

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

Minutes of Meeting

June 30, 2021, 13:00–14:30 (CET)

Online, via WebEx

Participants

Jürgen Müller (JM), Marcelo Santos (MS) Adrian Jäggi (AJ), Allison Kealy (AK), Christian Lisdat (CL), Frederica Migliaccio (FM), Franck Pereira dos Santos (FPS), Gabriel Guimarães (GG), Jakob Flury (JF), Laura Sanchez (LS), Michael Murböck (MM), Michel Van Camp (MC).

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](#) (Dec 3rd, 2020), which was distributed by e-mail along with this meeting's agenda was approved.

4 Reports

4.1 Office (JM)

JM made a presentation overviewing the activities of QuGe Project since the last meeting. Since then, the various components of the project have been involved with co-sponsoring of sessions in scientific meetings, namely COSPAR 2021, EGU 2021 and IAG Scientific Assembly 2021, the website is on <https://quge.iag-aig.org/> and there was the first workshop of working groups.

Concerning the IAG Scientific Assembly 2021, QuGe organized Session 6.4 entitled “Novel Sensors and Quantum Technology for Geodesy”, having JM as the convener and JF, MC, Bob Spero and Wenbin Shen as co-conveners. Four other sessions happened joint with QuGe, Session 1.6, 2a.2, “Height Reference Systems”, Session 2a.1, “Terrestrial, Marine and Airborne Gravimetry”, Session 2b.6, “Future Gravity Mission Concepts”, and Session 5.2, “Gravity Observations and Networks in the framework of GGOS”, being co-conveners from QuGe side JF, MC, Frank Flechtner and JM, respectively.

The IAG Scientific Assembly 2021 was a virtual meeting and with some constraints. For example, regarding Session 6.4, organized by QuGe, there was a limitation to 9 orals, with 5 minutes for each presenter and a time at the end for questions. The posters had an even greater time limitation and not enough time to discuss the posters per se. It was

suggested that a different tool should have been used, similar with what was used by the AGU. Posters are available on [IAG 2021—Scientific Assembly of the International Association of Geodesy \(sciconf.cn\)](https://www.sciconf.cn/). The orals were better, mostly because there was time for discussions. Another limitation was the conflict among poster sessions running in parallel to each other. One problem is that just half part of the day was used. Usually, during a normal conference, both halves of the day are used (morning and afternoon) and more time exist to navigate inside the poster hall.

The importance of connections to other IAG entities, such as IAG SC 2.1/2.3, JWG 2.1.1 on IGRF, GGOS WG 0.1.3 on IHRF, ICCT, and ICCG, was stressed.

JM also reported on the contribution to the IAG Travaux report, a total of 10 pages, including references. JM thanked all the contributions received.

And, also, the contribution of QuGe members to various research projects using quantum technology in geodesy and beyond was acknowledged.

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

FPS reported that two meetings took place, one on [26 January 2021](#) and the other on 12 March 2021. These meetings helped to define the first activities, including a Virtual Workshop “Quantum gravimetry in space and on ground”, which took place on 26-27 May 2021. A total of 10 oral presentations took place. Up to 290 people registered in the workshop, with a global coverage. The success of the workshop can be assessed by the participation, with an attendance varying from 130 to 160 simultaneous participants. Access to the workshop presentations is open via [WG 1 website](#).

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

MM reported the process of updating a list of selected publications, and early plans to organize a workshop, including interdisciplinary discussions and small group work, and plans for the use of their website. The remainder of the presentation was focused on future mission concepts and potential for improvements, including the use of new or improved measurement technologies, satellite formations, and processing and combination including complementary information from geophysical models.

2.4 WG 3 Relativistic geodesy with clocks (JF)

JF reported the realization of a [WG meeting](#) on 21 December 2020, discussing several topics including the development of optical clocks and optical time/frequency links, chronometric leveling, and height determination, as well as information on the meeting of the Consultative Committee on Time and Frequency. There is a plan in motion to organize a Workshop in 2021 following progresses in clocks (especially transportable ones) and clock comparisons, determination of and heights and other geophysical applications, and relativistic framework. There are also plans for a position paper discussing a continental network for chronometric leveling in Europe.

3 Planned activities (JM)

Plan of activities includes a strong presence in the conferences COSPAR 2022 (Athens) and EGU 2022 (Vienna), organizing or co-organizing sessions, and contributing to many other meetings, such as the AGU Fall Meeting, and others organized by the IAG. There are plans to intensify intra-relations among QuGe WGs and inter-relations with other IAG entities and external organizations and to demonstrate the benefit of the new technologies in geodesy, such as contributing to QuGe-related research activities and missions (NASA, ESA, EU and national programs pushing the use of quantum technology, etc.).

Finally, a reminder of the importance of the IUGG General Assembly in 2023, where the whole set of QuGe activities can be presented. QuGe will then also be evaluated by IAG. Thus, our major activities have to be consolidated within the current four years cycle.

4 New Business

LS suggested that QuGe should establish a contact with the UN-GGIM Subcommittee on Geodesy.

A discussion on ways to outreach others ended with MC volunteering to contact EOS. A QuGe paper is in preparation. Other journals that can be used for advertising the QuGe Project were mentioned, such as Physics Today and GIM.

5 AOB

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

Minutes prepared by MS.