

# Preface

This volume is the proceedings of the twelfth General Meeting (GM2022) of the International VLBI Service for Geodesy and Astrometry (IVS), held in Finnish Cyberspace, March 28 through April 1, 2022. The meeting was organized and hosted by the Finnish Geospatial Research Institute (FGI), National Land Survey of Finland (NLS).



**Fig. 1** Logo of the twelfth IVS General Meeting.

The previous General Meeting (GM2020), which was organized for in-person participation, had to be cancelled on very short notice prior to taking place (two weeks before the opening) due to the onset of the coronavirus disease 2019 (COVID-19) pandemic. Hence, GM2022 was effectively held four years after the last successfully executed GM.

When starting the preparations of GM2022, we were hopeful that we would be at the tail end of the pandemic and could hold the GM as a hybrid event. However, the latter turned out not to be the case. The Omicron wave of the COVID-19 pandemic together with restrictions implemented by the Finnish govern-

ment on organizing public events forced us to switch to a completely virtual format. Thus, GM2022 became the first GM that was held completely online.

The switch to a virtual meeting format was done about two months before the start of the event. The Local Organizing Committee, thus, was preparing a hybrid conference with an icebreaker, lecture room, coffee breaks, and meeting dinner for a significant time period for the in-person attendees—that is, with all the bells and whistles—as well as video and audio capabilities for the online folks. We would like to take this opportunity to thank the LOC for doing all this work and then being able to refocus the efforts to organize a purely virtual meeting. So, kudos to the **Local Organizing Committee** consisting of:

- Nataliya Zubko (Chair)
- Niko Kareinen
- Hannu Koivula
- Eliisa Nylén
- Markku Poutanen
- Renne Vantola

While a virtual setting largely removes the social interactions of an in-person meeting, it provides other opportunities. As there is no travel cost involved, groups are able to send more attendants. It is also possible to have recorded presentations that can be viewed asynchronously. On the other hand, the various time zones that the IVS community covers make for very awkward local times for some, resulting in partial attendance only.

The Program Committee had the task of organizing the scientific program taking the constraints of the virtual setting into consideration. In deliberation with the LOC, the result was a mix of oral sessions (via *Zoom*) and poster sessions in a virtual poster hall (via *Won-*

der). The outcome was an interesting and informative program for a wide cross-section of IVS members, including station operators, program managers, and analysts. We would like to thank the **Program Committee** consisting of

- Dirk Behrend, USA (Chair)
- James Anderson, Germany
- Johannes Böhm, Austria
- John Gipson, USA
- Anastasiia Girdiuk, Germany
- Megan Johnson, USA
- Lucia McCallum, Australia
- Chet Ruszczyk, USA
- Fengchun Shu, China
- Gino Tuccari, Italy
- Stuart Weston, New Zealand
- Alet de Witt, South Africa
- Nataliya Zubko, Finland

for their excellent work.

There were 177 registered participants from around the world that attended the meeting. In the five sessions of the meeting, the participants gave 98 presentations; 59 of these were talks, and 39 were posters or recorded presentations. The overall quality of the presentations was very high—a clear testament to the usefulness of the General Meeting as a knowledge exchange for all matters VLBI. In addition to the GM itself, there were several splinter meetings held before and after the GM. The 4th IVS Training School on VLBI for Geodesy and Astrometry took place from March 22–25, and an Analysis Workshop and a Correlator Workshop were held on April 1. Finally, the Directing Board had a meeting on April 5.

Given the circumstances, the meeting was very successful, showcasing the outstanding research that is done within the IVS community. The virtual format has its perks, but it is not a full replacement for an in-person event. The use of *Wonder* in the poster sessions enabled limited social interaction, alleviating somewhat the lack of not meeting in person. Still, we hope that the next GM can be held in person. As Arvo Kokkonen, Director General of National Land Survey of Finland, stated in his opening remarks, once the pandemic situation improves the IVS members are welcome to visit Helsinki and the Metsähovi Radio Observatory facilities when they are in the neighborhood.

The interested reader can find a feature article about GM2022 in the April 2022 issue of the IVS Newsletter. The Newsletter is available at

<https://ivscc.gsfc.nasa.gov/newsletter/issue62.pdf>

The next IVS General Meeting will be held in March 2024 in Tsukuba, Japan. As part of the GM, there will be festivities for the 25th Anniversary of the IVS. The host institution of GSI published their teaser video on the GGOS YouTube channel at <https://www.youtube.com/watch?v=mQkA8VHKWD4>.

This volume follows the session structure of GM2022 and contains the following:

- **The papers presented at the meeting.** There are five major sections of this volume, each corresponding to a meeting session. Poster/video and oral papers are mixed. The five sessions cover the following topics:

1. Technical Developments at the Stations
2. Observations, Operation, and Correlation
3. Data Structures, Scheduling, and Analysis Strategies
4. Interpretation of VLBI Results in Geophysics, Geodesy, and Astrometry
5. Extending the Use of VLBI to Frame Ties, Deep Space Exploration, and Other Areas

This volume includes 64 papers. All papers of this volume were edited by the editors for usage of the English language, form, and minor content-related issues.

- **An author index.**

The Proceedings volume is available on the IVS website from the URL

<https://ivscc.gsfc.nasa.gov/publications/gm2022>

The editors would like to thank the contributors to this volume.

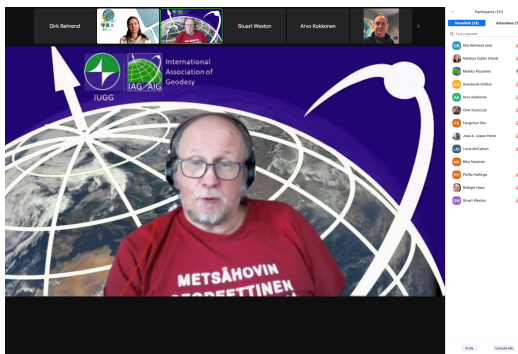
*Kyla Armstrong, Dirk Behrend, and Karen Baver*  
GM2022 Proceedings editors  
Greenbelt, MD ☉ November 2022



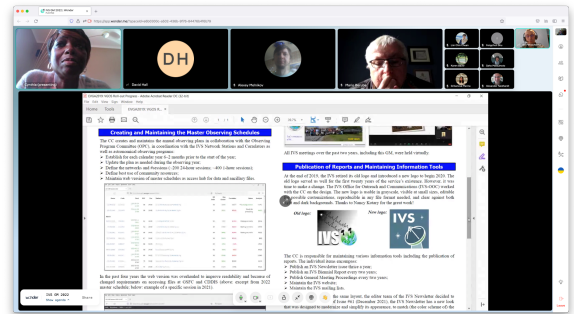
**Fig. 2** IVS Chair Rüdiger Haas welcoming the online participants to GM2022.



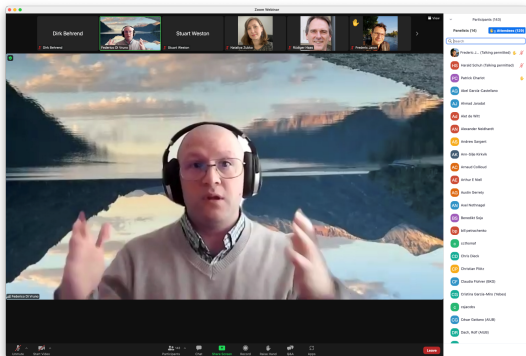
**Fig. 5** A virtual poster hall was provided by Wonder. This online platform allowed the participants to have direct interactions in a convenient way. There were three poster sessions organized during the GM so that participants were able to socialize as much as possible in this virtual setting.



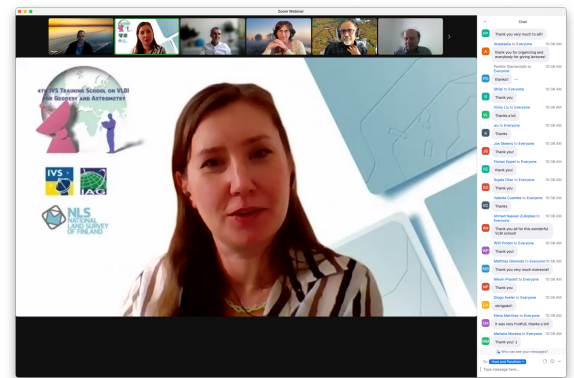
**Fig. 3** Markku Poutanen, IAG Secretary General, giving his welcome address.



**Fig. 6** During a poster session, the poster presenters could show off their work and interact face-to-face with interested participants.



**Fig. 4** Federico Di Vruno gave an invited talk on the potential impact of large satellite constellations on VGOS operations.



**Fig. 7** Nataliya Zubko, lead of the local organizing committee, together with her entire team perfectly arranged the GM as well as the various splinter meetings for a very successful event week.