IAG QuGe WG Q3 Online Meeting

Current and upcoming Q3 activities

Oct 25, 2022

1 – Welcome

Welcome by J. Flury.
18 participants

2 – Minutes

P. Delva takes the minutes.

3 - Current and upcoming activities (J Flury)

Current IAG period

- WG Q3: one of 3 Working Groups in IAG Project Novel Sensors and Quantum Technology for Geodesy (QuGe)

https://quge.iag-aig.org/quge-working-groups/232

- Kick off meeting Dec 21, 2020 (chair G Petit, co-chair J Flury)
- WG Q3 Workshop was planned but delayed
- G Petit retired from BIPM
- change in leadership approved: J Flury (chair), P Delva (co-chair)
- QuGe board meetings
- contribution to GGOS website

https://ggos.org/intro/geodetic-observation-measure-heights-with-clocks/
https://ggos.org/item/optical-atomic-clocks/#learn-this

- CCTF activities
- national activities
- conference sessions
- publications
- upcoming: IUGG 2023 – July 11-20

https://www.iugg2023berlin.org
We can meet there. Abstract submission is open.

In person / hybrid workshop planning

- successful IAG JWG 2.1 workshops 2017, 2018
- in person / hybrid workshops meanwhile work well, despite of ongoing pandemic, in particular for smaller groups
- time difference difficult for longer online meetings
- suggestion: 2 day in person / hybrid WG Q3 workshop in 3-4 months
- location: Paris / Hannover / tbc

C. Lisdat : 25-30 participants ? J. Flury: yes, maybe some invitations but not so many.
CL: PTB could be an option, but might be difficult to book a room. Not before summer.
S. Kopeikin: special permission to enter PTB? CL: no it's ok.
CL: Campaign starting from March 1st with the transportable clock. So not possible for PTB to organize it around this period of time.
J. Muller: could be in Hannover, early Feb, 1d ½, possible to organize a visit to PTB
W. Shen: better march than february

Membership list:

Claude Boucher (France)
Davide Calonico (Italy)
Pascale Defraigne (Belgium)
Pacôme Delva (France)
Ropesh Goyal (India)
Gesine Grosche (Germany)
Hua Guan (China)
Chris Hughes (UK)
Sergei Kopeikin (USA)
Jürgen Kusche (Germany)
Claus Lämmerzahl (Germany)
Marie-Françoise Lequentrec (France)
Guillaume Lion (France)
Andrew Ludlow (USA)
Helen Margolis (UK)
Elena Mazurova (Russia)
Nathan Newbury (USA)
Bijunath Patla (USA)
Nikos Pavlis (USA)
Gerard Petit (France)
Paul-Eric Pottie (France)
Ulrich Schreiber (Germany)
WenBin Shen (China)
Simon Stellmer (Germany)
Yoshiyuki Tanaka (Japan)
Pieter Visser (Netherlands)

4 - Updates on activities related to the group from members

J. Müller

Slides from GGHS meeting: simulation study on chronometric levelling
It is difficult to achieve cm accuracy in the near-future, but clocks can complement and help to reach this goal. 4 sub-areas over Europe are considered, with modelling of realistic error cases (tilts, offset, …). 5 clock points are added in each system, with equivalent 1cm error
The estimation of height is below ~ 2cm error
For time-variable gravity signals detection: cloks are complementary to GRACE (point-wise and high freq sampling); e.g. in Greenland: clocks sense a combination of mass and surface deformation

Simulation: optical clocks onboard LEOs.
https://zenodo.org/record/7239730
The simulation includes flattening coefficients. It is showed that clock need to reach 1e-19 in 60 mn stability in order to reach SLR accuracy.

P. Delva

Report on the TOFU, ROYMAGE and REFIMEVE projects from SYRTE (and collaborators).

C. Lisdat

Upcoming optical clock campaign: 1st of March. ICON network involved, with RIKEN (Prof Katori) invited (4-6 weeks). RIKEN and PTB transportable optical clocks will go in NPL. And then bring both transportable clock in PTB for a local comparison. One of the goel is to track systematic shifts. Hope to reach 1e-18 accuracy, below 1e-17 for sure.

B Patla

In collaboration with N. Ashby
Uncertainty due to geopotential model on the reference point in NIST ~ 7e-18
C. Lisdat: why the uncertainty is so big? J. Muller: it is like this in montainous areas or island, where there is not so much gravity points.