

**Report to the 33rd General Assembly
FIG Congress in Sydney, Australia 2010**

FIG Commission 5 – Positioning and Measurement

Report of Activities 2009

1. General

In 2009 Commission 5 – Position and Measurement has effectively used FIG events or symposia and our existing relationship with sister or like organisations to fulfil the objectives of our work plan and the needs of members. The focus on spaced based measuring techniques such as GNSS observations or satellite imagery continues to expand into non traditional surveying applications. For example, positioning and geodetic systems that were once specific for land administration are now emerging as integral infrastructure for other industries such as machine guidance, asset and resource supervision, and disaster management. There was also a renewed vigour and interest into global observing systems to assist with the monitoring and measurement of the earth's dynamics and the changes that are occurring as a result global movement.

Although these were popular topics in 2009, the technical fundamentals of positioning and measurement such as instrument calibration, network adjustments, standards / best practice guidelines, transformations, and new observing or processing techniques were also prevalent themes at Commission 5 related conferences or workshops.

2. Working Groups

WG 5.1 – Standards, Quality Assurance and Calibration

Chaired by David Martin

- Working Group 5.1 was active at the FIG Regional Conference in Hanoi, Vietnam. One session was dedicated to GNSS CORS Infrastructure and Standards.
- Discussions regarding the pertinence of FIG publication No. 9 Recommended Procedures for Routine Checks of Electro-Optical Distance Meters (EDM). FIG Guide, 1994 are ongoing. An effort will be made to re-edit this document after the revision of ISO 17123-4 Electro-optical distance meters (EDM instruments). This will started at the end of this year till completion.
- Two other standards, ISO 12858-2:1999 (version 2) Optics and optical instruments -- Ancillary devices for geodetic instruments -- Part 2: Tripods, and ISO 12858-1:1999 Optics and optical instruments -- Ancillary devices for geodetic instruments -- Part 1: Invar levelling staffs, are under an ISO systematic review.

WG 5.2 – Reference Frame in Practice

Chaired by Mikael Lilje

- Working Group 5.2 has been active at the FIG Working Week in Eilat, Israel as well as at the FIG Regional Conference in Hanoi, Vietnam. Together with Working Group 5.4, sessions about GNSS CORS networks were successfully facilitated at both events. The session covered basics, research topics as well as case studies. Also other sessions within the topic of the working group were organised.
- At the FIG Regional Conference in Hanoi the co-operation in South-East Asia and the Pacific region (which includes Australia and New Zealand) for a common Reference Frame was highlighted with several sessions including a panel discussion.
- The webpage has been updated with more information concerning national or regional CORS networks. The new presentations have used the CORS template that was developed for Stockholm as a basis.

WG 5.3 – Integrated Positioning, Navigation and mapping Systems

Co-chaired by Andrew Hunter and Naser El-Sheimy

- Working Group 5.3 participated in the 6th International Symposium on Mobile Mapping Technology, which was held in July 2009 at the São Paulo State University, Brazil.

WG 5.4 – Global Navigation Satellite Systems

Chaired by Volker Schwieger

- Working Group 5.4 was very active at the Working Week in Eilat, Israel as well as at the Regional Conference in Hanoi, Vietnam. Sessions about GNSS CORS networks were successfully facilitated in partnership with Working Group 5.2 “Geodetic Reference Frames in Practice”. The session covered basics, research topics as well as case studies.
- Schwieger, Lilje and Sarib presented a paper in Hanoi that was also the “FIG Article of the month” in December, 2009. The paper has the title “GNSS CORS - Reference Frames and Services”
- At the two main FIG Commission 5 symposiums in 2009, numerous sessions concerning Engineering Applications of GNSS were jointly convened with Commission 6. Additionally many presentations and papers regarding advances and applications in the GNSS domain were given and followed enthusiastically by the auditors.
- The work on a “Report on possibilities of cost-effective GNSS techniques for developing countries” is ongoing. It will be finished in time for the FIG Congress in Sydney 2010.
- Working Group 5.4 supported German Aerospace Centre (DLR) to acquire kinematic GPS tracks that will be used to evaluate the TanDEM-X digital elevation model. To date the first tracks have been acquired and have been successfully evaluated. The work is ongoing. First results were presented on the Regional Conference in Hanoi. The next report will be given in Sydney, Australia at the FIG Congress.

3. Cooperation

3.1 Cooperation with Other Commissions

In 2009, Commission 5 continued to work with Commission 4 and 6 on topics relating to deformation measurement, calibration of instruments, long range measurement, satellite and terrestrial imagery measuring techniques (in particular laser scanning) and vertical datum / reference frame issues for hydrography.

3.2 Cooperation with Sister Organisations

The Commission 5 Steering Committee made significant progress in 2009 to *consolidate and improve* our relationship with various sister or like organisations such as the International Association of Geodesy (IAG), Institution of Navigation (ION) and the Permanent Committee for GIS Infrastructure Asia-Pacific (PCGIAP). This was achieved by attending each other's symposia and having joint technical sessions on common issues or topics.

Mikael Lilje (Chair Elect of Commission 5) represented not only the Commission but also FIG at the ION International Technical Meeting in Anaheim, 26-28 January 2009. At this event he presented information to the ION officials on the role of FIG and how FIG / ION can enhance co-operation. Several meetings were also held to discuss participation in 6th International Symposium on Mobile Mapping Technology (Brazil) and our Regional Conference in Hanoi.

In August - September both Mikael Lilje and Rob Sarib participated in the IAG Scientific Assembly "Geodesy for Planet Earth" that was held in Buenos Aires, Argentina. At this event there were 2 technical sessions on 'Positioning and Applications' that were co-sponsored by FIG, ION and ISPRS. Mikael and Rob were also invited to attend and contribute to several IAG meetings with the IAG Executive and also Commissions that deal with 'GGOS', reference frames, positioning and applications. There were many noteworthy achievements from their attendance and for a full report refer to website:

http://www.fig.net/news/news_2009/buenos_aires_august_2009/iag_report_full.pdf.

At the FIG Regional Conference in Hanoi, Commission 5 in conjunction with the IAG and PCGIAP facilitated numerous technical sessions relating to the Asia and the Pacific Reference Frame (APREF) initiative. Representatives from these organisations, namely Dr John Dawson, Prof Chris Rizos, and Mr Steve Fisher, were active participants, and with valuable input from regional delegates made these forums a highlight.

3.2 Cooperation with UN

The International Committee on Global Navigation Satellite Systems (ICG), met in St Petersburg in Russia, 14-18 September 2009. Vice President Matt Higgins attended representing FIG and Commission 5. The ICG was formed several years ago as a result of recommendations of the UN Committee on the Peaceful Use of Outer Space (COPUOS). At this meeting reports were given on the status of major GNSS sub-systems and the activities of task forces on geodetic and timing references.

Also Vice President Higgins convened an ICG WG 4 workshop on GNSS Compatibility and Interoperability at the International GNSS Symposium held on the Gold Coast, December 2009.

4. Events

2009

A summary of the Commission 5 activities at events in 2009 can be found on our website <http://www.fig.net/commission5/index.htm>, however the highlights were:

- Vice President Matt Higgins attendance to the FIG - World Bank Conference, Washington D.C., 9-10 March 2009. At this event he presented on the topic “Positioning Infrastructures for Sustainable Land Governance”.
- Working Week held in Eilat, Israel (May 2009). There were 12 Commission 5 related technical sessions, and this comprised of 44 related technical papers and posters, including 5 peer reviewed papers. The papers address significant regional issues such as vertical reference frame and a variety of positioning techniques. There was also a Plenary Session for the technical FIG Commissions and our Chair Rudolf Staiger was the highlight presentation - “Push the button – or does the art of measurement still exist”. A full report from this technical event can be found at web site:
http://www.fig.net/commission5/reports/com_5_eilat_rep2009.pdf
- South East Asia Survey Congress in Bali, Indonesia (August 2009) – Vice President Matt Higgins and Rob Sarib attended this conference as FIG and Commission 5 representatives. Vice President Higgins gave a keynote address titled “Facing the Challenges Building the Capacity - Setting the Scene for the FIG Congress – Sydney 2010”, whilst Mr Sarib chaired technical sessions.
- Chair of Commission 5 Rudolf Staiger attended INTERGEO 2009 in Karlsruhe, Germany (September 2009). Like in the years before INTERGEO was the worldwide largest tradeshow regarding surveying equipment. From the FIG point of view it is interesting to note that this event is becoming more and more an international one. Our president Stig Enemark has accepted an invitation for a keynote speech at the INTERGEO 2010 in Cologne.
- Regional Conference Hanoi, Vietnam (October 2009) – This event attracted over 450 delegates from 40 different countries. It consisted of three plenary sessions, over 40 technical sessions which comprised of almost 200 technical papers or presentations. Commission 5 were involved in facilitating 11 technical sessions that were related to modern survey infrastructure and how they assist the land governance and building capacity. A full report from this technical event can be found at web site:
http://www.fig.net/commission5/reports/comm_5_hanoi_2009_report.pdf

2010

In 2010 Commission 5 will endeavour to send representatives to the following conferences however from a Commission 5 Steering Committee perspective we will be focussing our attention on the XXIV FIG International Congress and XXXIII General Assembly - Facing the Challenges - Building the Capacity, 11-16 April, Sydney, Australia, www.fig2010.com.

Other major activities in 2010 include:

- 9-11 March, Bonn, Germany
2nd International Conference on Machine Control & Guidance. Co-sponsored by FIG Commission 5 and 6. Web site: www.mcg.uni-bonn.de
- 10-13 July, San Diego, CA, USA
The 2010 Survey & Engineering GIS Summit. Organised as part of the ESRI User Conference. Co-sponsored by FIG. Web site: www.esri.com/events/survey/index.html
- 13 -17 September, Hamburg Germany
Workshop on Accelerator Alignment will be held at DESY.
- 15-17 September, Zurich, Switzerland
2010 International Conference on Indoor Positioning and Indoor Navigation (IPIN). Co-sponsored by FIG Commission 5. Web site: <http://www.ipin.ethz.ch>

5. Communication and Publications

Commission 5 have issued numerous reports and periodic newsletters to our delegates. These can be found on the website <http://www.fig.net/commission5/index.htm> .

Rudolf Staiger

Chair of FIG Commission 5
January 2010

Web site: www.fig.net/commission5