

IUGG – General Assembly, Prague (Czech Republic), June 22-July 2, 2015

Report on Geodetic Activities (IAG) by R. Barzaghi, M. Crespi (on behalf of the IAG National Delegate R. De Franco)

The following report highlights the IAG activities in Prague and in the following months, until the IAG Executive Committee (E.C.) held in San Francisco on December 12, 2015; they are divided into business meetings and scientific activities.

Official reports on E.C. (on June 26 and July 02) and Council meetings (on June 24 and 30) will be made public by the Secretary General H. Drewes, on the IAG Office website (<http://iag.dgfi.tum.de/index.php?id=304>); the present report will succinctly examine the main items.

The Geodesist Handbook preparation is ongoing, and the deadline for the material submission is January 31, 2016.

Highlights

- Overall participation to the IUGG-GA: the estimate of IUGG total participants is 4200 participants (with > 3200 oral presentations and 5422 abstracts in general) as for IAG the same estimate gives:
approx. 450 participants, with 552 abstracts in general (oral and poster presentation) (approx. 10% of the grandtotal)
i.e. IAG/IUGG ~ 11% which is a rather stable number, important because it determines the transfer of IUGG budget to IAG.
- IUGG-IAG resolutions (<http://iag.dgfi.tum.de/index.php?id=330>) - two IAG resolutions, respectively concerning the International Height Reference System and the Global Absolute Gravity Reference System; eight IUGG resolutions, five of them particularly concerning IAG (1 to 4 and 6)
- Levallois Medal: Rainer Rummel (Germany) - The Medal was awarded in recognition of his distinguished service to the Association and to the science of geodesy in general. He served as Commission Secretary from 1991 to 1995 and as Commission President from 1995 to 1999, and he is the scientific key person in the satellite mission "Gravity Field and Steady-State Ocean Circulation Explorer" (GOCE) launched in 2009.
- Bomford Prizes: Yoshiyuki Tanaka (Japan) - The Prize was awarded for his outstanding contributions, which opened new interdisciplinary research areas between modern geodesy and seismology.
- Young Authors Award 2013: Krzysztof Sośnica (Switzerland) - The Award is granted for his article "Impact of loading displacements on SLR-derived parameters and on the consistency between GNSS and SLR results", elected as the best publication of a young author, not older than 35 years, in IAG's Journal of Geodesy 2013.
- Young Authors Award 2014: Alvaro Santamaría-Gómez (France) - The Award is granted for his article "Long-term vertical land motion from double-differenced tide gauge and satellite altimetry data", elected as the best publication of a young author, not older than 35 years, in IAG's Journal of Geodesy 2014.
- ICCT has been established as a permanent structure of IAG
- List of elected officers for the E.C. 2015-2019
The results are:

Harald Schuh	(Germany)	President
Hermann Drewes		Secretary General
Zuheir Altamimi	(France)	Vice President

Geoffrey Blewitt	(USA)	President of	Commission 1
Roland Pail	(Germany)	President of	Commission 2
Manabu Hashimoto	(Japan)	President of	Commission 3
Marcelo Santos	(Canada)	President of	Commission 4

Representatives of the Services: Riccardo Barzaghi (Italy), Ruth Neilan (USA), Axel Nothnagel (Germany)

Communication and Outreach Branch (COB): József Ádam (Hungary)

Members at large: Maria Cristina Pacino (Argentina), Ludwig Combrinck (South Africa)

The President of ICCT has been appointed by E.C.: Pavel Novak (Czech Republic).

The GGOS project chair has been appointed by E.C.: Hansjorg Kutterer (Germany).

Status of IAG (Travaux) for the past four years, in strong synthesis:

- **Commission 1 (Reference Frames)**

(http://iag.dgfi.tum.de/fileadmin/IAG-docs/Travaux2015/01_Travaux_Template_Comm_1_tvd.pdf)

A dedicated web site was established immediately after the IUGG General Assembly in Melbourne; the web site (<http://iag.uni.lu>) contains all the information related to the activities and objectives of the Commission, its sub-Commissions, projects and Working Groups. The terms of reference for the new Commission 1 were compiled and submitted; the Commission 1 Symposium, REFAG, 13-17 October, 2014 was organized.

- **Commission 2 (Gravity Field)**

(http://iag.dgfi.tum.de/fileadmin/IAG-docs/Travaux2015/02_Travaux_Comm_2_2015.pdf)

Official commission symposium Gravity, Geoid and Height Systems, held in 2012 in Venice; session Gravity Field Determination and Applications at the IAG scientific assembly 2013 in Potsdam; assistance to the IGFS in the organisation of its 3rd general assembly in Shanghai. Projects: International and regional campaigns of absolute gravimeters (assured until 2017); new releases of global gravity field models based on GRACE and GOCE mission data; planning and design of future gravity field missions - especially of a GRACE follow-on mission; new marine gravity field (~2 mGal accuracies) and ocean mean dynamic topography models due to new data sources from GOCE and non-repeated altimetry missions.

- **Commission 3 (Earth Rotation and Geodynamics)**

(http://iag.dgfi.tum.de/fileadmin/IAG-docs/Travaux2015/03_Travaux_Comm_3_2011-2015_v2.pdf)

17th International Symposium on Earth Tides, held in Warsaw, Poland during 15-19 April 2013; International Symposium on Geodesy for Earthquake and Natural Hazards; GIA Modelling 2015 Conference and Elastic Modelling workshop; 16th General Assembly of WEGENER.

- **Commission 4 (Positioning and Applications)**

(http://iag.dgfi.tum.de/fileadmin/IAG-docs/Travaux2015/04_Com_4_Final_Report_2015.pdf)

A major goal of Commission 4 over the 2011-2015 period was to promote research collaborations across various science and engineering disciplines, and to organize joint professional workshops and seminars, often in strict cooperation with Sister Societies (FIG, ISPRS).

- **Inter Commission Committee on Theory (ICCT)**

(http://iag.dgfi.tum.de/fileadmin/IAG-docs/Travaux2015/05_ICCT_Final_Report_2011-2015.pdf)

Organization of the VIII Hotine-Marussi Symposium in Rome, June 17
Engineering of the Sapienza University of Rome. From a total attendance of about 100 participants, about 70 oral presentations and 15 posters were contributed. True to the InterCommission nature of ICCT, the nine sessions dealt with the full width of topics in theoretical geodesy. During the special session at the Accademia Nazionale dei Lincei Fernando Sansò was honoured for his long-term involvement in the organization of the series of Hotine-Marussi Symposia, after taking over the baton from Antonio Marussi in 1985. It was decided to

□21, 2013,

rename the VIII Hotine-Marussi Symposium by adding “in honour of Fernando Sansò” to its title.

- **Journal of Geodesy and IAG Symposia Series:** In this respect the main issues are the shortening of the time of reviewing (30 days for the first review, cut of Springer times from 200 days to 30 days) and the improvement of the impact factor (in the last period it increased from 1.6 to 2.4). The new Editorial Board will have 2 members more and the new Editor-in-Chief is Jürgen Kusche from the University of Bonn. The IAG Symposia Proceedings are managed by the new Editor-in-Chief Jeff Freymueller, from the University of Alaska in Fairbanks, who will have the delicate task of increasing the publication quality, also considering that the Proceedings collection is now in the WoS database.
- **GGOS:** In order to make optimal use of the GGOS structure introduced in 2011, streamlining efforts took place from late 2013 to early 2015. Starting with the 2013 Strategic Plan, GGOS has been making strides toward a goal, objective, and outcome-oriented strategic planning and implementation process. In order to reflect the structural streamlining and strategic direction, the GGOS Terms of Reference have been updated in 2015.
- Approval of next venue of the IAG Scientific Assembly: Kobe, Japan (unique candidate)

Report Scientific Activity

The International IAG activity has been organized in 6 Symposia according to the following scheme:

CODE	SYMPOSIA	LEAD CONVENOR
G01	Reference Frames	Tonie van Dam
G02	Static Gravity Field Models and Observations	Urs Marti
G03	Variations of the Gravity Field	Srinivas Bettadpur
G04	Earth Rotation and Geodynamics	Richard Gross
G05	GNSS ⁺⁺ : Emerging Technologies and Applications	Dorota-Grejner Brzezinska
G06	Unifying Height Systems	Laura Sánchez
G07	Geohazards Monitoring	Ioannis Doukas
G08	SeaLevel Observation and Modelling	Tilo Schöne

In addition IAG has co-organized with other IUGG Association the following 13 Joint Symposia:

CODE	SYMPOSIA
JA01	Joint Inversion and Mutually Constrained Inversion of Geophysical Observations
JA04	Results from SWARM, Ground Based Data and Earlier Satellite Missions
JA06	Data on the Edge: Preservation and Utilization of Historical Data in the Geosciences
JG01	Dynamics of the Cryosphere from Geometric and Gravimetric Observations
JG02	Modelling the Atmosphere and Ionosphere by Space Measurements
JH01	Extreme Hydrological Events
JH03	Variations of the Hydrosphere from Satellite Gravity Missions
JM01	Earth Systems Dynamics, Predictability and Probabilistic Forecasting
JM04	Data Assimilation in Geophysical Sciences
JP01	Sea Level Change and Variability: Past, Present and Future
JP04	Satellite Oceanography and Climatology
JS03	Geophysical Imaging of Natural Resources
JS04	Deformation of the Lithosphere: Integrating Seismology and Geodesy through Modelling

A short summary of the highlights of the G0x Symposia follows:

- G01:** 7 oral sessions, 1 poster session, 39 oral presentations, 23 posters.
Hot items: Celestial and Terrestrial reference frames, new Terrestrial Reference Frame ITRF2014, regional terrestrial reference frames, impact of troposphere and ionosphere on reference frames realization, displacements and deformations analysis, space techniques combination
- G02:** 12 oral sessions, 1 poster session, 66 oral presentations, 65 posters.

Hot items: GBVP, satellite altimetry (Jason-1, Cryosat-2), data fusion (gravity from airborne, GOCE, terrestrial, surface density), methodology and status of global models from GRACE, CHAMP and GOCE, ultra-high degree spherical harmonic series, new regional models, advances in airborne gravimetry

G03: 8 oral sessions, 1 poster session, 46 oral presentations, 32 posters.

Hot items: gravity field variation from GRACE, inter-techniques data comparison, gravity and hydrological variations, gravity and crustal variations, plans for future gravity missions

G04: 7 oral sessions, 1 poster session, 36 oral presentations, 32 posters.

Hot items: Earth rotation parameters determination, earthquakes impact on Earth rotation and center of mass, post glacial rebound and GIA models, sub-surface mass change from gravimetry, post crustal deformation after great earthquakes, strain fields from continuous GPS measurements

G05: 7 oral sessions, 1 poster session, 38 oral presentations, 43 posters.

Hot items: sensors integration, GNSS constellation integration, ZTD estimation and tropospheric tomography, GNSS reflectometry, new GNSS noise models, low-cost sensors

G06: 3 oral sessions, 1 poster session, 14 oral presentations, 9 posters.

Hot items: continental unification of vertical datums, regional vertical datum, W0 computation

G07: 3 oral sessions, 1 poster session, 19 oral presentations, 20 posters.

Hot items: GNSS for local geodynamics and seismology, DInSAR applications, landslides and local displacements monitoring

G08: 4 oral sessions, 1 poster session, 21 oral presentations, 23 posters.

Hot items: satellite gravity and altimetry and integration with tide gauges for sea level monitoring, sea level time series determination and assessment

Italy has been actively involved in the activities of the IAG services related to the gravity field. Since April 2013 Riccardo Barzaghi has been appointed as IGFS Chair. During the IGFS Service meeting in Prague (June 27, 2015) he was re-elected for the 2016-2019 period. In this meeting, reports have been given on the activities of all the Services acting under the IGFS umbrella. Particularly, it was mentioned that in the 2011-2015 period the IGFS was involved in organizing the GGHS2012 scientific meeting in Venice (October 9-12, 2012) and the 3rd IGFS General Assembly in Shanghai (June 30-July 6, 2014). Reports have been given on other relevant Italian activities related to the gravity field, namely those carried out by the Central Bureau of IGFS, run until Prague by OGS, and by the International Service for the Geoid (IGS), an official IAG service, managed at Politecnico di Milano that organized a Geoid School in Loja, Ecuador (October 7-11, 2013).

Italian Delegation to IAG: this has been restricted to 10 persons from Milan (4), Rome (3), Trento (1), Trieste (1) and Naples (1) only.

The scientific activity has been performed by 9 oral presentations and 2 posters.

The business activity has been conducted by R. Barzaghi and M. Crespi in Council and by R. Barzaghi in the new E.C..

R. Barzaghi was confirmed in the IAG E.C. as one of the Representatives of the Services and, as previously mentioned, as IGFS Chair. He has been also voted as a member in the GGOS Coordinating Board and he has been nominated as voting member in the GGOS Executive Committee.

M. Crespi was appointed by E.C. as ICCT Vice-President in the meeting held in San Francisco on December 13, 2015.

January 2016