



## Contents

<b>General Announcements</b> .....	<b>3</b>
Summary of the First Meeting of the IAG EC 2015-2019 .....	3
Call for Proposals for the Central Bureau of the International Gravity Field Service.....	6
Call for Participation – Global Geodetic Observing System Coordinating Office.....	9
Publications of the IAG Symposia series.....	11
Milestone reached on Svalbard .....	11
Advances in Space Research.....	12
<b>Meeting Announcements</b> .....	<b>14</b>
COSPAS Istanbul 2016, 41st COSPAR Scientific Assembly.....	14
JISDM 2016.....	15
Meetings Calendar .....	15
8th Annual Conference on European Space Policy .....	15
ION Precise Time and Time Interval Meeting (PTTI).....	15
IGS Workshop.....	15
Munich Satellite Navigation Summit .....	16
2nd IVS Training School on VLBI for Geodesy and Astrometry.....	16
9th IVS General Meeting.....	16
JISDM 2016 .....	16
TG-SMM 2016 .....	16
EGU General Assembly 2016 .....	16
ICEE-PDRP 2016 .....	16
FIG Working Week 2016.....	16
ESA Living Planet Symposium 2016 and 6 <sup>th</sup> GOCE User Workshop .....	16
Airborne Gravimetry for Geodesy Summer School.....	16
EUREF Symposium 2016 .....	16
18th Geodynamics and Earth Tide Symposium 2016.....	16
ISG Geoid School .....	16
6th International Conference on Cartography & GIS.....	17
GAGER 2016.....	17
International Symposium on Geodesy and Geodynamics (ISGG2016).....	17
41st COSPAR Scientific Assembly .....	17
AOGS 13 <sup>th</sup> Annual Meeting.....	17
INTERGEO, Geodätische Woche .....	17
IDS Workshop.....	17
SAR Altimetry Workshop.....	17
OSTST 2016.....	17
AGU 2016 Fall Meeting .....	17
IAG / IASPEI Scientific Assembly .....	17
27th IUGG General Assembly .....	17
<b>Reports</b> .....	<b>18</b>
Retreat of the International VLBI Service for Geodesy and Astrometry .....	18
Report on the VII SIRGAS School on Reference Systems and the Symposium SIRGAS 2015 .....	18
BKG Hosts 3-Day GGOS Workshop .....	19
<b>Obituary</b> .....	<b>21</b>
John Wahr (1951 – 2015) .....	21

The *IAG Newsletter* is under the editorial responsibility of the *Communication and Outreach Branch* (COB) of the IAG.

It is an open forum and contributors are welcome to send material (preferably in electronic form) to the IAG COB ([newsletter@iag-aig.org](mailto:newsletter@iag-aig.org)). These contributions should complement information sent by IAG officials or by IAG symposia organizers (reports and announcements). The *IAG Newsletter* is published monthly. It is available in different formats from the IAG new internet site: <http://www.iag-aig.org>

Each *IAG Newsletter* includes several of the following topics:

- I. news from the Bureau Members
- II. general information
- III. reports of IAG symposia
- IV. reports by commissions, special commissions or study groups
- V. symposia announcements
- VI. book reviews
- VII. fast bibliography

## General Announcements

### Summary of the First Meeting of the IAG EC 2015-2019

Place: Prague Congress Centre, Floor 2, Room 241

Time: Thursday, July 2, 2015, 08:30-12:00

**Attendees (voting):** H. Schuh (IAG President), Z. Altamimi (Vice President), H. Drewes (Secretary General), Ch. Rizos (Immediate Past President), M. Santos (President of Commission 4), P. Novák (President of ICC on Theory), R. Barzaghi, A. Nothnagel, (Representatives of the Services), L. Combrinck (Member at Large)

**Guest:** J. Böhm (later representing Commission 1 as the elected Vice President)

**Regrets:** G. Blewitt (President of Commission 1), R. Pail (President of Commission 2), M. Hashimoto (President of Commission 3), H. Kutterer (Chair of GGOS), J. Ádám (President of the COB), R. Neilan (Representatives of the Services), M. C. Pacino (Member at Large)

### Summary of Agenda Items

#### 1. Welcome and adoption of agenda

*H. Schuh*, as the new President of the IAG, welcomed the members of the IAG Executive Committee (9 out of 16 voting members, 1 guest) for the first session within the new term 2015-2019. The meeting took place on the occasion of the XXVI IUGG General Assembly in Prague, Czech Republic. The agenda had been distributed previously by e-mail and was unanimously adopted.

#### 2. Introduction to the IAG Executive Committee

*H. Schuh* presented the new EC members according to the elections carried out by e-mail voting before the IUGG General Assembly and gave a short summary of the coincident IAG General Assembly. He explained the procedure of the EC meetings and pointed out that they are strictly following Roberts Rules (see e.g. at [http://iag.dgfi.tum.de/fileadmin/IAG-docs/Robert\\_s\\_Rules.pdf](http://iag.dgfi.tum.de/fileadmin/IAG-docs/Robert_s_Rules.pdf)). Each decision has to be initiated by a motion seconded by at least one EC member. He further encouraged the EC members to read carefully the IAG Statutes and in particular the IAG Bylaws, where all regulations are written in detail. They were updated by the IAG Council at the preceding IUGG/IAG General Assembly (see Statutes at [http://iag.dgfi.tum.de/fileadmin/IAG-docs/IAG\\_Statutes\\_2015\\_final.pdf](http://iag.dgfi.tum.de/fileadmin/IAG-docs/IAG_Statutes_2015_final.pdf) and Bylaws at [http://iag.dgfi.tum.de/fileadmin/IAG-docs/IAG\\_Bylaws\\_2015\\_final.pdf](http://iag.dgfi.tum.de/fileadmin/IAG-docs/IAG_Bylaws_2015_final.pdf)). As a major task of the present EC he mentioned a throughout strategic planning. At the first meetings the new IAG structure has to be set up. This includes in particular the structures of the Commissions, the Inter-Commission Committee on Theory (ICCT), and the Global Geodetic Observing System (GGOS) which have to be adopted by the EC. The first step in the present session is the appointment of the Vice Presidents of these components. *H. Schuh* then explained the general structure of the IAG Executive Committee consisting of the Bureau (President, Vice President and Secretary General), the immediate Past President, the Presidents of the Commissions, the Inter-Commission Committee on Theory (ICCT) and the Communication and Outreach Branch (COB), the Chair of the Global Geodetic Observing System (GGOS), three representatives of the Services, and two Members at Large. He presented *Franz Kuglitsch*, who could not attend the meeting, as the new Assistant Secretary General.

*H. Drewes* explained the creation or continuation of Commission sub-components (Study Groups (SG), Working Groups (WG) and Projects). Sub-commissions are for a long period and should only be changed for extraordinary reasons. Projects may be continued for two four-year periods, while SGs and WGs are strictly limited to one period only. The work plans have to be prepared accordingly, i.e., they have to be structured in a way that the work can be done within this terms. SGs are basically orientated to more theoretical studies and should be established together with the ICCT; WGs concentrate on more practical aspects. SGs and WGs may be established and terminated by the EC at any time during the 4-year period. During the IAG Scientific Assemblies held between the IUGG General Assemblies all groups shall be evaluated whether they are working well and, in case they do not, be resolved. Joint sub-components of several Commissions or together with Services require the recommendation of all the presidents. They are called Joint Projects (JP), Joint Study Groups (JSG) and Joint Working Groups (JWG), respectively. The persons directing such a sub-component are entitled as "chairpersons"

whereas the title "president" is restricted to the IAG Commissions. *H. Drewes* also referred to the IAG Homepage <http://www.iag-aig.org> and to the website of the IAG Office <http://iag.dgfi.tum.de/>. All colleagues are urgently asked to check these pages continuously in order to look for relevant information and for possible improvements. He emphasised that the IAG Homepage is one of the main tools of advertisement to the public and therefore has to be maintained in the best possible way. The COB and the IAG Office cannot arrange all this work alone but depend on the permanent input of information by all IAG members and bodies. The IAG Office Homepage is for the internal contact within the IAG structure, in particular the EC, e.g. for all documents. There is a password-protected area; the password was given to the EC members. The preparation of the Geodesist's Handbook is an example (cf. agenda topic 13) for non-public document exchange. The next edition shall be issued in the JoG early in 2016; the continuous compilation will be done via the IAG Office Homepage. This is similar with the IAG Reports (Travaux) published every two years.

### **3. Structure of the Commissions**

As not all of the newly elected Commission Presidents (*G. Blewitt*, *R. Pail*, *M. Hashimoto* and *M. Santos*) could attend the meeting, they had been asked before to nominate the Vice Presidents. The proposals were discussed, and the following Vice Presidents were appointed by the EC after motions seconded by at least one EC member:

- Commission 1: Johannes Böhm (Austria)
- Commission 2: Shuanggen Jin (China)
- Commission 3: Cheng-Li Huang (China)
- Commission 4: Allison Kealy (Australia)

After his appointment *J. Böhm* participated in the EC meeting by proxy of the Commission 1 President *G. Blewitt*.

The re-appointment of *A. Kealy* was justified by the necessity of geographical balance (Australia would not be represented in the Commissions' leaderships), different fields in the Commission's research, and links to other societies (in particular FIG).

The President of Commission 3, *M. Hashimoto*, had sent by e-mail, and the President of Commission 4, *M. Santos*, presented by viewgraphs the drafts of their Commissions' structure which were briefly discussed.

### **4. Inter-Commission Committee on Theory (ICCT)**

According to the IAG Bylaws valid until the General Assembly 2015, *Pavel Novák* had been appointed as the ICCT President by the previous Executive Committee during its session in Prague on June 23, 2015 (in future the ICCT President will be elected like the Commission Presidents by the IAG Council). He proposed *Th. Hobiger* as the Vice President. As no acceptance of the candidature was available, the appointment was postponed.

### **5. Status of the Global Geodetic Observing System (GGOS)**

*H. Kutterer* had been re-appointed as the Chairman of GGOS during the sessions of the previous Executive Committee on June 26, 2015. As he could not attend the present EC meeting, *H. Drewes* presented his brief report showing the new GGOS structure. The GGOS Consortium, i.e. the steering and election committee, is composed of each two representatives from the IAG components (Services, Commissions, ICCT). It elects its members in the GGOS Coordinating Board, which is the GGOS executive committee and management board and includes also the GGOS officers. It directs the GGOS Coordinating Office, the GGOS Bureau of Networks and Observations and the GGOS Bureau of Products and Standards and receives their reports. The GGOS research is concentrated in the three Focus Areas "Unified Height Systems", "Geohazards Monitoring", and "Sea Level Change, Variability and Forecasting".

### **6. Status of the Communication and Outreach Branch (COB)**

The COB President *J. Adam* could not attend the present meeting. *H. Drewes* presented his viewgraphs explaining the IAG Website with a statistics of visitors (ca. 2000 per month in average) and the IAG Newsletter. He urgently asked the EC members to provide any useful information in order to keep the Website and Newsletter permanently up to date.

### **7. Representation of Services**

The IAG Services are represented in the EC by three elected persons. They are splitting the reports among themselves. *R. Barzaghi* will concentrate on the gravity related services, and *R. Neilan* and *A. Nothnagel* will cover the services oriented to geometry and combined products.

## **8. Representation of Developing Countries**

The two Members at Large, *L. Combrinck* and *M. C. Pacino* were asked to look after all the developing countries and distribute the reporting on the basis of the individual continents among themselves. They should give reports at each EC meeting.

## **9. Representatives to IAG Service and to external bodies**

*H. Drewes* presented the list of IAG representatives to the Services and external bodies (IUGG Commissions, IAG-related IUGG liaisons to international organisations, and other societies). The following representatives to the IAG Services were nominated by motions seconded by at least one EC member and then appointed: BGI: *U. Marti*, BIPM: *R. Biancale*, IDS: *M. Otten*, IERS: *A. Nothnagel*, IGETS: *S. Pagiatakis*, IGS: *C. Rizos* and *Z. Altamini*, IGFS: *U. Marti*, ILRS: *G. Blewitt*, IVS: *L. Combrinck*, PSMSL: *P. Knudsen*.

Missing representatives to the ICGEM, IDEMS and ISG will be nominated later (see [http://iag.dgfi.tum.de/fileadmin/IAG-docs/IAG\\_Representatives\\_2015.pdf](http://iag.dgfi.tum.de/fileadmin/IAG-docs/IAG_Representatives_2015.pdf)).

## **10. Approval of the new Editor-in-Chief of the Journal of Geodesy and of the IAG Symposia Series**

According to the IAG Bylaws the previous Editorial Board of the Journal of Geodesy had nominated in several meetings during the past IUGG General Assembly the new Board which elected *J. Kusche* as the new Editor-in-Chief. This election was approved by the previous IAG Executive Committee.

*J. Freymueller* was proposed as Editor-in-Chief of the IAG Symposia Series and *L. Sánchez* as the Assistant Editor-in-Chief. There was a seconded move to accept these nominations, and the proposed Editors were unanimously appointed.

## **11. Establishment of an IAG (Electronic) Proceedings Series**

There was a complaint of IAG associates that it is very difficult to publish symposia presentations in the peer-reviewed IAG Symposia Series, in particular for scientists from developing countries. It was proposed and supported by IAG EC members to establish a lower quality series of IAG proceedings, eventually only as electronic publications in the Internet. In the discussion there were concerns of conflicts with the existing Symposia Series, and the topic was postponed to later EC meetings.

## **12. Sponsorship of Symposia and Workshops**

*H. Drewes* explained that the previous EC decided that all meetings organised by an IAG component or by two IAG sub-components are automatically accepted as official IAG events. The adoption as requested by the IAG Bylaws is then implicitly given. He moved to have this decision again. *H. Schuh* seconded and it was unanimously accepted. The organizers of such meetings are requested to announce the relevant event to the IAG Secretary General and to the COB and provide reports to be published in the IAG Website and Newsletter. Moreover the IAG logo should generally be used in all official presentations. Other meetings can be sponsored by IAG only in a scientific way. Due to the strict rules and the limited budget, financial support is not possible.

## **13. The Geodesist's Handbook 2016**

The Geodesist's Handbook shall be published in early 2016 (see the previous Handbook in J. of Geodesy, **86**: 787-974, 2012 or online at <http://iag.dgfi.tum.de/index.php?id=315>) as. All draft texts should be sent to the IAG Office before the next EC meeting and discussed there.

## **14. IAG Services Assessment (ISA) status report**

The previous Executive Committee had started an IAG Services Assessment (ISA) directed by an ISA Team composed by *Ch. Rizos*, *H. Schuh*, *H. Drewes*. It was proposed to leave the existing ISA Team in office and ask them for continuous reports to the new EC. It was unanimously accepted.

## **15. Any other business**

The EC decided to hold its next meeting during the next AGU Fall Meeting in San Francisco on Saturday, Dec. 12, 2015. Another meeting will take place in 2016.

## 16. Adjourn

H. Schuh thanked the participants for their contributions and closed the session at 12:25.

Respectfully submitted  
H. DREWES, IAG Secretary General



### *Call for Proposals for the Central Bureau of the International Gravity Field Service*

#### **Introduction**

The International Gravity Field Service (IGFS) is a new unified ‘umbrella’ IAG service which will

- coordinate collection, validation, archiving dissemination of gravity field related data,
- coordinate exchange of software of relevance for gravity field activities,
- coordinate courses, information materials and general public outreach relating to the Earth’s gravity field.

The overall goal of the IGFS is to coordinate the servicing of the geodetic and geophysical community with gravity field related data, software and information. The combined data of the IGFS entities data will include satellite-derived global models, terrestrial, airborne and marine gravity observations as well as time-dependent gravity data, GPS leveling data, digital models of terrain and bathymetry as well as ocean gravity field and geoid from satellite altimetry. Thus both, the static and the temporal variations of the Earth’s gravity field will be covered by the IGFS.

The IGFS is not handling gravity field data distribution directly – The IGFS will function as a unifying service and contact for the following gravity field related services ‘IGFS-Centres’:

- **BGI** – International Gravity Bureau – collection, archiving, distribution of gravity data
- **ISG** – International Service for the Geoid – collection and distribution of geoid models, geoid schools
- **IGETS** – International Geodynamics and Earth Tide Service – collection and archiving of global Earth tide and Earth gravity field temporal variations data.
- **ICGEM** – International Centre for Global Earth Models – distribution of satellite and surface spherical harmonic models
- **IDEMS** – International DEM Service – provision of Global Digital Terrain Models (*to be activated*)

The IGFS was established by the International Association of Geodesy Executive Board at the General Assembly in Sapporo, Japan, August 2003. One of the main arguments for establishing the IGFS was to provide a more focused role of the gravity field, as one of the three fundamental pillars in GGOS, the Global Geodetic Observing System.

Another important role of the IGFS is to take initiative and coordinate international data collection projects.

#### **The Central Bureau**

#### **Charter**

Co-operate in defining:

- standards for gravity data observation procedures and associated data (meteorology, hydrology)
- data processing methods and reductions (tides, atmosphere, ...),
- data exchange format and archive
- gravity anomaly/disturbance computation (free-air, Bouguer, ...)
- the gravity and the geopotential reference system and to
- evaluate and recommend relevant geophysical models;

co-operate in activities related to:

- the design and realization of the global absolute and superconducting gravimeter network with special emphasis on co-located sites
- the definition and realization of the global height system
- the integration of
  - terrestrial, airborne and satellite measurements
  - gravity field and satellite-derived DTMs
- the evaluation and calibration of satellite-derived gravity field variations as well as the improvement of processing of satellite data
- making gravity data, gravity models (static and time-variable) and products available
- public outreach by
  - organizing schools on gravity and geoid
  - making SW and tutorials for gravity and geoid analysis available.

### **High Level Tasks**

- provide link between the IGFS entities and external networks (oceanic, atmospheric, hydrologic,...)
- provide link to the IAG/GGOS commissions/bureaus and communicate their requirements and recommendations to the IGFS-Centres
- propagate standards and recommendations related to gravity field observations and products and promote their use within the geoscientific community.

### **Organization**

- Tasks of permanent nature concerning all IGFS-Centres shall reside within the Central Bureau. Tasks of temporary nature may be delegated to task forces or standing committees.
- The Central Bureau will be headed by a director and a secretariat to attend to administrative, communications and web support.
- The Central Bureau will include such expertise as is necessary to conduct Bureau business and provide guidance and oversight to the supporting entities.
- Dedicated working groups may be set up for specific issues dealing with particular aspects of gravity field related issues.
- The head of the Central Bureau will be a member of the GGOS Consortium.

### **Interfaces with Internal and External Entities**

The Central Bureau acts essentially as representative of the IGFS-Centres and is liaison to other geodetic and geophysical services especially to the IAG/GGOS entities. There must be a routine exchange of information and regular meetings with representatives of the IGFS-Centres. A close contact has to be kept to the GGOS Bureaus for 'Product and Standards', 'Networks and Observations' and IAG Commission 2.

### **Call for Proposals**

The member services of the IGFS request proposals for the operation of the IGFS-Central Bureau. An organizational structure to operate the Central Bureau and an operational plan must be provided in the proposal. The proposal should clearly address the capabilities being offered by the institution, its financial ability to carry them out, and appropriate points of contact.

### **Resources**

The funds required for the IGFS Central Bureau have to be provided by the proposing institution. Proposers may also solicit support from external entities in terms of financial contributions and expertise. From the proposal it should become clear that the proposing institution has the expertise, capabilities and financial background to perform the proposed tasks.

### **Term**

The term of this appointment will be 4 years. It may be terminated by either party with a 6 months notice. The term will be automatically renewed, unless either party gives notice 6 months prior to the end of the term.

### **Proposal Structure, Deadline and Submission**

The proposal should contain the following parts: title, proposing institution and its address, designated head of the bureau, abstract, goals, expertise, work and schedule and allocated resources. Proposals should be concise, 4 – 5 pages in length. Proposals should be submitted electronically not later than January, 31<sup>st</sup>, 2016 signed by the responsible head of the proposing institution with the authority for the commitment of human and financial resources to the IGFS Chair.

**address:** Riccardo Barzaghi  
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Piazza Leonardo da Vinci 32  
20133, Milano, Italy  
**phone:** +39 0223996528  
**fax:** +39 0223996530  
**e-mail:** [riccardo.barzaghi@polimi.it](mailto:riccardo.barzaghi@polimi.it)

### Schedule

January 31 <sup>st</sup> , 2016:	due date for proposals
February 29 <sup>th</sup> , 2016:	report by evaluation committee to IAG
March 15 <sup>th</sup> , 2016:	decision by IAG
March 15 <sup>th</sup> – 31 <sup>st</sup> , 2016:	notification of proposer on proposal acceptance
April 1 <sup>st</sup> , 2016:	start of Central Bureau activities

### Proposal Review

The proposals will be evaluated and ranked by an evaluation committee set up among the members of the IGFS advisory Board. The successful proposer will be notified by the end of March 2016, with the goal to start the IGFS Central Bureau activities and work by April 1<sup>st</sup>, 2016.

RICCARDO BARZAGHI



*Global Geodetic Observing System  
of the International Association of Geodesy*

30 October 2015

### Introduction from the GGOS Chair

The Global Geodetic Observing System of the International Association of Geodesy is presenting the opportunity for hosting its Coordinating Office to interested entities. This is a rare opportunity for an agency, university, or other geodetic institution to achieve high-level visibility and influence within the scientific community. It is also a chance to be involved in efforts that have the potential to greatly improve the lives of millions of people through supporting collaborative geodetic projects, such as early warning systems for natural hazards.

The attached Call for Participation and supporting documents outlines the background, rationale, necessary tasks, and staffing needs of the Coordinating Office, which was formerly hosted by the Italian Space Agency, and is currently temporarily hosted by the German Federal Agency for Cartography and Geodesy.

I invite you to consider this opportunity and imagine how your efforts could potentially make great collaborative advances in geodesy a reality. We request that you submit any proposals for hosting this office to the GGOS Chair, Vice Chair, and Acting Director of the Coordinating Office by 15 January, 2016 at the latest; please do not hesitate contact me if you have any questions.

Best regards,

Dr. Hansjörg Kutterer  
GGOS Chair

## Call for Participation – Global Geodetic Observing System Coordinating Office

Document prepared by: GGOS Executive Committee

### Background

The Global Geodetic Observing System (GGOS), in its capacity as the official observing system of the International Association of Geodesy (IAG), works toward advancing the understanding of the dynamic earth system by quantifying the planet's changes in space and time. It accomplishes this through its three part mission:

- *To provide the observations needed to monitor, map, and understand changes in the Earth's shape, rotation, and mass distribution.*
- *To provide the global geodetic frame of reference that is the fundamental backbone for measuring and consistently interpreting key global change processes and for many other scientific and societal applications.*
- *To benefit science and society by providing the foundation upon which advances in Earth and planetary system science and applications are built.*

### Rationale

As defined in the GGOS Terms of Reference (approved in July 2011), *“The GGOS Coordinating Office (CO) performs the day-to-day activities in support of GGOS, the Executive Committee, the Coordinating Board and the Science Panel, and ensures coordination of the activities of the various components. The CO ensures information flow, maintains documentation of the GGOS activities and manages specific assistance functions that enhance the coordination across all areas of GGOS, including inter-services coordination and support for workshops. The CO in its long-term coordination role ensures that the GGOS components contribute to GGOS in a consistent and continuous manner and adhere to GGOS standards. The CO also maintains, manages and coordinates the GGOS Web presence.”*

### Call for Participation

The GGOS Coordinating Office provides a critical support component to the GGOS organization, and ensures optimal coordination of the activities of the various GGOS components. Though this is a substantial task, it is also a unique opportunity for the sponsoring institution or government to gain high-level visibility within the geodetic community and general society.

The Coordinating Office supports GGOS Goals and Objectives pertaining to communications, education, and outreach through developing a strong internet presence and outreach to the technical community as well as general society.

### Tasks of the Coordinating Office

In order to successfully satisfy the aforementioned needs, we formally invite proposals for a Coordinating Office to be based at either A) one institution, or B) shared across two or more entities to fully execute the described tasks.

- **Day-to-Day Management:** The GGOS Coordinating Office supports the Executive Committee, the Coordinating Board and the Science Panel, and ensures efficient and optimal coordination of the activities of the various components. The CO Director should be a primary point of contact for ensuring efficient, long-term information flow into and out of the GGOS components. The GGOS CO organizes monthly meetings, maintains membership lists, ensures that members, IAG Services, and the general public are informed (and reminded) about all pertinent meetings and projects. The CO assists in running elections and provides a central point of administrative contact and interaction with the IAG Bureau, Office, and Communications and Outreach Branch
  - For more information about various meetings and conferences throughout an average year, please refer to the attached GGOS Coordinating Office 2015 Implementation Plan, Table 1.3-2: “Coordinating Office Communications Plan.”
  - For a four-year overview of projected Coordinating Office activities, please refer to Figure 2.2-1, “Schedule of the Coordinating Office activities,” also found in the 2015 Implementation Plan.
- **Outreach and Member Engagement:** The CO engages the expert population within GGOS membership; engages in outreach to related and potentially complementary groups; supports geodetic satellite missions; advocates for new stations; and engages the general technical community through

sessions at workshops and conferences. The CO also provides administrative and organizational support to GGOS components, as well as to the IAG Bureau as requested.

- **Website Development and Maintenance:** The GGOS web presence is a consolidated and extensive resource – it is the primary point of engagement for the technical community, and a valuable tool for outreach to society. The GGOS website and portal are amalgamated into a single website and streamlined for both technical and general audiences.
  - The website provides online databases of GGOS resources, including: technical resources, reports issued by (and related to) GGOS, general efforts advancing the organization, student opportunities and other educational resources.
  - A component of the GGOS website is created for outreach to education and general interest audiences; educational materials are published for distribution to students of various age as well as the general public. The GGOS CO will receive ongoing support from BKG for all web related efforts

For a complete description of roles and responsibilities of the Coordinating Office, please refer to the [GGOS Coordinating Office 2015 Implementation Plan](#) .

### **Staffing Needs**

It has been recognized that a critical component of any organization like GGOS or the IAG services is its day-to-day management, designated to the Coordinating Office (CO). An optimal CO would provide resources for the following:

- *1 Full-time manager*, who would serve as Director of the Coordinating Office, and ex-officio member of the GGOS Coordinating Board and Executive Committee
- *1 Half-time support professional*, who would serve as Secretariat of the Coordinating Office

Please note that this office will need to provide its own funding, and will receive no financial resources from GGOS, the IAG, or its Services.

### **Proposals**

Please submit all proposals by **15 January 2016** to:

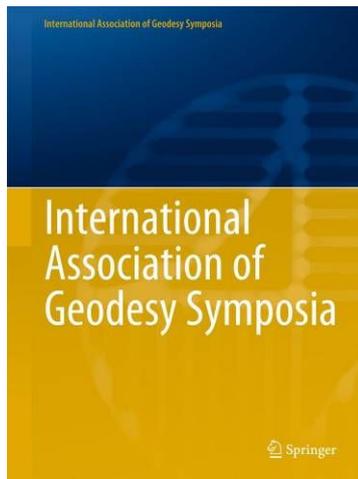
PROF. DR. HANSJÖRG KUTTERER  
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## *Publications of the IAG Symposia series*

### **IAG Symp. 146**



Following the REFAG 2014 symposium (Reference Frames for Applications in Geosciences), held in Luxemburg from 14 to 17 October 2014 by the IAG Commission 1, a new proceeding was started. Main Editor is Tonie van Dam. Associate editors are Zuheir Altamimi, Johannes Boehm, Tom Herring, Mikael Lilje, Richard Wonnacott. Review process is now complete and in total 29 papers were accepted out of the 32 submitted manuscripts. Electronic papers are available individually through their DOI numbers at <http://dx.doi.org>. Volume should soon be available through the Springer Web site at <http://rd.springer.com/search?facet-content-type=Book&facet-series=1345>

CHRIS RIZOS (Editor)  
PASCAL WILLIS (assistant Editor-in-Chief)

### *Milestone reached on Svalbard*

**The Norwegian Mapping Authority's new geodetic Earth observatory at Ny Ålesund in the Svalbard islands is taking shape, with the first stage completed just over a year after construction began.**



NMA's new Geodetic Earth Observatory at Ny-Ålesund, Svalbard. Photo: Martin Øen/ Veidekke Arctic.

This means that the new instrument building is now ready to receive the antennas which will be used to measure the planet's motions and changes. Jan Tore Sanner, Norway's minister of local government and modernisation, drove in the first pile for the observatory at 79°N in October 2014. Constructor Veidekke Arctic has been working since then to construct the station area at the Brandallaguna site outside Ny Ålesund.

### **Antennas next spring**

This job has been completed, and the NMA is on schedule to receive the antennas for installation next spring. The observatory is scheduled for completion in 2018. "Now that Veidekke has completed the first phase, we can really see the new era taking shape at Brandallaguna," says Per Erik Opseth, head of the NMA's Geodetic Institute. "This is great news for geodesy and for the international network we belong to." The NMA observatory is the northernmost facility of its kind, and represents one component in a worldwide network for observation and research.

### **UN resolution**

This commitment at Ny-Ålesund is also a topic at the UN, and the General Assembly resolution **A Global Geodetic Reference Frame for Sustainable Development**, adopted on 26 February 2015 will help to strengthen collaboration on global geodesy. The Global Geodetic Reference Frame (GGRF) Working Group is now working on the development of a roadmap that will describe how governments can contribute to the sustainability and enhancement of the Global Geodetic Reference Frame.

Link to animation movie about NMA's Geodetic Earth Observatory at Ny-Ålesund, Svalbard:  
<http://video.kartverket.no/norways-contribution-to-the-global>

ANNE JØRGENSEN

## *Advances in Space Research*

Dear colleagues,

for your information, issue 57(1) of *Advances in Space Research* (COSPAR official journal) published on paper in January 1, 2016, will remain available free-of-charge without any paid subscription to this journal for a complete year, courtesy of Elsevier, at <http://www.sciencedirect.com/science/journal/02731177/57/1>

In particular, the articles below could be of scientific interest to the geodetic community.

I remind you that ASR publishes 24 issues per year (2 issues of 20 or more papers each per month), that accepted papers appear online with a DOI in "accepted proofs" only a couple of days after acceptance and that this journal accepts electronic supplements and supports OpenAccess. Review process takes on average about 9 weeks before the first decision is sent back to the authors (4 weeks to find proper reviewers and 5 weeks to get their report and make a first decision). Published articles are referenced in ISI Web of Science, Scopus and many other scientific databases. This journal also accepts Special Issues. Its Impact Factor has been steadily increasing in the past few years and is now 1.385.



Submissions can be done electronically at any time using the EES System (<http://ees.elsevier.com/asr>).

Published articles can be found online at <http://www.sciencedirect.com/science/journal/02731177>

### **Earth Sciences**

Josef Sebera, Aleš Bezděk, Jan Kostecký, Ivan Pešek, C.K. Shum (2016) An oblate ellipsoidal approach to update a high-resolution geopotential model over the oceans: Study case of EGM2008 and DTU10, *Adv. Space Res.*, 57(1), 2-18, DOI : 10.1016/j.asr.2015.08.024  
<http://dx.doi.org/10.1016/j.asr.2015.08.024>

Weijie Tan, Danan Dong, Junping Chen, Bin Wu (2016) Analysis of systematic differences from GPS-measured and GRACE-modeled deformation in Central Valley, California, *Adv. Space Res.*, 57(1), 19-29, DOI : 10.1016/j.asr.2015.08.034  
<http://dx.doi.org/10.1016/j.asr.2015.08.034>

A. Nardo, B. Li, P.J.G. Teunissen (2016) Partial Ambiguity Resolution for Ground and Space-Based Applications in a GPS+Galileo scenario: A simulation study, *Adv. Space Res.*, 57(1), 30-47, DOI : 10.1016/j.asr.2015.09.002  
<http://dx.doi.org/10.1016/j.asr.2015.09.002>

Gerardo Allende-Alba, Oliver Montenbruck (2016) Robust and precise baseline determination of distributed spacecraft in LEO, *Adv. Space Res.*, 57(1), 46-63, DOI : 10.1016/j.asr.2015.09.034  
<http://dx.doi.org/10.1016/j.asr.2015.09.034>

Stelios P. Mertikas, Xinghua Zhou, Fangli Qiao, Antonis Daskalakis, Mingsen Lin, Hailong Peng, Ilias N. Tziavos, George Vergos, Achilleas Tripolitsiotis, Xenophon Frantzis (2016) First preliminary results for the absolute calibration of the Chinese HY-2 altimetric mission using the CRS1 calibration facilities in West Crete, Greece, *Adv. Space Res.*, 57(1), 78-95, DOI : 10.1016/j.asr.2015.10.016  
<http://dx.doi.org/10.1016/j.asr.2015.10.016>

### **Astrodynamics And Space Debris**

Yunlong Teng, Jinling Wang, Qi Huang (2016) Mathematical minimum of Geometric Dilution of Precision (GDOP) for dual-GNSS constellations, *Adv. Space Res.*, 57(1), 183-188, DOI : 10.1016/j.asr.2015.10.024  
<http://dx.doi.org/10.1016/j.asr.2015.10.024>

A. Jäggi, C. Dahle, D. Arnold, H. Bock, U. Meyer, G. Beutler, J. van den Ijssel (2016) Swarm kinematic orbits and gravity fields from 18 months of GPS data, *Adv. Space Res.*, 57(1), 218-233, DOI : 10.1016/j.asr.2015.10.035  
<http://dx.doi.org/10.1016/j.asr.2015.10.035>

Junhong Liu, Defeng Gu, Bing Ju, Zhen Shen, Yuwang Lai, Dongyun Yi (2016) A new empirical solar radiation pressure model for BeiDou GEO satellites, *Adv. Space Res.*, 57(1), 234-244, DOI : 10.1016/j.asr.2015.10.043  
<http://dx.doi.org/10.1016/j.asr.2015.10.043>

### **Earth Magnetosphere and Upper Atmosphere**

Byung-Kyu Choi, Sang Jeong Lee (2016) Anomalous ionospheric disturbances over South Korea prior to the 2011 Tohoku earthquake, *Adv. Space Res.*, 57(1) 302-308, DOI : 10.1016/j.asr.2015.10.025  
<http://dx.doi.org/10.1016/j.asr.2015.10.025>

### **Fundamental Physics in Space and Microgravity Sciences**

Lorenzo Iorio (2016) The impact of the orbital decay of the LAGEOS satellites on the frame-dragging tests, *Adv. Space Res.*, 57(1), 493-498, DOI : 10.1016/j.asr.2015.10.014  
<http://dx.doi.org/10.1016/j.asr.2015.10.014>

Neus Puchades, Diego Sáez (2016) Approaches to relativistic positioning around Earth and error estimations, *Adv. Space Res.*, 57(1), 499-508, DOI : 10.1016/j.asr.2015.10.031  
<http://dx.doi.org/10.1016/j.asr.2015.10.031>

Seasons Greetings  
PASCAL WILLIS  
Editor-in-Chief  
Advances in Space Research

## Meeting Announcements

*COSPAR Istanbul 2016, 41st COSPAR Scientific Assembly*  
30 July -7 August 2016, Istanbul, Turkey

<https://www.cospar-assembly.org>  
<http://cospar2016.tubitak.gov.tr>



The next COSPAR meeting will attract about 2500 scientists and engineers from the world over. More than 100 symposia will cover all areas of space science: Space studies of the Earth's surface, meteorology and climate, Space studies of the Earth-Moon, Planets and small bodies of the solar system, Space studies of the upper atmospheres of the Earth and Planets including reference atmosphere, Space plasmas in the Solar system, including planetary magnetospheres, research in astrophysics from space, life sciences as related to space, material sciences in space, fundamental physics in space, and several Panel meetings.

Interdisciplinary lectures will also be given by key scientists and several associated events, such as meeting organized by Elsevier for young scientists to help them publish or review scientific articles.

In particular, we would like to draw the attention of geodesists of a meeting, organized by the COSPAR Panel on Satellite Dynamics, in conjunction with IAG Commission 1.

The aim of the Panel on Satellite Dynamics is to support activities related to the detailed description of the motion of artificial celestial bodies. This goal should be achieved by improving the current theories of motion and by evaluating their determining forces in a more sophisticated way. Detailed theoretical understanding of the dynamics of satellites should coincide with the results of precise tracking in order to obtain the most precise knowledge possible of the orbit and the corresponding orbital positions.

Two different sessions (both as 2-day meetings) are part of the Panel on Satellite Dynamics:

**PSD.1** The scope of the Panel on Satellite Dynamics entails the positioning of a wide range of objects in space, including Earth orbiting satellites for Earth observation such as GRACE, GOCE, Swarm and the Copernicus Sentinels, and navigation satellite systems such as GPS, GLONASS, Galileo, BeiDou, QZSS or tracking systems such as SLR and DORIS. In addition, positioning plays an important role in the success of the continuously growing number of today's and tomorrow's planetary and solar system missions. Limiting errors in Precise Orbit Determination (solar radiation pressure, time variable gravity fields, phase center corrections, etc...) are of critical interest for many stakeholders. Moreover, formations of satellites are being realized and proposed for Earth observation and fundamental sciences, that impose very severe constraints on (relative) positioning and orbit and attitude control solutions (e.g. micro-propulsion). Satellite orbit determination requires the availability of tracking systems, well established reference frames and accurate station coordinate solutions, detailed force and satellite models, and high-precision time and frequency standards. Contributions are solicited covering all recent developments and plans in ground, satellite or probe positioning and navigation.

**PSD.2** Global Navigation Satellite Systems (GNSS) are playing an increasing role in monitoring the Earth's environment. Together with other space geodesy techniques (e.g. InSAR, DORIS, ICESat, LiDAR, GRACE/GOCE and Radar Altimetry, etc.), it can measure changes to the land surface geometry with millimeter accuracy, and sub-meter pixel resolution. This session will address current geodetic and remote sensing capabilities, sensing/imaging in order to measure and monitor terrain, ground moisture, water cycle effects, ice/snow melting, ocean circulation and sea state, atmospheric weather and climate, earthquakes and tsunamis, volcanic activity, and more, warning using a variety of geodetic and remote sensing techniques. Papers on combining GNSS with in-situ observations and other satellite or airborne sensor data, as well as discussing new applications for such systems, and future missions/challenges are also welcome.

### Important dates:

12 February 2016: Abstract submission deadline

31 May 2016: end of early registration fees

HEIKE PETER, PASCAL WILLIS (for PSD.1) and SHUANGGEN JIN (for PSD.2)  
Convenors of the Satellite Dynamic Panel sessions

## *JISDM 2016*

Dear Colleague,

We are pleased to invite you to the 3rd International Symposium on Deformation Monitoring JISDM 2016 held from March 30 to April 1, 2016 in Vienna, Austria. For further details please see the conference website at [www.jisdm2016.org](http://www.jisdm2016.org). Here also the preliminary conference program may be found. The final program will be announced at the beginning of March, 2016 on the conference web-site. The conference program covers the topics announced under [www.jisdm2016.org/call-papers](http://www.jisdm2016.org/call-papers) for Papers. Additionally, as special feature it includes presentations at the peak of research in the field of Metrology for long distance surveying.

We would be very grateful if you also encourage members of your research team to participate in the conference. Please also distribute this information again internationally and inform your colleagues at your faculty, department, your working group members, etc., who have research foci related to the topics of the conference and invite them to actively participate at the symposium.

The earlybird registration deadline ends January 15, 2016. We would like to advise you that the conference registration fee has to be paid well in advance and received in our bank account latest by January 15, 2016 to obtain the reduced rate.

We have negotiated special rates as well as limited contingents in several hotels conveniently located to the conference venue at TU Wien. Please use the booking code 'JISDM 2016' to receive these rates and guarantee the booking with your credit card. Rates are subject to availability and the hotels may grant it as follows:

Hotel Carlton Opera: [www.carlton.at](http://www.carlton.at) (booking deadline 7th March, 2016)

Clima City Hotel: [www.climacity-hotel.com](http://www.climacity-hotel.com) (booking deadline 16th February, 2016)

Hotel 3 Kronen: [www.hotel3kronen.at](http://www.hotel3kronen.at) (booking deadline 29th February, 2016)

Hotel Erzherzog Rainer: [www.schick-hotels.com](http://www.schick-hotels.com) (booking deadline 11th February, 2016; resp. February 25, 2016)

Hotel Johann Strauss: [www.kremslehnerhotels.at](http://www.kremslehnerhotels.at) (booking deadline 29th February, 2016)

Hotel Mercure Secession: [www.hotelsecession.com](http://www.hotelsecession.com) (booking deadline 10th February, 2016)

Hotel Papageno: [www.shs-hotels.com/hotel-papageno](http://www.shs-hotels.com/hotel-papageno) (booking deadline 29th February, 2016)

Thank you very much for your support and hope to see you in Vienna.

Kind regards,

Prof. Dr. Hans-Berndt Neuner

Prof. Dr. Guenther Retscher

Chairs of JISDM2016 Organising Committee

## *Meetings Calendar*

### 8th Annual Conference on European Space Policy

January 12 – 13, 2016, Brussels, Belgium

URL: <http://www.b-bridge.eu/en/index.html>

### ION Precise Time and Time Interval Meeting (PTTI)

January 25 – 27, 2016, Monterey, California, USA

URL: <http://www.ion.org/ptti/>

### IGS Workshop

February 8 – 12, 2016, Sydney, Australia

URL: <http://igsworkshop2016.org/>

Munich Satellite Navigation Summit

March 1 – 3, 2016, Munich, Germany

URL: <http://www.munich-satellite-navigation-summit.org>

2nd IVS Training School on VLBI for Geodesy and Astrometry

March 9 – 12, 2016, Hartebeesthoek, South Africa

URL: [http://www.evga.org/2nd\\_vlbi\\_school.html](http://www.evga.org/2nd_vlbi_school.html)

9th IVS General Meeting

March 13 – 17, 2016, Ekudeni (Johannesburg), South Africa

URL: <http://ivs2016.hartrao.ac.za/>

JISDM 2016

March 30 – April 1, 2016, Vienna, Austria

3rd Joint International Symposium on Deformation Monitoring

URL: <http://www.jisd2016.org/>

TG-SMM 2016

April 12 – 15, 2016, Saint Petersburg, Russia

4th IAG Symposium “Terrestrial gravimetry. Static and mobile measurements”

URL: <http://www.elektropribor.spb.ru/tgsmm2016/eindex>

EGU General Assembly 2016

April 17 – 22, 2016, Vienna, Austria

URL: <http://www.egu2016.eu/>

ICEE-PDRP 2016

April 24 – 26, 2016, Bhaktapur, Nepal

International Conference on Earthquake Engineering and Post Disaster Reconstruction Planning

URL: <http://icee-pdrp2016.com>

FIG Working Week 2016

May 2 – 6, 2016, Christchurch, New Zealand

URL: <http://www.fig.net/fig2016/>

ESA Living Planet Symposium 2016 and 6<sup>th</sup> GOCE User Workshop

May 9 – 13, 2016, Prague, Czech Republic

URL: <http://lps16.esa.int/>

Airborne Gravimetry for Geodesy Summer School

May 23 – 27, 2016, Silver Spring, Maryland, USA

URL: <http://geodesy.noaa.gov/>

EUREF Symposium 2016

May, 25 - 27, 2016, San Sebastian, Spain

URL: [http://www.euref.eu/euref\\_symposia.html](http://www.euref.eu/euref_symposia.html)

18th Geodynamics and Earth Tide Symposium 2016

June 5 – 9, 2016, Trieste, Italy

URL: <http://www.lithoflex.org/g-et/>

ISG Geoid School

June 6 – 10, 2016, Ulaanbaatar, Mongolia

URL: <http://www.isgeoid.polimi.it/>

6th International Conference on Cartography & GIS

June 13-17 2016, Albena, Bulgaria

URL: <http://www.iccgis2016.cartography-gis.com/>

GAGER 2016

July 18 – 23, 2016, Wuhan, Hubei, China

Geodesy, Astronomy and Geophysics in Earth Rotation (GAGER2016) – A Joint IAU / IAG / IERS Symposium

URL: <http://main.sgg.whu.edu.cn/gager2016/>

International Symposium on Geodesy and Geodynamics (ISGG2016)

July 22 – 26, 2016, Tianjin, China

URL: <http://isgg2016.csp.escience.cn>

41st COSPAR Scientific Assembly

July 30 – August 7, 2016, Istanbul, Turkey

URL: <http://www.cospas-assembly.org/>

AOGS 13<sup>th</sup> Annual Meeting

July 31 – August 5, 2016, Beijing, China

URL: <http://www.asiaoceania.org/aogs2016/>

INTERGEO, Geodätische Woche

October 11 – 13, 2016, Hamburg, Germany

URL: <http://www.intergeo.de/>

IDS Workshop

October 31 – November 1, 2016, La Rochelle, France

URL: <http://ids-doris.org/meetings/ids-meetings.html>

SAR Altimetry Workshop

October 31 2016, La Rochelle, France

URL: <http://www.aviso.altimetry.fr/en/news/events-calendar.html>

OSTST 2016

November 1 – 4, 2016, La Rochelle, France

URL: <http://ids-doris.org/meetings/ids-meetings.html>

AGU 2016 Fall Meeting

December 12 – 16, 2016, San Francisco, California, USA

URL: <http://meetings.agu.org/upcoming-meetings/>

IAG / IASPEI Scientific Assembly

July 30 – August 4, 2017, Kobe, Japan

URL: <http://iag.dgfi.tum.de/index.php?id=291>

27th IUGG General Assembly

July 8 – 17, 2019, Montreal, Canada

URL: <http://www.iugg.org/assemblies/>

## Reports

### *Retreat of the International VLBI Service for Geodesy and Astrometry*

On October 7–8, 2015, the Directing Board of the International VLBI Service for Geodesy and Astrometry (IVS) held a retreat at the Dominion Radio Astrophysical Observatory, Penticton, BC, Canada, to discuss current and future challenges for the IVS. To benefit from external views and experience, six high-ranking colleagues of the space-geodetic community were invited as well. They provided very useful input and we thank them once again for their participation.

The IVS is in the process to change over to a new technological concept, the VLBI Global Observing System (VGOS), which requires good planning and organization of the transition period. Furthermore, in an ever increasing competition for funds, the IVS products and their uniqueness need to be emphasized to the right persons. With this in mind, an evaluation of the current state preceded the discussions on possible solutions for the problems at hand. The main points of discussion were focused on correlation, product lines, institutional relations, a business plan as well as operations details with concepts for the future. Critical items included the aging of the experienced workforce of the IVS, the preparation of the correlators for the large increase in data throughput for VGOS, an emphasis on the service aspect of the IVS, and the need for increased public relations work, among other items. Following the findings and the actions discussed, a summary report of the retreat has been drafted and will be made available soon. In a subsequent step, a strategic plan will be developed for the IVS making use of the findings of the retreat.

AXEL NOTHNAGEL, IGG Bonn University  
DIRK BEHREND, NVI, Inc.

### *Report on the VII SIRGAS School on Reference Systems and the Symposium SIRGAS 2015 Santo Domingo, Dominican Republic, November 16 - 20, 2015.*

The current activities, advances, and new challenges of SIRGAS are reported, discussed, and re-oriented (if required) in the annual SIRGAS Meetings, which have been held since 1993. In this series, the *Symposium SIRGAS2015* took place in Santo Domingo, Dominican Republic, November 18 to 20, 2015. In the days prior to the Symposium (November 16 and 17), a new edition of the *SIRGAS School on Reference Systems* was held. Both events were hosted by the *Universidad Nacional Pedro Henríquez Ureña* (UNPHU) and they were developed in the frame of the project *Monitoring crustal deformation and the ionosphere by GPS in the Caribbean* granted by the *International Union of Geodesy and Geophysics* (IUGG) in agreement with the *International Association of Seismology and Physics of the Earth's Interior* (IASPEI), the *International Association of Geodesy* (IAG), and the *International Association of Geomagnetism and Aeronomy* (IAGA).

The SIRGAS School was attended by 60 participants from 19 countries: Argentina, Bolivia, Brazil, Chile, Colombia, Costa Rica, Dominican Republic, Ecuador, Germany, Guatemala, Haiti, Honduras, Mexico, Monserrat (UK), Panama, Puerto Rico (USA), Uruguay, USA, and Venezuela. The subject of the school concentrated on strengthening the basic concepts needed for the appropriate generation and use of fundamental geodetic and geophysical data in the Caribbean Region, especially for studying, understanding and modelling deformations of the Earth's surface and features of the ionosphere and its influence on navigation systems used for civil aviation.

The Symposium SIRGAS2015 was attended by 148 participants from the same 19 countries. In 54 oral presentations and 15 posters, the following topics were presented: SIRGAS advances and new challenges, maintenance and new perspectives for the continental reference frame, national reference frames, geodetic estimation of geophysical parameters, height systems, gravimetry and geoid, geodetic analysis of the Earth's crust deformation, and practical applications and use of reference frames. Presentations are available at the SIRGAS web site ([www.sirgas.org](http://www.sirgas.org)).

Thanks to the support of the IUGG, the IAG, and the Pan-American Institute of Geography and History (PAIGH), it was possible to provide 20 SIRGAS colleagues from 9 countries with partial travel grants. SIRGAS deeply acknowledges this support.

In the frame of this Symposium, the SIRGAS Directing Council elected our colleagues William Martínez-Díaz (Colombia) and Virginia Mackern (Argentina) as the new SIRGAS President and Vice-president. They will coordinate the SIRGAS activities for the next four years.



Attendees of the VII SIRGAS School on Reference Systems.  
Santo Domingo, Dominican Republic, November 16-17, 2015.



Attendees of the Symposium SIRGAS2015.  
Santo Domingo, Dominican Republic, November 18-20, 2015.

CLAUDIO BRUNINI, LAURA SÁNCHEZ

### *BKG Hosts 3-Day GGOS Workshop*

The Global Geodetic Observing System (GGOS), chaired by Bundesamt für Kartographie und Geodäsie (Federal Agency for Cartography and Geodesy, BKG) President Prof. Dr. Hansjörg Kutterer, recently held a three-day workshop at the BKG facilities in Frankfurt am Main. The meetings, which drew participants representing many geodetic entities from around the world, consisted of sessions with the GGOS Consortium, Coordinating Board, Bureau of Products and Standards, and Bureau of Networks and Operations.

GGOS, in its capacity as the official observing system of the International Association of Geodesy (IAG), works toward advancing the understanding of the dynamic earth system by quantifying the planet's changes in space and time. GGOS is a unique entity within the IAG, and seeks to unite relevant IAG components to tackle some of the most pressing and critical issues affecting both geodesy and society today. Efforts discussed include, but are not limited to: the United Nations Global Geodetic Reference Frame Working Group, which is supported by GGOS members; natural hazard early warning systems, which has a dedicated GGOS Focus Area; and future efforts regarding an International Height Reference System and Global Absolute Gravity Reference System.

Each GGOS Bureau held a half-day meeting to discuss general issues and create roadmaps to solutions. The Bureau of Products and Standards (BPS), chaired by Detlef Angermann of DGFI-TU München, discussed the recent Inventory of Standards and Conventions document assembled by BPS and slated for publication in the IAG Geodesist's Handbook. Also addressed were proposed revisions to ISO Standard 19111, which defines a data model for describing reference frames and transformations between them. Dr. Johannes Ihde of BKG gave an overview of two recently adopted IAG resolutions: one for the definition and realization of an International height Reference System, and a second for the establishment of a Global Absolute Gravity Reference System.



The GGOS Bureau of Networks and Observations, chaired by Michael Pearlman of the Harvard-Smithsonian Center for Astrophysics, featured extensive discussions on Metadata, featuring a keynote presentation by Bernd Richter of BKG, following a successful GGOS Metadata Workshop last October. Richter noted that GGOS efforts with metadata should enable search capability and high-level discoverability, as well as facilitate machine-to-machine communication for rapid and accurate availability. Daniela Thaller, who leads a working group under the BNO and is also based at BKG, presented progress on simulations and data analysis that would make best use of existing resources, including co-location in space, as well as new dedicated satellites.

BKG hosted this workshop in its capacity as the temporary host of the GGOS Coordinating Office, currently led by Allison Craddock. Due to the success of this new meeting format, GGOS hopes to permanently hold workshops of this nature once per year, with the next workshop tentatively scheduled for late October 2016 at the Harvard-Smithsonian Center for Astrophysics in Cambridge, Massachusetts, USA.

ALLISON B. CRADDOCK

## Obituary

### *John Wahr (1951 – 2015)*



Professor John M. Wahr passed away on November 11, 2015 at the age of 64.

Professor Wahr was the first geophysicist to join the Department of Physics at CU-Boulder. He joined the department as an Assistant Professor in 1983, built the Geophysics Group within the Department, and had a highly distinguished career. He was also a Fellow of the Cooperative Institute for Research in Environmental Sciences. John entered semi-retirement (retiring only from departmental duties) and became a Research Professor in 2013 after having taught for 30 years. John received his B.S. degree from the University of Michigan and his PhD degree from CU-Boulder and then held a post-doctoral position at the Geophysical Fluid Dynamics Laboratory at Princeton University before being called back to CU-Boulder as a faculty member in 1983.

Professor Wahr is a world-renowned scientist who made seminal contributions to many areas of geophysics and geodesy. In his early research career, John was successful at developing the theoretical framework to understand the effects of the Earth's interior structure as well as atmospheric and oceanic mass distributions on the Earth's rotation, tides, wobble and nutation. Later in his career, and even more prominently, he worked on determining the effects of large-scale deglaciation on the Earth's surface vertical motions, sea-level changes, and the Earth's gravity field. In each of these research areas, he made groundbreaking contributions. His models of Earth's tides and nutation served as international standards for nearly 20 years.

In the last two decades, Professor Wahr devoted most of his research efforts to developing tools and models to observe and analyze the time-variations in the Earth's gravity field as observed from space. This has led to pioneering advances in a broad range of disciplines, including hydrology, glaciology, oceanography, meteorology, and solid-Earth geophysics. He was one of the principal intellectual forces behind NASA's highly successful satellite gravity mission, GRACE (Gravity Recovery and Climate Experiment). Using GRACE gravity data, John and his collaborators quantified the mass loss in Greenland and Antarctica since 2002 due to ice melting. He also examined seasonal and secular variations in ocean mass and terrestrial water storage on both global and basin scales. These innovations opened up entirely new avenues to observe and study mass movements in the shallow subsurface of the Earth on different time and spatial scales. These advances not only directly impact Earth science but also have profound societal significance.

Professor Wahr's research received wide recognition and acclaim. He won two major awards from the American Geophysical Union: the James B. Macelwane Award and the Charles A. Whitten Award in 1985 and 2006, respectively. He also received the Vening Meinesz Medal from the European Geosciences Union in 2004, was awarded the Guy Bomford Prize for Geodetic Research from the International Association of Geodesy in 1983, and was inducted into the US National Academy of Sciences in 2012. Professor Wahr's research excellence was acknowledged locally by his being named a Professor of Distinction by the College of Arts and Sciences at CU-Boulder in 2012. Moreover, John was simply a great colleague in the Physics Department and within the national and international geophysical communities. He was unselfish, modest and collegial. He was always willing to help junior colleagues at the university and elsewhere.

Professor Wahr was a dedicated teacher and mentor: always caring, patient, and insightfully helpful with his students, collaborators, and colleagues. He taught Physics at CU-Boulder for 30 years, from introductory undergraduate physics to advanced graduate physics and geophysics courses. He has advised nearly 30 PhD and post-doctoral scholars; many of whom, following his example, remain active in teaching and geophysical research.

In addition to his outstanding research career, John was an avid outdoorsman, strong athlete, and devoted family man. He was often found hiking with his family and his solo hikes and bike rides were legendary. To clear his head he would take the bus to Nederland and walk back to Boulder. One of his favorite solo outdoor activities involved a week in the backcountry of Yellowstone: long days covered on cross-country skis and then winter camping in snow caves of his own construction. John was a baseball fan, first of his hometown team the Detroit Tigers but he adopted the Colorado Rockies after they formed in Denver, and would regularly attend Rockies

games with his family. He was an accomplished musician with a fine singing voice, and a particular love of opera.

John was an intensely humble and private man who, nevertheless, had an enormous impact on people around him that extended well beyond the scientific insights that he shared with and inspired in others. He was respected and well liked by essentially everyone who came into contact with him.

Professor Wahr is survived by his dear wife Ann Wahr, by his daughter Katie Wahr, an elementary school teacher, of Boulder and son Andrew Wahr, a civil engineer, of Milwaukee, Wisconsin, and by his sister Jan Wahr and father John Wahr, both of Boulder.

John requested that no services be held on his behalf. However, condolences can be shared with John's family on the "Messages" page of the web site commemorating his life, which was constructed by his son at [johnwahr.com](http://johnwahr.com).

MIKE RITZWOLLER  
SHIJIE ZHONG