



**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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Meeting Announcements

COSPAR Moscow 2014, 40th COSPAR Scientific Assembly

2-10 August 2014, Moscow, Russia

<https://www.cospar-assembly.org>

<http://cospar2014moscow.com>



The next COSPAR meeting will attract about 2500 scientists and engineers from the world over. The 119 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 2-day 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 should be achieved by improvement of the theories of motion and by more sophisticated evaluation of their determining forces. Detailed theoretical understanding of the dynamics of satellites should be matched with the results of precise tracking in order to obtain the most precise knowledge possible of the orbit itself and the corresponding orbital positions. The scope of the Panel on Satellite Dynamics is positioning of a wide range of objects, including Earth orbiting satellites for observing geopotential fields such as GRACE and GOCE, sea and ice level, and navigation satellite systems such as GPS, GLONASS, Galileo, Beidou, or tracking systems such as SLR and DORIS. In addition, positioning plays an important role for the continuously growing number of today's and future 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 this discipline. Moreover, formations of satellites are being realized and proposed for Earth observation and fundamental sciences, that pose very high demands 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.

Important dates:

21 February 2014: Abstract submission deadline
17 May 2014: end of early registration fees

PASCAL WILLIS and HEIKE BOCK
Convenors of the Satellite Dynamic Panel session

Third International School on "Least Squares Approach to Modelling the Geoid"

After the successful experiences in the determinations and evaluations of precise local geoid models in different countries as well as the very well met 1st and 2nd International Geoid Schools at Yildiz Technical University, Istanbul, in September 2010 and Universiti Teknologi Malaysia, Johor Bahru, in February-March 2012, we plan to arrange the 3rd International Geoid School based on the KTH Approach. (KTH is a Swedish abbreviation for Royal Institute of Technology, Stockholm, Sweden). The school will be arranged at KTH from *18 to 22 of August, 2014*.

The KTH approach to geoid determination is unique in the sense that it uses least squares technique in the spectral domain to combine the data in an optimum way by considering the errors of the EGM, the gravity data and the truncation of Stokes' integral to a cap around the computation point. Another feature that distinguishes the KTH method from others is the way corrections for topography, atmosphere and ellipsoidal shape of the earth are applied: all corrections are added as separate additive corrections. This method was successfully applied in the determination of several regional geoid models: over Sweden, the Baltic countries, Greece, Iran, Sudan, Zambia, Ethiopia, Tanzania, Serbia, Moldova, part of Turkey and, finally, in the 2009 test project for the comparison of up-to-date methods of geoid modelling in Auvergne, France. See also Yildiz et al. (2012) below. The official geoid models of Sweden and Estonia are based on the LSMSA technique.

The school will be organized with theoretical lectures in the mornings followed by computer exercises in the afternoons, where the software available at KTH will be used. Computers will be simultaneously available for the exercises. Since the Geoid School has a full-week intensive program, it can be counted as an external full graduate course.

The school is primarily offered only for university students and personnel from public organizations, and the software package is made available only for training of students and scientific works.

Why KTH approach?

Many different methods have been proposed through the years for regional geoid determination by gravimetric data, each based on its own technique and philosophy. Today, all such methods combine long-wavelength Earth Gravity Models (EGMs) with local gravity data, and they mainly differ in the way they combine these data sets. The KTH approach is unique in the sense that it uses least squares technique in the spectral domain to combine the data in an optimum way by considering the errors of the EGM, the gravity data and the truncation of Stokes' integral to a cap around the computation point. Another feature that distinguishes the KTH method from others is the way corrections for topography, atmosphere and ellipsoidal shape of the earth are applied: in contrast to other methods, which all apply these corrections both to the gravity anomaly (direct effects) and to the preliminary computed geoid heights (indirect effects), it only corrects the preliminary geoid heights by so-called additive corrections. Any of the additive corrections can be added afterward at any time when better data are available for its improvement (without the need to repeat all the computations). The method, called Least Squares Modification of Stokes Formula with Additive corrections (LSMSA), is the result of 30 years of research and several M.Sc. and Ph.D. theses at KTH. The LSMSA is an accurate, simple and practical method of determining the geoid. The theoretical and practical aspects of this method have been developed since 1984 to present mainly by and under the supervision of Prof. Lars E. Sjöberg. (See numerous papers, e.g. in *J. of Geodesy*.) The method has been successfully applied in the determination of several high-resolution regional geoid models in different areas. Through the LSMSA approach, various data, such as a Global Geopotential Model, gravity anomalies and a high-resolution photogrammetric/SRTM Digital Elevation Model are combined to a gravimetric geoid model, and the method can be (and usually is) designed to match with GPS/levelling data by using the least-squares principle. Several of the successful applications are reported in M.Sc. and Ph.D. theses at www.infra.kth.se/geo. Notable among these studies are the applications in rough topographic areas and in several developing countries with only limited gravity anomaly data. The results of comparisons clearly show that the LSMSA is advantageous to other methods.

Finally, in the recent test project for the comparison of up-to-date methods of geoid modelling with data from Auvergne area in France, no method provided better results than the LSMSA. A comparison of remove-compute-restore and LSMS techniques on this data set is also reported in Yildiz et al. (2012; see open access reference below).

The lecture notes will be prepared on a CD, which contains also exercises, data sets and software. Each student will receive a copy of the CD, and it will also be sent electronically to students well ahead of the school. All lectures are followed by computer exercises, where the software available at KTH will be used. The participants should bring their own laptop for the exercises.

This training course provides a good opportunity for the student to familiarize himself with the latest developments in geoid determination, as well as to enhance the international collaboration in gravity field modelling by building contacts to the professionals dealing with geoid determination in various countries.

Reference

H Yildiz, R Forsberg, J Ågren, C C Tscherning, L E Sjöberg (2012) Comparison of remove-compute restore and least squares modification of Stokes formula techniques to quasi-geoid determination over the Auvergne test area. *Journal of Geodetic Science* 2(1): 53-64 (open access)

Preliminary Program

See http://www.kth.se/polopoly_fs/1.454622!/Menu/general/column-content/attachment/IGS2014-KTH.pdf

The Venue

The school will be held at Royal Institute of Technology, Division of Geodesy and Geoinformatics, Drottning Kristinas väg 30, Stockholm.

Accommodation

There are many hostels and numerous hotels in Stockholm (search the web), but unfortunately not many with low prices. For example, STF hostel/hotel (www.fridhemsplan.se/) (newly renovated) has single rooms from 550 SEK, double rooms from 650 SEK and triple from 900 SEK. The participants must book their accommodation by themselves. If anyone needs a room-mate among participants, the organizers may help to find one.

Registration

The registration fee is 5000 SEK to be paid due 15 June, 2014. Late registration fees of 6000 SEK are accepted after that date. The fee includes lecture notes, preliminary software manual, a CD with the LSMSA software package, lunches, coffee/tea at breaks, a social dinner and a city sight-seeing tour. Details for payment are provided by the contact persons given below.

Notification of your interest to participate in the school

Please send an email to Mr. M. Bagherbandi (mohbag@kth.se) as soon as you know that you are likely to participate.

More information

Contact the organizer (see below) or Mohammad Bagherbandi (mohbag@kth.se) for additional questions.

Organizer

The geoid school is led by:

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MOHAMMAD BAGHERBANDI

ISPRS Technical Commission I Symposium Sustaining Land Imaging: UAVs to Satellites

URL: <http://www.commissions1.isprs.org>

The ISPRS Technical Commission I Symposium, in conjunction with the Pecora 19 ASPRS Fall Meeting and IAG Commission 4 Assembly, will take place *November 17-20, 2014 in Denver, Colorado (USA)*. The three-day event will include technical programs, plenary sessions with keynote and invited papers, and parallel sessions with oral and poster presentations. In addition, the symposium exhibition will feature the latest developments in commercial geospatial technologies.

The main focus of The ISPRS Technical Commission I is primary data acquisition and processes which include remote sensing technologies, sensor platforms, geometric and radiometric sensor calibration, georeferencing and sensor orientation, image and data standards, low-level sensor integration, and system design. The ISPRS Technical Commission I Working Groups play a vital role in organizing meetings which fosters multidisciplinary research and developments, and international cooperation.

The Mid-Term Symposium, the most important event organized by ISPRS Technical Commission I, provides a unique forum for all geospatial sensing and data acquisition professionals. Scientists, researchers, practitioners and decision makers, will present their latest research, discuss state-of-the-art sensing technologies, share research ideas, and encourage international collaboration.



Quadcopter in action

The main topics of the Symposium are:

- Data acquisition and pre-processing, and integration of various imaging sensors with other relevant systems on remote sensing platforms
- Design, construction, characterization, and installation of imaging and non-optical imaging sensors (IR, SAR, IfSAR, LiDAR, RF, etc.) for aerial and spaceborne missions for Earth observation
- Testing, calibration and evaluation of imaging and non-optical imaging sensors, including laboratory, in-flight/in-situ, inter-calibration and test fields
- Image technologies and data transfer protocols , standardization of definitions and measurements of active and passive imaging sensor parameters, geometric and radiometric properties, quality standards, and factors affecting data quality
- Integrated platform guidance, navigation, direct georeferencing and integrated sensor orientation
- Mobile Mapping, UAV/UAS, and autonomous system applications

You are encouraged to submit a paper or abstract for oral or poster presentation. All accepted papers will be published in either the International Annals (double-blind full paper review) or the International Archives (abstract review) of the Photogrammetry and Remote Sensing and Special Information Sciences.

We hope you will take advantage of this opportunity to join fellow researchers, scientists and practitioners from mapping and remote sensing, at this important event. Attend general and technical sessions, exhibits, and educational workshops on the very latest remote sensing research, modeling, applications, analysis techniques, and technologies. Reconnect with old friends or make new ones at the ISPRS Technical Commission I Symposium.



Denver, CO

See you in Denver!

CHARLES TOTH
President
The ISPRS Technical Commission I

Meetings Calendar

IVS General Meeting

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

ESG 2014

March 15-17, 2014, Venice, Italy
The 2014 International Conference on Environmental Science and Geoscience
URL: <http://tinyurl.com/esg2014>

GEOProcessing 2014

March 23-27, 2014, Barcelona, Spain
URL: <http://www.iaia.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>

3rd International Conference on the Use of Space Technology for Water Management

April 1- 4, 2014, Rabat, Morocco

Organized in cooperation with European Space Agency (ESA)
URL: <http://www.unoosa.org/oosa/en/SAP/act2014/Morocco/index.html>

INGEO 2014

April 3- 4, 2014, Prague, Czech Republic
6th International Conference on Engineering Surveying
URL: https://www.svf.stuba.sk/generate_page.php?page_id=5061

European Navigation Conference ENC GNSS 2014

April 15-17, 2014, Rotterdam, The Netherlands
URL: <http://www.enc-gnss2014.com/>

SARAL International Science and Applications Meeting

April 22-24, 2014, Ahmedabad, India
URL: http://smc.cnes.fr/SARAL/GP_actualite.htm

European Geosciences Union General Assembly 2014

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

GNSS : Principles, Augmentation and Evolutions of EGNOS

May 12- 23, 2014, Toulouse, France
URL: <http://www.formationcontinue-enac.fr/co/WORKGNSSEXT.html>

30th IUGG Conference on Mathematical Geophysics

June 2- 6, 2014, Merida Yucatan, Mexico
URL: <http://eventos.iingen.unam.mx/IUGG2014/>

EUREF Symposium 2014

June 4- 6, 2014, Vilnius, Lithuania
URL: http://www.euref.eu/euref_symposia.html

ICC&GIS 2014

June 15-21, 2014, Riviera, Bulgaria
5th Jubilee International Conference on Cartography & GIS
URL: www.iccgis2014.cartography-gis.com

IGS Workshop 2014

June 23-27, 2014, Pasadena, CA, USA
URL: <http://igs.cb.jpl.nasa.gov/pipermail/igsmail/2013/008013.html>

The 3rd International Gravity Field Service (IGFS) General Assembly

June 30-July 6, 2014, Shanghai, China
URL: <http://202.127.29.4/meetings/igfs2014/index.html>

International Symposium on Certification of GNSS Systems & Services

July 8 - 9, 2014, Dresden, Germany
URL: <http://www.dgon-cergal.org/>

GENAH 2014

July 22-25, 2014, Matsushima, Miyagi, Japan
International Symposium on Geodesy for Earthquake and Natural Hazards
URL: <http://genah2014.jpn.org/index.html>

AOGS 11th Annual Meeting

July 28-August 1, 2014, Sapporo, Japan

URL: <http://www.asiaoceania.org/aogs2014/public.asp?page=home.htm>

40th COSPAR Scientific Assembly

August 2-10, 2014, Moscow, Russia

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

XXXI General Assembly and Scientific Symposium of the IUGG

August 16-23, 2014, Beijing, China

URL: <http://www.chinaursigass.com/>

3rd International School on "Least Squares Approach to Modelling the Geoid"

August 18-22, 2014, Stockholm, Sweden

URL: <http://www.kth.se/en/abe/inst/som/avdelningar/geo/geodesi/handelser-1.78120>

18th WEGENER General Assembly: Measuring and Modelling our Dynamic Planet

September 1-4, 2014, Leeds, UK

URL: <http://see.leeds.ac.uk/wegener/>

Summer school on "GRACE/GRACE-FO applications for the terrestrial water cycle"

September 15-19, 2014, TBD, Germany

URL: <http://www.massentransporte.de/index.php?id=28>

Journées 2014 "Systemes de reference spatio-temporels"

September 22-24, 2014, Pulkovo Observatory, St. Petersburg, Russia

URL: <http://journées2014.gao.su/>

Eighth FORMOSAT-3/COSMIC Data Users' Workshop

September 30 – October 2, 2014, Boulder, USA

URL: www.cosmic.ucar.edu/workshop_2014/

INTERGEO / Geodätische Woche

October 7-9, 2014, Berlin, Germany

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

European VLBI Network (EVN) Symposium

October 7-10, 2014, Cagliari, Italy

URL: <http://www.evlbi.org/meetings/meetings.html>

REFAG2014

October 13-17, 2014, Luxembourg

IAG Commission 1 Symposium 2014 "Reference Frames for Applications in Geosciences"

URL: <http://iag.uni.lu/index.php?id=189>

The Climate Symposium 2014

October 13-17, 2014, Darmstadt, Germany

URL: <http://www.theclimatesymposium2014.com>

SARAL/AltiKa Workshop

October 27, 2014, Konstanz, Germany

URL: <http://www.ostst-altimetry-2014.com/>

IDS Workshop

October 27-28, 2014, Konstanz, Germany

URL: <http://www.ostst-altimetry-2014.com/>

19th International Workshop on Laser Ranging

October 27-31, 2014, Greenbelt, MD, USA

URL: <http://ilrs.gsfc.nasa.gov/about/meetings.html>

Ocean Surface Topography Science Team (OSTST) meeting

October 28-31, 2014, Konstanz, Germany

URL: <http://www.ostst-altimetry-2014.com/>

ISPRS Technical Commission I Symposium Sustaining Land Imaging: UAVs to Satellites

November 17-20, 2014, Denver, Colorado, USA

URL: <http://www.commission1.isprs.org/>

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

November 18-21, 2014, Madrid, Spain

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

11th International Conference on Location-based Services

November 26-28, 2014, Vienna, Austria

URL: <http://www.lbs2014.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, 2015, 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/>