



Global Geodetic Observing System

of the International Association of Geodesy

Session Summary: GGOS Focus Area Unified Height System GGOS Days 2017, Vienna Oct. 31 to Nov. 2, 2017

The session dedicated to the GGOS-FA UHS concentrated on reporting the present achievements and immediate challenges related to the establishment of the International Height Reference System (IHR) defined by the IAG 2015 Resolution No. 1, Prague 2015. The corresponding activities are being conducted by the joint working group (JWG) Strategy for the Realization of the IHR. This JWG is supported by the International Gravity Field Service (IGFS), the IAG Commissions 1 and 2 (Reference Frames and Gravity field), the Inter-commission Committee on Theory (ICCT), the regional sub-commissions for reference frames and geoid modelling, and both GGOS Bureaus (Networks and Observations and Products and Standards). The main topics discussed during the meeting in Vienna can be summarized as follows:

1) Report of activities

- Summary of the JWG terms of reference to provide all meeting attendees with a homogeneous context.
- Definition of the IHR and immediate objectives to advance in its realisation.
- Station selection for a first approximation to the International Height Reference Frame (IHRF) network.
- An inventory of the numerical experiments that are being presently performed for the computation of the potential values.

Main conclusions:

- The geodetic stations selected up to now for the IHRF reference network should be the basis for the computation of the potential values. Further changes (additional stations) may be considered without problem.
- A “centralised” computation of the potential values (like the geometric coordinates in the ITRF) is (still) complicated due to the restricted accessibility to terrestrial gravity data. In this way, it is necessary to count on national/regional gravity field modellers.
- The different numerical experiments performed up to now for the computation of potential values provide results with large discrepancies.
- To reduce the discrepancies between the different computations, it is necessary to outline a basic set of standards and conventions.

2) Present Actions

- Identification and selection of primary standards for the computation of potential values with the participation of:
 - GGOS JWG: Strategy for the Realization of the IHR (chair: L. Sánchez)
 - GGOS JWG: Establishment of the GGRF (chair: U. Martí)
 - IAG SC 2.2: Methodology for geoid and physical height systems (chair: J. Ågren)
 - ICCT JSG 0.15: Regional geoid/quasi-geoid modelling - Theoretical framework for the sub-centimetre accuracy (chair: J. Huang)
 - IAG JWG 2.2.2: The 1 cm geoid experiment (chair: Y.M. Wang)
 - IGFS: International Gravity Field Service (chair: R. Barzaghi, director Central Bureau: G. Vergos)
 - J. Mäkinen – tide system issues for the IHR/IHRF
 - Recommendations of the GGOS-BPS Inventory (Angermann et al. 2016)



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- Experiment for “calibrating” computation methods:
 - NGS/NOAA (Y.M. Wang) will provide terrestrial gravity data, airborne gravity, a digital terrain model, deflexions of the vertical and GPS/levelling data for an area of about 700 km² in Colorado, USA.
 - With these data, the different processing groups should compute potential values for some virtual IHRF stations in that region.
 - The results obtained individually should be compared to identify sources of discrepancy between the different computation methods.
 - At present (Oct. 2017), the airborne gravity is being measured. It is expected to get access to the complete data set by spring 2018.
 - Initial contributors: J. Ågren, J. Huang, L. Sánchez, V. Lieb, Y.M. Wang, I. Oshchepkov, V. Grigoriadis, S. Claessens, G. Vergos (more colleagues are welcome!).
 - First results to be presented at the Symposium GGHS2018, Sep 17 - 21, 2018, Copenhagen, Denmark.

The contribution of many colleagues to the IHRS issues is specially acknowledged: M. Véronneau, J. Huang, D. Roman, M. Amos, I. Oshchepkov, S.R.C. Freitas, R.T. Luz, M. Pearlman, C. Estrella, C. Brunini, U. Marti, D. Piñon, D. Avalos, S.M.A. Costa, J. Mäkinen, Y.M. Wang, H. Denker, V. Lieb, D. Blitzkow, J. Ågren, A.C.O.C. Matos, R. Pail, J. Ihde, R. Barzaghi, M. Sideris, J. Chire, A. Álvarez, C. Iturriaga, I. Liepiņš, N. Suárez, J. Krynski, R. Forsberg, G. Vergos, J.L. Carrión-Sánchez...

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