David.Malaspina@Colorado.edu>  
Xiangning Chu <chuxiangning@gmail.com>  
Hui Zhang <h.zhang@sdu.edu.cn>  
Philippe Escoubet <philippe.escoubet@esa.int>  
Vikas Sonwalkar <vssonwalkar@alaska.edu>  
Amani Reddy <areddy1@alaska.edu>  
Paul Bernhardt <pabernhardt@alaska.edu>  
Robert Moore <moore@ece.ufl.edu>  
Yohei Miyake <y-miyake@eagle.kobe-u.ac.jp>  
Esa Kallio <esa.kallio@aalto.fi>  
Ivana Kolmašová <iko@ufa.cas.cz>  
Claudia Martinez-Calderon <claudia@isee.nagoya-u.ac.jp>  
Miroslav Hanzelka <mha@ufa.cas.cz>  
Pietro Zucca <zucca@astron.nl>  
Natchimuthuk Gopalswamy <natchimuthuk.gopalswamy-1@nasa.gov>  
Rob Pfaff <robert.f.pfaff@nasa.gov>  
Mike Kosch <mkosch@sansa.org.za>  
Hanna Rothkaehl <hrot@cbk.waw.pl>

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

We intend to support the 11th VERSIM Workshop in Colorado, planned for October 2024.

We would also like to support the 12th Workshop, but the timing and location of that are as yet unclear - 2026 or 2027 would be the most likely dates, and hence care needs to be shown around the timing of the URSI GASS in 2026.

## 6. Proposed sessions and conveners for AT-RASC 2024

This is the current list as of 6 September 2023. Almost all the sessions are confirmed with at least one convener agreed, but in some cases extra conveners are being sought.

### H01: Open Session

Craig Rodger (University of Otago, New Zealand)  
Robert Marshall (University of Colorado Boulder, USA)

### H02: Plasma waves, wave-particle interactions, and their multifold effects on the radiation belts

David Hartley (University of Iowa, USA)  
Ondrej Santolik (Academy of Sciences of the Czech Republic, Czechia)  
Vania Jordanova (Los Alamos National Laboratory, USA)  
Yoshizumi Miyoshi (University of Nagoya, Japan)

### H03: Machine learning techniques and their application to plasma waves

Drew Turner (Johns Hopkins Applied Physics Laboratory, USA)



**H04: Recent advances in geospace research from multi-point observations**

Jyrki Manninen (University of Oulu, Finland)  
Jean-Francois Ripoll (CEA, France)  
Yoshiya Kasahara (Kanazawa University, Japan)

**H05: Radio diagnostics of space weather plasma processes**

Mauro Messerotti (University of Trieste, Italy)

**H06: Computer simulations in space plasmas**

Esa Kallio (Aalto University, Finland)  
Yohei Miyake (Kobe University)  
[esa.kallio@aalto.fi](mailto:esa.kallio@aalto.fi), [y-miyake@eagle.kobe-u.ac.jp](mailto:y-miyake@eagle.kobe-u.ac.jp)

**H07: Analysis of natural boundary layers in terrestrial and planetary environments:  
Macro/micro scale kinetic approaches**

Hui Zhang (Shandong University, China)  
[h.zhang@sdu.edu.cn](mailto:h.zhang@sdu.edu.cn)

**H08: Turbulence and Instabilities in Space Plasmas**

Alexander Pitňa (Charles University, Czechia)  
[alex@aurora.troja.mff.cuni.cz](mailto:alex@aurora.troja.mff.cuni.cz)

**H09: Tribute to Craig Kletzing - his fascination with plasma waves and the upcoming TRACERS mission**

David M. Miles (University of Iowa)

Note: this is not really a session, but rather a special Commission H lecture to celebrate a recently deceased colleague. Craig Kletzing gave one of General Lectures at the 2022 AT-AP-RASC meeting, was the PI of the magnetic field plasma wave instrument on NASA's Van Allen Probes flagship mission, and a leading light in the Commission H community. He died shortly before the 2023 URSI GASS. Given the strong URSI link, we ask for a special session in the programme by which Craig's colleague Dave Miles (the new PI of Craig's TRACERS mission) provides a tribute talk. Only 1 "abstract" should be accepted, which is Dave Miles. So a bit like a general lecture, or tutorial talk, but a Commission H single speaker presentation.

H-led joint sessions

**HG01: Active Experiments in Space and Laboratory Plasmas**

Robert Moore (University of Florida, USA)  
Mark Golkowski (University of Colorado Denver, USA)

**HG02: Observations of near-Earth space from Small Satellites and Suborbital Platforms**

Robert Marshall (University of Colorado Boulder, USA)  
Bruce Fritz (U.S. Naval Research Laboratory, USA)  
David Malaspina (University of Colorado Boulder, USA)

**HGE01: Atmospheric, ionospheric, magnetospheric, and high energy effects of lightning discharges**

Ivana Kolmašová (Charles University, Czechia)  
Martin Fullekrug (University of Bath, UK)  
Ningyu Liu (University of New Hampshire, USA)

**HGE02: Meet the HGE Experts - Presentations**

František Němec (Charles University, Czechia)  
Bruce Fritz (U.S. Naval Research Laboratory, USA)  
Riccardo Trinchero (Politecnico di Torino, Italy)

**HGE03: Meet the HGE Experts - Panel Discussion**



František Němec (Charles University, Czechia)  
Bruce Fritz (U.S. Naval Research Laboratory, USA)  
Riccardo Trinchero (Politecnico di Torino, Italy)

**HJ01: Radio emission from the Sun, Heliosphere, and Planets**

Pietro Zucca (ASTRON Netherlands Institute for Radio Astronomy, Netherlands)



## **APPENDIX ONE**

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

Co-chair for URSI Commissions H and G: Mark Clilverd (UK)

Co-chair for IAGA: Andrei Demekhov (Russia); Report received from Mark 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 10th 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 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.

Note that during the 2023 URSI GASS in Sapporo the URSI co-chair, Mark Clilverd (UK), stepped down after 9 years of service. He was replaced by Claudia Martinez-Calderon (Japan).

### **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 Fenno-Scandinavia 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.