International Association of Geodesy Newsletter

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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). 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

Books for review are the responsibility of:

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General Announcements

IAG Young Authors Award 2011 – Thomas Artz

The IAG Young Authors Award 2011 is awarded to Thomas Artz for the paper "Assessment of periodic sub-diurnal Earth rotation variations at tidal frequencies through transformation of VLBI normal equation systems". It was published by Thomas Artz, Sarah Tesmer and Axel Nothnagel in Journal of Geodesy, 2011, Volume 85, Issue 9, pp. 565-584. This paper presents a new method to determine an empirical model for short period Earth rotation variations. The method is based on the transformation of normal equation systems of linear spline representations to normal equation systems in the model domain. The main advantages of this procedure are that it maintains the full variance-covariance information and also its high flexibility: the original data can be used to estimate time series of highly resolved parameters, and the transformation procedure allows the estimation of a parametric model. Furthermore the procedure provides an easy and elegant way to combine intermediate results of several space geodetic techniques in an almost rigorous way without the need to parameterize the model coefficients at the time of the technique specific parameter adjustment. Within the awarded paper, almost 6 million observables of VLBI sessions with duration from 1 to 24 hours over a time span of more than 30 years were analyzed to estimate simultaneously the terrestrial and the celestial reference frame as well as the transformation parameters in between. This can be done on all time scales, i.e., daily mean Earth orientation parameters as well as tidally induced short period variations can be determined in the form of a consistent model. The necessity for a set-up, which must be highly consistent and independent of the temporal regime, is demonstrated by thorough investigations of the correlations between the different parameters. The empirical results are in good agreement with present geophysical modeling approaches and show the incompleteness of the current official IERS Conventions (2010) model. Thus, the publication represents a possible approach to derive next generation reference frames and Earth orientation parameters as the transformation approach does not induce a loss of precision but provides high flexibility for the combination of different space geodetic techniques.

The main author and awardee, Thomas Artz, got in contact with geodesy for the first time in 1997 when he started an apprenticeship in land surveying. From 2001 onwards he studied geodesy at Bonn University and in 2005 he graduated (Dipl.-Ing.) with a thesis on the behavior of cable and phase calibration signals applied to radio telescopes. This initial contact with VLBI was later deepened during a first scientific employment in the famous VLBI group of the Institute of Geodesy and Geoinformation (IGG) of Bonn University. In 2011, he compiled his work in a Ph.D. thesis with the title "Determination of Sub-daily Earth Rotation Parameters from VLBI Observations". At present, he is employed at IGG as a post-doc scientist working on radio telescope observations of artificial satellites and implications on reference frames. During his scientific career, Thomas has gathered profound knowledge in many parts of geodetic theory and scientific computing. He is a specialist in various aspects of geodetic and astrometric VLBI providing tutorials and courses to master and phd students. In the meantime, his publication record has grown substantially.

HARALD SCHUH
IAG Vice President

IAG Young Authors Award 2012 – Manuela Seitz

After studying geodesy and getting her diploma degree (Dipl.-Ing.) at the Technical University of Dresden (TUD), Germany in 2001, Manuela Seitz became a research fellow at the German Geodetic Research Institute (DGFI) in Munich. In 2008 she obtained her doctorate at TUD. Her phd supervisor was Prof. Reinhard Dietrich and the thesis dealt with the combination of geodetic space techniques for the realization of the International Terrestrial Reference System. Since 2008, Manuela Seitz has been working as a post-doc and a senior scientist at DGFI. She is chair of the IERS International Terrestrial Reference System (ITRS) Combination Centre (CC) at DGFI. Her research activities are focused on the ITRS and the consistent realization of the terrestrial and the celestial reference systems. Her field of interest also covers the analysis of space geodetic techniques, in particular the analysis of VLBI observations, the combination at the observation level and the realization and application of short-term reference frames. She is chair of the IAG - Joint Working Group 1.3 "Strategies for epoch reference frames" and co-chair of the "IERS Working Group on the combination at the observation level". Furthermore, she is an active member of seven other Working and Study Groups of the IAG and the IAU.

The IAG Young Authors Award 2012 is presented to her for the paper "The 2008 DGFI Realization of the ITRS: DTRF2008" which she published in the Journal of Geodesy (2012) 86:1097-1123 (http://iag.dgfi.badw.de/fileadmin/IAG-docs/Seitz_et_al_2012.pdf) with the co-authors Detlef Angermann, Mathis Bloßfeld, Hermann Drewes and Michael Gerstl. The paper deals with the recent realization of the International Terrestrial System computed at the ITRS Combination Centre at DGFI as a contribution to ITRF2008. The ITRS CC at DGFI was established in 2001 as one of three IERS Combination Centers. The combination strategy at DGFI is based on stacking the normal equations. The input data are derived from VLBI, SLR, GPS and DORIS observations by weekly or session-wise processing and are provided by the responsible IAG Services. The direct combination of normal equations for realization of the ITRS is only applied by DGFI and the method is described in detail in the paper. The advantage of the combination at the normal equation level is that the geodetic datum is realized directly from the observations sensitive to these parameters. Different from the combination on solution level as applied by other combination centers, e.g. the ITRS CC at IGN, Paris, an application of similarity transformations within the combination process is not necessary. The combination at the normal equation level is rigorous and does not depend on individual operator decisions. The parameter space of the ITRS realization of DGFI comprises station positions and velocities, and daily resolved Earth Orientation Parameters (EOP). For the first time, also nutation parameters are included in the ITRS realization at DGFI. In their capacity as parameters common to all techniques, the terrestrial pole coordinates provide a measure for the consistency of the combined frame. This potential is successfully used for for taking into account the local ties. Additionally, the combination of the terrestrial pole coordinates links the technique networks with respect to their orientation and therefore leads to an improved consistency of the Terrestrial Reference Frame (TRF).

In the awarded paper the complete computation process is documented and all information is given to make the processing and the necessary decisions transparent and comprehensible. In particular, the analysis of the datum parameters is explained and discussed in detail. The two independent ITRS realizations computed by DGFI and IGN provide the possibility to assess the accuracy of ITRF by comparison of the two frames. This accuracy evaluation is also part of the paper and is done separately for the datum parameters (origin, orientation and scale) and the network geometry. The accuracy of the datum parameters, assessed from the comparison of DTRF2008 and ITRF2008, is between 2–5 mm and 0.1–0.8 mm/year. The network geometry (station positions and velocities) agrees within 3.2 mm and 1.0 mm/year. At the end of the awarded paper a list of detailed recommendations for future ITRS realizations resulting from the DTRF2008 computation are given.

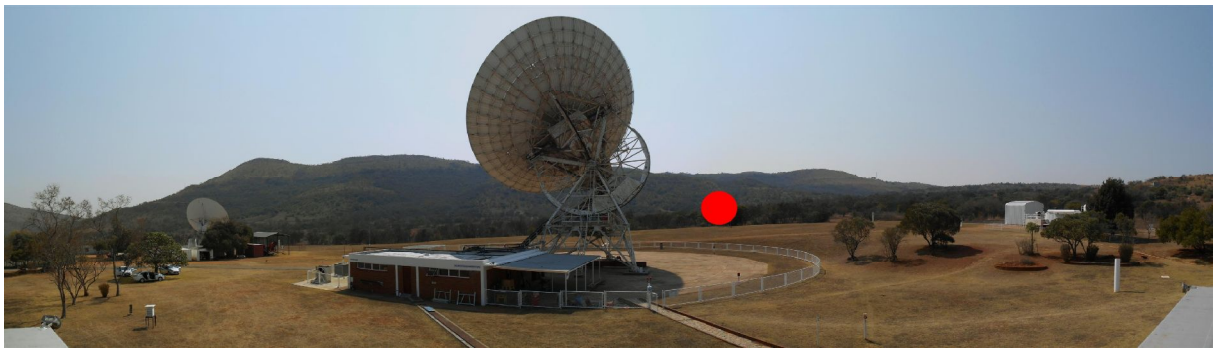
HARALD SCHUH
IAG Vice President

VGOS Network Expands to South Africa

The International VLBI Service for Geodesy and Astrometry (IVS) is implementing an innovative VLBI infrastructure over the next several years in order to meet the goals of the Global Geodetic Observing System (GGOS). The new VLBI network is called 'VLBI2010 Global Observing System' (VGOS) and will eventually consist of 25–30 12-m class antennas. A number of very fast radio telescopes are under construction or are already close to becoming operational: Wettzell (DE), Yebes (ES), Santa Maria (PT), Tenerife (ES), Ny Ålesund (NO), Badary (RU), Zelenchuckskaya (RU), Ishioka (JP), Kokee Park (US), and Greenbelt (US). At a later stage the VGOS network will include also the three AuScope antennas at Hobart, Katherine, and Yarragadee (AU) as well as Warkworth (NZ).

The most recent funding for a VGOS project was achieved by the Hartebeesthoek Radio Astronomy Observatory (HartRAO) expanding the VGOS network to the southern hemisphere. HartRAO has received funding for the acquisition and installation of a fully VGOS-compliant radio telescope. This telescope will be located at the same site as the current 15-m and 26-m radio telescopes. It will be possible to pair up the existing 15-m telescope (which is not fully VGOS compliant because of slower slew speeds and smaller bandwidth) and the new VGOS radio telescope to increase the number of source observations. The funding cycle stretches over a period of three years, commencing in 2014. Budget allocation has been requested in such a way as to optimize the development and implementation phase. Total funding allocated is 3.5 Million Euros.

Currently we are in the process of determining a suitable location, which needs to be virtually free of radio frequency interference (RFI) and founded on bedrock. An RFI monitoring station will be set up and moved to different locations to determine the most suitable area. Based on this information, various geophysical tests (refractivity, resistivity) will be conducted to create a geological map. Core drilling will be used to ultimately select the point of installation.



A possible location for the VGOS antenna at the Hartebeesthoek site (indicated by the red dot).

The new radio telescope will become part of IVS' VGOS network and will contribute to GGOS. It will primarily be a GGOS node. In the interim, the existing 15-m radio telescope will be used for geodetic VLBI (EOP determination) and the 26-m radio telescope will be utilized for astronomical and astrometric VLBI. Expected first light for the South African VGOS telescope will be sometime during 2016. The co-location of the radio telescopes, Satellite Laser Ranging, Lunar Laser Ranger in development, a geophysical vault containing a seismometer, accelerometer, and absolute gravimeter, and the adjacent DORIS (1.5 km distant) and GNSS equipment on site will ensure HartRAO's high level contribution to the Services of the IAG.

LUDWIG COMBRINCK
HAYO HASE

IAG monthly news for GIM – IAG page in the GIM International July 2013

The IAG become a partner with the magazine GIM International from the start of 2012. We would join sister geospatial organisations such as the FIG, ISPRS, ICA, GSDI & OGC in having a monthly page of news. The article titled "*IAG Commission 4, 'Positioning & Applications'*" for the *July 2013* issue of GIM is available from the webpage http://www.gim-international.com/issues/articles/id2015-IAG_Commission_4,_Positioning__Applications.html .

CHRIS RIZOS
President of IAG

IGU National Awards

Anni Talwani Memorial Prize

Indian Geophysical Union (IGU) was established in 1963. It is serving the Earthsystem scientific community by providing proper platforms to project the scientific achievements by the young and senior scientists. In addition to the existing national awards, IGU is instituting "ANNI TALWANI MEMORIAL PRIZE" starting from the year 2013, using the grant provided by Prof. Manik Talwani, USA. IGU invites nominations from meritorious scientists of age not more than 60 years (both Indian and foreign scientists who have contributed significantly through their studies covering the land and/ or offshore parts of India). Only such nominations that are duly forwarded by Fellows and Foreign Fellows of IGU or Heads of the institutes (where the applicants are carrying out the scientific studies) are eligible for selection by a committee constituted by the President of IGU. The Nominations duly signed by the proposer along with a detailed bio-data should reach the Hon. Secretary, IGU, NGRI Campus, Hyderabad-500 017 on or before 31st October, 2013. The applicants can send needed details electronically to: igu123@gmail.com

The nomination should include:

1. A one page letter stating the candidate's qualifications for the prize.
2. Candidates CV; it should not exceed two pages
3. A list of candidates' ten most important publications. Number of citations
4. Three one page letters of recommendations from renowned national or international senior earth system scientists.

Prof. Devendra Lal Best Paper Award

Indian Geophysical Union is introducing "Prof. Devenra Lal Best Paper Award" from 2013. The best paper will be selected for the current year from publications of Journal of Indian Geophysical Union that appeared in the four issues of 2013.

The above Prize/Award for 2013 will be given during the inaugural function of the 50th annual convention of IGU scheduled on 08 January 2014 at NGRI, Hyderabad.

KOTESWARA RAO
Hon. Secretary, IGU

Meeting Announcements

IAG Scientific Assembly 2013

The online registration was closed (as announced on this webpage before) on 28 August 2013, 23:59 h. Now, only on-site registration in Potsdam and on-site payment is possible. Themes as well as detailed description of themes of the IAG Scientific Assembly 2013 are available from the webpage http://www.iag2013.org/IAG_2013/Themes.html. For further conference information, please visit our homepage http://www.iag2013.org.

The IAG Committees would like to thank cordially all authors for their scientific contributions. Nearly 500 abstracts were received. Notifications of acceptance will be sent to all authors per e-mail at the end of May.All abstracts accepted and presented at the Assembly (oral or poster) may be submitted as papers for publication in the peer-reviewed IAG Symposia Series at Springer Publisher within one month after the Assembly.

IAG 2013 will offer you an interesting and comprehensive scientific program together with a variety of unique cultural events.

IAG 2013 LOC

IC-MSQUARE 2013

September 1-5, 2013, Prague, Czech Republic
2nd International Conference on Mathematical Modeling in Physical Sciences
URL: http://www.icmsquare.net

IAG Scientific Assembly

September 1-6, 2013, Potsdam, Germany
URL: http://www.iag2013.org

Vienna VLBI Software (VieVS) User Workshop

September 9-10, 2013, Vienna, Austria
URL: http://vievs.geo.tuwien.ac.at/user-workshop/2013/

2nd Joint International Symposium on Deformation Monitoring (JISDM)

September 9-11, 2013, Nottingham, UK
URL: www.nottingham.ac.uk/ngi/documents/events-pdfs/jisdm2013.pdf

ESA Living Planet Symposium 2013

September 9-13, 2013, Edinburgh, UK
URL: http://www.livingplanet2013.org/

TGSMM 2013

September 11-20, 2013, St Petersburg, Russian Federation
IAG Third Symposium "Terrestrial Gravimetry: Static and Mobile Measurements - TGSMM-2013

Scientific developments from highly accurate space-time reference systems

September 16-18, 2013, Observatoire de Paris, Paris, France
URL: http://syrte.obspm.fr/jsr/journees2013/

ION GNSS 2013

September 16-20, 2013, Nashville, TN, USA
URL: http://www.ion.org/meetings/?conf=gnss

ITU/BIPM Workshop on the Future of the International Time Scale

September 19-20, 2013, Geneva, Switzerland
URL: http://www.itu.int/ITU-R/go/itu-bipm-workshop-13/

Statusseminar der DFG-Forschergruppe Referenzsysteme (FOR1503)

September 19-20, 2013, Berlin, Germany
URL: http://www.referenzsysteme.de/

7th Coastal Altimetry Workshop

October 7-8, 2013, Boulder, USA
URL: http://www.coastalaltimetry.org/

11th International School of Geoid Service: Heights and Height Datum

October 7-11, 2013, Loja, Ecuador
URL: http://www.11iges.utpl.edu.ec/

Geodätische Woche and INTERGEO

October 8-10, 2013, Essen, Germany
URL: http://www.intergeo.de/

2nd International VLBI Technology Workshop

October 10-12, 2013, Seogwipo, South Korea
URL: http://ivtw2013.wikidot.com/

Ocean Surface Topography Science Team (OSTST) Meeting

October 8-11, 2013, Boulder, USA
URL: http://sealevel.jpl.nasa.gov/science/ostscienceteam/scienceteammeetings/

2013 Asia-Pacific Space Geodynamics Symposium

Ohio State University, Oct 17-19, 2013
URL: http://apsg2013.geodeticscience.osu.edu (available soon)

School on Reference Systems, Crustal Deformation and Ionosphere Monitoring

October 21-23, 2013, Panama City, Panama
URL: http://www.sirgas.org/index.php?id=233&L=0

SIRGAS Meeting 2013

October 24-26, 2013, Panama City, Panama
URL: http://www.sirgas.org/index.php?id=193&L=2

ICAG 2013

November 5-13, 2013, Walferdange Underground Laboratory, Luxembourg
International Comparison of Absolute Gravimeters

GRMSE2013

November 8-10, 2013, Wuhan, China
International Conference on Geo-Informatics in Resource Management & Sustainable Ecosystem
URL: http://www.ggers.org/

18th International Workshop on Laser Ranging

November 11-15, 2013, Fujiyoshida, Japan
URL: http://geo.science.hit-u.ac.jp/lw18

6th European Workshop on GNSS Signals and Signal Processing

December 5-6, 2013, Munich, Germany
URL: http://ifen.bauv.unibw.de/gnss-signals-workshop/

Gi4DM 2013

December 9-11, 2013, Hanoi, Vietnam
9th International Conference on GeoInformation for Disaster Management; Theme: Earth Observation for Disaster Management.
URL: http://www.gi4dm2013.com

AGU 2013 Fall Meeting

December 9-13, 2013, San Francisco, CA, USA
URL: http://sites.agu.org/meetings/

50th Annual Convention of IGU

January 8-12, 2014, CSIR-NGRI, Hyderabad, India
50th Annual Convention of IGU will be held during 8-12 January 2014 at CSIR-NGRI, Hyderabad, India. Online Deadline of submission of Extended Abstracts is 14.08.2013, closing of online submission of Extended Abstracts is 15.10.2013.
URL: http://www.igu.in

17. Internationaler Ingenieurvermessungskurs

January 14-17, 2014, Zurich, Switzerland
URL: http://www.igp.ethz.ch/iv2014/

ION International Technical Meeting (ITM) 2014

January 27-29, 2014, San Diego, CA, USA
URL: http://www.ion.org/meetings/?conf=itm

SPACOMM 2014

February 23-27, 2014, Nice, France
URL: http://www.iaria.org/conferences2014/SPACOMM14.html

IVS General Meeting

March 2-7, 2014, Shanghai, China
URL: http://ivs2014.csp.escience.cn/

GEOProcessing 2014

March 23-27, 2014, Barcelona, Spain
URL: http://www.iaria.org/conferences2014/GEOProcessing14.html

Munich Satellite Navigation Summit 2014

March 25-27, 2014, Munich, Germany
URL: http://www.munich-satellite-navigation-summit.org/

Third International School on "The KTH Approach to Modeling the Geoid"

March 31-April 4, 2014, Johor Bahru, Malaysia
URL: http://www.infra.kth.se/geo/events/geoidschool.html

European Geosciences Union General Assembly 2014

April 27 – May 2, 2014, Vienna, Austria
URL: http://www.egu2014.eu/

40th COSPAR Scientific Assembly

August 2-10, 2014, Moscow, Russia
URL: http://www.cospar-assembly.org/

ILRS Technical Workshop

October 27-31, 2014, Greenbelt, MD, USA
URL: http://ilrs.gsfc.nasa.gov/about/meetings.html

ICSU GRC Conference "Improving Geophysical Risk Assessment, Forecasting and Management"

November 18-21, 2014, Madrid, Spain
URL: http://www.icsu.org/

AGU 2014 Fall Meeting

December 15-19, 2014, San Francisco, CA, USA
URL: http://sites.agu.org/meetings/

European Geosciences Union General Assembly 2015

April 12 – 17, 2014, Vienna, Austria
URL: http://www.egu.eu

XXVI IUGG General Assembly

June 22 – July 2, 2015, Prague, Czech Republic
URL: http://www.iugg.org/assemblies/

XXIXth IAU General Assembly

August 3 – 14, 2015, Honolulu, Hawaii, USA
URL: http://www.iau.org/science/meetings/future/general_assemblies/1024/

41th COSPAR Scientific Assembly

July 30 – August 7, 2016, Istanbul, Turkey
URL: http://www.cospar-assembly.org/

Reports

VLBI Training School Held in Finland – Espoo, 2–5 March 2013

Early March saw the first geodetic VLBI school being organized by the IVS in Espoo (Helsinki), Finland. With heavy snow outside, a warm lecture hall at Aalto University welcomed around 50 participants in the EGU and IVS Training School on VLBI for Geodesy and Astrometry. Among them were PhD and master students from around the world who are interested in and involved with VLBI. There was also a teaching team consisting of members of the international components of the IVS. The VLBI training school was part of the activities of IVS Working Group 6. Its aim was to convey knowledge to the next generation researchers who will work with the next generation VLBI system for geodesy and astrometry.

The training school took place from 2–5 March 2013. Most lectures were given at Aalto University; however, the classes of the second day were held at the premises of the Finnish Geodetic Institute at Masala, which gave us the opportunity to visit this quiet institution in the beautiful forests. The lectures covered general issues as well as detailed aspects of VLBI and the next generation VLBI system. A broad range of technical aspects were discussed, including observations, correlation, data analysis, and the interpretation of results. Every individual lecture was a brilliant report and contained both the fundamental theory and the cutting-edge development.

In addition to the classroom-style lectures, several interesting exercises were arranged which allowed us to solidify the information learned in the lectures and to practice the processing of VLBI data. On March 3, an ice-breaker dinner was provided at the Finnish Geodetic Institute at Masala in an easy and relaxed atmosphere. The event gave us the opportunity to communicate with other attendees and to get to know what other research groups are working on. Finally, on March 5, an IVS Analysis Workshop rounded out these eventful four days.

During the training school, I was impressed to see that the teachers, who are experts in certain fields of VLBI, listened attentively to the other lectures and actively participated in the exercises, although they may have been quite familiar with the material. By talking with other attendees, I learned that we all found this training school to be informative and very beneficial. This is due to the successful organization done by the hosts, the program committee, and the teachers. A big thank-you to all of them and to the organizations that sponsored the school! I hope that this was only the first of a long series of VLBI schools in the future.

MINGHUI XU