



International Federation of Surveyors  
Fédération Internationale des Géomètres  
Internationale Vereinigung der Vermessungsingenieure  
**Commission 5**  
Positioning and Measurement (2007-2010)  
[www.fig.net/figtree/commission5](http://www.fig.net/figtree/commission5)

## Newsletter - April 2007 Edition

### MESSAGE FROM Rudolf Staiger COMMISSION 5 CHAIR

Dear Colleagues,

The FIG XXX General Assembly and Working Week in Hong Kong SAR China (13-17 May) is fast approaching. I hope to greet many Commission 5 past and present colleagues, and new faces at this conference. My Commission team have prepared a technical program that we believe will be appealing and indicative of themes which are relevant now and for the future.

In this edition you will read Commission 5 news and also the latest version of our Work Plan. I will welcome any feedback or comment from you before this proposal is ratified at the General Assembly in Hong Kong.

Looking forward to seeing you in Hong Kong.

Regards,



### COMMISSION NEWS HOT of the PRESS

FIG and ION

Co-operation Agreement SIGNED !

The FIG Council held its first meeting in early March. One of the agenda items was the Co-operation Agreement between the Institution of Navigation (ION) and FIG. The agreement was adopted and signed by the FIG Council and will now be presented at the General Assembly in Hong Kong in May for their information.

Commission 5 and ION will investigate joint activities on topics such as -

- Reference frames and observing systems
- Positioning, measurements and applications
- Navigation and tracking
- Geoid determination and height systems
- Sensors and platforms
- Hydrographic surveying, marine geodesy
- Systems for data processing, analysis and representation
- Special applications of geodesy to engineering
- Theory and algorithms
- Education and training
- Cooperation with other international organizations such as the United Nations (UN) and International Organization for Standardization (ISO)
- Contributing to multi-disciplinary research and advisory teams

Currently the FIG liaison officer with ION is FIG VP Matt Higgins and he will discuss with

Rudolf Staiger who will be the Commission 5 contact person in the future.

We look forward to good co-operation and the benefits to both ION and FIG.

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## Report on Munich Satellite Navigation Summit 2007

**Matt Higgins** the Vice President of FIG attended the above summit. The following is an extract from his report and a full version of this report can be sourced at the following web location-

<http://www.fig.net/commission5/index.htm> .

The Satellite Navigation Summit held in Munich (March 2007) is an information exchange forum on latest status and policy developments relating to all the major providers of GNSS, including the EU, USA, Russia, India, Japan and China. The 2007 Summit had approximately 440 registrants from 28 countries.

The sessions in the Summit were structured as "Panels" where speakers gave short explanations of the status of their topic and then form a panel that is questioned by the Session Chair. This format enabled issues to be explained and those which may need some attention in terms of policy and planning.

The Summit program comprised of :

- News from satellite Navigation Systems
- Munich Flashlights - News from Bavaria
- Debate Between the Galileo Responsibilities
- Starting, Waiting or No Interest in Galileo/GNSS Applications
- Do We Know More About the Galileo Public Regulated Service (PRS) Now?
- The U.S. Scene of Satellite Navigation
- Why Galileo for Australian Industry?
- Views and Perspectives of Worldwide GNSS Industry
- Is (or Will Be) the Russian GLONASS System Interoperable with the Other GNSS?
- The International Space Station: a Talk by Astronaut Thomas Reiter
- Galileo Masters Competition 2007

All presentations from the Summit will eventually be made available on the web site- [www.munich-satellite-navigation-summit.org](http://www.munich-satellite-navigation-summit.org) .

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## University of Toronto PhD and MSc Graduate Student Opportunities

Applications are invited for qualified students to pursue fully funded graduate studies (MSc or PhD) at the University of Toronto in the Geomatics group of the Department of Civil Engineering and Lassonde Institute for Engineering Geoscience. Students with background in geodesy, engineering, geophysics or physics are encouraged to apply.

For more information contact Prof. Georgia Fotopoulos at [foto@civ.utoronto.ca](mailto:foto@civ.utoronto.ca)

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## Australian Geodetic Community Receive \$15.8 million AUD to Enhance Geodetic Infrastructure

In summary this infrastructure will consist of -

- Approximately 50 GNSS base stations distributed across the Australian continent,
- A new VLBI site and replacements for the other ageing 2 systems,
- An upgrade to the SLR system, and
- The purchase of both an absolute (FG5) and relative gravity meter.

Refer to the following web links for more information.

General Info : <http://www.ncris.dest.gov.au/>

Australian Federal Minister's press release:

<http://www.dest.gov.au/Ministers/Media/Bishop/2006/11/B001271106.asp>

Fact Sheet on the AuScope part:

[http://www.ncris.dest.gov.au/NR/rdonlyres/79D83DCE-8CA2-4E4B-99CC-F7B7A2B2CC4C/14718/NCRISfactsheets\\_oz\\_structure\\_content.pdf](http://www.ncris.dest.gov.au/NR/rdonlyres/79D83DCE-8CA2-4E4B-99CC-F7B7A2B2CC4C/14718/NCRISfactsheets_oz_structure_content.pdf)

See also: <http://www.auscope.org.au/>

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## COMING EVENTS

### FIG XXX General Assembly and Working Week

13-17 May 2007, Hong Kong SAR, China  
Web site: [www.fig.net/fig2007](http://www.fig.net/fig2007)

#### Commission 5 Activities -

- **Open Commission Meeting** on Sunday 13 May @ 1600 in the Tai Po room.
- **Technical Sessions**
- **TS1B** - Adjustment and Calculation (Tai Po) Monday 14 May @1400
- **TS2B** - Quality of Measurements (Tai Po) Monday 14 May @1600
- **TS3B** - Airborne Surveying Laserscanners and Cameras (Tai Po) Tuesday 15 May @1100
- **TS4B** - GNSS 1 (Tai Po) Tuesday 15 May @1400
- **TS5A** - GNSS 2 (Fanling) Tuesday 15 May @1600
- **TS6C** - Forum on New Techniques for Positioning (Shek-O) Wednesday 16 May @1100
- **TS6F** - Terrestrial Laser Scanning 1 (Harbour2) Wednesday 16 May @1100
- **TS7C** - New Techniques and Sensors for (Shek-O) Wednesday 16 May @1400
- **TS8C** - Terrestrial Laser Scanning 2 (Shek-O) Wednesday 16 May @1600.

Please make sure you attend **TS6C** as this is a open forum to follow up on the Munich RTK Networks / CORs session ; and to also discuss the impact of *New Positioning Techniques* ( ie LocataLites, pseudolites, RFID readers/tags, WiFi access points, UWB, LBS etc) on surveying AND to also define the role of FIG Commission 5 in this emerging field.

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### Joint CIG/ISPRS Conference on Geomatics for Disaster and Risk Management Gi4DM.

23-25 May, Toronto, Ontario, Canada

This event is Co-sponsored by FIG.

"The fundamental goal of this conference is to use the latest state-of-the-art space-based geomatics technologies to understand the dynamic Earth processes and geo-hazards. This will be accomplished through the uses geoinformation for risk reduction, mitigation, monitoring and response to disasters, including-

- Geomatics technologies and advances,
- Geospatial information
- Geodesy and Earth processes."

The Canadian Institute of Geomatics (CIG) will also be celebrating its 125th anniversary.

Refer to web site:

<https://www.cig-acsg.ca/cig2007/english/home.htm>

Or contact FIG Commission 5 representative  
Prof. Georgia Fotopoulos  
[georgia.fotopoulos@utoronto.ca](mailto:georgia.fotopoulos@utoronto.ca)

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### 5th International Symposium on Mobile Mapping Technology

28-31 May 2007, Padova - Italy  
Organised by FIG Commission 5, IAG and ISPRS.

Contact: [naser@geomatics.ucalgary.ca](mailto:naser@geomatics.ucalgary.ca)

Dear Colleagues,

We invite you to attend the 5th International Symposium on Mobile Mapping Technology in Padua, Italy. The core objective of the conference will be to discuss most recent technologies, exchange experiences and promote future research, development and production in fields related to mobile mapping. We look forward to see you in Padua!

For more information please visit the webpage  
<http://www.cirgeo.unipd.it/cirgeo/convegna/mm2007/index.html>

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## 9th South East Asian Survey Congress

29 October to 1 November 2007  
Christchurch - New Zealand

Incorporating the 119th New Zealand Institute  
of Surveyors Conference, the 6th Trans  
Tasman Surveyors Conference and CASLE  
General Assembly and **FIG Commissions 4  
(Hydrography) and 5 (Positioning &  
Measurement) Workshops.**

Website :

[www.surveyors.org.nz/congress2007](http://www.surveyors.org.nz/congress2007)

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## The 4th International Symposium on LBS and TeleCartography

In celebration of The Hong Kong Polytechnic  
University's 70th Anniversary

The Department of Land Surveying and  
Geoinformatics of the Hong Kong Polytechnic  
University and the Cartography and Engineering  
Geodesy Research Groups of the Vienna  
University of Technology are pleased to  
present the 4th International Symposium on  
LBS and TeleCartography in cooperation with  
the ICA Commissions on Maps and Internet and  
Ubiquitous Cartography, and the IAG WG 4.1.2  
on Indoor and Pedestrian Navigation, to be held  
from Thursday, 8th to Saturday, 10th  
November, 2007 at the Hong Kong Polytechnic  
University, PR China.

Contributions from the fields of Cartography,  
Geoinformation, Computer Sciences,  
Telecommunication, Geodesy, Spatial Cognition,  
Geomedial Techniques, etc. should address  
current topics of:

- Location Based Services
- TeleCartography (Map based LBS)
- Applying Multimedia to LBS
- Ubiquitous Mapping
- Wearable Mapping
- Positioning Methods
- Navigation Systems
- Mobile Mapping
- Cartographic Theories & Techniques
- Visualization, VR & Augmented Reality

- Personalization & Adaptive Methods
- Spatial Decision Support
- Persistent Spatial Assistants
- Smart Environments & Active Landmarks

Send your abstract (200 words) before July  
1st, 2007 as \*.doc - file to  
[lsgi.lbs2007@polyu.edu.hk](mailto:lsgi.lbs2007@polyu.edu.hk)

All contributions will be reviewed by the  
programme committee for inclusion in an  
upcoming book on Location Based Services and  
TeleCartography.

For further information about the symposium  
please contact Miss Eling Yim at  
(852) 2766 4350 or see:

<http://www.lsgi.polyu.edu.hk/LBS2007>

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## 6th FIG Regional Conference

12 - 15 November 2007

San Jose - Costa Rica,

See website : [www.fig.net](http://www.fig.net)  
for more information

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## FIG Commission 5 Positioning and Measurement Work Plan 2007-2010 Version March 2007

PLEASE provide comments on the proposed  
Commission 5 WORK PLAN to  
[rudolf.staiger@uni-duisburg-essen.de](mailto:rudolf.staiger@uni-duisburg-essen.de)

### 1. Title

Positioning and Measurement

### 2. Terms of Reference

- The science of measurement  
(instrumentation, methodology and  
guidelines)
- The acquisition of accurate and reliable  
survey data related to the position, size



and shape of natural and artificial features of the earth and its environment and including variation with time.

### 3. Mission statement

- Focus on modern technologies and technical developments and assist individual surveyors, through guidelines and recommendations, to choose and utilise those methods, technologies and instruments that are most appropriate to different applications.
- Follow technical developments through collaboration with other FIG commissions and other international organisations; participation in appropriate meetings; and the preparation of appropriate publications.
- Support research and development and stimulate new ideas in the fields of expertise represented within the commission.
- Collaborate with manufacturers on the improvement of instrumentation and associated software.
- Present and promote the work of the commission and its working groups on an ongoing basis at FIG working weeks and other relevant technical meetings and in appropriate FIG and other media.

### 4. General

This work plan covers the development, use and integration of technologies for positioning and measurement and the associated standardisation, best practice and fundamental reference frame issues. Many of the issues are global in nature and Commission 5, working with like-minded Sister Associations, is well placed to deal with them. FIG Council has also asked the Commissions to cooperate with United Nations Agencies to address global problems such as sustainable development and humanitarian needs. The disciplines covered by Commission 5 are at the heart of delivering solutions for the spatial aspects of these important global problems. Specific activities aimed at developing countries include examination of Low Cost Surveying Technologies, assistance with implementation of modern Geodetic Reference Frames and

associated infrastructure and contribution to appropriate Continuing Professional Development programs.

In addition to the specific activities above, the Commission will support and contribute to FIG Task Forces and the Standards Network. The Commission will also respond to the FIG Council to address new issues as they emerge.

### 5. Working Groups

#### Working Group 5.1 – Standards, Quality Assurance and Calibration

##### Policy Issues

- Influence the development of standards affecting positioning and measurement instruments and methods, in collaboration with the FIG task force on standards and through participation in the relevant Technical Committees (TCs) of the International Standards Organisation (ISO) and other appropriate bodies.
- Acceptance controls, quality assurance and certification and their impact on the surveying profession.
- Checking and calibration of measuring instruments.
- Assist other Commission Working Groups to implement Standards from ISO TC211 as appropriate.

##### Chair

David Martin (France), e-mail: [martin@esrf.fr](mailto:martin@esrf.fr)

##### Specific project(s)

- Transform the existing recommendations on the Use and Calibration of EDM (FIG-Publication 7/1994) in a digital document and make it available on the FIG-Website
- Actualise the above mentioned EDM-Standards
- Present and promote the use of standards and guidelines to the surveying community.
- Establish guidelines and recommendations for instruments taking into account latest development in surveying technology.
- Guidelines and Recommendations for the ISO Guide to Uncertainty of Measurements.

- Review Standards coming from ISO TC211 for relevance to Positioning and Measurement.
- Contribution to the new GPS related Work Item of ISO TC 172 SC6, in cooperation with Working Group 5.4.

#### Workshop(s)

Participation in FIG Working Weeks and other major Commission events (see events section below) with dedicated Technical Sessions and/or Workshops as appropriate.

#### Publication(s)

- Recommendations for the Use and Calibration of EDM
- FIG Working Weeks will include Technical Papers on specific issues and presented by Working Group Members and other invited experts.
- Guidelines for instruments taking into account latest development in surveying technology.

#### Timetable

- Draft publications will be presented at FIG Working Weeks during the term of this plan and according to a timetable to be developed by the Working Group Chair.
- Working group final report: dedicated session, FIG Congress, 2010.

#### Beneficiaries

- FIG member associations, manufacturers and users of survey equipment, governments, standardisation organisations, decision makers, GIS developers and users, surveying businesses, individual surveyors.

### **Working Group 5.2 - Reference Frame in Practice**

#### Policy issues

- Work 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).

- Continue the existing co-operation with IAG on the African Reference Frame Project (AFREF) as well as facilitate similar actions on other continents such as South America and Asia.
- Provide background technical information on relevant issues written in a way that is accessible to the surveying practitioners.
- Develop an inventory of approaches to reference frame issues in different countries (including transformation methodologies) that is accessible to surveying practitioners.
- Examine the concepts of dynamic and semi-dynamic datums.
- Examine how surveying practitioners are changing how they access the reference frame, through less emphasis on networks of ground monuments and more emphasis on Global Navigation Satellite Systems (GNSS) base stations.
- Examine global positioning services such as OmniSTAR and StarFire and their use for positioning in a national reference frame
- Examine the increased use of GNSS for height determination as well as the use of geoid models for connection to local height datums.
- Examine the role that the satellite missions GRACE, GOCE and CHAMP will have on global geoid models
- Examine the increasing role of aerial and space based imagery in the realisation of reference frames.
- Liaise with Commission 4 to review and revise (where required) FIG Publication 37, Vertical Reference Surface for Hydrography

#### Chair

Mikael Lilje (Sweden), e-mail: [mikael.lilje@lm.se](mailto:mikael.lilje@lm.se)

#### Specific project(s)

- Initiate, contribute and facilitate meeting(s) of all organisations involved in defining or using (regional) reference

frames to develop common approaches and avoid duplication.

- Continue development of Technical Fact Sheets that briefly explain basic concepts, practical applications and issues and which summarise the activities of organisations with specific responsibilities in the field.
- Ensure terminology used in above publications conform to and give substance to the relevant Standards coming from ISO TC211.
- Ensure that the working group web page is running and updated.

#### Workshop(s)

- Participation in FIG Working Weeks and other major Commission events (see events section below) with dedicated Technical Sessions and/or Workshops as appropriate.
- Seminars and meetings involving key organisations involved in defining or using (regional) reference frames will be convened at a venue, time and date to be confirmed by the Working Group Chairs.
- Symposium on Applications of Permanent GPS/GNSS Networks. WG 5.2 and WG 5.3 event.

#### Publication(s)

- Web page
- FIG Working Weeks will include Technical Papers on specific issues and presented by Working Group Members and other invited experts.
- Technical Fact Sheets as outlined above.
- Working group final report will be presented at FIG Congress, 2010.

#### Timetable

- Draft publications will be presented at FIG Working Weeks during the term of this plan and according to a timetable to be developed by the Working Group Chairs.
- Working group final report: dedicated session, FIG Congress, 2010.

### **Working Group 5.3 – Integrated Positioning, Navigation and Mapping Systems**

#### Policy issues

While this is a new focus, it includes the topics covered by the previous Working Groups 5.3

and 5.4 (during 2002 to 2006) and extends to cover technology generally.

- Issues associated with ongoing and rapid developments in Integrated Positioning, Navigation, and Mapping systems, including performance and applications of such systems and guidelines for their use.
- Ensuring FIG input to planning associated with programs of GPS Modernisation and GNSS Development.

#### Co-Chairs

Andrew Hunter and Naser El-Sheimy (Canada),  
e-mail: [ahunter@ucalgary.ca](mailto:ahunter@ucalgary.ca) and  
[naser@geomatics.ucalgary.ca](mailto:naser@geomatics.ucalgary.ca)

#### Specific project(s)

- Report on the development, possibilities and limitations of new technologies.
- Prepare guidelines for practitioners on making the best use of systems to achieve the results required for particular applications.
- Develop FIG input to GPS Modernisation and GNSS Development.
- Collaborate with other Commissions and other international organisations (including IAG and ISPRS) and with equipment, software and service providers.
- Continue commitment to relevant inter-disciplinary events including the series of Symposia on Mobile Mapping (joint with IAG and ISPRS).

#### Workshop(s)

- Participation in FIG Working Weeks and other major Commission events (see events section below) with dedicated Technical Sessions and/or Workshops as appropriate.

#### Publication(s)

- Guidelines on making the best use of emerging systems.

#### Timetable

- Draft publications will be presented at FIG Working Weeks during the term of this plan and according to a timetable to be developed by the Working Group Chair.
- Working group final report: dedicated session, FIG congress, 2010.

### Beneficiaries

FIG member associations, manufacturers and users of survey equipment, governments, standardization organizations, decision makers, GIS developers and users, surveying businesses, individual surveyors.

### Working Group 5.4 - GNSS - Global Navigation Satellite Systems

#### Policy issues

- Cooperation with all organisation involved in the field of GNSS e.g. IAG and ISO.
- Maintaining contact with GNSS receiver and equipment manufactures to provide state-of-the-art information to the users.
- Cooperation with Commissions 3, 4, 6 and 8 regarding GNSS integration into GIS respectively GNSS for disaster risk management as well as GNNS applications in hydrography and engineering surveys..
- Providing technical GNSS background information on relevant issues for surveying practitioners via web pages, tutorials and workshops.
- Development of recommendations regarding procedures to check GNSS equipment.
- Contribute to FIG input to GPS modernisation and GNSS development
- Prepare the surveying profession for GNSS-mass-markets (e.g. Location Based Services, traffic applications,...) as well as required technologies (e.g. assisted GPS, car navigation technology).

#### Chair

Volker Schwieger (Germany), e-mail: [volker.schwieger@iaqb.uni-stuttgart.de](mailto:volker.schwieger@iaqb.uni-stuttgart.de)

#### Study Groups

##### Study Group 5.4.1- Cost-effective GNSS

- Analysis of current "low-cost" GNSS markets (e.g. LBS, traffic) including additional necessary technologies like e.g. odometers, mobile phones
- Recommendations for surveyors to infiltrate these markets
- Development of methods to use "low-cost" GPS for precise applications
- Report on cost-effective GNSS

##### Study Group 5.4.2 - GNSS networks (together with WG 5.2)

- Analysis and review of GNSS network technologies for practitioners
- Analysis of the importance of site calibrations of permanent networks
- Analyse and compare different commercial and non-commercial GNSS networks
- Organise Workshops(s) on GNSS networks

##### Study Group 5.4.3 - Precise GNSS

- Develop and publish methods for GNSS heighting
- Develop and publish investigations regarding the GNSS/tachometer combinations
- Contact with GNSS equipment manufacturers
- Provide newest technical background information to the practitioners
- Develop input to discussions on GPS modernisation and GNSS development, e.g. through the UN mandated International Committee on GNSS (ICG).

##### Study Group 5.4.4 - GNSS calibration and check (together with WG 5.1)

- Development of procedures and recommendations for checking GPS equipment
- Recommendations for the calibration of GPS antennas and permanent GPS sites
- Cooperation with standard organisations (e.g. ISO)
- Organisation of scientific workshops and tutorials for practitioners
- Discussion with GNSS equipment manufacturers about procedures

#### Workshops

- Participation in FIG Working Weeks, Regional Conferences as well as other major Commission 5 events in special technical sessions
- GNSS tutorials (fundamentals and practice relevant information, possibly including practical training) e.g. at Working Weeks and Regional Conferences in cooperation with local organizers, especially for "surveying practitioners"



- International Workshop on GNSS for Practitioners (engineering geodesy companies, state survey, cadastral administration) together with all Working Groups of Commission 5 and partners like IAG or the Institute of Navigation where appropriate.
- Specialised International Workshops on GNSS calibration (antenna, site, multipath) and on GNSS networks (together with WG 5.2).

#### Publications

- Technical Papers at Working Weeks, Regional Conferences and Commission 5 Symposia and Workshops
- Recommendations for Calibration of GPS antennas and Check of GPS Measurement Systems (together with WG 5.1 and relevant institutions like e.g. ISO).
- Report on possibilities of cost-effective GNSS techniques for developing countries.

#### Timetable

Report and recommendations should be presented (and published) on next FIG Congress 2010.

## 6. Co-operation with Other Commissions

Commission 6.

## 7. Co-operation with United Nation Organisations, Sister Associations and other Partners

Commission 5 is the lead Commission for FIG's Memorandum of Understanding with the United Nations Office for Outer Space Affairs. GNSS will be the focus of cooperative activities from 2007 to 2010.

Commission 5 is also committed to cooperation with Sister Associations, especially those with which FIG has a Memorandum of Understanding. Commission 5 has specific liaison interest with the International Association of Geodesy (IAG) and the International Society for Photogrammetry and Remote Sensing (ISPRS). The Commission 5 Steering Committee will ensure that Working

Group activities and Commission 5 events further these goals of cooperation with Sister Associations.

Commission 5 is also committed to the new Cooperation Agreement with the US based Institute of Navigation (ION) and will undertake activities as agreed with ION, especially in relation to GNSS.

## 8. Commission Officers

### Commission Chair

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### Chair of Working Group 5.1

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**Chair of Working Group 5.2**

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## CALL FOR WORKING GROUP MEMBERS for 2007-10

There are four (4) main working groups proposed for the term 2007-10 and they are -

- Working Group 5.1 - Standards, Quality Assurance and Calibration
- Working Group 5.2 - Reference Frame in Practice
- Working Group 5.3 - Integrated Positioning, Navigation and Mapping Systems
- Working Group 5.4 - GNSS - Global Navigation Satellite Systems

If any of these working groups are of interest to you 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 facilitate 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 the Vice Chair for Administration.

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.

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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](mailto:robert.sarib@nt.gov.au)