Newsletter
FIG Commission 5

Positioning and Measurement

"A World and a Profession in Transition"

Newsletter 5, April 2002

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By Mikael Lilje, secretary FIG Commission 5

The four years have now come to an end. It is with a sad feeling that I now end my period as secretary for the Commission but it is also with excitement that I look forward towards the coming four years. I believe, and have great confidence in Matt Higgins, that the coming four years will be busy but enjoyable years for FIG and especially all of us following FIG Commission 5.

At the Congess in Washington there will be several reports on what the commission has done and several others pointing out the future within our sector. Jean-Marie, Matt and myself hope that there will be a large number of people following the commission's sessions and that there is plenty for everyone.

News from the chairman

By Jean-Marie Becker, chair FIG Commission 5

My time as chairman for FIG Commission 5 will end at the Congress in Washington. This will also be the end as an active member of FIG during more than thirty years. I will also definitively retire from all professional activities.

After four year as chairman I want to summarise my impressions about the activities of our Commission as follow:

- Globally speaking I believe that our Commission has done a good work and achieved most of its objectives.
- The Secretariat has worked well with its WEB Site and Newsletters.
- The majority (3) of the WGs has fulfilled their objectives during the whole period and they have also organised seminars and workshops specific to their activity and responsibility field: standards, heights and mobile mapping,
- More than 150 technical papers have presented and published at the FIG-WW, seminars, workshops and other events.
- We have given useful information and recommendations to the common surveyors concerning equipment, maintenance, calibration and "best use".
- We have had fruitful collaboration with other organisations like ISO/TC 172 SC6, IAG SC4, ISPRS and ICA
- Unfortunately some WGs reduced or stopped their activity at mid-term for different reasons: health or others?

I have also to make some remarks and reflections concerning the following:

- We have all the time to remember that our work has to satisfy primarily the needs of the common surveyors.
- We have to make the scientific developments accessible and useful for the surveyors in an easy way.
- The candidates to the Working Groups needs much more than enthusiasm, they need also time to achieve their work and money to finance their travel during the four years period.
- The members of the WGs have to represent the whole profession including the practitioners.
- Workshops and seminars without parallel sessions are very efficient and much appreciated by the professionals and are recommended

Finally I want to thanks all colleagues, collaborators and others for their active participation in our work and I wish our successors success in their mission.*!*

COMMISSION 5 ACTIVITIES 1998 – 2002 OVERVIEW

By Jean-Marie Becker, chair FIG Commission 5

1. Mission of the Commission

In our first Newsletter from November 1998 we presented the work plan and the new structure adopted for Commission 5 for the coming four years. We also identify and highlighted the questions of importance as our mission for the benefit of the surveyors at that time.

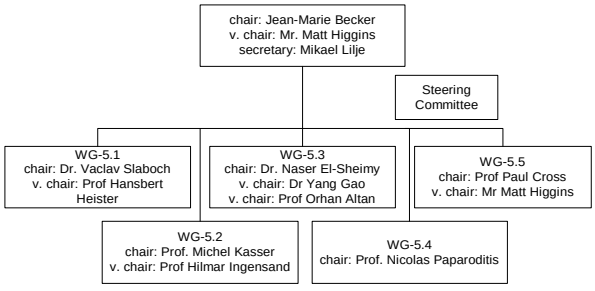
- Focus on modern technologies and technical developments and, through guidelines and recommendations assist individual surveyors to choose and utilise the most appropriate methods in their daily work
- Support researches, development and stimulate new ideas in our working field and make scientific results (also from other organisations IAG, ISPRS, etc) accessible and useful for the Surveyors applications
- Collaborate with the manufacturers in the improvement of instrumentation and associated software by regular contacts.
- Present and promote the work of the working groups on an on-going basis at FIG working weeks and other technical meetings
- Inform regularly all FIG-members and the surveying community about the progress of our work through our own Newsletter and commission Web page.

2. New structure for Commission 5

To realise this goals a new structure for FIG-Commission 5 was adopted as follow (see figure)

The most significant changes from the older organisation were the following:

- The establishment of an *Steering Committee* (SC5) including the commission chair , vice chair, secretary and all WG chairs and vice chairs in total 13 persons. This SC had regular meetings at minimum one each year during the FIG WW and at each technical workshop or seminar where several C5 officers participated
- The creation of *5 Working Groups* covering 5 different specific fields with well defined objectives and responsibilities as follow
  - WG 5.1- Standards, Quality Assurance and Calibration
  - WG 5.2- Height determination Techniques
  - WG 5.3- Kinematic and integrated Positioning Systems
  - WG 5.4 -Digital Mapping
  - WG 5.5 -Reference Frame in Practice
- A well working Commission *Secretariat* under the leadership of Mikael Lilje
- The creation and publication of a *Commission 5 Newsletter* published twice the year and accessible on our homepage (www.lm.se/fig5). Newsletter with regular information and reports about what happens inside and outside the field of responsability of C5.



Activities of the Commission.

Commissions 5 and 6 are the two technical commissions inside the FIG family and their activities have been deeply affected by the enormous technical evolution from the last two decades. The whole profession has been subject of a complete technological transition caused by: electronic equipment, computerisation, satelitte (GPS, GLONASS; etc) and laser technologies, digital world and globalisation.

During the past four year Commission 5 has actively been involved in different technical events like workhops, seminars, conferences mostly together with other FIG commissions or syster organisations as ISPRS, IAG, CLGE, NKG or organised by its one WG's.

3.1 Participation to the FWW and other FIG events.

In many of this events several WG5 participated together simultanly and contribute with their own technical sessions and papers under the leadership from the acting WG chairs. This was the case under all **FWW** after Brigton as Sun City (1999), Prague (2000), Seoul (2001) and know Washington (2002). The number of proposed papers (40 to 90) was each time much larger than the allocated time for presentations. In average around 16 papers were presented.

In some other events C5 was responsible or deeply involved in the organisation of the technical and scientific parts as for example in Malta September 2000 in the Seminar: "The Mediterranean Surveyors in the New Millennium ". Including the participation also of FIG C2, C4, C5, C6, C7 and other organisations as ICA(Int. Cartographique Association), IAG, CLGE (European Council of Geodetic Surveyors), Ceplis (European Association of Private Practionners), EU (European Union) and the local surveyors organisations. Seminar were also Bob Foster, FIG President participated.

C5 was participated also in the following events:

1999 Oct: Strasbourg, Seminar on modern measuring techniques at ENSAIS

1999 Sept: Hanover, Intergeo – 83 Geodätentag by DVW and BDVW

1999 Sept: Olsztyn, 9th Int. Symposium on Deformation Measurement by **C6.**

1999 Nov: Hönefoss, Geodesi-og-Hydrografidagerne, by Norwegian Association

2000 March: Stockholm, SLF's Int. Symposium, organised by the Swedish Association

2000: München, International Course on Engineering Surveying

2000: Neubrandenburg, 5. Norddeutschen Fachtagen by DVW & BDVW

2000: Melbourne, Australia FIG-UN Roundtable

2000: Perth, The 6th SE Asian Surveyors Congress

2001: Berlin, Intergeo – 85 Geodätentag

2001: Colombia, Carthagena, Symposium on Vertical Reference Systems arranged by IAG

2001: Nairobi, Int.Conference on Spatial Information for Sustainable Development, Joint Seminar FIG C1, 2, 5, 7, 8, 9 and UNCHS, ECA organised by C3**.**

2001: Hanoi, Int. Seminar on GIS, Land Management for Sustainable Development

3.2 The FIG liaison to ISO/TC172 SC6 through Commission 5

ISO/TC172 SC6 is acting with "Geodetic and surveying instruments".

Commission 5 is the official FIG Liaison to ISO/TC172 SC6 and this through its Chairman. He has participated to all its annual working meetings: Bonn (1997), London (1998), Berlin (1999), Heerbrugg (2000) and Tokyo (Nov.2001). Several of FIG Commission WG 5.1 members have also actively participate to this standardisation work.

The FIG expectations and requests on standards have been defined as follow: *one* unique *userfriendly standard* for each instrument type, suitable *everywhere without* special ancillary equipment, by *common* field operators.
The new updated ISO standards published end of November 2001 fulfil these FIG expectations. This is illustrated in ISO17123 part 2-4 by some examples of "*simplified procedures*" for determining the *achievable precision of survey instruments* (EDM, Levels, Theodolites). See also the paper from JM BECKER: Recommendations concerning Survey instruments and Quality specifications- FIG XII Congress Washington 2002, TS 5.11- Standards , Quality Assurance and Calibration.
The standardisation work is now progressing with other survey equipment like: Electronic tacheometers, Rotating lasers, Optical Plumbing instruments and Measuring tapes. The results are expected for 2003-2004. But standards for GPS are not under preparation because GPS still is changing and only recommendations can be done in a appropriate way.

Still some obstacles subsiste for a easy common use of standards. The fact that the standards are not free of charge dissuades many surveyors to use them. If ISO wont to reach the all the Users they have to be *free of charge and easy to understand*. Two solutions to solve this handicap can be hardly recommended: the first one is that the Manufacturers automatically integrate all standards in their software package, the second one is that ISO give free access on Internet to the standards and application software.
To facilitate the diffusion and the access of the standards, FIG C5 has the intention to publish a *popular version* of the "simplified test method" for each instrument type on its WEB, so that all Surveyors easily can make use of them.

Note: In the figure above from left to right first line: Peter Scheibli (Secretary ISO/TC172 SC6), J-M Becker (second line: Chair C5 and Liaison FIG-ISO), Karl Zeiske (Convenor ISO/TC172 SC6), Hans Heister (Vice Chair WG 5.1) & other members present at the Tokyo meeting November 2001.

In conclusion FIG Commission 5 is very happy about the progress made during the last years by the ISO/TC172 SC6 both regarding the *updating and harmonisation* of earlier standards and on the *establishment* of new standards. In both cases the results are in good concordance with the FIG (End-Users) requests this will facilitate their application by the Surveyors. This is also the result of the good collaboration between FIG C5 and ISO/TC 172 SC6 during the last years. This co-operation has to continue in the future for the benefit of all surveyors.

3.3 FIG relation with IAG and other sister organisations

Most of the active members from Commission 5 are also members of other organisations as for example IAG (International Association of Geodesy) or ISPRS, ISARC, etc. Very often the same person is actif in two or more organisations in the *same field* and sometimes *on identical subject*. If the activities of both (or their members) organisations are complementary they will be benefit and helpful for the End Users. In the contrary case we will have competition and conflict which means duplication of efforts and expenses and no global result.

Several subjects from the workplan from C5 WG's are actual for IAG namely:

- WG 5.2: Height determination questions especially at national or global level
- WG 5.3: Multi sensors and integration of techniques (IAG SC4) and ISPRS (WGII)
- WG 5.4: Digital Mapping (ISPRS)
- WG 5.5: Reference Frames, Theory and in Practise

To eliminate or minimise eventual conflict situation C5 has had bilateral discussions with the representatives from IAG and ISPRS (1998-2002) in Vienna, Gävle, Bangkok, Berlin, Cairo, Budapest and Hanoi to clarify the action field of each other. So far we agreed that:

- We exchange regularly information about our respective activities and technical events like seminars, workshops, etc.
- We try to coordinate our efforts as much as possible through consultations
- IAG and ISPRS concentrate their efforts especially on the scientific and theoretical part
- FIG and C5 on the practical and implementation part.

This means that *C5 is the link* between the scientists, the developpers and the practionners (surveyors). FIG helps the surveyors to implement the new developed techniques , equipment, standards, etc in their pratical work. On the other hand FIG informs the scientists about existing problems and stimulate them in their developing activities in a way to solve and cover all the End-users needs.

An agreement between IAG and FIG has been formalised by both Secretariats.

3.4 Commission 5 relations to the Manufacturers.

Several attemps have been made in the past to cooperate with the Manufacturers and this in to ways: firstly through special meetings during the FWW (as example in Brighton 1998) where the representatives of the Manufacturers were invited to participate in some technical information breafing and secondly through direct contacts taken by the WG's especially WG 5.1 members. The breafing hold in Brighton (1998) was successful and attracted many representativers from the manufacturers, we had the possibility to exchange our views in this field. Later meetings were not so popular and we have to be more efficient.

4. Working Groups activities in their specific technical fields

Each C5-WG has in its specific field followed and participated in the technical development undertaken to solve actual practitioners problems through participation to international or its own arranged seminars, workshops, to focuse more deeply on specific subjects, items or questions as for example:

4.1- Standards & Calibrations questions (WG 5.1).

To begin with, it is important to stress that FIG does not create any standards! This is done by organisations as ISO, CEN and DIN. What FIG can do is to translate these for the common surveyor so that they are understandable. FIG can create guidelines or recommendations and this is the role of the working groups within FIG Commission 5. In their work plan they have the task of creating recommendations on the best use of e.g. certain instruments. For more information about the work plans of the working group, please see http://www.lm.se/fig5.

- Workshop in Brno 1998 organised by Vaclav Slaboch together with the Tcech Surveyors Annual seminar
- Workshop in Seoul May 2001 on "Guidelines for Check, Maintenance and Calibration of Survey Instruments" in connection with the FWW 2001.Ten presentations were made and followed by an open Panel discussion. The chairman Karl Zeiske and many other member of ISO/TC172 SC6 partipated actively to this event. The focus was on how ISO and FIG can collaborate to make the standards accessible and comprehensible for the End-Users
- Münich, Graz & Fulda (2001): WG and "Round Table" meetings and Seminar on

calibration of survey instrument involving most of the European countries.

Note: The members of this WG have been very active and deeply involved in the ISO work to update and establih ISO standards and for the FIG guilelines and recommendations. They are also involved in calibration questions especially in laboratories.

4.2 Height Determination questions (WG 5.2):

Two specific and successful events from this WG 5.2

From left to right M.Higgins, J-M Becker, N. Paparoditis (chair WG 5.3) & M. Kasser (chair WG 5.2). During the meeting in Paris at IGN Spring 2000

- Seminar in Gävle, Sweden March 1999: "Geodesy and Surveying in the Future – The Importance of heights" under the responsability of WG5.2 . This seminar covering one whole field namely *heights* was highly appreciated by all participants both from the practitionners and the scientific parts from the surveying communauty. This is probably the best way to communicate and transfer information (knowledge) between researchers, developpers, teachers, manufacturers and the common surveyors
- Worhshop in Akranes, Iceland June 2001 together with NKG (Nordic Geodetic Commission – Height Determination Working Group).

4.3 Questions on Integrated Mapping Techniques (WG 5.3 & WG 5.4)

- 2th and the 3th International "Worshop on Mobile Mapping" in Bangkok (1999) respective in Cairo (2001) where WG 5.3 with its chair Naser El Sheimy has had a leading rule in the organisation and programme together with IAG/SC4 and ISPRS/WGII. Also WG5.4 (Nicolas Paparoditis) participated in the scientific programme with presentations.
- The Vienna, "5th Conference on Optical 3-D Measurement Techniques " October 2001 where WG 5.3 actively participated.

This picture is from the Workshop on Mobile Mapping hold in Bangkok 1999 together with IAG, ISPRS, etc, where WG 5.3 had a leading function.

The two other WGs (WG 5.4 & WG 5.5) had less separate activities and were more involved in the FWW.

CONCLUSIONS

We believe that Commission 5 has achieved a good work during the past four years. Some points can be namned:

- We have a well functioning Sekretariat, WEB side and Newsletter
- We can see that Commission 5 and especially the WGs 5.1, WG 5.2 & WG 5.3 were very active in their specific working field participating and organising many technical events.
- We have had good collaboration with ISO/TC172 SC6 resulting in new updated standards following our requirements that means useful and userfriendly for our members.
- We have published more than 150 technical papers

- We have published simplified recommendations for Survey instruments Maintenance and Quality specifications for the users, manufacturers, owners, authorities and institutions.
- We have good collaboration with our sister organisations IAG; ISPRS, ICA, etc
- We have penetrated the questions related to the height determination questions and can make recommendations for the *best use* of the different existing techniques.
- We have reported regularly about the technical achievements and developments in our field and participated to the discussions concerning the future of the Surveyor profession.

We have to thanks all our active members for their efforts and congratulate them for the good results. I hope that our successors will have the same enthousiame for their work and can continue what we have started..

Note: For more information and details please consult C5 Newsletters, C5 WEB pages, our publications and the reports from the WG chairs.

Commission 5 Activities in the Future: 2002–2006 Work Plan

Matthew B HIGGINS, incoming chair of FIG Commission 5

1. INTRODUCTION

Commission 5 of the International Federation of Surveyors (FIG) is responsible for the topics of Positioning and Measurement. This paper summarises the Work Plan for Commission 5 for the period 2002 – 2006. Full versions of all Commission work plans are maintained on the FIG web site (www.fig.net).

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 on-going 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 and contribution to appropriate Continuing Professional Development programs.

5. WORKING GROUPS

5.1 Working Group 5.1 – Standards, Quality Assurance and Calibration

5.1.1 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.

5.1.2 Specific project(s)

- Present and promote the use of standards and guidelines to the surveying community.
- Establish guidelines and recommendations for specific instruments.
- Guidelines and Recommendations for the ISO Guide to Uncertainty of Measurements.
- Review Standards coming from ISO TC211 for relevance to Positioning and Measurement.

5.2 Working Group 5.2 – Reference Frame in Practice

5.2.1 Policy Issues

This is a continuation of the previous WG5.5 but includes some of the work of the previous WG5.2. Policy Issues include the following:

- Work to bring together all organisations involved in defining or using reference frames to develop common approaches and avoid duplication. Such organisations include FIG, IAG, ISO, groups of national mapping agencies, other influential national agencies (such as the US DoD's NIMA) and alliances of commercial organisations (such as Open GIS Consortium and the European Petroleum Survey Group).
- 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 how surveying practitioners are changing how they access the reference frame, through less emphasis on networks of ground monuments and more emphasis on GNSS base stations.
- Examine the increased use of GNSS for height determination and the use of geoid models etc for connection to local height datums.
- Examine the increasing role of aerial and space based imagery in the realisation of reference frames.

5.2.2 Specific project(s)

- Contribute to convening of a workshop of all organisations involved in defining or using 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.
- Continue development of Local Information Sheets to describe the current situation in individual countries. Emphasis is on the provision of a brief background with contact information and to be a conduit between practising surveyors and the information they require.
- Ensure terminology used in above publications conform to and give substance to the relevant Standards coming from ISO TC211.

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

5.3.1 Policy Issues

- While this is a new focus, it includes the topics covered by the previous Working Groups 5.3 and 5.4 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.

5.3.2 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).

6. CO-OPERATION WITH SISTER ASSOCIATIONS

Commission 5 is 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.

7. CO-OPERATION WITH THE UNITED NATIONS AGENCIES

Commission 5 is committed to cooperation with United Nations Agencies. Targeting of activities, events and publications of the Commission will contribute to United Nations goals such as assistance to developing countries and sustainable development. Other activities (outlined in the next Section) will also contribute. Commission 5 will work with other Commissions on topics aimed at Developing Countries such as Low Cost Surveying Technology and appropriate Continuing Professional Development programs.

8. OTHER ACTIVITIES

8.1 Inter-Commission Activities

Commission 5 will be involved in Joint Working Groups (JWG) on:

- *Low Cost Surveying Technology and Techniques for Developing Countries*. Joint with Commissions 3 and 7 and led by Commission 5. The JWG will concentrate initially on a dedicated technical session at an appropriate symposium or Working Week and ensure

broad circulation of outcomes and papers. The topic will then be assessed to see if a full JWG work plan is warranted for the longer term.

- *Location Based Services*. Joint with Commission 3 and led by Commission 3.
- *Ocean Governance*. This topic deals with the management of rights and responsibilities in marine areas. Joint with Commissions 4 and 7 and led by Commission 4.

8.2 Continuing Professional Development

Commission 5 will also work with Commission 2 to contribute to Continuing Professional Development Programs for FIG member organisations, especially in developing countries where the resources may not be available locally.

8.3 Special Topic Activities

Commission 5 will also undertake special topic activities as required. The topics will be those identified as important for the Commission or for the over-arching priorities of FIG Council and its Work Plan but that do not warrant a full Working Group. The activities may take the form of special publications, conference sessions or dedicated workshops on the topics and which one or two key people can be invited to pursue.

Commission 5 will make its contribution to the FIG World Report on Best Practices launched by the Council in its work plan for 2003–2006.

8.4 Liaison with Equipment, Software and Service Providers

Commission 5 will continue to build relationships with Equipment, Software and Service Providers to ensure relevant standards and best practices are incorporated into new products.

8.5 Steering Committee

As in the previous term, there will be a Steering Committee to set direction and oversee the general management of the Commission. It will be made up of all Working Group Chairs (as Commission Vice-Chairs, in line with the emerging FIG structural arrangements) and will be led by the Commission Chair.

8.6 Communications

Commission 5 will develop and maintain a web page with linkages to other relevant web pages to keep commission delegates, other FIG members, users of surveying services and the public involved in and informed about the work of the Commission.

9. CALENDAR OF EVENTS

The Events in the Calendar have been classified according to the type of Commission 5 involvement as follows:

- FIG WW: The main meetings each year for Commission 5 Delegates and for the Steering Committee will occur at the FIG Working Week or Congress.
- Strategic FIG Event: FIG Council sees these as events for furthering its strategies. These often involve liaison with United Nations. Given that the Working Weeks are concentrated in the Mediterranean region in 2003, 2004 and 2005, Commission 5 will also concentrate effort toward FIG Events in other regions (see below) and encourage participation of Delegates in those regions. As many Steering Committee members as possible will also be encouraged to participate in those events.
- C5 Event: These are directly associated with Commission 5 Working Groups.
- Inter-Commission Event: Event that furthers Inter-Commission cooperation and has Commission 5 involvement.
- Liason Events: These further Commission 5 goals for Liaison and will be attended by the Commission Chair or an appropriate member of the Steering Committee.
- UN Committees on GIS: Commission 5 is also interested in developing better liaison with UN Committees on GIS and

their Working Groups which deal with issues of relevance to Commission 5 (eg Geodesy Working Group). Many of these Committees and their Working Groups have annual meetings but have not been included below. While it would difficult for Commission 5 officers to attend all such events, an effort will be made to establish some liaison and to attend a subset of meetings. Of particular interest are those Committees covering developing countries, including:

- African Spatial Data Infrastructure Initiative – Africa SDI, CODI
- Permanent Committee on GIS Infrastructure for Asia & the Pacific – PCGIAP
- Permanent Committee on SDI for the Americas – PC IDEA

Report on Standards, Quality Assurance and Calibration
FIG WG 5.1 Activities in 1998-2002

Hans HEISTER, Germany Vaclav SLABOCH, Czech Republic

Activities of FIG WG 5.1 have been oriented on following key issues:

- Development of standards affecting geodetic instruments and methods,
- Acceptance controls, quality assurance and certification and their impact on the surveying profession,
- Checking and calibration of measuring instruments.

Tasks resulting from the key issues have been ensured through specific projects oriented on promotion of standards and guidelines to the surveying community and through guidelines and recommendations for checking and determination of field accuracy of total stations, digital levels, laser planes etc. and for their calibration, including laboratory calibration. Members of the WG collaborated also with the FIG Task Force on Standards a participated in the relevant technical committees of the International Organisation for Standardisation (ISO) and other appropriate bodies, like Work Party on Quality Assurance of the CLGE, Work Group on Quality Issues of the EuroGeographics, National Standardisation and Metrological bodies.

The promotion and dissemination of achieved results have been ensured through active participation numerous national and international seminars and conferences and through participation in multinational projects. Let us name only the most important once in chronological order:

- 35th International Geodetic Information Days, November 1998, Brno, Czech Republic,
- Jubilee Seminar "Geodesy and Surveying in the Future – the Importance of Heights, March 1999, Gävle, Sweden,
- XIIIth International Course on Engineering Surveying, March 2000, Munich, Germany,
- International Seminar "The Mediterranean Surveyor in the New Millennium", September 2000, St. Julian's, Malta,
- Seminar on "Quality Management in Geodetic Measuring Techniques", November 2001, Fulda, Germany,
- Sessions dedicated to Standards, Quality Assuramce and Calibrations during the FIG Working Weeks in Sun City 1999, Prague 2000 and Seoul 2001,
- Continuous participation in the activities ISO TC 211 Geographic Information/Geomatics and ISO TC 172/SC6 JWG Optical Instruments

Activities of the WG resulted in several important achievements, mainly in:

- Elaboration of the new proposal of a new ISO standard for levelling instruments which is a result of joint effort inside ISO of Technical Commission TC172/SC6 JWG (Optical instruments: levels, theodolites, EDM, invar staffs, etc.). The proposed standards are adapted not only to check the instruments from the constructor`s point of view but also to satisfy the field surveyor's needs,
- Metrological comparison of length and azimuth standards between German and Czech geodetic laboratories according to ISO standards carried out in July and August 2001 enabled to test the procedure for accreditation of a geodetic laboratory according to ISO/IEC 17025 "General Requirements for the Competence of Testing and Calibration Laboratories".

The latest information about the situation in the field of was presented at the 54th CPD Seminar organised by the German Association of Surveying in November 2001, in Fulda that dealt in detail with Accreditation, Certification and Traceability to National Standards, Calibration, Uncertainty of Measurements, Testing of Geodetic Measuring Equipment.

CONCLUSION

The activities of FIG WG contributed substantially to awareness of importance of modernisation of the existing standards or creation of new ones for geodetic instruments testing. There should be only one standard for each type of instrument testing, which could be used anywhere and without any special equipment by common field operators and which could answer the question whether the required accuracy can be achieved with the instrument available for the given task.

It has been also stated – in agreement with the FIG Tasks on standards – that the surveyors have to take a more active part in official national and international standardisation and metrological activities as the geodetic metrology represents a special complex branch of metrology that is not sufficiently covered.

The surveying institution should take over the responsibility for official national "geodetic" standards like length, azimuth, position, gravity, etc.

The activities of FIG Commission 5 in this field are far from being completed and they must continue. The trend aiming to development of a "full automated surveying black box" will continue and the surveyor's role as a quality and data manager will prevail over his traditional role of a field data collector. Completely new instruments have emerged on the market like terrestrial and airborne scanners, wireless geographic information technologies, real time navigation equipment, etc. which – in spite of their geodetic origin are no longer connected with our surveying profession. .

REPORT FROM THE ACTIVITIES OF THE ISO/TC 172 SC6 (STANDARDS FOR SURVEYING INSTRUMENTS)

By Jean-Marie Becker, Chairman FIG Commission 5 and FIG Liaison to ISO/TC 172 SC6

The surveying profession has been subject to rapid technical evolution concerning both techniques and equipment. Today ISO (the International Standard Organisation) is finalising the updating and harmonisation of earlier standards for older instruments for example EDM, theodolites and levels. Standards for new instruments as digital

levels, laserplanes, total stations, commonly used by the today Surveyors have been started during the last years. Since 1997 several Technical Commissions inside ISO (TC59/SC4 and TC172/SC6) dealing with the same subjects have been integrated into TC172/ SC6, this in order to eliminate the duplication of standards for the same instrument used for different applications.

The complexity, diversity and multitude of standards and the special ISO-language made it very difficult for FIG member to understand and apply standards. They often complicated more the surveyor life than they were to any help.

Also before 1990 FIG was not much interested and involved in the ISO standards activities. At the FIG Congress in Helsinki (Finland) 1990, FIG Commission 5, responsible for questions related to survey methods and instruments, establish a WG for producing "*Recommendations for routine checks of Electro-optical distance meters* ". The results that was published 1994 at the FIG Congress in Melbourne reached a great success inside the profession and have been translated in several languages.

Since that time several members from FIG-C5 are directly engaged in the ISO work for the updating or establishment of new standards. 1999 FIG obtained the Class A liaison status to ISO/TC 172 SC6, and J-M Becker represents FIG.

The ISO objective for the standards is to specify *field procedures* to be followed each time the achievable precision or "accuracy" for a given surveying instrument used together with its ancillary equipment (tripod, staffs, etc) has to be determined. This will allow the surveyor to investigate that the precision given by the measuring equipment is appropriate to the intended-measuring task.

The Surveyor has to be convinced that if he apply the standards it will help him, otherwise he will not apply them. For these reasons the surveyor require *user friendly standards*, low time consuming for implementation (about ½ hour) (low-costs) with results are easy to be interpreted.

ISO/ TC 172 SC6 has followed the FIG requests on standards in its work namely: only *one standard* for each type of instrument, for use *anywhere*, *without* any *special* ancillary equipment, by *common field operators*.

This means that the surveyor who applies these standards is able before any fieldwork to answer to the following question: **"***Can I achieve the required precision ("accuracy") in the project with my equipment, yes or no?"*and make the appropriate decision.

In the following I want to report about the results presented by ISO/TC 172 SC6 at the last meeting in November 2001 in TOKYO/ Japan. These new standards are the first generation of standards in agreement with the new ISO and FIG objectives and represent an important step forward to produce *user friendly standards.*

- The standards have been updated and modernised. This means that they can be used for *two purposes*: first for a *simplified (field) test* and secondly for a *full test (laboratory or field)* to determine the achievable precision of one *measuring system*: Instrument + ancillary equipment (tripod, staff, etc) + observers (team members), under existing environmental conditions at a specific time.
- The following new standards are definitive and accessible for use since end November 2001:

ISO 17123 part 2 *:"Levels"*
ISO 17123 part 3 : "*Theodolites"*
ISO 17123 part 4 : "*EDM"*
They replace all the earlier existing standards for these instruments.

- New standards for the following instruments are under preparation.

ISO 17123 part 5: " *Electronic tacheometer*"
ISO 17123 part 6: " *Rotating lasers*"

Proposals have been discussed and the final publication is expected for year 2003

- First attempt and discussions have been done about a new standard for "*Optical plumbing instruments*": ISO 17123 part 7.
- Furthermore proposals have been made concerning a new standard for "*Measuring tapes* – Steel and Textile tapes ". Much more work has to be done before a final standard is published.

FIG Commission 5 is very happy about the progress made during the last years by the ISO/TC 172 SC6 both regarding the updating and harmonisation of earlier standards and on the establishment of new standards. In both cases the results are in good concordance with the FIG (End-Users) requests this will greatly facilitate their application by the Surveyors. This is also the result of the good collaboration between FIG C5 and ISO/TC 172 SC6 during the last years. This co-operation has to continue in the future for the benefit of all surveyors.

FIG C5 has the intention to publish a popularised version of the "simplified test method" for each instrument type on the WEB, so that all Surveyors easily can make use of them. This work is part of the activities from WG 5.1.

REPORT FROM THE HANOI SEMINAR ON GIS, LAND MANAGEMENT FOR SUSTAINABLE DEVELOPMENT

HANOI, VIETNAM, November 16-17, 2001

By Prof. Jean-Marie Becker Chairman FIG Commission 5

The Hanoi Seminar was organised by the Vietnam Association of Geodesy, Cartography & Remote Sensing under the leadership of Prof. Le Quy Thuc and his team. It took place at the Hanoi Horison Hotel who had good conference locals well suited for that purpose.

More than one hundred participants including about 20% women were registrated. The majority ábout 70% was from Vietnam. Speakers represented foreign countries like Canada, Australia, Norway, Sweden and France. They came and represented universities, governments, private and manufacturers people acting in this field. In total there were about 35 presentations distributed over 4 sessions: session 1 (opening) and 4 (Closing) were common for all participants, session 2 (Mapping and Surveying) and 3 (GIS and Land Management) were parallel sessions.

All presentations were directly translated from English to Vietnamese and vice versa by local surveyors.

Several companies like Statens Kartverk (Norway), Trimble, Sokkia, Pentax, Intergraph and Mecosium (Vietnam) sponsored together with FIG this event and contribute with a separate exhibition in the same hotel.

Representatives from several FIG Commissions contribute with their presence (chair of sessions) and presentations: Kari Strande (Norway) for Commission 3, Tommy Österberg (Sweden) and Sue Nichol (Canada) for Commission 7, Michel Kasser (France) and Jean-Marie Becker (Sweden) for Commission 5.

Prof. Jean-Marie Becker represented also officially FIG, its President Bob Foster and the FIG Bureau during the whole seminar. For that purpose he presented the greetings

from FIG President at the opening ceremony and made the concluding speak at the closing of the seminar.

As this was the first seminar organised in Vietnam by the Vietnam Association of Geodesy, Cartography and Remote-Sensing it can be good to summarise our impressions on it as follow.

- We had many good presentations with interesting topics.
- The level both in substance and technical content (especially in session 3 = Mapping and Surveying) was of good standard fully comparable with similar seminars in Europe.
- Furthermore the presentations from colleagues outside FIG (ISPRS) were a excellent complement.
- The simultaneous translation done by local surveyors works well and can be recommended as a good example for other FIG-events where the local participants have problem with English as for example in the Francophone countries.
- Most of the presentations were followed by intensive discussions but the time used for translations reduced seriously the time for these discussions. This has to be ameliorated in the future by better timing and less overlapping between the spoken translation and its overhead presentation.
- It is also recommendable that the organisers made the technical programme available at least one month before the start of the seminar and use FIG better for that purpose.
- Many participants show their interest to participate more actively in the FIG Commissions activities. They are potential candidates for the different Working Groups; FIG commissions have here good possibilities to engage them.

Calender for FIG Commission 5

2002

- GIS'02 – International Symposium on Geographic Information Systems, 23-26 September, Istanbul, Turkey (Inter-Commission Event)
- Workshop on Reference Frame in Practice (see WG5.2 Work Plan above), probably in France in late 2002 (C5 and Liaison Event)

2003

- International Seminar on Development of Land Management in the Mekong Region, February, Phnom Penh, Cambodia (Strategic FIG Event)
- FIG Working Week and XXVI General Assembly, 19–23 May, Eilat, Israel (FIG WW)
- IUGG 23rd General Assembly, June – July 2003, Sapporo, Japan (Liaison Event)
- 4th International Conference on Mobile Mapping Technology, Mid-August, Kuming, China (C5 Event)
- Conference for the Arab and Francophone Countries in Morocco in October 2003 / 2004 (Strategic FIG Event)
- The 7th South East Asian Surveyors Congress, 3-7 November, Hong Kong, China (Liaison Event)

2004

- FIG Working Week and XXVII General Assembly, 23-28 May, Athens, Greece (FIG WW)
- XX ISPRS Congress, 12-23 July, Istanbul, Turkey (Liaison Event)
- Conference in Colombia, October (This may be an Inter-Commission Event or it may develop as the Strategic FIG Event for 2004)
- Commission 5 convened event on Applications of Permanent GPS/GNSS Networks, in late 2004 in Brisbane, Australia. Ideally, this will be joint with IAG. (C5 and Liaison Event)

2005

- FIG Working Week and XXVIII General Assembly, 7-12 May, Cairo, Egypt (FIG WW)
- Possibly Africa (Strategic FIG Event)

2006

- FIG XXIII Congress and XXIX General Assembly, August - September, Munich, Germany (FIG WW)

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