

# GGOS Focus Area Unified Height System: Ongoing activities

Laura Sánchez

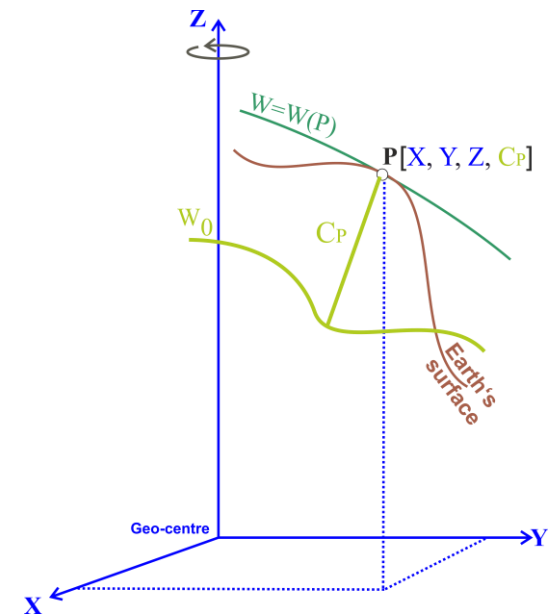
Deutsches Geodätisches Forschungsinstitut (DGFI-TUM)  
Technische Universität München

GGOS Coordinating Board Meeting  
Vienna, Apr. 7, 2018

# Objective

Implementation of the **International Height Reference System (IHR)** and its realisation **IHRF (International Height Reference Frame)** introduced by the IAG Resolution No. 1, Prague, July 2015. **Primary actions** are:

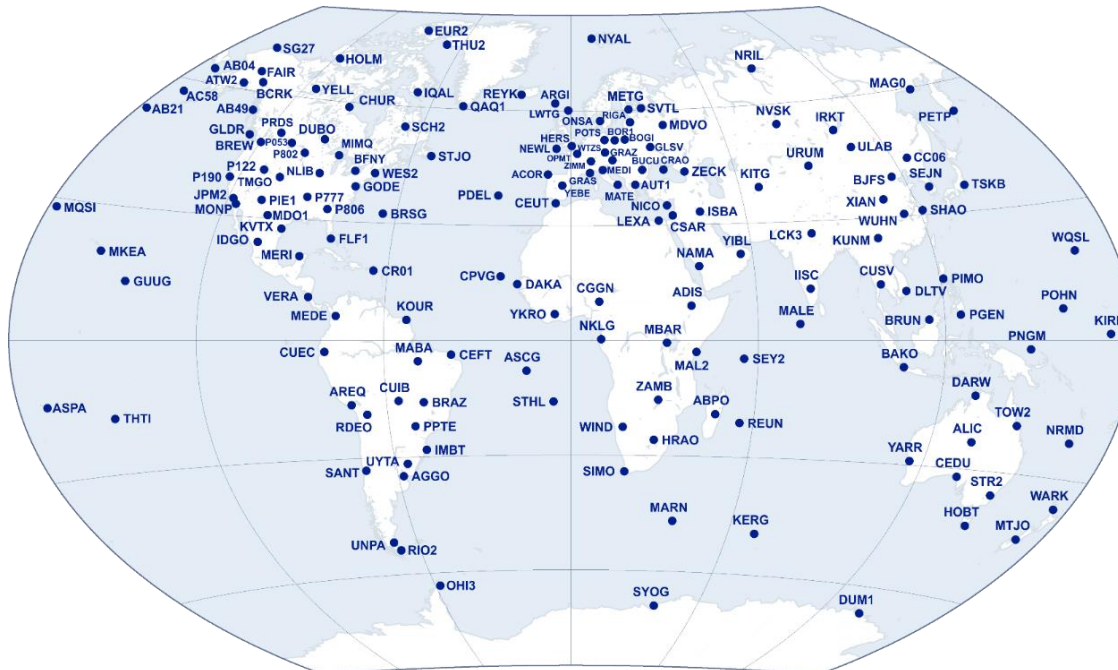
1. **Station selection** for the IHRF reference network
2. Strategy for the determination of **high-precise primary coordinates**  $\mathbf{X}_P$ ,  $\dot{\mathbf{X}}_P$ ,  $W_P$ ,  $\dot{W}_P$  at the IHRF reference stations
3. Identification and preparation of **standards and conventions** to ensure consistency between the definition (IHR) and the realisation (IHRF); i.e., an equivalent documentation to the IERS conventions is needed for the IHR/IHRF



IHR/IHRF coordinates according to the IAG Resolution No. 1, 2015

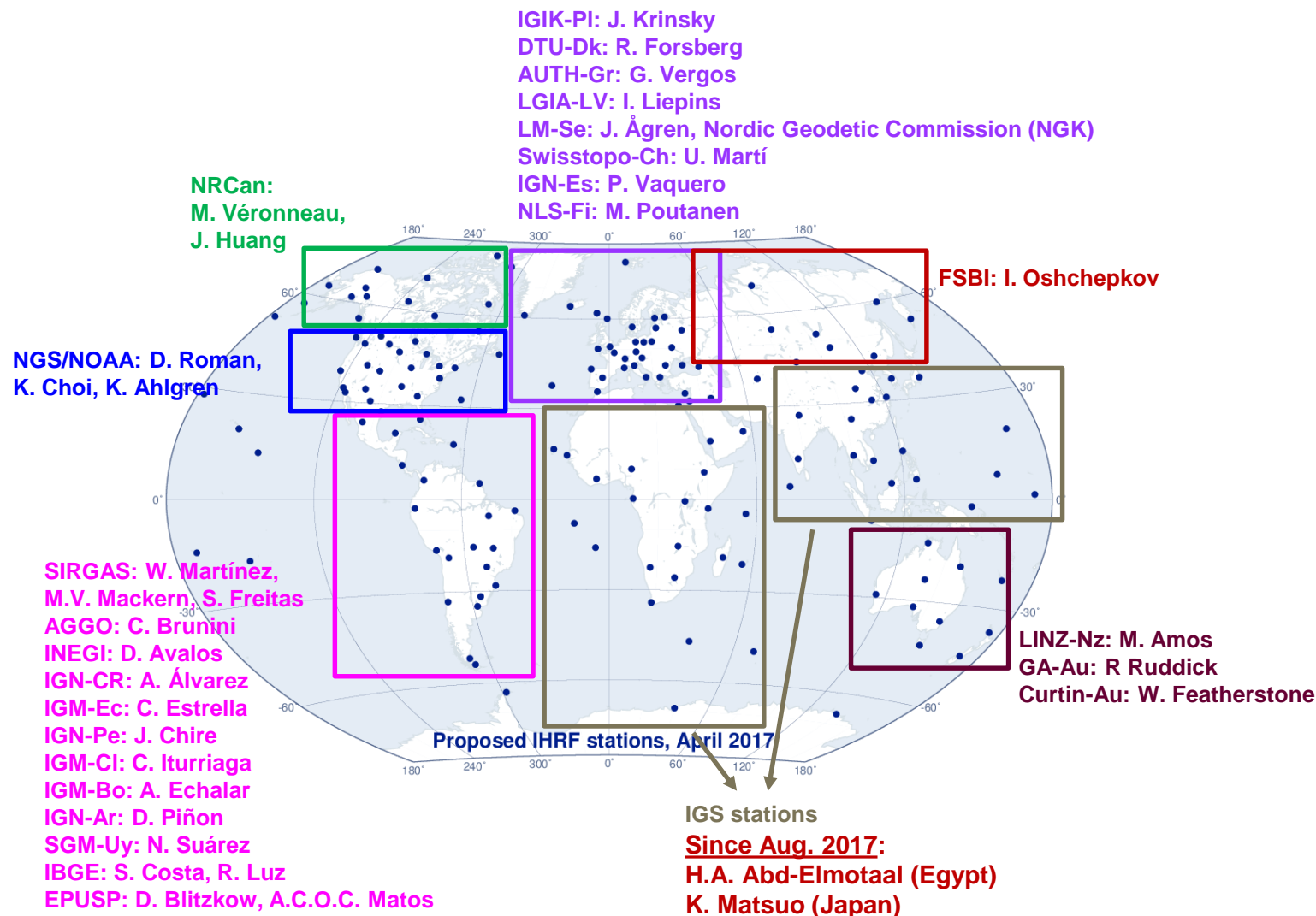
# Activities related to the IHRF reference network

- Sep. 2016 (GGHS2016, Thessaloniki): Criteria for selection of IHRF stations
- Oct. 2016 (GGOS Days 2016, Cambridge, MA): Preliminary IHRF station selection
- Nov. 2016 – Mar. 2017: Interaction with regional and national experts about the preliminary station selection and proposal for further geodetic sites
- Apr. 2017 (EGU2017, Vienna): First proposal for the IHRF reference network.

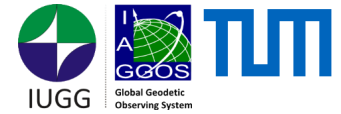


IHRF reference network as of April 2017 (163 stations)

# Interaction with regional/national experts for the IHRF station selection

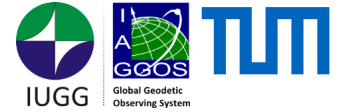


# Activities related to the IHRF coordinates (1/2)



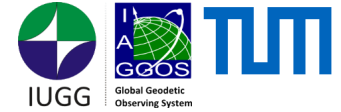
- May to Aug. 2017: Numerical tests for the computation of potential values at the IHRF stations: **Discrepancies up to the dm-level!**
- What should we do? - Discussions at the IAG-IASPEI Assembly (Aug. 2017, Kobe):
  1. To compute IHRF coordinates **using exactly the same input data** and the own methodologies/software of colleagues involved in the gravity field modelling
  2. Based on the comparison of the results, to **identify a set of standards** that allow to get as similar and compatible results as possible.

# Activities related to the IHRF coordinates (2/2)



- Dec. 2017 - Jan. 2018: A set of basic (minimum) standards/requirements for the computation of potential values within the IHRF experiment was prepared (L. Sánchez, J. Ågren, J. Huang, Y.M. Wang, R. Forsberg)
- Feb. 2018: Y.M. Wang (NGS/NOAA) provided terrestrial gravity data, airborne gravity, and a digital terrain model for an area of about 700 km<sup>2</sup> in Colorado, USA
- Since Feb. 2018: Different computation groups are working with these data
- Sep. 2018 (GGHS2018 Symposium, Copenhagen): Expected evaluation of the first results of this experiment.

# Networking within the IAG



This experiment is supported by:

- GGOS JWG: [Strategy for the Realisation of the IHRIS](#) (chair: L. Sánchez)
- IAG JWG 2.2.2: [The 1 cm geoid experiment](#) (chair: Y.M. Wang)
- 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)
- IGFS: [International Gravity Field Service](#) (chair: R. Barzaghi, director CB: G. Vergos)
- GGOS JWG: [Establishment of the GGRF](#) (chair: U. Martí)
- [39 colleagues from 23 countries are contributing to this experiment](#): A. Ellmann (EE), A.C. de Matos (BR), B. Erol (TR), C. Hwang (TW), D. Avalos-Naranjo (MX), D. Blitzkow (BR), D. Pangastuti (ID), D. Roman (US), D. Smith (US), D. van Westrum (US), G. Vergos (GR), H. Abd-Elmotaal (EG), H. Denker (DE), H. Sarid (IL), I. Oshchepkov (RU), J. Ågren (SE), J. Huang (CA), J. Li (CN), K. Ahlgren (US), K. Matsuo (JP), L. Sánchez (DE), L. Sjöberg (SE), M. Filmer (AU), M. Sideris (CA), M. Varga (HR), M. Véronneau (CA), M. Willberg (DE), R. Barzaghi (IT), R. Pail (DE), R. Forsberg (DK), S. Claessens (AU), S. Dalyot (IL), S. de Freitas (BR), S. Hilla (US), T. Jiang (CN), V. N. Grigoriadis (GR), W. Featherstone (AU), X. Li (US), Z. Qilong (CN)

More information about publications, presentations, reports, business meetings, etc. at <http://ihrs.dgfi.tum.de>, [www.ggos.org](http://www.ggos.org)