



# International Association of Geodesy *Newsletter*

## January 2016

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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](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 Second Meeting of the IAG EC 2015-2019

Place: San Francisco, CA, USA, Hotel Marriott Marquis, 780 Mission St., Room Pacific C

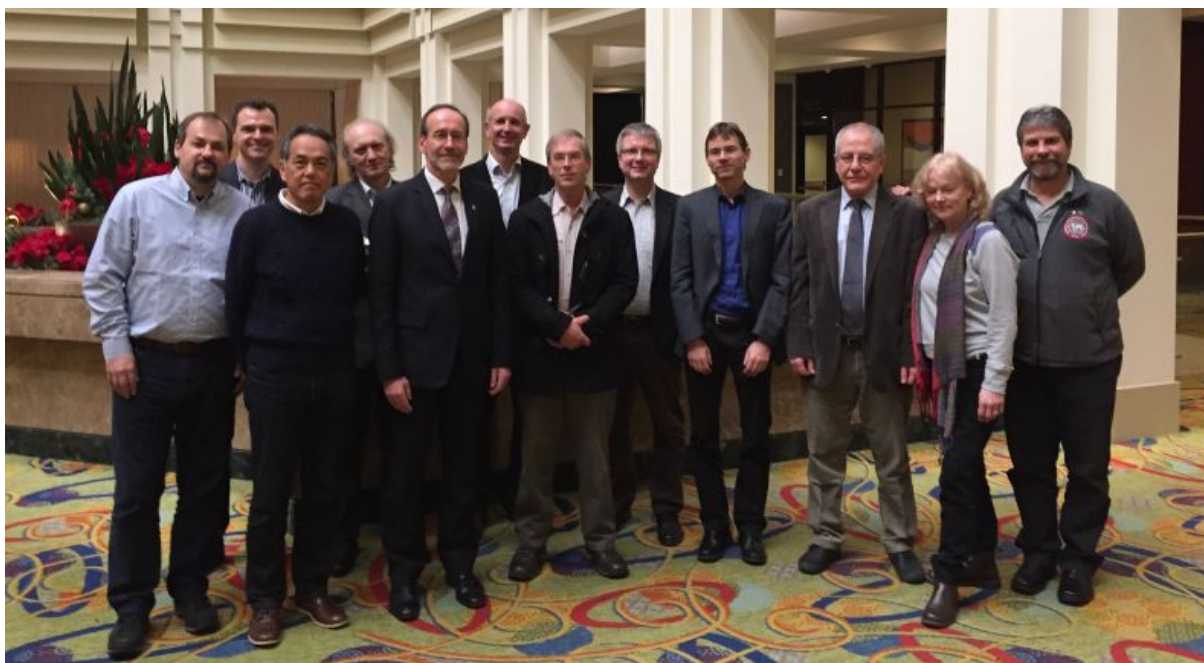
Time: Saturday, December 12, 2015, 09:00 – 18:00

**Attendees (voting):** H. Schuh (IAG President), Z. Altamimi (Vice President), H. Drewes (Secretary General, via Skype), G. Blewitt (President of Commission 1), R. Pail (President of Commission 2), M. Hashimoto (President of Commission 3), M. Santos (President of Commission 4), P. Novák (President of ICC on Theory), H. Kutterer (Chair of GGOS), R. Barzaghi, R. Neilan, A. Nothnagel (Representatives of the Services), L. Combrinck (Member at Large)

**Regrets:** C. Rizos (Immediate Past President), J. Adam (President of the COB), M.C. Pacino (Member at Large)

**Attendees (non-voting):** F. Kuglitsch (Assistant Secretary General)

**Guests:** J. Ceva (Moderator of the IAG Strategy Process), J. Freymueller (Editor in Chief of the IAG Symposia Series), G. Johnston (Chair of the IGS Governing Board)



### Summary of Agenda Items

#### 1. Welcome and adoption of agenda

The 2<sup>nd</sup> IAG EC Meeting in the term 2015-2019 took place on the occasion of the AGU Fall Meeting. *H. Schuh*, the President of the IAG, welcomed the members of the EC (13 out of 16 voting members, 1 non-voting member, 3 guests). The agenda was distributed previously by email and was unanimously adopted. *H. Schuh* introduced the new Assistant Secretary General, *F. Kuglitsch*, and highlighted the importance of discussing the IAG strategy process together with the guest and moderator *J. Ceva* during this meeting. On suggestion of *Z. Altamimi*, *H. Schuh* invited *G. Johnston* to join the meeting after the coffee break at 11:00 for discussing agenda point 10 “*Position Paper on the UN Global Geodetic Reference Frame*”. The EC Members approved the minutes of the first EC Meeting in Prague, July 2, 2015.

#### 2. Structure 2015-2019 of the Commissions 2, 3 and 4

*R. Pail* gave the presentation about Commission 2. It will keep 6 sub-commissions: SC 2.1 *Gravimetry and Gravity Networks* (Chair *L. Vitushkin*) will remain as before. SC 2.2 is now called *Methodology for Geoid and Height Determination* (Chair *J. Agren*) and SC 2.3 is now called *Satellite Gravity Missions* (Chair *A. Jäggi*). SC

2.4 *Regional Geoid Determination* (Chair *M.C. Pacino*) and SC 2.5 *Satellite Altimetry* (Chair *X. Deng*) keep their names; and SC 2.6 is now called *Gravity and Mass Transport in the Earth System* (Chair *J. Kusche*). *R. Pail* also presented the new Working Groups “*Relativistic Geodesy: First steps towards a new geodetic technique*” and “*Gravity for Climate Model Validation*”. The GGHS-2016, a joint meeting with IGFS, will be organized in Thessaloniki, Greece, 19-23 September 2016. *H. Schuh* explained that working groups have a life time of 4 years, working or study groups have a maximum of 20 members, and the Commission Steering Committee 10-12 members; e.g. sub-commission chairs and others. Sub-commissions have no steering committees.

*M. Hashimoto* gave the presentation of Commission 3. He reported about its objectives, structure, and activities. There are 5 sub-commissions: SC 3.1 *Earth Tides and Geodynamics* (Chair *J. Bogusz*), SC 3.2 *Crustal Deformation* (Chair *Z.-K. Shen*), SC 3.3 *Earth Rotation and Geophysical Fluids* (Chair *J. Chen*), SC 3.4 *Cryospheric Deformation* (Chair *S. Abbas Khan*), and SC 3.5 *Tectonics and Earthquake Geodesy* (Chair *H. Ozener*). *H. Drewes* mentioned that there can be only up to 2 Members at Large in the Commission’s Steering Committee but up to 3 Representatives of IAG services. *H. Schuh* clarified that sub-commissions do not have members but any interested scientist can contribute and become involved in study or working groups. He mentioned that there is also a GGOS focus area which is chaired by *T. Schöne* that should be closely linked to the Joint Working Group 3.2.

*M. Santos* gave the presentation on Commission 4. There will be only 4 instead of 6 subcommissions: SC 4.1 *Emerging Positioning Technologies and GNSS Augmentation* (Chair *V. Gikas*), SC 4.2 *Geo-Spatial Mapping and Geodetic Engineering* (Chair *J. W. Wang*), SC 4.3 *Atmosphere Remote Sensing* (Chair *M. Schmidt*), and SC 4.4 *Multi-Constellation GNSS* (Chair *P. Wielgosz*). *H. Drewes* noted that there should be no co-chairs as in this case nobody feels responsible. Also, vice-chairs should be avoided. *H. Schuh* suggested nominating more young people as chairs to the working and study groups. Commission 4 will have a symposium in 2016 in Wroclaw, Poland. *H. Drewes* clarified that meetings can get support from IAG if one component or sub-component of IAG is supporting it and if at least one member of the SOC gets approved by the EC.

### **3. Structure of the Inter-Commission Committee on Theory and Appointment of the ICCT Vice President**

*P. Novák*, gave the presentation on the structure and activities of ICCT. He mentioned that the ICCT past president, *N. Sneeuw*, will continue being involved in ICCT activities. There are 12 study groups, all of them jointly organized with one or more commissions. The setup of 2 more study groups (*New generation of terrestrial reference frames* and *New realization of geodetic reference system*) is under consideration. He highlighted the involvement of early-career scientists in the study groups. *H. Drewes* noted that the ICCT study groups should be also mentioned with the names of their chairs in the Commission structures referring to ICCT for further information. They have to report to ICCT. The EC Members recommended organizing the Hotine-Marussi Symposium in 2018. *P. Novák* proposed *M. Crespi* to become the next ICCT Vice-President. The EC members unanimously approved it.

### **4. Programmes 2015-2019 of the Services**

*R. Barzaghi* gave the presentation about the International Gravity Field Service (IGFS): Bureau Gravimetricque International (BGI), International Service for the Geoid (ISG), International Center for Global Earth Models (ICGEM), International DEM Service (IDEMS), International Geodynamics and Earth Tides Service (IGETS). He mentioned that soon there will be a call for a new IGFS Central Bureau which should start its activities on 1 April 2016. Also, he reported that *J.-P. Boy* is the interim chair of IGETS; the interim IGETS website is <http://www.eas.slu.edu/GGP/ggphome.html>. The renewal of IDEMS is still under discussion. *H. Schuh* and *H. Kutterer* mentioned that collaborating with a company (ESRI) is principally OK as long as free access is guaranteed and the commercial interest is clarified.

*R. Neilan* gave an overview about the International GNSS Service (IGS) and introduced *G. Johnston* as the new IGS Chair. She mentioned that ILRS has a new SLR station in Brazil funded by Russia. At the ICG Meeting in Boulder there was the idea that IGS starts a pilot project to do GNSS Monitoring Assessment Validation. She also mentioned that the IGS Analysis Center Coordinator is moving from the USA to Australia because the US National Geodetic Survey cannot support it anymore. *G. Johnston* will propose *T. Herring* as the new coordinator. Also, there will be an IGS workshop in Sydney, Australia from 8-12 February 2016, and she will make sure that the IGS report will be finished by then.

A. Nothnagel gave a presentation about the International Earth Rotation and Reference Systems Service (IERS), the Bureau International des Poids et Mesures (BIPM), the International VLBI Service for Geodesy and Astrometry (IVS), and the Permanent Service for Mean Sea Level (PSMSL).

## 5. Structure of GGOS

H. Kutterer mentioned that the GGOS website ([www.ggos.org](http://www.ggos.org)) hosted by BKG, is currently updated and will be relaunched in early 2016, that GGOS is looking for a host and director of the GGOS Coordinating Office, and that the GGOS Science Panel Chair needs to be elected. He explained that the GGOS Consortium is the collective voice for all GGOS matters and meets annually (GGOS Days), and that the GGOS Coordinating Board is the decision making body of GGOS which meets twice a year. Also, he mentioned that the GGOS Executive Committee still needs to be approved by the members of the Coordinating Board. The GGOS Science Panel, a multi-disciplinary advisory board that provides scientific support and guidance to the GGOS steering and coordination entities is almost complete. He mentioned that there are proposals for 2 new GGOS Working Groups: *Strategy for the Realization of the International Height Reference System (IHRS, Chair L. Sanchez)* and *New Technologies and Multidisciplinary Contribution to Disaster Monitoring and Management (Chair J. Doukas)*.

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

As the COB President J. Adam could not attend the meeting, H. Schuh summarized the report and concluded that the COB needs to get news/input for the IAG website and the IAG newsletter regularly. He requested all commissions and services to contribute once per year, and also to report about all symposia. Every month, one report (up to one page) by a commission or service should become available and submitted to GIM International and the IAG Newsletter. He further mentioned that the COB will submit the reports to GIM International. C. Rizos will still be acting as the editor of the text, if required. The scheduling of the monthly report submissions should be mainly organized by the COB.

## 7. Report from developing countries

L. Combrinck, gave the presentation about the African VLBI Network (AVN) Project and other activities in Africa. M.C. Pacino could not attend the meeting to give a presentation about the activities in South America. H. Schuh noted that there is no Member at Large who can report about the activities in Asia and suggested M. Hashimoto to report about this topic at future EC meetings.

## 8. IAG Representatives to IUGG Commissions and Working Group

H. Schuh presented the names of IAG Representatives to Scientific Bodies (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)). The EC members approved R. Barzaghi as representative to ICGEM, R. Pail as representative to ISG, J. Hagedorn as representative to SEDI, H. Schuh for UN-GGIM, S. Rozsa for the IUGG Outreach Committee, B. Heck for the IUGG Capacity Building and Education Committee, H. Schuh for the IUGG Honours and Recognition Committee, J. Freymueller for the IUGG Statutes and Bylaws Committee, and to ask L. Hothem or M. Craymer to become representative to ISO.

## 9. IAG Strategy discussion

H. Schuh invited J. Ceva starting the IAG Strategy discussion. J. Ceva mentioned the importance of deciding how IAG would like to proceed, either with (i) the development of a strategic plan, (ii) addressing different issues without doing a formal strategic plan, or (iii) postponing the strategic planning process. He presented 8 questions that should be answered first to begin the strategic planning process. H. Schuh mentioned that there are several open issues motivating him to undertake a strategic planning process. The last time IAG did a similar strategic planning exercise was about 15 years ago and since then many things in science have changed. There is a need to attract early-career scientists in IAG activities and to further strengthen IAG outreach activities (c.f. COB), especially to reach policymakers and to increase visibility of IAG and Geodesy in general. Internal relationships such as between IAG and GIAC, UN-GGIM, IERS must be clarified, and the IGFS must be strengthened by improving its structure. Further open issues, sent by C. Rizos, are e.g. the implementation of UN-GGRF or the International Services Assessment (ISA) which still has to be finished.

Several EC members highlighted the difficulties of attracting early-career scientists who usually are not aware what IUGG or IAG stands for because these are mostly doing science management. Anyways, there should be events for early-career scientists at IAG events but also universities and organizers of similar meetings (e.g.



International Geodetic Student Meeting in Munich, 2016) should be contacted to advertise IAG. Also, they suggested to precisely defining the objectives of IAG to easily distinguish IAG from other organizations such as ISPRS or FIG. *H. Schuh* mentioned that the IAG mission statements and objectives should be written in a modern language and not simply taken from the IAG Statutes.

The EC members agreed to start the strategic planning process but to avoid any major changes in the structure of IAG. *H. Schuh* mentioned that all the EC members should be involved in the strategic planning process (incl. possible external input, e.g. *G. Beutler*). It should be presented to the public at the IAG Scientific Assembly 2017 and finalized in 2 years. The EC members decided a meeting for a 1.5 day retreat and a 0.5 day EC meeting in Potsdam, Germany, from 25-26 April 2016.

#### **10. Position paper on the UN Global Geodetic Reference Frame**

A draft position paper describing the IAG's understanding of the Global Geodetic Reference Frame (GGRF) had been submitted by an ad-hoc working group of GGOS. This paper was subject of the discussion. *G. Johnston* presented the "*Description of the Global Geodetic Reference Frame*". He summarized that the major goal is the sustainable development and not the technical details. *H. Schuh* noted that it is good to have a report as a compilation of IAG's understanding of the GGRF. But he also confirmed that some statements are contradicting each other. *H. Kutterer* agreed that the paper is a good basis for further discussion and future perspectives but a stronger focus should be put on the need of the international geodetic community to reach the goals. The EC agreed that the document requires further revision. *H. Schuh* invited the EC members sending further comments to *J. Ihde* and *R. Barzaghi* and the ad-hoc working group. The EC agreed to approve the position paper provisionally. An e-voting on the approval of the final document needs to be done.

#### **11. Structure 2015-2019 of the Commission 1**

*G. Blewitt* gave the presentation about Commission 1 which will have 4 Sub-commissions: SC 1.1 *Coordination of Space Techniques* (Chair *U. Hugentobler*), SC 1.2 *Global Reference Frames* (Chair *X. Collilieux*), SC 1.3 *Regional Reference Frames* (Chair *C. Bruyninx*), and SC 1.4 *Interaction of Celestial and Terrestrial Reference Frames* (Chair *Z. Malkin*). He mentioned that there will be 6 Joint Working Groups. *H. Schuh* mentioned that there should be no Co-Chairs but only Vice-Chairs to give responsibility to one person and recommended making the Joint Working Group 1.3 *Definition of next generation terrestrial reference frames* a Joint Study Group. *G. Blewitt* mentioned that Commission 1 has not appointed any Representatives of Services. *H. Schuh* commented that representatives for up to 3 Services and up to 2 Members at Large (considering geographical balance) should be appointed. Also, he clarified that scientists involved as officer or member in the Associations do not have to come from a paid-up IUGG member country (except the Association President).

#### **12. Relations with other international scientific and professional bodies**

*H. Schuh* discussed the relations with other international, scientific and professional bodies and the IAG Representatives to Scientific Bodies (see [http://iag.dgfi.tum.de/fileadmin/IAGdocs/IAG\\_Representatives\\_2015.pdf](http://iag.dgfi.tum.de/fileadmin/IAGdocs/IAG_Representatives_2015.pdf)). He mentioned that the President of the IAG Commission 1 (*G. Blewitt*) is also President of the COSPAR sub-commission B2, and assigned as IUGG Liaison Officer to COSPAR.

#### **13. Travaux 2015 and Geodesist's Handbook 2016**

*H. Schuh* referred to the Travaux 2015 (<http://iag.dgfi.tum.de/index.php?id=329>) and mentioned that the deadline for contributions for the Handbook 2016 is on 31.01.2016. Templates are available at [https://www.overleaf.com/latex/templates/journal-of-geodesyspringer-latex-template/mntwrgpqzrw#.VmluKb\\_0chR](https://www.overleaf.com/latex/templates/journal-of-geodesyspringer-latex-template/mntwrgpqzrw#.VmluKb_0chR).

#### **14. Status of the Prague proceedings**

*J. Freymueller* presented the idea of exploring the possibility of making future IAG Symposia books entirely electronic, together with IAG and Springer. *H. Kutterer* supported this idea and thinks it should be a strategic interest of IAG to get a broad readership (with possibly open access) and a higher visibility.

#### **15. Status of the Journal of Geodesy**

*H. Schuh* presented the status of the Journal of Geodesy, prepared by the Editor-in-chief *J. Kusche* (<http://iag.dgfi.tum.de/fileadmin/IAG-docs/Report-JoG.IAG-EC.2015.pdf>)

## **16. IAG/IASPEI Scientific Assembly, Kobe, Japan, 2017-07-30 to 2017-08-04**

*H. Schuh* gave an overview about the current status of preparations for the IAG/IASPEI Assembly 2017. He mentioned that the Local Organizing Committee (LOC; chaired by *K. Heki*) is known and the Scientific Organizing Committee (SOC) should consist of both IAG and IASPEI representatives. He suggested the 4 IAG Commission Presidents, the President of ICCT, the Chair of GGOS and *R. Barzaghi* as SOC members. He further mentioned that as many as possible joint symposia between IAG and IASPEI should be organized. Possible topics (suggested by the EC to the SOC) might be earthquake monitoring, seismic modelling, potential fields for constraining 3D-Earth modelling, early warning systems (e.g. tsunamis, volcanoes), deformation, inverse problems, time series analysis, and error propagation. *M. Hashimoto* mentioned that the sessions should be fixed by May 2016, the registration and abstract submission should start by September 2016, the deadline of abstract submission should be in February 2017, and the program should be fixed by April 2017. *Z. Altamimi* mentioned that the UN-GGIM meeting in New York might coincide with the Kobe Assembly.

## **17. Asia Oceania Geosciences Society meeting AOGS 2016**

*H. Schuh* mentioned that the AOGS Meeting in Beijing from 31 July to 5 August 2016 is in conflict with the UN-GGIM Meeting but it definitely would be worth attending AOGS because there are at least 5 Geodesy sessions.

## **18. Report from IUGG and ICSU**

*F. Kuglitsch* gave the presentation about the news from IUGG. He reported about the new composition of the IUGG EC and Finance Committee, changes in the IUGG structure, statistics of the IUGG General Assembly 2015 and the upcoming Scientific Assemblies of the IUGG Associations in 2017.

## **19. IAG Services Assessment, ISA**

*H. Schuh* reported that during the last IAG term all Services were requested answering a questionnaire to do an overall assessment. Based on the questionnaires that were answered by (almost) all Services a first round of review was done by three experts for each Service. Then feedback was given to the Services and they were requested to respond. So far IAG has received answers from IGFS, ISG and IVS. He mentioned that IAG Past-President *C. Rizos* agreed continuing to chair the IAG Services Assessment. He further noted that this assessment is kind of a formal approval of the services which might increase their impact and visibility. *Z. Altamimi* asked for getting the questionnaire (without answers).

## **20. Any other business**

*M. Santos* proposed sponsoring 2 meetings: (1) EuroCow European Calibration and Orientation Workshop, 10-12 February 2016, Lausanne, Switzerland (SOC member: *P. Wielgosz*); (2) International Conference on GNSS+ (ICG2016), 28-30 July 2016, Shanghai, China (SOC member: *V. Gikas*). The EC approved these meetings, i.e. early-career scientists may apply for IAG travel grants and the meeting organizers have to use the IAG logo. *H. Schuh* clarified that a meeting is an IAG Symposium when it is organized by 1 IAG component or 2 sub-components. Also, he mentioned that the papers should be published in a Springer volume, assuming that the number of papers is sufficient (~20). The IAG Secretary General needs to be informed about the symposia one year in advance.

## **21. Next IAG EC meeting**

The EC decided to hold its next meeting together with the strategic planning retreat in Potsdam, Germany, 25-26 April 2016. Then it should be decided whether an EC meeting should be organized also on the occasion of the AGU Fall Meeting in December 2016.

## **22. Adjourn**

*H. Schuh* thanked the participants for their contributions and closed the session at 17:50.

Respectfully submitted  
F. KUGLITSCH, Assistant Secretary General

## *ITRF2014 is available on line*

Dear ITRF Users and Colleagues,

The ITRS Center at IGN has the pleasure to announce to the community the availability of the ITRF2014 solution at the dedicated web site:

[http://itrf.ign.fr/ITRF\\_solutions/2014/](http://itrf.ign.fr/ITRF_solutions/2014/)

I want to take this opportunity to acknowledge the enormous efforts of the Technique Services (IVS, ILRS, IGS, IDS) and their Analysis and Combination Centers for their contributions by providing reprocessed solutions. The quality of the ITRF2014 is certainly benefiting from these technique improved solutions. Many thanks to a number of institutions and individuals for their contributions to the ITRF2014 project. I want also to acknowledge the contribution of DGFI and JPL colleagues, as well as my colleagues at the ITRS Center: IGN Geodetic Research Laboratory (LAREG) and IGN Survey Department (SGN).

The ITRF2014 web site contains the most important results and information regarding the ITRF2014 combination. It will be updated regularly to add more details and results useful to the ITRF users.

For any comment, question or specific request, please contact: itrf at ign.fr

Cordially

ZUHEIR ALTAMIMI  
Head, ITRS Center

## *ITRF2014, released January 21, 2016*

The new version of the International Terrestrial Reference Frame (ITRF) was released in January 21, 2016, and is available at the dedicated website: [http://itrf.ign.fr/ITRF\\_solutions/2014/](http://itrf.ign.fr/ITRF_solutions/2014/).

As recognized by the United Nations General Assembly resolution on the Global Geodetic Reference Frame for Sustainable Development (<http://www.unggrf.org/>), the ITRF (<http://itrf.ign.fr/>) is fundamental to various positioning (location-based), satellite orbit determination and Earth science applications. It is adopted and used by the international geodetic community, at the global and regional levels, as the standard and most accurate terrestrial reference frame available today. Its parent system (i.e. mathematical and physical formulation), namely the International Terrestrial Reference System (ITRS), is formally adopted and recommended by the International Union of Geodesy and Geophysics (IUGG) for all Earth science applications.

The ITRF, developed and maintained by the International Earth Rotation and Reference Systems Service (IERS - <http://www.iers.org>), a Service of the International Association of Geodesy (IAG), since the past 30 years. Its construction is based on a rigorous combination of geodetic products (temporal station coordinates and Earth Orientation Parameters – EOPs), provided by the main four space geodetic techniques, through their co-located measuring instruments at a certain number of core sites, called co-location sites. The space geodetic techniques that provide measurements for the computation of the ITRF include the Global Navigation Satellite Systems (GNSS), Satellite Laser Ranging (SLR), Very Long Baseline Interferometry (VLBI), and Doppler Orbitography Radiopositioning Integrated by Satellite (DORIS). These space geodetic techniques are organized as scientific services under the umbrella of the IAG: the International GNSS Service, formerly the International GPS Service (IGS – <http://igs.org/>), the International VLBI Service (IVS – <http://ivscc.gsfc.nasa.gov>), the International Laser Ranging Service (ILRS – <http://ilrs.gsfc.nasa.gov>) and the International DORIS Service (IDS – <http://ids.cls.fr>).

The ITRF2014 solution includes 1499 stations, located at 975 sites, about 10% of which are co-located with 2, 3, or 4 distinct space geodetic instruments as illustrated by Figure 1. The ITRF2014 input data comprises (1) the IAG technique service solutions provided in the form of daily or weekly time series of station positions and daily EOPs (Polar Motion from satellite techniques and VLBI, and Universal Time and Length of Day from VLBI only), as detailed in Table 1, and (2) 239 local tie vectors provided by the owners of the co-located instruments, in 139 SINEX files with full variance-covariance information.

Table 1. Summary of ITRF2014 space geodesy input data

| Service/Technique | Number of Solutions            | Time span                          |
|-------------------|--------------------------------|------------------------------------|
| IGS/GNSS/GPS      | 7714 daily                     | 1994.0 – 2015.1                    |
| IVS/VLBI          | 5328 daily                     | 1980.0 – 2015.0                    |
| ILRS/SLR          | 244 fortnightly<br>1147 weekly | 1980.0 – 1993.0<br>1993.0 – 2015.0 |
| IDS/DORIS         | 1140 weekly                    | 1993.0 – 2015.0                    |



The Earth is deforming, subject to multiple geophysical solicitations, such as tectonic plate motion, Earthquakes and loading effects generated by the atmosphere, ocean circulation and terrestrial hydrology. While tectonic plate motion will be an additional product of ITRF2014 that is coming soon, Post-seismic deformation and loading effects have to be considered during the ITRF2014 processing in order to improve the accuracy and precision of the frame. Two innovations were then introduced in the ITRF2014 processing, namely:

- To account for the loading seasonal effects, annual and semi-annual terms were estimated, using a sinusoidal function, for stations with sufficient time-spans of the 4 techniques during the stacking processes of the corresponding time series;
- Post-Seismic Deformation (PSD) models, using logarithmic or/and exponential functions, were determined by fitting GNSS/GPS data at major GNSS/GPS Earthquake sites. The PSD models were then applied to the 3 other techniques at Earthquake Co-location sites.

The main benefit of estimating seasonal signals and post-seismic deformations is to be able to infer a robust and accurate velocity field of the ITRF2014 sites, as illustrated by Figure 2.

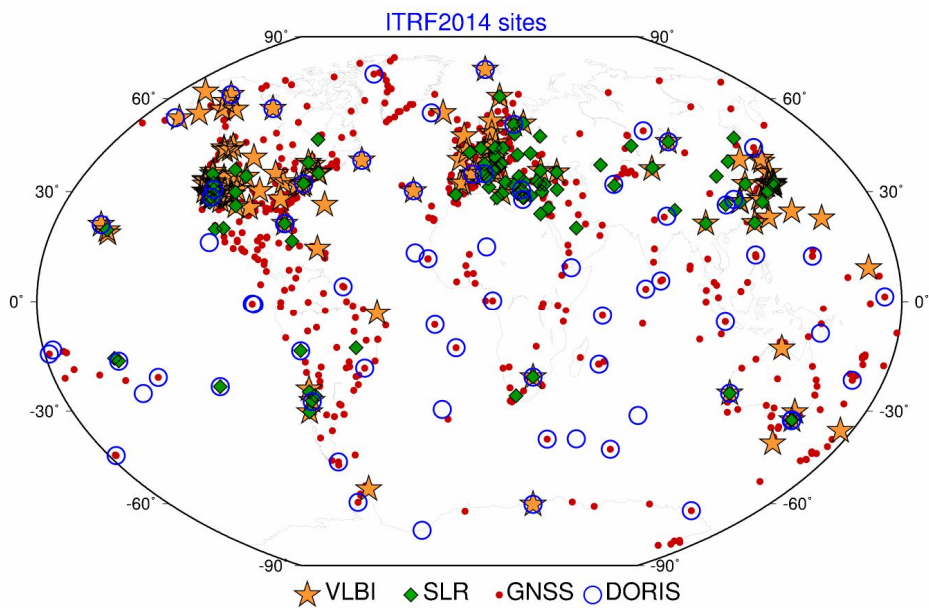


Figure 1. Distribution of ITRF2014 sites.

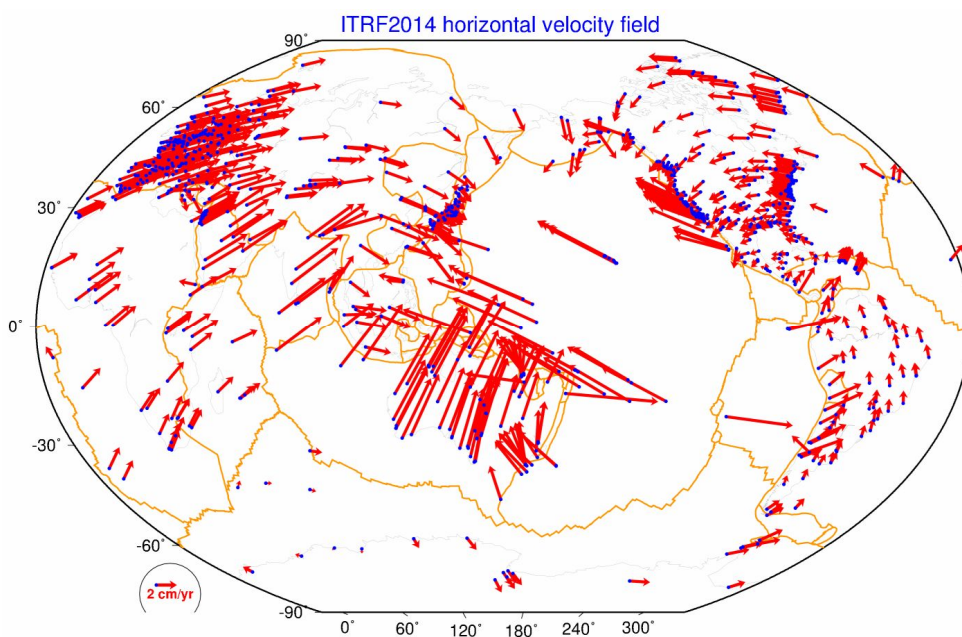


Figure 2. ITRF2014 Horizontal Velocities

ZUHEIR ALTAMIMI  
IGN France, IAG Vice-President

## Meeting Announcements

### *EuroCOW*

*10-12 February 2016, Lausanne, Switzerland*

We would like to bring to your attention to an international event organized in Lausanne, Switzerland on EPFL campus between *Feb 10-12 2016* that relates geodesy, photogrammetry, remote sensing, computer vision with other fields on the subject of sensor integration for mapping from small (e.g. UAV) as well as larger mobile platforms.

Apart selected contributions, this meeting features special invited speakers, live demos and updates on new products from two principal sponsors (\*senseFly\* and \*Pix4D\*) as well as the possibility to participate at two specialized workshops (space limited).

Please consult [www.eurocow.org](http://www.eurocow.org) for more information while noting that registration is available until *Jan. 27, 2016*.

With the best regards,

JAN SKALOUD (convener)

### *Airborne Gravimetry Summer School*

*May 23-27, 2016, Silver Spring, Maryland, USA*

The National Geodetic Survey (NGS) will host a five-day Airborne Gravimetry for Geodesy Summer School from May 23-27, 2016, in Silver Spring, Maryland, U.S.A.

The following topics will be addressed:

- Understanding airborne gravimetry: fundamental theory, data collection, and data processing
- Combining gravity data from satellite, airborne, and terrestrial sources
- Geoid modeling: fundamentals and recent advances
- Emerging developments in airborne gravimeter technology
- Monitoring geoid changes over time

Training will be conducted by world-renowned experts in the field. The school is open to anyone interested in airborne gravimetry for geodesy and geophysics. The Airborne Gravimetry for Geodesy Summer School classes are free of charge.

Please register on this website to reserve your space in the class. Space is limited to 50 participants and will be allocated to registrants on a first-come, first-served basis. Registration is open until March 31, 2016 or until the school is full.

For more information, please contact Dr. Yan Ming Wang at [yan.wang@noaa.gov](mailto:yan.wang@noaa.gov)

YAN MING WANG

### *IAG/CPGPS International Conference on GNSS+ (ICG+2016)*

*July 27-30, 2016, Shanghai, China*

<http://202.127.29.4/meetings/icg2016>

Nowadays, multi-Global Navigation Satellite Systems (GNSS) have been developed and widely used, including US's GPS, Russia's GLONASS, China's BeiDou and EU's Galileo as well as regional systems, such as Japan's QZSS and India's IRNSS. The International Conference on GNSS+: Advances, Opportunities and Challenges (ICG+2016) will be held on July 27-30, 2016, Shanghai, China. The ICG+2016 aims to provide a platform for GNSS scientists and engineers to communicate and exchange in theory, methods, technologies, applications and

future challenges. The ICG+2016 is open to all scientists who may have the latest results and developments in BDS/GNSS+, including constellations, signals, orbit, receiver, positioning/navigation/timing theory, algorithms, models and applications in engineering and Earth science as well as combining multi-sensors. Manuscripts on new advances in Multi-GNSS and other regional systems, compatibility, interoperability and new applications are also welcomed.

The ICG+2016 is jointly sponsored by the International Association of Geodesy (IAG), International Association of Chinese Professionals in Global Positioning Systems (CPGPS), Shanghai Astronomical Observatory, CAS and Shanghai Jiao Tong University, China. The main topics and sessions are as followings:

### Sessions & Topics

- Session 1: BDS/GPS/GLONASS/GALILEO Systems
- Session 2: Space and Ground Augmentation
- Session 3: GNSS Signals and Receiver
- Session 4: GNSS Algorithms and Models
- Session 5: GNSS Orbiting Determination and Modelling
- Session 6: GNSS PPP and Applications
- Session 7: GNSS Atmospheric Sensing & Meteorology
- Session 8: GNSS Ionosphere and Space Weather
- Session 9: Multi-Sensor Integration Navigation & LBS
- Session 10: GNSS-Reflectometry and Applications
- Session 11: GNSS/InSAR Surveying and Geodesy
- Session 12: GNSS/VLBI/SLR and Geodynamics

### General Chair

- [Shuanggen Jin](#), Shanghai Astronomical Observatory, CAS, China

### Scientific Organizing Committee (SOC)

- Wan-Sik Choi, Electronics & Telecommunications Res. Institute, Korea
- Naser El-Sheimy, University of Calgary, Calgary, Canada
- Maorong Ge, GFZ German Research Centre for Geosciences, Germany
- Linlin Ge, University of New South Wales, Sydney, Australia
- Manuel Hernandez-Pajares, Universitat Politecnica de Catalunya, Spain
- Xiaochun Lu, National Time Service Center, CAS, Xi'An, China
- Jyh-Ching Juang, National Cheng Kung University, Taiwan
- Marcelo Santos (Co-Chair), University of New Brunswick, Canada
- Harald Schuh, GFZ German Research Centre for Geosciences, Germany
- Chuang Shi, GNSS Research Center, Wuhan University, China
- Toshitaka Tsuda, RISH, Kyoto University, Japan
- Feixue Wang, National University of Defense Technology, China
- Jinling Wang, University of New South Wales, Sydney, Australia
- Pawel Wielgosz, University of Warmia and Mazury in Olsztyn, Poland
- Dongkai Yang, Beijing University of Aeronautics & Astronautics, China
- Wenxian Yu (Co-Chair), Shanghai Jiao Tong University, China
- Yunbin Yuan, Institute of Geodesy and Geophysics, CAS, China
- Qin Zhang, School of Geology & Geomatics, Chang'An University, China

### Local Organizing Committee (LOC)

- Peng Guo, Shanghai Astronomical Observatory, CAS, China
- Xiaogong Hu (Chair), Shanghai Astronomical Observatory, CAS, China
- Peilin Liu, Shanghai Jiao Tong University, China
- Ling Pei, Shanghai Jiao Tong University, China
- Rui Jin, Shanghai Astronomical Observatory, CAS, China
- Xuerui Wu, Shanghai Astronomical Observatory, CAS, China
- Yang Yu, Shanghai Astronomical Observatory, CAS, China

### Sponsors

- International Association of Geodesy (IAG)
- International Association of Chinese Professionals in GPS (CPGPS)

- Shanghai Astronomical Observatory (SHAO), CAS, China
- Shanghai Jiao Tong University (SJTU), China

SHUANGGEN YIN

## *GGHS2016*

Dear Colleagues,

The **GGHS2016** “Gravity, Geoid and Height Systems 2016” Meeting is the first Joint Commission 2 and IGFS Symposium co-organized with GGOS Focus Area 1 “Unified Height System”. It will take place in Thessaloniki, Greece September 19-23, 2016 at the premises of the Aristotle University of Thessaloniki (Main Ceremony Hall of the Aristotle University of Thessaloniki).

The main focus of GGHS2016 will be on methods for observing, estimating and interpreting the Earth gravity field as well as its applications. Therefore it will cover all fields of studies and objectives of IAG Commission 2, IGFS and GGOS Focus Area 1.

GGHS2016 continues the long history of IAG’s Commission 2 Symposia, GGG2000 (Banff, Canada), GG2002 (Thessaloniki, Greece), GGSM2004 (Porto, Portugal), GGEO2008 (Chania, Greece), GGHS2012 (Venice, Italy), with those of IGFS, 1st IGFS Meeting 2006 (Istanbul Turkey), 2nd IGFS Meeting 2010 (Fairbanks, Alaska, USA), 3rd IGFS Meeting 2014 (Shanghai, China) under a unified umbrella, the latter being decided during the XXVI IUGG General Assembly in Prague.

### **GGHS2016 SESSIONS**

**Session 1:** Current and future satellite gravity missions

**Session 2:** Global gravity field modelling

**Session 3:** Local/regional geoid determination methods and models

**Session 4:** Absolute and relative gravimetry: observations and methods

**Session 5:** Height systems and vertical datum unification

**Session 6:** Altimetry, Mass transport and Climate-relevant processes

### **IMPORTANT DATES**

Feb. 15, 2016 – Apr. 30, 2016 Abstract Submission

Jun. 15, 2016 Early Registration

Jun. 30, 2016 Abstract acceptance notification

Jul. 31, 2016 Session organization

Aug. 15, 2016 Letter of schedule

### **COMMITTEES**

#### **LOC**

George S. Vergos (Chair of the LOC)

Vassilios N. Grigoriadis

Christopher Kotsakis

Dimitrios A. Natsiopoulos

Dimitrios Tsoulis

Ilias N. Tziavos

#### **Scientific Committee**

Roland Pail (President Comm. 2)

Riccardo Barzaghi (President IGFS)

Shuanggen Jin (Vice President Comm. 2)

Laura Sanchez (Chair GGOS Focus Area 1 JWG 0.1.1)

Leonid Vitushkin (Chair SC2.1)

Jonas Agren (Chair SC 2.2)

Adrian Jäggi (Chair SC 2.3)

Maria Cristina Pacino (Chair SC 2.4)

Xiaoli Deng (Chair SC 2.5)

Jürgen Kusche (Chair SC 2.6)

Pavel Novak (representative ICCT)

Sylvain Bonvalot (Director BGI)  
Franz Barthelmes (Director ICGEM)  
Mirko Reguzzoni (Director ISG)  
Jean-Pierre Barriot (Director ICET)

More information on the conference sessions, venue site, accommodation and hosting city along with important dates for abstract submission, registration, trip and visa arrangements can be found in the symposium website at <http://www.gghs2016.com> and the [First Circular](#).

We are looking forward to welcoming you in Thessaloniki!

GEORGE S. VERGOS  
(on behalf of the GGHS2016 LOC and Scientific Committee)

## *Meetings Calendar*

### IGS Workshop

February 8 – 12, 2016, Sydney, Australia  
URL: <http://igsworkshop2016.org/>

### GNSS Conference

February 18 – 20, 2016, Trieste, Italy  
1<sup>st</sup> International Conference New Advanced GNSS and 3d Spatial Techniques  
URL: <http://gnss.dia.units.it/>

### 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.jisdmsymposium2016.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)

European Navigation Conference 2016

May 30 – June 2, 2016, Helsinki, Finland

URL: <http://www.enc2016.eu>

Baltic Geodetic Congress

June 2 – 4, 2016, Gdansk, Poland

URL: <http://www.bgc.geomatyka.eu/2016/>

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/>

ISDE 2016

July 7-8 2016, Beijing, China

URL: [www.isde2016summit.org](http://www.isde2016summit.org)

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.cospar-assembly.org/>

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

July 31 – August 5, 2016, Beijing, China

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

GGHS2016

September 19-23, 2016, Thessaloniki, Greece

URL: <http://www.gghs2016.com>

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/>

## Obituary

### *Hermann Seeger (1933 – 2015)*



Professor Hermann Seeger passed away on December 9, 2015 at the age of 82.

Born in Northern Germany, Hermann Seeger studied Geodesy at the University of Hannover, where he also started his scientific career at the famous Geodetic Institute of Prof. Walter Grossmann, completing his thesis on the new tool of electromagnetic distance measurement. In 1967 he moved to the Institute for Applied Geodesy - IfAG (now the Federal Office for Cartography and Geodesy - BKG) in Frankfurt am Main, where he eventually led the Department for Geodetic Research.

In 1978 Seeger accepted a post at the University of Bonn as professor and director of the Geodetic Institute, famous for its work in VLBI.

In 1987 he returned to the IfAG, now as president, a position he held until his retirement in 1998. In this period the IfAG was re-organized into the present BKG. With admirable skill and enormous assertiveness, Seeger managed to ward off the threat of cut-backs and restrictions.

His merits can best be illustrated by his extraordinary ability to realize new conceptions, bring together scientists and administrators in joint projects, and, last but not least, secure the necessary funds. Numerous projects now taken for granted resulted from his initiatives. In particular we should never forget how he invited large numbers of young scientists to stay at the BKG and receive training, especially in modern techniques; many directors of the land survey in different countries owe their positions to these initiatives. Hermann also organized co-operation across political fences at a time when such projects were far less in evidence than they are now. Here we should mention CERCO, OEEPE and FIG in particular. In the world wide network of fundamental stations, two of the most important sites in the southern hemisphere, which is still less well covered, would hardly exist without the work of Hermann Seeger.

In numerous already existing or newly created groups, Seeger introduced modern techniques such as SLR, VLBI and GPS. These represented the latest state of the art, though in those days they were still quite unusual and not generally well-known. At the same time he saw to it that existing installations were developed to the best possible level and that personnel were adequately equipped. Among his many achievements we should mention in particular:

- the development of the Satellite Observation Station Wettzell into one of the internationally most important fundamental stations;
- his activities as co-organizer of the WEGENER-MEDLAS Project in NASA's Crustal Dynamics Project (CDP);
- the installation of IfAG's/BKG's Mobile Laser Ranging Station (MOBLAS);
- the installation of the O'Higgins Permanent VLBI Observatory Site in Antarctica in cooperation with the German Aerospace Center (DLR);
- his energetic support for the establishment and operation of the Transportable Integrated Geodetic Observatory (TIGO);
- his initiation of European (and in particular German) VLBI activities;
- his long-standing support for the setting up and operation of the European Reference Frame (EUREF), which has developed into a very precise and well functioning continental network.

Besides his membership of many national and international scientific organisations, Seeger received numerous honours, such as "Permanent Guest" of EUREF, Honorary Professor of the University of Wuhan/China, Corresponding Member of the Croatian Academy of Sciences, and others.

Even after his retirement he continued to take part regularly and with great enthusiasm in various conferences and other activities, sparing no efforts or expense of his own. - His last years were marked by grave illness, so that his death may be regarded as a merciful release.

All who knew Hermann remember him as an outstanding individual with a sometimes unusual, original and wilful style of management, but also as a reliable and thoroughly committed colleague in all areas. His co-workers will remember him as someone who, besides his professional interest, always took steps to ensure their welfare. He promoted geodesy with outstanding courage, devotion and selflessness.

HELMUT HORNIK