

IAG Project – Novel Sensors and Quantum Technology for Geodesy (QuGe)

Minutes of Meeting

Dec 13, 2021, 16:00–18:30 (CET)

Online, via WebEx

Participants

Jürgen Müller (JM), Marcelo Santos (MS), Christian Lisdat (CL), Frederica Migliaccio (FM), Franck Pereira dos Santos (FPS), Gabriel Guimarães (GG), Jakob Flury (JF), Michael Murböck (MM), Michel Van Camp (MC), Erricos C. Pavlis (EC), Gerard Petit (GP), Ulrich Schreiber (US), Bob Spero (BS)

1 Welcome

JM opened the meeting, thanking the participation of everyone.

2 Approval of the agenda

The agenda previously distributed by e-mail was approved

3 Approval of last meeting minutes

The minutes of the last meeting (June 30, 2021), which was distributed previously, was approved.

4 Reports

4.1 Office (JM)

JM made a presentation overviewing the activities of QuGe Project since the last meeting. He provided a brief overview of QuGe participation in the IAG 2020 Scientific Assembly. JM also commented on an overview paper targeting an EOS upcoming special issue, prepared by MC, FPS, MM, GP and JM. The topic of this special issue is new technologies. JM outlined the ideas for further activities, see TOP 5 below.

4.2 WG 1 Quantum gravimetry in space and on ground (FPS)

WG1 has organized the big and successful workshop in May and put much effort in preparing the aforementioned EOS paper. Now, it is in the process of planning their activities for 2022.

4.3 WG 2 Laser interferometry for gravity field missions (MM)

The WG is looking for a new chair and vice-chair. There are new publications, not yet updated on the site. An Online Workshop is being planned for 2022, just before EGU. Several contributions to conferences were reported, including the IAG, GSTM, and AGU. MM commented on Flechtner et al. discussing Next Generation Gravity Mission simulation studies GRACE-I and MAGIC, and Murböck et al. on NEROGRAV (DFG

research unit) updates. BS referred to a paper of interest by Shi-Chen et al., “Novel along-track processing of GRACE follow-on laser ranging measurements found abrupt water storage increase and land subsidence during the 2021 March Australian Flooding.”

4.4 WG 3 Relativistic geodesy with clocks (GP)

GP presented a summary of activities related to relativistic geodesy in 2021. Discussions on the redefinition of the second involved about 40 experts in 3 working groups under a Task Force called “Redefinition.” About 200 questionnaires were responded by stakeholders, entities, and individuals. Results were presented to the CCTF in March 2021. Relativistic geodesy is the main application requiring new accurate optical clocks. The work in the Task Force “Redefinition” will generate a white paper of about 100 pages, covering status and future developments of optical frequency standards, developments of capacity to compare clocks and disseminate the second at 10^{-18} accuracy, developments of contribution of optical standards to time scales, user needs and impacts of a redefinition and options for a redefinition. This white paper will be available in the spring of 2022. Practical work of European projects was delayed. Ongoing work on optical fiber networks (TIFOON) and optical clocks comparisons (ROCIT). There were no specific WG activities in 2021. GP will step down as chair by this year’s end but remain as member. A new chair and co-chair will be proposed soon. There is a plan for a Workshop during the 2022 spring (probably in May), to deal with progresses in clocks and clock comparisons, geopotential and height determination and other geophysical applications, and relativistic framework.

5 Planned activities (JM)

Planned activities include sessions proposed to the following conferences. EGU 2022: G4.1 - Moderns concepts for Gravimetric Earth Observation. COSPAR 2022: H0.5 – Advanced Methods for Geodesy, Metrology, navigation and Fundamental Physics. IUGG 2023: Joint Symposium (with IAVCEI, IAPSO) S12 on New Technologies for Geosciences. IUGG 2023 is open to ideas for joint symposia with other IAG Commissions and with other Associations. Efforts to continue organizing conference sessions and workshops.

Intra-relations within IAG include the GGOS Science Panel.

Stressed the importance to participate in symposia being organized by other IAG Commissions in 2022, such as the [X Hotine-Marussi Symposium](#) (June), the [2nd International Symposium of Commission 4: Positioning and Applications](#) (September), the [Gravity, Geoid, and Height Systems 2022](#) (September), and the [Reference Frames for Applications in Geosciences](#) (REFAG) (October).

JM also emphasized the importance of contributions to research activities and missions (NASA, ESA, e.g., GRACE-I, CARIOQA), and the importance to engage in efforts and studies to demonstrate the benefits of the new technologies in geodesy and beyond.

Nomination of 2 QuGe members for Science Panel (SP) of GGOS. After deliberations, Jürgen Müller and Michael Van Camp were chosen.

JM ended hosting a discussion on the use of social media for the benefit of QuGe. Several ideas were shared and at the end it was decided that MS will gather information with other IAG entities on their use of social media and share a plan with QuGe executive members.

6 AOB

Next meeting to happen in six months, in a date to be determined.

Minutes prepared by MS.