



International Fédération of Surveyors
Fédération Internationale des Géomètres
Internationale Vereinigung der Vermessungsingenieure

FIG Commission 5 Position and Measurement July 2014 e Newsletter and XXV FIG Congress Report

Dear Colleague,

In this edition you will read about the activities of our Commission at the XXV FIG Congress and 37th General Assembly. We are also presenting the proposed Work Plan for the period 2015-18 that the incoming FIG Commission 5 Chair Prof. Volker Schwieger has prepared.

My term as the Chair of FIG Commission 5 is coming to an end. I started 1998 as Secretary for the Commission when my colleague Jean-Marie Becker was the Commission Chair. I continued as Co-chair (together with Michel Kasser, France) of the working group on Reference Frame when Matt Higgins was Commission Chair (2003-2006) and as Chair of the same working group when Rudolf Staiger was Commission chair (2007-2010). Since then I have been Chair of this Commission, and looking back I am very proud to have been involved with this successful journey as well as enjoying this period. This would not have been possible if we did not work well as a team and so thanks to everyone that has been involved. A very special thank should of course go to Rob Sarib (perhaps the real engine of the Commission!) who has been our Vice Chair of Administration since 2002, and he will also be stepping aside from FIG official duties at the end of 2014.

I am very confident that FIG Commission 5 will continue to be active, successful in the coming years, and that Volker and his team will be successful.



Please feel free to distribute this newsletter to colleagues and friends.

Warmest Regards Mikael Lilje, (Mikael.Lilje@lm.se)
Chair of FIG Commission 5

FIG XXV Congress – Kuala Lumpur, Malaysia, 16-21 June 2014



The Congress Overview

The FIG Congress and 37th General Assembly was held 16th-21st June, 2014 in Kuala Lumpur, Malaysia. The event was jointly organized by FIG and the Malaysian member association **Association of Authorised Land Surveyors Malaysia, PEJUTA**. More than 2600 surveyors from 100 different countries

participated in this congress and delegates attended over 500 presentations in over 150 technical sessions, meetings or forums.

From a FIG Commission 5 perspective, the Congress was important and impressive. Perhaps for the first time, a Prime Minister discussed “Geodesy” and its importance to a nation in an opening talk to the Congress! You can find part of his talk on YouTube at <https://www.youtube.com/watch?v=L8BUApdgv5w>.

In addition to the technical program, the focus during the week was also on the coming UN Resolution on Global Geodetic Reference Frame, an initiative initiated by the UN-GGIM and its working group on Geodesy. FIG as an organization is part of UN-GGIM and during the Congress FIG Commission 5 on numerous occasions promoted and supported this important initiative. For instance, the Malaysian Prime Minister discussed the UN resolution; the FIG President Teo Chee Hai did so in his opening talk as well as during the General Assembly. The Commission organized several joint sessions with UN GGIM AP during the week to highlight the UN Resolution. We were all very pleased and satisfied when the FIG General Assembly approved the FIG / UN GGIM AP statement on Global Geodetic Reference Frame in the second General Assembly. For a copy of the statement refer to the end of this report or navigate to the website location - http://fig.net/admin/ga/2014/minutes/UNGGIMAP-FIG_statement_on_ggrf.pdf.

Professor Chris Rizos, the President of the International Association of Geodesy (IAG), gave a well-received plenary talk on *Opportunities & Challenges for the Surveying Industry in a Multi-System GNSS World*. Prof. Rizos discussed how the future of surveying/geomatics would be impacted by several geospatial technology trends. The five mega-trends he mentioned and identified, that will influence developments in geodesy, were:

- The decades-long revolution unleashed by GPS
- The forthcoming era of multi-constellation GNSS
- The evolution of precise positioning from niche to mass markets
- The importance of global geodetic reference frames
- The acceptance that geodesy is indeed an Earth observation science



Taking these as starting points, a uniquely *geodetic perspective* on the challenges and opportunities for the geomatics discipline could be articulated – with consequences for the future of geomatics education, innovation & product development, evolution of practices & service provision, and the promotion of geomatic skillsets.

At this Congress, the Commission proudly released two new publications. The first one is an updated version of the FIG publication no 49 on *Cost effective GNSS technology*. The first edition was well received but since its initial release, the rapid developments in GNSS have meant an update was required. The second publication is the *Reference Frames in Practice Manual*. The manual is a

compilation of fact sheets and is the result of cooperation between FIG and IAG. Multiple authors from the reference frame community have contributed to this publication. Mr. Graeme Blick from LINZ (New Zealand) has done an excellent job in coordinating and putting the concept together. Both new publications are available on the FIG Website - <http://www.fig.net/pub/figpub/index.htm> .

Also, an important outcome and decision was to schedule new seminars on *Reference Frames in Practice*. After consultation with both the IAG and UN GGIM AP, the next seminar could be in Singapore, July 2015 in conjunction with the South East Asian Survey Congress (SEASC). The theme at this seminar would be more focused on Vertical Reference Frames and issues pertinent to the region. After this event we are proposing to hold another seminar in conjunction with the FIG Working Week in Christchurch in 2016.

Technical Program Summary



The Commission 5 technical program at the Congress was comprehensive and extensive. It comprised of 22 technical sessions and forums. Several of them were joint sessions with Commission 6, and three were convened with sister organization, the UN-GGIM on the theme *Global Geodetic Reference Frame and CORS*.

It is impossible to present and reflect on all presentations in this report. Despite several "no-shows", overall the standard and technical quality was good. To highlight some sessions and presentations we would like to mention the following;

UN-GGIM-AP / FIG / IAG / UN-ICG Reference Frames in Practice - The Future

The session reviewed the technical seminars on reference frames that have been held over the past few years, and discussed some future needs. At the session, UN GGIM AP WG 1 through its chair Dr. John Dawson mentioned that they have appreciated the technical seminars, the cooperation with FIG and would encourage a continuation of this relationship. Dr Dawson also mentioned that the next liaison could possibly happen in conjunction to the SEASC in Singapore 2015.

There were also several case study presentations that discussed dense velocity fields based on data from dense CORS network to determine geodynamic movements.



Next Generation Positioning Infrastructure (PI) - What is it and Why?

In these sessions, there were some interesting thoughts delivered to discuss we might be heading in the future regarding positioning and positioning infrastructure. We discussed the use of "Locata", the internet, Wifi, RFID and future GNSS techniques such as Precise Point Positioning (PPP) but also how social media and GNSS perhaps could be combined.

Joint FIG Commission 5/ UN-GGIM-AP Session on Global Geodetic Reference Frame and CORS

For the Congress, we organized three joint sessions together with UN GGIM AP and focused on the proposed UN resolution on Global Geodetic Reference Frame. The first session saw presentations from Dr. Vanessa Lawrence (Co-Chair UN-GGIM), Dr. John Dawson (Chair UN-GGIM-AP WG 1 and representing Australia as the Co-chair of UN-GGIM working group on Geodesy), Prof. Chris Rizos (President IAG) and Joao Torres (Chair, IAG Sub Commission 1.3 on Regional Reference Frames).



In the second and third sessions relating to this topic, discussions occurred on the need for regional high-quality reference frames, such as the European ETR89, especially when more and more countries are interested in moving to a dynamic datum.

Geoid, Gravity and Vertical Datum Determination

Three sessions were organized concerning this theme which demonstrated the present and increasing interest in height determination and the importance of heights. Overall there were technical case studies from several parts of the world, and comprised of a mixture from developed countries such as the USA, and emerging countries.

Multi-GNSS Environment and Precise Point Positioning

This interesting session included presentations describing Multi-GNSS campaigns in South-East Asia using GPS, GLONASS and BeiDou. Techniques such as PPP were discussed. The technique was discussed at several presentations during the

congress including the plenary session. Some believe that PPP could be a technique to use instead of RTK (or network RTK) but it appears the general consensus amongst the surveying community is that PPP should be seen as another technique that compliments nRTK. Also from research, there is still a long way to go before PPP has initialization time that is shorter, and results are of higher accuracy than present GNSS measurement techniques.

Ubiquitous Positioning and Kinematic Measurements

In the two sessions on this topic the results of Working Groups 5.4 and 5.5 were discussed. Special focus was on in-door positioning and mapping as well as location based services (LBS). Further input was delivered with respect to GNSS-INS coupling and to 3D data acquisition and modelling.

Cost Effective Positioning

This unique session dealt with different aspects of low cost or cost effective aspects of positioning. Some contributions deal with the supplementation of survey techniques by RFID chips as well as using GNSS CORS networks. Research regarding high-sensitive GPS receivers was presented too. The contributions given by presenters yielded an extensive discussion in the auditorium among the national and international participants.

Standards and Recommended Practices for Positioning and Measurement

This important session included the introduction the "Guide of the Expression of Uncertainty in Measurement". It also provided an overview presentation concerning the Swedish Handbook in Surveying and Mapping, and enabled the participants to obtain some ideas on how to use standards and best practice rules.

Other technical sessions dealt with *Laser Scanning, Maps and Map Production as well as Remote Sensing, Unmanned Aerial Vehicles and Geodynamics*. For more information about technical sessions and program please refer to website www.fig.net/fig2014, www.fig.net/pub/fig2014/index.htm, or the "Surveyors Reference Library" <http://www.fig.net/srl/> to review all the presentations and technical papers.

Meetings

One of the primary purposes of FIG conferences is to provide working group members the opportunity to meet, resolve and formulate strategies 'face to face' both formally and informally. Commission 5 is very supportive of such meetings and thus participated in and convened various administrative meetings during this event. The main meetings that the Commission 5 Chair and Vice Chairs attended were -

- ACCO - Advisory Committee of Commission Officers
- Commission 5 Open Annual
- Steering Committee
- IAG / UN-GGIM-AP Liaison

A summary of the discussions from these meeting can be found in the Steering Committee Minutes, and are available via the web location - http://www.fig.net/commission5/steering_committee/steeringcommittee.htm

In addition to the above meetings Dr. David Martin, who is the Chair of FIG WG 5.1 Standards, Quality Assurance and Calibration, and also the Chair of the **FIG Standards Network**, convened a Standards Network meeting for all delegates with an interest in "standards".

The Standards Network is responsible for building and maintaining relations with the different standardisation bodies, proposing priorities on FIG's standardisation activities and ensuring information flow on standardisation to FIG members. One of the principal ways these goals are accomplished is through a Standards Network meeting held during FIG working weeks and Congresses. Each Commission sends a representative to the meeting to discuss their Commission's interest and requirements in standards.

A broad spectrum of work in FIG shows that standards are important in the surveying profession. Standards work in FIG ranges from input on the very specific ISO/TC 172 SC6 Survey Instrument Standards; to liaison with the much broader ISO/TC 211 Geographic Information/Geomatics which impacts on virtually every aspect of the surveying profession; to the remarkable work of Commission 7 members to initiate, develop and publish ISO 19152:2012 Land Administration Domain Model (LADM); and the implication of Commission 9 in the IPM coalition with the aim to develop and implement International Property Measurement Standards.

During the Standards meeting held in Kuala Lumpur several key points were discussed and reviewed. News was provided by Nic Donnelly our ISO/TC 211 liaison. Unfortunately Hans Heister was unable to attend this meeting. Nevertheless we would like to thank Hans for his hard work over the past number of years in TC 172 SC6. He will be replaced as liaison to TC 172 SC6 by Ingo Neumann the University of Hannover. Professor Neumann is a member of FIG Commission 5 as well a member of the German standards organisation mirror committee NA 005-03-04 in DIN.

During the meeting Steven Ramage (Ordnance Survey) discussed a possible FIG liaison to the Open Geospatial Consortium(OGC <http://www.opengeospatial.org/>). This proposal is being discussed by the direction of the OGC and the FIG council.

The next Standards Network meeting will be held during the FIG working week in Sophia Bulgaria 17-21 May 2015.

General Assembly



As per other Congresses or Working Weeks there were two FIG General Assemblies (GAs). The main outcomes or highlights from the GAs were –

- A new voting system was ratified and will enable larger member associations to have greater voting rights to reflect the number of members. For example under the new system a member association can have one, two or three votes depending on their membership size.

- Chryssy Potsiou was elected FIG President 2015-18
- Rudolf Staiger and Diane Dumashi were elected FIG VPs 2015-18
- Helsinki was selected to host FWW 2017
- Istanbul was selected to host FIG Congress 2018

Social Activities

There were several social events organized for the delegates –

- Opening Ceremony
- Foundation Dinner
- Gala Dinner

In conjunction with Commission 4 and 6 we also had our traditional technical commission's dinner. The dinner was held at the night club / restaurant called The Rabbit Hole. The food, beer and wine were excellent.





For more photos of the Congress please refer to the FIG Picture Galleries at the FIG website.

Commission Work Plan 2015-18

Although, the final Work Plan for the next term is still being finalised by the Chair Elect Prof. Volker Schwieger, the following working groups and proposed structure are outlined:

- WG 5.1 Standards, Quality Assurance and Calibration
- WG 5.2: Reference Frame in Practise
- WG 5.3: GNSS
- WG 5.4: Multi-Sensor-Systems (joint with IAG and Commission 6)
- WG 5.5: Cost-effective Positioning
- WG 5.6: Vertical Reference Frames



More details will be distributed later on. You can influence structure and content of the Commission. Please feel free to contribute and deliver your input to email - volker.schwieger@ingeo.uni-stuttgart.de or li.zhang@ingeo.uni-stuttgart.de .

Upcoming events:

REFAG2014, 13-17 October. IAG symposium where FIG is co-sponsoring one session on "Georeferencing in Practice".

Please submit your paper! Webpage: <http://iag.uni.lu/index.php?id=189>.

Questions to be addressed by presentations in this session:

- How can we make the best of the development of geodetic infrastructure created by both commercial and governmental parties?
- How can we make sure that national and regional realizations of ITRF are homogenous and traceable?
- How can conflicts of interest be minimized?
- How do we join forces in an optimal way concerning the development of GNSS and reference frames both globally and nationally?

Ninth Meeting of the International Committee on Global Navigation Satellite Systems (ICG) hosted by the European Commission, Prague, Czech Republic, 10th- 15th November , 2014. www.icg9prague.eu

LBS 2014, 11th Symposium on Location Based Services. 26 -28 November 2014, Vienna, Austria: <http://www.lbs2014.org/>

FIG Working Week and General Assembly, May, 2015, Sofia, Bulgaria. Web site: <http://www.fig.net/fig2015>

How to Participate in Our Commission

Commission 5 Chairs of the working groups are continually developing the membership for their working groups. There is still opportunity for you to join any of the working or joint working groups. If you are interested then there are two levels in which you could actively contribute and they are –

- The first level of participation is as a "core member" of a working group contributing directly to discussions, publications, meetings, and facilitates technical sessions, etc.
- The second level of participation is as part of a "reference group" to review publications, technical papers, provide feedback on issues and general assistance, etc.

People interested in being involved in one of the working groups should contact the Chair of the relevant Working Group and send a copy to our **NEW Vice Chair for Administration**, Li Zhang email: li.zhang@ingeo.uni-stuttgart.de.

All responses should indicate the desired level of participation, either as a "core member" or as part of a "reference group" and also include a one or two paragraph biography of your professional career to date.

There is also another way to assist Commission 5 with their work and that is to become a National Delegate to Commission 5. Please note, we recommend that before you consider this option you will need to check with your FIG member association whether they already have a National Delegate for Commission 5 and

if it has been officially listed on our website. Please navigate to location <http://www.fig.net/comm/natdel5.htm> .

Briefly, the role of a National Commission Delegate is to -

- establish networks within their countries to communicate information and obtain feedback for the Commission,
- be actively involved in commission activities, including responding to questionnaires or correspondence and identifying topics and authors of papers for Commission symposia and FIG congresses,
- seek and encourage funding support to attend FIG activities, including commission meetings, and
- write at least one annual report for publication in a local newsletter or technical journal or for dissemination by some other means to individual members of their member association or organisation.

If you wish to be a National Delegate for Commission 5 your FIG member association must formally submit in writing to the FIG Office the name, professional title, address, telephone and fax numbers and email address of the nominated person.

Commission 5 looks forward to your response and please do hesitate to ask any questions or if you have any further queries.

FIG Commission 5 e-Newsletter

If you would like to circulate Commission 5 NEWS to all our members please email your item for consideration to the

- Vice Chair Administration – Rob Sarib robert.sarib@nt.gov.au or
- Chair of Commission 5 - Mikael Lilje Mikael.Lilje@lm.se

Joint UN-GGIM-AP/FIG Statement on Global Geodetic Reference Frame

WE, the participants of the **FIG/FIG Technical Sessions on Global Geodetic Reference Frame** at the XXV FIG Congress on 19th June 2014, having met in the context to share knowledge, promote understanding and to enhance cooperation for the sustainability and enhancement of the Global Geodetic Reference Frame, hereby issue the:

UN-GGIM-AP/FIG Statement on Global Geodetic Reference Frame

Recognising the growing need for an accurate and stable Global Geodetic Reference Frame to support, *inter alia*, earth observation, including sea level and climate change monitoring, natural hazard and disaster management and a wide range of other activities in public and private sectors throughout the World, contributing towards inclusive social progress, environmental sustainability and economic development,

Noticing the decision adopted by the Committee of Experts on UN-GGIM at its third session in Cambridge in July 2013, on taking actions to facilitate the submission of a resolution on Global Geodetic Reference Frame to be tabled at the 2013-14 session of the UN General Assembly and to establish a Working Group to develop the conceptual note and draft text of a UN General Assembly resolution,

Noticing further that the draft resolution is planned to be discussed at the fourth session of the Committee of Experts on Global Geospatial Information Management in New York on 6 – 8 August 2014,

Reaffirming the collective commitment of UN-GGIM-AP and FIG to support the implementation of an accurate and stable geodetic reference frame being crucially important to a wide range of activities in all territories of the World, at land and at sea,

Urges member states and their representatives within UN-GGIM-AP together with all member states and their representatives at the fourth session of the Committee of Experts on Global Geospatial Information Management, to support the approval of a draft resolution on Global Geodetic Reference Frame for Sustainable Development, and to submit to the 2013-14 session of the UN General Assembly for final adoption

Urges FIG member associations and all other membership groups of FIG, to take appropriate initiatives to inform and encourage the representatives of their respective countries to the fourth session of the Committee of Experts on Global Geospatial Information Management, to support the approval of the draft resolution on Global Geodetic Reference Frame for Sustainable Development and its submission to the UN General Assembly.

Kuala Lumpur
19th June 2014