

**Report to the 31st General Assembly
FIG Working Week in Stockholm, Sweden, June 2008**

FIG Commission 5 – Positioning and Measurement

Report of Activities 2007-2008

1. General

The year 2007-2008 has been a year of ‘consolidation’ for FIG Commission 5 – Positioning and Measurement. The new working group Chairs have been ‘finding their feet’ whilst developing their working group plans and team membership to ensure solid foundations for the coming years.

There has been a high level of active participation from Commission 5 Steering Committee and delegates at the two main events held in Hong Kong SAR and in Costa Rica. As per the past years, topics and issues relating to GNSS, Reference Frames, and integrating various measurement techniques into Mobile Mapping and GIS have been the most popular. However, there has been much fascination with new positioning techniques such as “LocataLites, pseudolites, RFID readers/tags, WiFi access points, and UWB”. In addition, Commission 5 has recognised a reinvigorated interest in the field of positioning / measurement standards and calibration. On going and renewed interest in these topics have confirmed the framework for the Commission’s Work Plan for 2007-10. Refer to website: http://www.fig.net/comm/wp_07_10/commission_5.pdf.

To accomplish the objectives of our Work Plan, Commission 5 in 2007-08 have facilitated discussion forums and technical sessions, formed new sub working groups as required, began the “Fact Sheets” program, worked with our like and sister associations, pro-actively listened to our delegates wants and needs, initiated a technical policy on poster presentations, and actively participated in FIG administrative meetings, discussions and initiatives.

Commission 5 believes the ‘key’ to our successful progress to date has been the ‘down to business’ attitude and the active engagement with our ‘grass root surveyors’ to ascertain their technical wants and needs.

2. Working Groups

WG 5.1 – Standards, Quality Assurance and Calibration

Chair: David Martin

- Working group 5.1 was constituted following the Hong Kong Working Week. Links with the FIG Standards Commission were established and a summary of FIG Commission 5 activities with respect to standards compiled. Links with ISO (International Organization for Standardization) ISO/TC 172/SC06 were also established. Incidentally, a new standard ISO 17123 part 8 GNSS field measurement systems in real time kinematic (RTK) was published in 2007.

- Commission 5.1 participated actively in the Commission 5 sessions at the FIG Regional Conference in San Jose, Costa Rica. It was decided to propose two sessions concerning Standards Calibration and Testing of GNSS at the Stockholm 2008 Working Week. Of course Commission 5.1 has been actively involved in the organisation of these sessions.
- At the FIG Regional Conference in San Jose, Costa Rica the idea of establishing a series of documents that outline ‘best practice’ procedures for Standards, Testing and Calibration of the principal survey instruments which would be freely available on the FIG web site was proposed. If this idea is endorsed, these documents will be elaborated over the coming two years.

WG 5.2 – Reference Frame in Practice

Chair: Mikael Lilje

- The Working Group has been acquiring new members as well as confirming former members for their continuous interest in the working group.
- The Working Group was very active at the Working Week in Hong Kong (China SAR) as well as at the Regional Conference in San Jose (Costa Rica). Successful sessions about GNSS CORS networks were realised together with Working Group 5.4, see below. It is planned to repeat the success in this field at the Working Week in Stockholm this year too. Two Sessions about GNSS CORS networks are planned again.
- The working group has developed an internet portal with numerous links to other internet sources.

WG 5.3 – Integrated Positioning, Navigation and Mapping Systems

Co-Chairs: Andrew Hunter and Naser El-Sheimy (Canada)

The 2007-08 highlights for this working group were the:

- 5th International Symposium on Mobile Mapping Technology held in Padova from May 28 to 31, 2007. It was organized and co-sponsored by CIRGEO – Interdepartment Research Center for Geomatics, the University of Padova, University of Calgary and The Ohio State University, the relevant working groups from ISPRS and IAG and other major corporate sponsors. The symposium and technical sessions provided a stimulating casual environment to promote scientific presentations, interactive discussions, and information exchange. It brought together 180 participants from 23 countries, who are specialists, engineers, users and those interested in mobile mapping technology, real-time positioning, sensor integration and calibration, feature extraction and 3-D data acquisition. 88 oral presentations in 18 sessions and 33 posters in one poster session reported most recent research and development and application achievements of mobile mapping. The symposium program was structured in such a way that features common to all Mobile Mapping Systems (MMS) were treated first before specific application; new applications, and trends in MMS were considered. Common features included the mathematical framework of direct georeferencing for land and airborne imaging sensors, integrated navigation system, object extraction and recognition, and estimation techniques common to all MMS. Only after these common features had been treated, specific sessions were dedicated to cover the full spectrum of Mobile Mapping Technology.
- creation of a special study or interest group on New Positioning Techniques. This group will monitor the new various positioning technologies (such as LocataLites, pseudolites, RFID readers/tags, WiFi) and facilitate discussions on this topics at various FIG events. The sub working group have set up a “Blackboard” website, hosted by the University of

Calgary, and are using this interactive electronic discussion portal to develop the potential roles / functions / tasks and the terms of reference for this sub working group. One of the main objectives of this group is to engage discussion with the tele-communications industry on 'mobile phone' and other digital positioning infrastructure and applications. It is hoped that such interaction will be achieved through discussion forums being held in Stockholm.

WG 5.4 – Global Navigation Satellite Systems

Chair: Volker Schwieger

- The structure of the newly established Working Group was finalised including the Special Study Groups 5.4.1 “Cost-Effective GNSS”, 5.4.2 “GNSS networks”, 5.4.3 “Precise GNSS” and 5.4.4 “GNSS Calibration and check”. The respective chairs are nominated and Working Group members were acquired for the special study groups. The sub-group on GNSS developments and modernisation is chaired by Georgia Fotopoulos (Canada) was assigned to SSG 5.4.3. The web presentation of the Working Group was organised and renewed.
- The Working Group was very active at the Working Week in Hong Kong (China SAR) as well as at the Regional Conference in San Jose (Costa Rica). Successful sessions about GNSS CORS networks were realised together with Working Group 5.2 “Geodetic Reference Frames in Practise”. It is planned to repeat the success in this field at the Working Week in Stockholm this year too. Two Sessions about GNSS CORS networks are planned again.
- Regarding GNSS calibration and check a first presentation regarding this topic was given in Costa Rica. For Stockholm two sessions are organized together with Working Group 5.1 “Standards, Quality Assurance and Calibration”.
- The work for a “Report on possibilities of cost-effective GNSS techniques for developing countries” has started managed by Neil Weston (USA), chair of SSG “Cost-Effective GNSS”, and the chair of WG 5.4.

3. Cooperation

3.1 Cooperation with Other Commissions

Commission 5 have continued to hold joint or combined technical sessions with Commission 6 at FIG symposiums. The common surveying field of interest has primarily been in deformation studies using GNSS, satellite or terrestrial imagery, and laser scanning. There are however opportunities emerging for more co-operation amongst other Commissions. This became more pronounce in Costa Rica, as survey and / or positioning infrastructure was identified as a significant and important component in the decision making process of land management and maintenance of key fundamental spatial datasets.

3.2 Cooperation with Sister Organisations

Following on from the International Association of Geodesy (IAG) / FIG MoU signing in Munich, the Commission 5 Steering Committee have met, through the course of the year at various conferences, with IAG officials Ruth Neilan and Chris Rizos, the outgoing President of Commission 4 (Positioning & Applications) and the incoming Vice-President of IAG, to discuss future combined events and initiatives.

Rudolf Staiger, Chair of Commission 5, attended the 24th General Assembly of IUGG (International Union for Geodesy and Geophysics) in Perugia, Italy 2–13 July 2007. This conference takes place every four years and IUGG consists of seven international unions all dealing with earth sciences, from which IAG is directly related to FIG. The General Assembly was attended by about 4,000 scientists from all over the world, and 450 were registered as IAG participants. Whilst at IUGG Rudolf Staiger was very well received by Chris Rizos, he also attended several technical IAG sessions and held several meetings with key IAG officials. For a full report refer to:

<http://www.fig.net/commission5/reports/Report%2024th%20General%20Assembly%20of%20IUGG%20-%20Rudolf%20Staiger.pdf>

For the Stockholm Working Week, FIG Commission 5 and IAG Commission 4 have jointly organised 2 technical sessions and they are discussion forums on “Real Time GNSS CORS” and “New Position Techniques”.

Commission 5’s liaisons also include practical involvement as Naser El-Sheimy assisted with the organisation of the FIG / ISPRS / IAG 5th International Symposium on Mobile Mapping Technologies in Padova, Italy May 2007.

3.3 Cooperation with the United Nations

Vice President Matt Higgins attended meeting of the International Committee on Global Navigation Satellite Systems (ICG) in Bangalore, India, 4–7 September 2007. The ICG has been formed as a result of recommendations of the UN Committee on the Peaceful Use of Outer Space (COPUOS), as ratified by the General Assembly of the UN. The United Nations Office for Outer Space Affairs (UN OOSA) acts as the secretariat for the ICG. It should be noted that FIG has a MoU with UN OOSA. A feature of the overall ICG meeting was the first gathering of the so-called “Provider’s Forum”, which involves the providers of all of the major Global Navigation Satellite Systems (GNSS) sub-systems. The global user community for GNSS was also represented with major players from many application areas. At the end of the week the ICG compiled a Joint Statement from the meeting, which included a report from the Provider’s forum. That report has for the first time set out principles agreed amongst the providers about ensuring compatibility and interoperability between the various GNSS sub-systems. The next full meeting of the ICG will be held in December 2008 and hosted by the USA at NASA’s Jet Propulsion Lab in Pasadena, California. For a full report refer to:

<http://www.fig.net/commission5/gnss/Higgins%20Report%20on%20ICG%20Meeting%20Bangalore%20India%20September%202007.pdf>

4. Events

2007

A summary of the Commission 5 activities at events in 2007 can be found on our website <http://www.fig.net/commission5>, however the highlights were:

- At the **Hong Kong Working Week**, the Commission facilitated several GNSS CORS open sessions as this type of technical information exchange forum has proven to be a successful format at previous FIG events, such as the Congress in Munich. The theme of these sessions focussed on ‘New Positioning Techniques and Infrastructure’ and issues

relating to ‘RFID, WiFi’, ubiquitous positioning, geo-referencing, communications, and the role of FIG. As result, a new sub-group of Working 5.3 called “New Positioning Techniques Forum” Chaired by Andrew Hunter was formed. This new special interest group comprises of members such as Joel van Cranenbroeck, Chris Rizos, Esmond Mok, and David Zilkoski. This group met informally for the first time at the 4th International Symposium on LBS and TeleCartography which was held in Hong Kong, November 2007.

- In **San Jose, Costa Rica at the FIG Regional Conference** the Commission facilitated another series of GNSS CORS forums. The objective of these discussion sessions was to provide fundamental information about GNSS CORS to assist with the uptake and implementation of such infrastructure to manage land administration issues and initiatives in the Region. From the responses of participants and the local surveying community these forums were a great success and from a Commission 5 work plan perspective it was the launching pad for the Commissions ‘Fact Sheet’ program.
- Commission 5 also conducted a special session on geodesy supporting sustainability, chaired by John Hannah, at the **9th South East Asian Survey Congress** and the 119th New Zealand Institute of Surveyors Conference in Christchurch, New Zealand 31 October to 2 November 2007.
- Vice President and Commission 5 liaison officer, Matt Higgins has also attended several **Munich Navigation Summits in Germany**. These forums focus on the status and policy developments relating to all major providers of GNSS, including the EU, USA, Russia, India, Japan and China. Mr Higgins participated in the March 2007 and February 2008 summits.

2008

In 2008 Commission 5 are endeavouring to send representatives to:

- 13th FIG Symposium on Deformation Measurements and Analysis (WG 6.1) with the 4th IAG Symposium on Geodesy for Geotechnical and Structural Engineering (SC 4.2) – Measuring the Changes, 12-15 May, Lisbon, Portugal. Web site: <http://measuringchanges.lnec.pt>
- 1st International Conference on Machine Control & Guidance. Co-sponsored by FIG Commission 6, 24-26 June, Zurich, Switzerland, Web site: <http://www.mcg.ethz.ch>
- The XXI Congress of the International Society for Photogrammetry and Remote Sensing - Silk Road for Information from Imagery, 3-11 July, Beijing, China P. R., Web site: www.isprs2008-beijing.org
- ION GNSS 2008, September 16-19, Savannah International Convention Centre, Savannah, Georgia, USA, Web site: <http://www.ion.org/meetings/#gnss>

5. Communication and Publications

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

Modifications to make the Commission 5 website more dynamic continue, and this form of medium (as well as other electronic / digital communication sources) to disseminate information has become the ‘norm’ for this Commission.

6. Other Notable Achievements

Another highlight for the year 2007-08 was the signing of United States Institute of Navigation (ION) / FIG MoU in March 2007 by FIG Council and ION representative Dorota Brzezinska. This signing will now provide a clear mandate for ION, FIG and IAG to work towards a three-way co-operation on GNSS matters. FIG are planning to send several representatives to the next ION event which is to held in September in Georgia USA.

Prof. Rudolf Staiger

Chair of FIG Commission 5

March 2008

Commission web site: www.fig.net/commission5