



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

**FIG Commission 5 Position and Measurement
Newsletter
December 2010**

Dear Colleague,

Welcome to the FIG Commission 5 e-Newsletter. In this edition you will find the latest information about our Commission and its activities over the last few months and also what to expect in the future. Please feel free to distribute this newsletter to colleagues and friends.

**FIG Working Week 2011 - Bridging the Gap between
Cultures - Marrakech, Morocco, 18-22 May 2011**



FIG Working Week and General Assembly 2011 will be held in Marrakech, Morocco 18-22 May 2011. Final invitation is available on the web. At the same time the web site and registration information will be updated.

Call for papers

Please note that the deadline for abstracts for non peer reviewed papers is **now 15 December 2010**.

http://www.fig.net/fig2011/fig2011_call.pdf

For all papers submit your abstract here:

<http://www.fig.net/abstractdb/submit.asp?id=13>

Guidelines for writing papers:

http://www.fig.net/fig2011/guidelines_for_papers_fig2011.pdf

Template for papers:

http://www.fig.net/fig2011/fig_2011_template.doc

At this symposium Commission 5 will be facilitating sessions on the usual topics

- Geodetic and positioning measurement – infrastructure, methodology, adjustment and analysis
- Standards, best practice guidelines, quality assurance and calibration for survey (including geodetic) measuring instruments
- National or geospatial reference systems and associated infrastructure
- Reference systems, frames and datums in practice
- GNSS CORS RTK networks and infrastructure - the impact of these networks, their operations and applications
- Geodetic observing systems - the role in global / regional issues and climate change
- Terrestrial and airborne laserscanning
- Cost-effective surveying (GNSS and other survey methods)
- Ubiquitous positioning techniques and applications -such as RFID, WiFi, AGPS, mobile phones, MEMS inertial sensors, Locata

- Kinematic measurements – including GNSS and Multi Sensors Systems
- GNSS modernisation and its effect on surveying
- Geoids and gravity - modelling, measurements and applications
- eGeodesy
- GGOS (Global Geodetic Observing System)

Also, depending on the abstracts received, there will also be dedicated sessions on the AFREF – the African Reference Frame Project. If there are suitable papers there could be sessions on –

- Overview / experiences/ status reports from EUREF, SIRGAS, APREF, ITRF and IGS / IAG
- the status of AFREF in countries ie 'soft and hard' infrastructure, issues / hurdles, general situation
- discussion or workshops to develop the way forward, data policies, work plan / time table, what organisations can do, infrastructure requirements etc

For more information navigate to FIG Working Week web site: www.fig.net/fig2011 and www.onigt.ma (French and Arabic)

At this stage, about 400 papers have been submitted in total and approximately 80 of them have indicated that they are relevant to Commission 5!

Reports from Various Symposiums

IGS Workshop and Vertical Rates Symposium, Newcastle Tyne, UK, 28 June – 2 July 2010 – Mikael Lilje



June 28 – July 2 2010 the Newcastle University Geodesy Group hosted approximately 200 participants in the International GNSS Service (IGS) Workshop 2010 and the COST Action ES0701 Vertical Rates Symposium. The Workshop focused on the application and status of current IGS operations and possibilities for future improvements. The final day of the meeting examined application of GNSS to tide gauge vertical land movement, glacial isostatic adjustment (GIA), subsidence and tectonic motion.

The International GNSS Service is committed to providing the highest quality data and products as the standard for global navigation satellite systems (GNSS) in support of Earth science research, multidisciplinary applications, and education. These activities aim to advance scientific understanding of the Earth system components and their interactions, as well as to facilitate other applications benefiting society. IGS is vital for more or less any high quality GNSS survey in a country. More information on IGS can be found at <http://igsceb.jpl.nasa.gov/>

The workshop is organised every second year. This year, Mikael Lilje was asked to give a plenary talk with the title FIG and IAG/IGS is a strong combination in which he highlighted some of the cooperation that has been conducted during the last number of years as well as expressed a hope of an increase but perhaps more focused cooperation in the coming years.

All presentations from the symposium can be found at <http://www.ceg.ncl.ac.uk/igs2010/> and that includes video-recordings!

FIG Commission 5 and 6 Workshop on "Innovative Technologies for an Efficient Geospatial Management of Earth Resources" Ust-Kamenogorsk, Eastern Kazakhstan, 3-7 September 2010

FIG Commissions 5 (Positioning and Measurement) and 6 (Engineering Surveys) together with Agency of the Republic of Kazakhstan for Land Resources Management, D. Serikbaev East Kazakhstan State Technical University (EKSTU), Siberian State Academy of Geodesy (SSGA) and Regional Scientific and Technological Park "Altai" organised a Workshop on "Innovative Technologies for an Efficient Geospatial Management of Earth Resources". The Conference was attended by about 100 participants and contained almost 60 presentations.

http://www.fig.net/news/news_2010/kazakhstan_sept_2010.htm

12 International Workshop on Accelerator Alignment (IWAA) DESY Hamburg, Germany, 13-17 September 2010 – Dr David Martin

The 12 International Workshop on Accelerator Alignment (IWAA) was held at the Deutsches Elektronen-Synchrotron (DESY) between 13 and 17 September 2010. The series of workshops are nominally held every two years at particle accelerator laboratories around the world. They are devoted to large scale and high precision positioning of particle accelerators and photon science experiments, focusing on the exchange of information between geodesists, surveyors, physicists and others specialists. The fields of geodesy, geomatics, metrology and traditional surveying overlap in this unique gathering.

Participants of IWAA generally come from laboratories, institutes, universities and companies around the world whose interests include particle physics, synchrotron light and medical or industrial applications. The workshops are usually focused on practical examples for aligning components including specialized techniques to increase positioning accuracies. Mathematical models used to refine raw observation data and the use of new equipment to generate this data is covered.

As with other years a variety of topics concerning high precision accelerator alignment were discussed. This field overlaps metrology and traditional surveying and geodesy. Standard measurement precision is millimetric to sub-millimetric over distances ranging between several hundred metres up to nearly 30 km. New and planned machines as well as experiments go well beyond even this and

require micro-metre alignment precision on the same scales. The use of specialised techniques and instruments are needed to guarantee that these requirements can be met.

This year there was a special concentration on survey calculations. In an effort to harmonize the approach to calculations and accuracy an excellent lectures series on least squares calculations at a very accessible level were given. These lectures will be available with the conference proceedings (<http://iwaa2010.desy.de/>) or (<http://www-conf.slac.stanford.edu/iwaa/currentConf.html>). Interested persons are encouraged to consult the comprehensive IWAA collection of articles related to accelerator alignment for more detailed information concerning this dynamic field.



Report on The 5th Meeting of the International Committee on Global Navigation Satellite Systems (ICG-5) Turin Italy, October 2010 – Matt Higgins

The Fifth Meeting of the International Committee on Global Navigation Satellite Systems (ICG) was held in Turin, Italy from 18 to 22 October 2010. 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 also be noted that FIG has a MoU with UN OOSA.



The International Federation of Surveyors (FIG) is an Associate Member of the ICG and Vice President Matt Higgins was there as the FIG representative and as Co-Chair of Working Group D of the ICG. Mikael Lilje, the incoming Chair of FIG Commission 5 on Positioning and Measurement for the period 2011 to 2014, was also at the meeting as FIG's representative on Task Force D1 on Geodetic References. For the full report refer to FIG website - http://www.fig.net/news/news_2010/turin_october_2010.htm

16th Permanent Committee on GIS Infrastructure for Asia and the Pacific (PCGIAP) Meeting, Singapore, 18 - 21 October 2010 - Graeme Blick

Geographic information technologies and spatial data infrastructure play important roles in allowing governments, local communities, non-government organizations, the commercial sector, and people to make progress in addressing many of the world's most pressing problems. The Global Spatial Data Infrastructure 12 World Conference (GSDI 12) held in Singapore in October 2010 explored the complementary roles of government, private industry and the academic community in realizing better means for sharing geographic data and technologies and developing improved location-based services for meeting real world needs.



Run in conjunction with GSDI 12 was the 16th Permanent Committee on GIS Infrastructure for Asia and the Pacific (PCGIAP) meeting. The aims of the Committee are to maximize the economic, social and environmental benefits of geographic information by providing a forum for nations from Asia and the Pacific to:

- cooperate in the development of a regional geographic information infrastructure;
- contribute to the development of the global geographic information infrastructure;
- share experiences and consult on matters of common interest; and
- participate in any other form of activity such as education, training, and technology transfer.

Four working groups are established under PCGIAP:

- WG 1 - Geodesy technologies and applications
- WG 2 - Geospatial data management and service
- WG 3 - Spatially enabled government and society

- WG 4 – Institutional strengthening

Of particular relevance to the author and members of FIG Com 5 is WG 1 which has the following priorities:

- Establishment of a regional vertical geodetic datum
- Enhancement of a regional geodetic infrastructure through annual cooperative campaigns
- Improvement of the regional geoid
- Implementation of an absolute gravity reference system
- Development of transformation parameters for spatial data
- Geodetic technology transfer to the Pacific Islands

One of the major focuses of WG1 is the coordination and development of the Asia Pacific Reference Frame (APREF). Annual regional surveys have been coordinated by Australia that seek campaign GNSS data and data from GNSS CORS stations across the region for analysis and the development of APREF.

A number of countries reported on their activities and an overview of the project and results was provided by Australia. There was also discussion around the future development of APREF and how countries can contribute to this initiative. It was interesting to see the different levels of participation by countries in the region and the clear desire to contribute data and work towards the improvement of APREF.

It was a very worthwhile couple of days that highlighted for me the work being undertaken towards the development of a regional reference frame across the Asia Pacific region.

Large Volume Metrology Conference, Chester UK, 2 - 3 November 2010 – Dr David Martin

The Large Volume Metrology Conference LVMC was held recently in Chester UK. This event, and its American equivalent, the Coordinate Metrology Society Conference (CMSC), provide forums to discuss and actually see the latest innovations and instruments in the field of portable 3D industrial measurement technologies. Featured instruments and technologies include laser trackers, laser scanners, electronic theodolites, photogrammetry and a whole host of others. As in previous years, the LVMC combined technical conference sessions with a comprehensive trade exhibition of some of the world's leading measurement system manufacturers.

Several very interesting presentations were made on education and training in metrology, instrument calibration and a number of other very specialised topics such as Measurement Assisted Determinate Assembly (MADA). This is an economical approach to machining and assembling large aircraft (or other) components. It proposes that pieces can be produced with inaccurate interfaces and hole positions and these can be accurately measured. Bespoke smaller components can subsequently be produced to high accuracy with respect to these measurements. The complete assembly can then be put together with part-to-part holes and interfaces facilitating determinant assembly. This is quite a radical departure from traditional processes in aerospace manufacture.

For those interested, the next CMSC (<http://www.cmssc.org/>) will be held July 25-29, 2011 in Phoenix Arizona and the next LVMC (<http://www.lvmc.org.uk/>) will certainly be held sometime in autumn 2011.

Report on the 2nd Asia Oceania Regional Workshop on GNSS - "Asia Oceania is the Showcase of New GNSS", Melbourne Australia, 21-22 November 2010 – Rob Sarib

FIG Vice President Matt Higgins and Commission 5 Vice Chair of Administration Rob Sarib attended the 2nd Asia Oceania Regional Workshop on GNSS that was held in Melbourne on 22 November. Vice President Higgins was an invited guest and presented on the topic "Australia's Requirements and Contributions in the Multi GNSS Era". The event was hosted by the Japanese Space Agency JAXA and the Royal Melbourne Institute of Technology (RMIT) University.



The main purpose of this workshop was to discuss the effects of a multi GNSS signal environment on geospatial and geoscience activity in the Asia Oceania region, and to then continue the modification of 'demonstrator project plans' to address the primary issues identified. To assist and generate discussion amongst the 101 participants from 11 different countries, there were numerous presentations (40) from countries in the region on the following themes-

- Multi GNSS Network Establishment
- Precise Positioning (Agriculture and Machine Guidance)
- Disaster Mitigation and Measurement
- Intelligent Transfer Systems (ITS), Mapping and Location Based Services (LBS)

The above key applications were formulated at the 1st Asia Oceania Regional Workshop that was held in Bangkok at the beginning of this year. Also at this inaugural workshop the Multi-GNSS Asia (MGA) committee was established to set up the framework for campaigns or projects arising from the workshops, to

facilitate the promotion of their activity, and to administer the 'agreements' for participants involved in the demonstrator campaign.

Refer to website <http://www.multignss.asia/> for more information.

It is intended that the multi GNSS demonstrator campaigns will be finalized by end of 2011 and thus start in 2012 - 2014, however actual start dates will depend on when the new GNSS signals are available for analysis.

The following is a summary of each working group's outcomes and the future possible activity for each theme -

- Multi GNSS Network Establishment
 - Participants need to consider -
 - hosting and be part of a tracking or monitoring network that has multi GNSS receivers / antennae
 - being a Data and / or Analysis centre
 - The governing board of this working group is to continue the development of the framework and accompanying documentation for participation, and a schedule for the creation of a multi GNSS network.
 - Possible campaign / project outcomes are - RINEX format to be amended to include new GNSS signals ; analysis and processing software for new signals ; precise orbit / clock estimations for new GNSS's ; high resolution ionospheric models for single frequency GNSS receivers or areas that have ionospheric (tropospheric?) anomalies ;
- Precise Positioning (Agriculture and Machine Guidance)
 - The problems or issues identified were the declining skilled workforce ; environmental sustainability ; better efficiency and production ; standards for GNSS applications ; improving target community engagement and uptake ; vegetation canyons ie GNSS signals blocked or masked by trees and their canopy ; investigation of the QZSS 'Lex' service and compare with other real time solutions such as VRS, FKP, MAX, MSAS etc ; examination of alternate communications for real time positioning ; accuracy of base data mapping ; will multi GNSS signals improve the height component.
 - The proposal for a demonstrator project to address the above consisted of a 'test track' to analyse the various signals from the different GNSS signals in different environments ; develop plans and actions to promote the benefits of precise positioning to the target community.
- Disaster Mitigation and Measurement
 - The workshop continued discussion on the impact of a multi GNSS environment on positional accuracy with respect to a series of project topics. The topics involved -
 - Tsunami buoys
 - Earthquake monitoring
 - Weather prediction and atmospheric research
 - Radio occultation observation
 - Landslide monitoring
 - Usage of augmented signals such as the QZSS LI-SAIF or LEX
 - GNSS reflectometry
- ITS, Mapping and LBS
 - Possible issues that could be address by a demonstrator campaign are -

- Does this industry application need more accurate positioning / geo-referencing? If so how?
- Will a multi GNSS environment have a significant impact with these applications?
- What are the integrity / accuracy of a multi GNSS positioning in the environments related to this theme? Evaluate through field observations?

The following points may need to be considered by the GNSS CORS operators in the Asia Oceania region –

1. Need to development an infrastructure upgrade plan that will enable their GNSS CORS network to access multi GNSS signals. This means GNSS antennae and receivers must be able to access at least QZSS, GPS, GALILEO, GLONASS signals. The priority would be GLONASS and then either QZSS and GALILEO. This may mean present antennae will need to be replaced and the firmware in GNSS receivers upgraded.
2. Need to consider participation in the demonstrator campaigns.
3. Need to 'watch' the positioning services that will be delivered from each new GNSS as they become operational. With special attention to the real time decimetre services.
4. Other points to consider –
 - a. the multi GNSS environment needs to be interoperable ; data and the exchanging of this data needs to be accessible and open ; products need to be generated ie precise orbit / clock parameters, ionospheric / tropospheric models ; and GNSS providers need to collaborate with the IGS.
 - b. Currently there are 60 GNSS satellites available and it is predicted there will be 120 + by 2020. This means there could be up to 6 times the amount of GNSS signals available for users.
 - c. The potential benefits of a 'working multi GNSS environment are – more integrity, greater availability, possible better accuracy in bad GNSS conditions / environments, and less expensive positioning services.

Interesting News and Articles

JAXA Launch MICHIBUKI QZSS – Rob Sarib

The Japanese Space Agency, JAXA, launched the first MICHIBUKI QZSS satellite on the 11 September 2010. The primary purpose of this satellite is to support positioning in Japan where there are 'urban canyons', mountainous area that are not friendly to GPS. This means the QZSS satellites with have near zenith orbit patterns. Also as the orbit path traverses the Asia Oceania region it is anticipated that once fully operational, there will be 'most of the time', access to signals from at least 3 satellites. Present analysis of tracking indicates the orbits are 'perfect'.

It is expected the QZSS signals will available for validation by the end of 2010. There are 6 signals that will be available from QZSS – L1 C/A L1C, L2C, L5, L1-SAIF and LEX. Note L1 – SAIF and LEX are augmented signals (or performance enhancement signals). The L1-SAIF signal has full compatibility with GPS-SBAS and will transmit wide area differential GPS (WDGPS) correction data with an integrity message. LEX will also be a downlink for either precise orbit parameters

or positional correction information and is expected to facilitate a real time solution (such as precise point position - PPP) at the decimeter accuracy level. This has wide area implications and applications for those users requiring this level of real time positioning.

For the demonstrator campaign JAXA will be providing 40 x JAVAD multi GNSS receivers and antennae for project use. This instrument type can access QZSS, Galileo, GPS and Glonass.

Web site <http://qz-vision.jaxa.jp>

APREF Participation Grows – Dr John Dawson

There are now 38 participating agencies and countries in the Asia Pacific Reference Frame Project – APREF. GNSS CORS data is being obtained from organizations based in Iran across to west to the USA! Through the APREF participants will have the ability to improve the monitoring of their stations relative to the their National and / or Regional CORS infrastructure as well the knowledge that their network will be making an important contribution to improving the National and Regional geodetic infrastructure. Presently, GNSS data received is being to included in the routine APREF analysis, which is currently undertaken by several analysis centres in Asia Pacific region.

Co-ordinates for 1650 CORS! – Dr Neil Weston

The National Geodetic Survey (NGS) will soon release coordinates for all 1650 CORS sites in the United States that are consistent and aligned to ITRF05. NGS will then use derived transformation parameters to produce coordinates in the NAD 83 (CORS96A) reference datum, the official datum in the United States for civil activities. NGS expect to release these co-ordinates in very early spring.

Deformation in National Datums – Graeme Blick

What interest is there in deformation in national datums?

A question has been raised about how to describe deformation in national datums (and potentially international datums).

National datums are increasingly needing to account for deformation in order to maintain the level of absolute accuracy that GNSS users expect.

In New Zealand, for example, the current national datum, NZGD2000, is "semi-dynamic" - meaning that its definition includes both coordinates of reference stations at a specific time (2000.0) and a deformation model which is used to calculate the coordinate at other times. The deformation model is updated periodically in response to deformation events and improved measurement of ongoing deformation, in the same way as mark coordinates are updated when new surveys provide more accurate information.

Other countries also have or may be considering establishing deformation models (eg HTDP in the USA).

At present there is no recognized standard way to represent this deformation so that it can be used by positioning software, such as in GPS receivers, GIS software, and so on.

It seems that now there is an opportunity to establish a common standard for publishing national deformation models that can be supported by both the authorities defining the models, and the software vendors using them.

Would it be useful to establish a forum under Commission V to debate this? In the first instance if you have an interest in this topic please contact Chris Crook, at ccrook@linz.govt.nz.

FIG Handover on Copenhagen – Rudolf Staiger & Mikael Lilje

The end of the current term of office for the Council, as well as Commission Chairs, was celebrated at the 'FIG Handover' event in Copenhagen on the 25 – 26th November. The new term for the officers does not start though until the 1st January 2011. The handover ceremony included music, speeches and more and highlighted the change that FIG has gone through over last 20 years. Besides thanking Stig Enemark for his period as FIG President, also the former Commission 5 Chair Matt Higgins was noticed for his excellent achievements within FIG.

Other major changes that Commission 5 should notice is that the current Commission chair, Rudolf Staiger, will become Vice President for the period 2011-14 and that Mikael Lilje will take over on 1st January as Commission 5 Chair. One of Rudolf's focus for the coming period will be to work closely with the Commissions as the Chair of ACCO. The coming ACCO had its first meeting the 27th November where much time was spent on the various Commissions work plans. Also the coming FIG WW in Marrakesh was discussed and especially the peer review process that will start immediately.

The photo below is of incoming Commission 5 Chair Mikael Lilje receiving his "pin" from newly elected FIG President Teo Chee Hai and Vice President Rudolf Staiger.



FIG Commission 5 2011-14, DRAFT work plan

By the 1st of January, 2011 Mikael Lilje (Sweden) will take over as chair of the FIG Commission 5. He will follow the successful term of Prof. R Staiger. Mikael was appointed at FIG Working Week in Stockholm, Sweden in 2008. The main work from then has been to form the proposed structure of the Commission, find suitable working group chairs and with their help prepare a work plan for FIG Commission 5 for the period 2011-14. The work plan will be subject of approval by the General Assembly at FIG Working Week in Marrakesh, Morocco.

Mikael has in his draft work plan proposed the following working groups:

Working group 5.1 - Standards, Quality Assurance and Calibration

Chair: David Martin, France (david.maretin@esrf.fr)

The working group should influence the development of standards affecting positioning and measurement instruments and methods, in collaboration with the FIG Standards Network and through participation in the relevant technical committees (TCs) of the International Standards Organisation (ISO) and other appropriate bodies. It should also be involved with acceptance controls, quality assurance and certification and their impact on the surveying profession as well as testing and calibration of measuring instruments. The working group should assist other Commission Working Groups to implement Standards from TC 172/SC 6 and ISO TC211 as appropriate.

Working group 5.2 – Reference Frame

Chair: Graeme Blick, New Zealand (gblick@linz.govt.nz)

The working group should try to bring together all organisations involved in defining or using reference frames to develop common approaches and avoid duplication. Such organisations include FIG, the International Association of Geodesy (IAG), ISO, groups of national mapping agencies, other influential national agencies (such as the US Department of Defence's National Geospatial-Intelligence Agency (NGA), which is responsible for WGS84.) and alliances of commercial organisations (such as Open GIS Consortium and the European Petroleum Survey Group). It should also continue with the existing co-operation with IAG on the Regional Reference Frame Projects such as AFREF, APREF, EUREF, NAREF, and SIRGAS. The working group should consider options for the development and implementation of 4 dimensional datums that incorporate the effects plate tectonic and regional effects such as those due to earthquakes or local effects such as landslides as well as develop an inventory of approaches to reference frame issues in different countries (including transformation methodologies) that is accessible to surveying practitioners. It should also examine how surveying practitioners can access the reference frame, through less emphasis on networks of ground monuments and more emphasis on Global Navigation Satellite Systems (GNSS) base stations and provide information on the maintenance of CORS networks to ensure long-term stability.

Working group 5.3 – Geodetic and Positioning Infrastructure

Chair: Neil Weston, USA (neil.d.weston@noaa.gov)

The working group should examine the positioning services using CORS, the various positioning techniques using GNSS and the existing automated positioning software via WWW. The working group should also focus on real time networks as well as GNSS products and advancements. GNSS is in a very intense and interesting development phase and the working group should provide FIG input during planning and implementation phases associated with programs of GPS Modernisation and GNSS Development.

Working group 5.4 – Kinematic Measurements

Chair: Volker Schwieger, Germany

(volker.schwieger@ingeo.uni-stuttgart.de)

The working group should bring to together practitioners, instrument manufactures and scientists that deal with kinematic measurements as well as maintain contact with instrument and sensor manufactures to provide state-of-the-art information to the users. The main topics will be -

- Kinematic aspects of geodetic instruments like total stations and GNSS receivers
- Typical kinematic sensors like inertial measurement units, odometers, etc.
- Time issues like synchronisation and dead time.
- Integration of different sensors to Multi-Sensor-Systems.
- Quality of integrated kinematic measurements

Working group 5.5 – Ubiquitous Positioning

Chair: Allison Kealy, Australia (akealy@unimelb.edu.au)

This working group, which is a joint working group between FIG and IAG, will focus on the development of shared resources that extend our understanding of the theory, tools and technologies applicable to the development of ubiquitous positioning systems. It has a major focus on;

- Performance characterization of positioning sensors and technologies that can play a role in the development of ubiquitous positioning systems
- Theoretical and practical evaluation of current algorithms for measurement integration within ubiquitous positioning systems.
- The development of new measurement integration algorithms based around innovative modeling techniques in other research domains such as machine learning and genetic algorithms, spatial cognition etc.
- Establishing links between the outcomes of this WG and other IAG and FIG WGs (across the whole period)
- Generating formal parameters that describe the performance of current and emerging positioning technologies that can inform FIG and IAG members.

The working groups are interested in participants and any interested person should contact either Mikael Lilje, Rob Sarib or the respective working group leaders directly.

New FIG Publications

Sydney Declaration - Final version of the declaration adopted as outcome of the XXIV FIG Congress held in Sydney, Australia, 11-16 April 2010

http://www.fig.net/pub/figpub/sydney_decl/sydney_declaration.pdf

Forthcoming events

2011

13 -15 April, Garching/Munich, Germany

The 1st International Workshop on The Quality of Geodetic Observation and Monitoring Systems - QuGOMS 2011. Co-sponsored by FIG Commission 5

Abstract submission: 15 November 2010

Invitation flyer: <http://www.fig.net/events/2011/qugoms2011.pdf>

Web site: www.gih.uni-hannover.de/qugoms2011

13-16 June, Cracow, Poland

Mobile Mapping Technology Symposium, MMT11

7-12 July, San Diego, California, USA

The Survey Summit arranged by ESRI and the American Congress on Surveying and Mapping (ACSM). Co-sponsored by FIG

Deadline for abstract submission: 6 December 2010

Web site: www.thesurveysummit.com

For **additional FIG and FIG Commission events** see always up-to-date information at: www.fig.net/events/events.htm

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 – robert.sarib@nt.gov.au

Last Words from Rudolf Staiger Chair Commission 5

I would like to thank all the active members of Commission 5, especially all Working Group Chairs and the Vice Chair for Administration Rob Sarib, for their valuable efforts and contributions. I'm looking very much forward towards an interesting and productive cooperation between the Council and Commission 5, not forgetting the other 9 Commissions! I hope that the positive outcome and effectiveness will continue and remain a strong motor for FIG.

On behalf of Commission 5 I would like to wish you a very Merry Christmas and a safe Happy New Year!



Kind regards,

Handwritten signature of Rudolf Staiger

Prof. Rudolf Staiger
Chair Commission 5