

Report to the 25th General Assembly
 FIG Congress in Washington, 19-26 April 2002

**FIG COMMISSION 5
 POSITIONING AND MEASUREMENT
 REPORT OF ACTIVITIES 1998–2002**

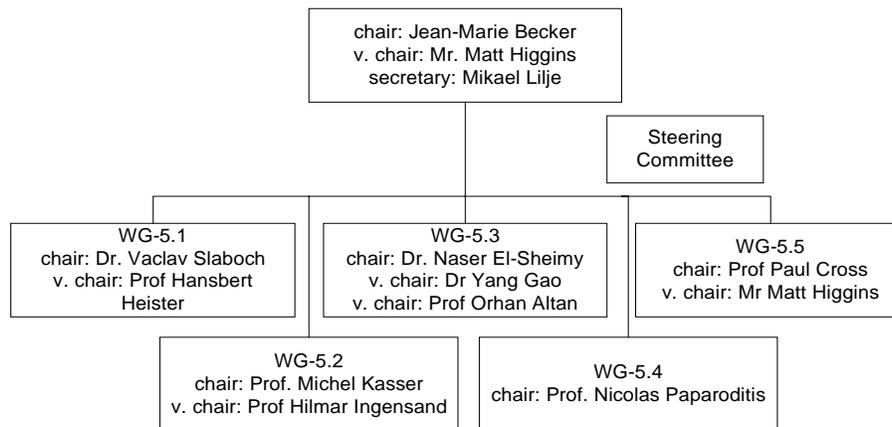
1. MISSION OF THE COMMISSION

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 identified and highlighted the topics of importance to our mission for the benefit of the surveyors at that time as follows:

- 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 gain 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 compared to the previous organisation were:

- The establishment of a *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 once a year during the FIG Working Week and at each technical workshop or seminar where several Commission 5 officers participated.
- The creation of 5 *Working Groups* covering 5 different specific topics with well defined objectives and responsibilities as follows:
 - 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 responsibility of C5.

3. 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, satellite (GPS, GLONASS etc) and laser technologies, digital world and globalisation.

During the past four years Commission 5 has been actively involved in different technical events like workshops, seminars, conferences most often together with other FIG commissions or sister organisations like ISPRS, IAG, CLGE, NKG or organised by its one WGs.

3.1 Participation to the FIG Working Weeks and other FIG events

In many of these events several working groups participated simultaneously and contributed with their own technical sessions and papers under the leadership from the acting WG chairs. This has been the case at all Working Weeks after Brighton: Sun City (1999), Prague (2000) and Seoul (2001) and now at the FIG Congress in Washington (2002). The number of proposed papers (40 to 90) to each event was each time much bigger than the time allocated for presentations. In average 16 papers were presented at the technical programme during the Working Weeks.

In some other events Commission 5 was responsible or deeply involved in the organisation of the technical and scientific parts of the programme as for example in Malta September 2000 at the seminar: "The Mediterranean Surveyors in the New Millennium". Participation to this seminar also included FIG Commissions 2, 4, 5, 6 and 7 and other organisations such as ICA (International Cartographic Association), IAG (International Association of Geodesy), CLGE (European Council of Geodetic Surveyors), CEPLIS (European Association of Private Practitioners), EU (European Union) and the local surveyors' organisations. Further Robert Foster, President of FIG participated.

Commission 5 participated also the following events:

1999 Oct: Strasbourg, Seminar on modern measuring techniques at ENSAIS
 1999 Sept.: Hanover, Intergeo – 83rd Geodätentag, organised by DVW & BDVW
 1999 Sept.: Olsztyn, 9th International Symposium on Deformation Measurement, organised by FIG Commission 6.
 1999 Nov.: Hønefoss, Geodesi-og Hydrografidagerne, organised by Norwegian association
 2000 March: Stockholm, SLF's International Symposium, organised by the Swedish Association of Surveyors SLF
 2000: München, International Course on Engineering Surveying
 2000: Neubrandenburg, 5. Norddeutschen Fachtagen, organised by DVW & BDVW
 2000: Melbourne Australia, FIG-UN Roundtable and Conference on Land Management for Sustainable Development (Bathurst Declaration)
 2000: Perth, The 6th SE Asian Surveyors Congress
 2001: Berlin, Intergeo – 85 Geodätentag
 2001: Cartagena, Colombia, Symposium on Vertical Reference Systems, arranged by IAG
 2001: Nairobi, International Conference on Spatial Information for Sustainable Development, Joint Seminar of FIG Commissions 1, 2, 5, 7, 8 and 9, organised by FIG Commission 3, Institution of Surveyors of Kenya (ISK) and UN-Habitat.
 2001: Hanoi, International 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 its entire 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 participated to this standardisation work.

The FIG expectations and requests on standards have been defined as follows: *one* unique *user-friendly standard* for each instrument type, suitable *everywhere without* special ancillary equipment, by *common* field operators.

The new updated ISO standards published at the 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 Jean-Marie Becker: Recommendations Concerning Survey Instruments and Quality Specifications (FIG XXII Congress, Washington 2002, TS 5.11 – Standards, Quality Assurance and Calibration).

The standardisation work is now progressing with other survey equipment like: Electronic tachymeters, Rotating lasers, Optical Plumbing instruments and Measuring tapes. The results are expected in 2003–2004. Standards for GPS are not under preparation because GPS is still under development and only recommendations can be given in an appropriate way.

There are still some obstacles on the way towards easy common-use standards. The fact that the standards are not free of charge dissuades many surveyors to use them. If ISO will reach all the users they have to be *free of charge and easy to understand*. To solve this handicap two solutions can be warmly be recommended: the first one is that the manufacturers

automatically integrate all standards in their software package, the second one is that ISO gives free access to the standards and application software on Internet.

To facilitate the diffusion and the access of standards, Commission 5 has the intention to publish a *popular version* of the “simplified test method” for each instrument type on its web site, so that all surveyors can easily make use of them.

Note: In the figure below (from left to right first line): Peter Scheibli (Secretary ISO/TC172 SC6), Jean-Marie Becker, (second line) (Chair of Commission 5 and Liaison FIG-ISO), Karl Zeiske (Convenor ISO/TC172 SC6), Hans Heister (Vice Chair WG 5.1) and other members present at the ISO meeting in Tokyo in 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 which will facilitate their application by the surveyors. This is also the result of the good collaboration between FIG Commission 5 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. It is very common that the same person is active 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 benefit and help the end-users. In the opposite case we will have competition and conflicts which mean duplication of efforts and expenses and no global results.

Several subjects from the Commission 5 work plan 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 situations Commission 5 has had bilateral discussions with the representatives of 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 have agreed that:

- We exchange regularly information about our respective activities and technical events like seminars, workshops, etc.
- We try to co-ordinate our efforts as much as possible through consultations
- IAG and ISPRS concentrate their efforts especially on the scientific and theoretical part
- FIG and Commission 5 on the practical and implementation part.

This means that *Commission 5 is the link* between the scientists, the developers and the practitioners (surveyors). FIG helps the surveyors to implement the new developed techniques, equipment, standards, etc in their practical work. On the other hand FIG informs the scientists about existing problems and stimulates them in their work in developing activities in a way which solve and cover all end-users' needs.

A Memorandum of Understanding between IAG and FIG has been formalised by both Secretariats and endorsed by the FIG General Assembly.

3.4 Commission 5 relations to the Manufacturers

Several attempts have been made in the past to co-operate with the manufacturers. This has been made in two ways: firstly through special meetings during the FIG Working Weeks (as for example in Brighton, 1998) where the representatives of the manufacturers were invited to participate in some technical information briefing and secondly through direct contacts taken by the WGs especially by WG5.1 members. The briefing hold in Brighton (1998) was successful and attracted many representatives from the manufacturers and 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 Commission 5 WG has within its specific field followed and participated in the technical development undertaken to solve actual practitioners' problems. This has happened through participation to international or self-arranged seminars and workshops to focus more deeply on specific subjects, items or questions as for example:

4.1 – Standards and 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 like 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; this is the role of the working groups within FIG Commission 5. In their work plans they have the task to create recommendations on the best use of e.g. certain instruments. For more information about the work plans of the working groups, please see <http://www.lm.se/fig5>.

- Workshop in Brno 1998 organised by Vaclav Slaboch together with the Czech Surveyors' Annual Seminar
- Workshop in Seoul May 2001 on "Guidelines for Check, Maintenance and Calibration of Survey Instruments" in conjunction to the FIG Working Week 2001. Ten presentations were made followed by an open panel discussion. The chairman Karl Zeiske and many other members of ISO/TC172 SC6 participated 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.
- München, Graz and Fulda (2001): WG and "Round Table" meetings and a 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 establish ISO standards and for the FIG guidelines 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

- Seminar in Gävle, Sweden March 1999: "Geodesy and Surveying in the Future – The Importance of Heights" under the responsibility of WG5.2. This seminar which covered one whole field namely *heights* was highly appreciated by all participants representing both practitioners and the scientific partners of the surveying community. This is probably the best way to communicate and transfer information (knowledge) between researchers, developers, teachers, manufacturers and the common surveyors
- Workshop in Akranes, Iceland June 2001 together with NKG (Nordic Geodetic Commission – Height Determination Working Group).



From left to right Matt Higgins, Jean-Marie Becker, Nicolas Paparoditis (chair WG 5.3) and Michel Kasser (chair WG 5.2). During the meeting in Paris at IGN in early 2000.

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

- 2nd and 3rd International "Workshop on Mobile Mapping" in Bangkok (1999) respective in Cairo (2001) where WG 5.3 with its chair Naser El-Sheimy has had a leading role 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 5th Conference on Optical 3-D Measurement Techniques” in Vienna in 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 FIG Working Weeks.

5. CONCLUSIONS

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

- We have a well functioning Secretariat, Web site and a Commission Newsletter
- We can see that Commission 5 and especially the WGs 5.1, WG 5.2 and 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 which means useful and user-friendly solutions to 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 surveying profession.

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

Note: For more information and details please consult Commission 5 Newsletters, Commission web page, Commission publications and the reports from the WG chairs.

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