



## International workshop for the Implementation of the Global Geodetic Reference Frame (GGRF) in Latin America

Buenos Aires, Argentina, Sep 16 - 20, 2019

This workshop is a capacity building activity of the project “Implementation of the United Nations’ Resolution on the Global Geodetic Reference Frame (UN-GGRF) for Sustainable Development in Latin America”, sponsored by the International Union of Geodesy and Geophysics (IUGG) with the support of the International Association of Geodesy (IAG), the International Association of Seismology and Physics of the Earth’s Interior (IASPEI), the Argentine-German Geodetic Observatory (AGGO), the Instituto Geográfico Nacional of Argentina, and the International Committee on Global Navigation Satellite Systems (ICG) of the United Nations Office for Outer Space Affairs (UN-OOSA) .

### Objectives

- To present the definition of the GGRF and the roadmap for its implementation, emphasizing its fundamental role for the Earth system monitoring and economic development and sustainability.
- To give a complete overview of the different international organizations contributing to and supporting the implementation of the GGRF to promote a more active participation of the Latin American countries in global and regional related initiatives.
- To identify deficiencies (and possibilities of improvement) in the existing Latin American geodetic infrastructure and to show how fundamental geodetic observatories operate.
- To strengthen the combination of geodetic and seismologic infrastructure and methods to improve the reference in Earth system modelling and mitigation of natural disasters produced by seismic activity.
- To provide the Latin American colleagues responsible for the national geodetic reference frames with scientific and political arguments to convince policy makers about the necessity of investing in geodetic and geophysical infrastructure in their countries.

### Preliminary agenda

	Sep 16	Sep 17	Sep 18	Sep 19	Sep 20
08:30 – 10:00	Registration	Global and regional cooperation frameworks	Global geodetic reference systems and frames	IAG Services	Argentine-German Geodetic Observatory (AGGO)
	Opening			GGOS	
10:00 – 10:30	Coffee break				
10:30 – 12:00	Geodesy of reference in Latin America	Global and regional cooperation frameworks	IAG Services	GGOS	Argentine-German Geodetic Observatory (AGGO)
12:00 – 14:00	Lunch time				
14:00 – 15:30	GGRF definition and organization	Global and regional cooperation frameworks	IAG Services	GGOS IAG Alignments with GEO and ICG-UNOOSA	Visit to AGGO
15:30 – 16:00	Coffee break				
16:00 – 17:30	GGRF definition and organization	Global geodetic reference systems and frames	IAG Services	IAG Alignments with GEO and ICG-UNOOSA	Visit to AGGO

<b>Monday, Sep 16, 2019</b>	
08:00 – 09:00	Registration
<b>Opening session</b>	
09:00 – 09:30	Welcome addresses
09:30 – 09:50	Welcome to Argentina – S Cimbaro
09:50 – 10:00	Objectives of the workshop – <u>L Sánchez</u> , C Brunini
10:00 – 10:30	Coffee break
<b>Geodesy of reference in Latin America: Overview</b>	
10:30 – 10:50	SIRGAS: Sistema de Referencia Geocéntrico para las Américas – <u>V Mackern</u> , W Martínez, V Cioce, R Pérez-Rodino, SRC de Freitas
10:50 – 11:10	Gravity infrastructure in Latin America – <u>D Blitzkow</u> , ACOC de Matos
11:10 – 11:30	Geoid modelling in South America – <u>C Pacino</u> , ACOC de Matos, D. Blitzkow,
11:30 – 11:50	OAFA Station in the GGOS Era – AM Pacheco, <u>R Podestá</u> , J Li, L Weidong, J Saunier
12:00 – 14:00	Lunch time
<b>GGRF definition and organization</b>	
14:00 – 14:20	The United Nations Initiative on Global Geospatial Information Management (UN-GGIM) and its Regional Committee for the Americas (UN-GGIM Americas) – P Merodio-Gómez, <u>S Cimbaro</u>
14:20 – 14:40	UN-GGIM Subcommittee on Geodesy and the UN Resolution on the GGRF – G Johnston
14:40 – 15:00	The GGRF roadmap – G Johnston
15:00 – 15:30	Governance arrangements for sustaining the GGRF – <u>D Roman</u> , R Gross
15:30 – 16:00	Coffee break
16:00 – 16:30	UN Subcommittee on Geodesy and its working group on Education, Training and Capacity Building – M Lilje, C Pacino, A Craddock, <u>D Roman</u>
16:30 – 17:00	Improving the Geodetic Infrastructure via the UN-GGIM initiative – Z. Altamimi
17:00 – 17:30	Brainstorming 1: UN-GGIM Americas, Subcommittee on Geodesy and SIRGAS: The role of SIRGAS in UN-GGIM Americas and in the Subcommittee on Geodesy

<b>Tuesday, Sep 17, 2019</b>	
<b>Global and regional cooperation frameworks</b>	
08:30 – 08:50	The International Science Council (ISC) – A Ismail-Zadeh
08:50 – 09:10	The International Union of Geodesy and Geophysics (IUGG) – A Ismail-Zadeh
09:10 – 09:40	Structure, status and recent achievements of the International Association of Geodesy (IAG) – H Schuh
09:40 – 10:00	The role of the IAG sub-commissions in Latin America: SIRGAS and gravity field modelling – H Drewes
10:00 – 10:30	Coffee Break
10:30 – 11:00	IAG vision on the implementation of the UN General Assembly resolution on the GGRF and its roadmap – Z Altamimi
11:00 – 11:30	The International Federation of Surveyors (FIG) – M Lilje, <u>D Roman</u>
11:30 – 12:00	The International Association of Seismology and Physics of the Earth's Interior (IASPEI) and its Latin American and Caribbean Seismological Commission – M Assumpção
12:00 – 14:00	Lunch time

14:00 – 14:30	Support of the Pan-American Institute of Geography and History (PAIGH) to the development of the Geospatial Information in the Americas – <u>CF Rodríguez Tomeo</u>
14:30 – 15:00	Sustainability of the regional reference frame organisation in Latin America – <u>C Brunini</u> , <u>L Sánchez</u>
15:00 – 15:30	Brainstorming 2: Participation/interaction of the Latin American countries in ISC, IUGG, IAG, IASPEI, FIG, IPGH: pros and cons
15:30 – 16:00	Coffee Break
<b>Global geodetic reference systems and frames</b>	
16:00 – 16:30	International Celestial Reference System and Frame (ICRS/ICRF) – <u>R Heinkelmann</u>
16:30 – 17:00	The ITRF: Three decades of research and development, usages and applications – <u>Z Altamimi</u> ; <u>X Collilieux</u> , <u>P Rebischung</u> , <u>L Metivier</u> , <u>K Chanard</u>
17:00 – 17:30	On the International Gravity Reference System (IGRS) – <u>A Rülke</u> , <u>H Wziontek</u> , <u>S Bonvalot</u> , <u>J Mäkinen</u> , <u>V Pálinkáš</u> , <u>D van Westrum</u> , <u>R Falk</u> , <u>L Vitushkin</u>

### Wednesday, Sep 18, 2019

#### Global geodetic reference systems and frames (cont)

08:30 – 09:00	The EGM2020 (Earth Gravitational Model 2020) – <u>DE Barnes</u> , <u>H Small</u> , <u>S Ingalls</u> , <u>J Beale</u> , <u>R Ganley</u>
09:00 – 09:30	International Height Reference System and Frame (IHRM/IHRF) – <u>L Sánchez</u>
09:30 – 10:00	Brainstorming 3: Densification of the global reference frames in Latin America
10:00 – 10:30	Coffee break

#### Scientific Services of the International Association of Geodesy

10:30 – 11:00	The International GNSS Service (IGS) – <u>G Johnston</u> , <u>A Craddock</u>
11:00 – 11:30	Presentation of the DORIS system and the International DORIS Service – <u>L Soudarin</u>
11:30 – 12:00	The Science Contributions of DORIS and Synergy with other Geodetic Techniques – <u>F Lemoine</u>
12:00 – 14:00	Lunch time
14:00 – 14:30	International Laser Ranging Service (ILRS) – <u>M Pearlman</u>
14:30 – 15:00	International VLBI Service for Geodesy and Astrometry – Latin American Aspects – <u>D Behrend</u> , <u>A Nothnagel</u> , <u>H Hase</u>
15:00 – 15:30	International Earth Rotation and Reference Systems' Service (IERS) – <u>R Heinkelmann</u> , <u>B Luzum</u> , <u>D Thaller</u>
15:30 – 16:00	Coffee break
16:00 – 16:30	International Gravity Field Service (IFGS) – <u>R Barzaghi</u>
16:30 – 17:00	ICGEM - International Centre for Global Earth Models Service of IAG – <u>E Sinem Ince</u> , <u>F Barthelmes</u> , <u>S Reissland</u> , <u>K Elger</u>
17:00 – 17:30	International Service for the Geoid (ISG) – <u>M Reguzzoni</u> , <u>L Sánchez</u> , et al.

### Thursday, Sep 19, 2018

#### Scientific Services of the International Association of Geodesy (cont)

08:30 – 09:00	International cooperation to provide geodetic reference data and products: global geodetic data analysis and data repositories at the Bundesamt für Kartographie und Geodäsie (BKG) – <u>D Thaller</u>
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09:00 – 09:30	Recent gravity field modelling studies and future plans at GFZ – <u>E Sinem Ince</u> , Ch Foerste, Ch Dahle, Ch Voigt, O Abrykosov, H Dobsław, R Koenig, F Flechtner
<b>Global Geodetic Observing System (GGOS)</b>	
09:30 – 10:00	The Global Geodetic Observing System of the International Association of Geodesy – R Gross
10:00 – 10:30	Coffee break
10:30 – 11:00	GGOS Bureau of Networks and Observations – M Pearlmann
11:00 – 11:20	Recent Activities of the GGOS Standing Committee on Performance Simulations and Architectural Trade-Offs (PLATO) – D Thaller
11:20 – 11:40	GGOS Bureau of Standards and Products – D Angermann, T Gruber, M Gerstl, R Heinkelmann, U Hugentobler, <u>L Sánchez</u> , P Steigenberger
11:40 – 12:00	GGOS working group on Digital Object Identifiers (DOI) for geodetic data – A Craddock
12:00 – 14:00	Lunch time
14:00 – 14:20	Essential geodetic variables – R Gross
14:20 – 14:40	GGOS external relations: an overview – A Craddock
<b>IAG Alignments with GEO Priority Engagement Areas and UNOOSA-ICG</b>	
14:40 – 15:10	Group on Earth Observations (GEO): Overview – R Gross
15:10 – 15:30	GGOS Efforts in Support of the Sendai Framework for Disaster Risk Reduction – A Craddock
15:30 – 16:00	Coffee break
16:00 – 16:20	Geodesy and the UN Sustainable Development Goals – A Craddock
16:20 – 16:40	Geodetic Capacity Building in support of the GGIM-World Bank Integrated Geospatial Information Framework – N Brown, A Craddock
16:40 – 17:10	The International Committee on Global Navigation Satellite Systems (ICG) of the United Nations Office for Outer Space Affairs (UNOOSA) – S Gadimova
17:10 – 17:30	Brainstorming 4: Adoption and response to the Sendai Framework and Sustainable Development Goals

<b>Friday, Sep 20, 2019</b>	
<b>Argentine-German Geodetic Observatory (AGGO)</b>	
08:30 – 08:50	Contributions of BKG to core geodetic infrastructure – T Schüler
08:50 – 09:20	The AGGO geodetic fundamental station at La Plata – H Hase
09:20 – 09:40	The Satellite Laser Ranging System of AGGO – M Häfner
09:40 – 10:00	German efforts and challenges to install and maintain AGGO operational – J Bouman
10:00 – 10:30	Coffee break
10:30 – 10:50	Argentine efforts and challenges to install and maintain AGGO operational – C Brunini
10:50 – 11:20	Learnings and recommendations from the Argentine-German cooperation to install fundamental geodetic observatories – C Brunini, J Boumann
11:20 – 12:00	Brainstorming 5: how to reproduce geodetic observatories like AGGO in other Latin American countries?
12:00 – 15:00	Lunch time and moving to AGGO (by bus, only foreign participants)
15:00 – 18:00	Visit to AGGO

## Speakers

- **Zuheir Altamimi**  
Research director of the Institut National de l'Information Géographique et Forestière (IGN) and the Institut de Physique du Globe de Paris (IPGP), Paris, France  
President of the International Association of Geodesy (IAG)  
Lead of the UN-GGIM Subcommittee on Geodesy Working Group on Geodetic Infrastructure  
Primary scientist of the International Terrestrial Reference System (ITRS) Center of the International Earth Rotation and Reference Systems Service (IERS)
- **Marcelo Assumpção**  
Institute of Astronomy, Geophysics and Atmospheric Sciences, University of São Paulo (USP), São Paulo, Brazil  
Executive Secretary of the IASPEI Latin American and Caribbean Seismological Commission (IASPEI-LACSC)
- **Daniel E Barnes**  
National Geospatial-Intelligence Agency (NGA), Arnold, MO, USA
- **Riccardo Barzaghi**  
Dipartimento di Ingegneria Civile e Ambientale, Politecnico di Milano, Milan, Italy  
Chair of the International Gravity Field Service (IGFS)
- **Dirk Behrend**  
NVI Inc., US National Aeronautics and Space Administration (NASA), Goddard Space Flight Center, Greenbelt, MD, USA  
Director, Coordinating Center, International VLB Service for Geodesy and Astrometry (IVS)
- **Denizar Blitzkow**  
Escola Politécnica, Universidade de São Paulo, São Paulo, Brazil
- **Johannes Bouman**  
Director of the Department of Geodesy, Bundesamt für Kartographie und Geodäsie (BKG), Frankfurt, Germany
- **Claudio Brunini**  
Science Director of the Argentinean-German Geodetic Observatory (AGGO), Universidad Nacional de La Plata, CONICET, La Plata, Argentina  
Past President (2007 – 2015) of SIRGAS
- **Sergio Cimbaro**  
Director of the Instituto Geográfico Nacional, Buenos Aires Argentina  
South America Board Member of the United Nations Initiative on Global Geospatial Information Management Regional Committee for the Americas (UN-GGIM Americas)
- **Allison Craddock**  
NASA Jet Propulsion Laboratory, Pasadena, CA, USA  
Manager External Relations of the Global Geodetic Observing System (GGOS)  
Central Bureau Director and Secretariat of the International GNSS Service (IGS)
- **Hermann Drewes**  
Technische Universität München, München, Germany  
Past Secretary General (2207 – 2019) of the International Association of Geodesy (IAG)

IAG Representative to SIRGAS

- **Sharafat Gadimova**  
Executive Secretariat, International Committee on Global Navigation Satellite Systems (ICG),  
United Nations Office for Outer Space Affairs (UN-OOSA), Vienna, Austria
  
- **Richard Gross**  
NASA Jet Propulsion Laboratory, Pasadena, CA, USA  
Vice-president of the International Association of Geodesy (IAG)  
Acting president of the Global Geodetic Observing System (GGOS)
  
- **Hayo Hase**  
Argentine-German Geodetic Observatory (AGGO), Bundesamt für Kartographie und Geodäsie  
(BKG), La Plata, Argentina
  
- **Michael Häfner**  
Argentine-German Geodetic Observatory (AGGO), Bundesamt für Kartographie und Geodäsie  
(BKG), La Plata, Argentina
  
- **Robert Heinkelmann**  
Head of the VLBI group, Space Geodetic Techniques, Helmholtz Centre Potsdam, GFZ German  
Research Centre for Geosciences, Potsdam, Germany  
Analysis Coordinator, International Earth Rotation and Reference Systems' Service (IERS)
  
- **Elmas Sinem Ince**  
Helmholtz Centre Potsdam, GFZ German Research Centre for Geosciences, Potsdam, Germany  
Director of the International Centre for Global Earth Models (ICGEM)
  
- **Alik Ismail-Zadeh**  
Karlsruhe Institute of Technology (KIT), Karlsruhe, Germany  
Russian Academy of Sciences, Moscow, Russia  
Secretary of the International Science Council (ISC)  
Past Secretary General (2007 – 2019) of the International Union of Geodesy and Geophysics (IUGG)
  
- **Gary Johnston**  
Branch Head, Geodesy and Seismic Monitoring, Geoscience Australia, Canberra, Australia  
Chair of the Governing Board of the International GNSS Service (IGS)  
Co-chair of the UN-GGIM Subcommittee on Geodesy
  
- **Frank Lemoine**  
US National Aeronautics and Space Administration (NASA), Goddard Space Flight Center,  
Greenbelt, MD, USA  
Chair of the International DORIS Service (IDS)
  
- **Virginia Mackern**  
Universidad Nacional de Cuyo and Universidad Juan Agustín Maza, Mendoza, Argentina  
Vice-president of SIRGAS
  
- **Cristina Pacino**  
Universidad Nacional de Rosario, Rosario Argentina  
Representative of the International Association of Geodesy (IAG) to the of the UN-GGIM  
Subcommittee on Geodesy Working Group on Education, Training and Capacity Building  
Past chair (2015 – 2019) of the IAG SC 2.4b: Gravity and Geoid in South America

- **Michael Pearlman**  
Harvard-Smithsonian Center for Astrophysics, Cambridge, MA, USA  
Director of the Bureau of Networks and Observations of the Global Geodetic Observing System (GGOS-BNO)  
Director of the Central Bureau of the International Laser Ranging Service (ILRS)
- **Ricardo Cesar Podestá**  
Director del Observatorio Astronómico Félix Aguilar, Facultad de Ciencias Exactas, Físicas y Naturales, Universidad Nacional de San Juan, San Juan, Argentina
- **César Fernando Rodríguez Tomeo**  
Secretary General, Pan-American Institute of Geography and History (PAIGH), Mexico City, Mexico
- **Daniel Roman**  
Chief Geodesist, National Geodetic Survey (NGS), US National Oceanic and Atmospheric Administration (NOAA), Silver Spring, MD, USA  
US Representative to the UN-GGIM Subcommittee on Geodesy Working Group on Governance  
Chair of Commission 5 (Positioning and Measurement) of the International Federation of Surveyors (FIG)
- **Axel Rülke**  
Bundesamt für Kartographie und Geodäsie (BKG), Leipzig, Germany
- **Laura Sánchez**  
Deutsches Geodätisches Forschungsinstitut, Technische Universität München (DGFI-TUM), München, Germany  
Lead of the Focus Area Unified Height System of the Global Geodetic Observing System (GGOS)  
Member of the GGOS Bureau of Products and Standards (GGOS-BPS)  
Member of the Advisory Board of the International Gravity Field Service (IGFS)  
Past vice-president (2007 -2015) of SIRGAS
- **Laurent Soudarin**  
Collecte Localisation Satellites (CLS), Ramonville Saint-Agne, France  
Director of the Central Bureau of the International DORIS Service (IDS)
- **Harald Schuh**  
Director of the Department of Geodesy and Head of section Space Geodetic Techniques, Helmholtz Centre Potsdam, GFZ German Research Centre for Geosciences, Potsdam, Germany  
Past President (2015 - 2019) of the International Association of Geodesy (IAG)
- **Torben Schüler**  
Director of Geodetic Observatory Wettzell, Bundesamt für Kartographie und Geodäsie (BKG), Bad Kötzing, Germany
- **Daniela Thaller**  
Bundesamt für Kartographie und Geodäsie (BKG), Frankfurt, Germany  
Director Central Bureau, International Earth Rotation and Reference Systems' Service (IERS)  
Chair of the Standing Committee on Performance Simulations and Architectural Trade-Offs (PLATO) of the Global Geodetic Observing System (GGOS)