

**Report to the 29th General Assembly
FIG Congress in Munich, October 2006**

FIG Commission 6 – Engineering Surveys

Draft Work Plan 2007-2010

1. Terms of reference

- Acquisition, processing and management of topometric data and all related information throughout the life cycle of a project (at construction site);
- Quality control and validation for civil engineering constructions and manufacturing of large objects;
- Modern concepts for setting-out and machine guidance;
- Deformation monitoring, analysis and interpretation, measurement of dynamic loaded structures (general);
- Prediction of deformation and movements in engineering projects, mines and areas of geological hazard;
- Automatic measuring systems, construction and industry and multi-sensor measuring systems;
- Terrestrial laser systems, their usage in architecture, civil engineering and industry;
- Industry measuring system metrology, testing and quality control;
- Standards related to the construction, deformation measurement and measuring system metrology.

2. Mission statement

- Promote the knowledge, skills and abilities of surveyors in civil and industrial works within the various professional fields of engineering;
- Support all development and multidisciplinary expertise leading to integrated survey methods, using various instruments and sensors and combining geometry with all other data relevant to each engineering problem;
- Provide a forum for exchange of knowledge related to engineering analysis of survey data for the study of structures;
- In addition to the links with related WGs of IAG, ISM and ISPRS, look for possible co-operation within these organisations and support the co-operation of civil, structural and mechanical engineers with our profession;
- Co-operation with other FIG Commissions;
- Participation on the FIG standardisation policy, support the standardisation activities at the international, local and national level, development of standards;
- Participation on regional FIG events, events organised in co-operation with sister organisations.

3. General

This Working Plan covers a wide scale of survey disciplines related to plants, installations and constructions of any kind. Through the Working Plan Commission 6 want to extend the Council strategy by encouraging:

- development of international standards and qualifications,
- closer links and co-operation with other FIG Commissions,
- development of best practice guides in Engineering Surveys,
- actively support and participate in FIG regional events.

4. Working Groups

WG6.1 – Deformation Measurement and Analysis

Policy issues

Automation of monitoring surveys.

Enhancement of geometrical modelling of deformations from integrated deformation surveys

Physical interpretation of deformations including numerical modelling and prediction of deformations and back analysis.

Chair

N.N

Vice-chair: Cecilia Whitaker (USA)

Specific project(s)

Regular symposia and exchanges between researchers and concerned professionals.

Workshop(s)

- 13th International Symposium on Deformation Measurements,, 2008;

- 14th International Symposium on Deformation Measurements, Australia, 2009;

Contributions to various joint meetings and FIG working weeks;

Publication(s)

Proceedings of the meetings (by the host).

Beneficiaries

Geodetic engineers dealing with comparative measurements of deformed or unstable objects, geologists, geophysicists, and civil and structural engineers concerned on this issue.

WG6.2 – Engineering Surveys for Industry and Research

Policy issues

Engineering surveys in industry and research demand ultimate quality to be realised in ever-shorter time slots and under spatially most limited conditions. WG2's main goal is to provide the specialists involved in that kind of missions with the latest state of the art concerning:

- The use of adapted survey techniques in industry & engineering;
- Multidisciplinary collaboration between survey engineers, civil engineers, structural & mechanical engineers, R&D scientists - for a better approach of complex engineering survey problems;
- Specific algorithms, instrumentation, equipment and techniques in engineering surveys;
- High precision measurements and special techniques for the large scale metrology of big equipment or structures;
- Integration of survey & alignment sensors with actuators and/or tools for on-line monitoring and control of a given process (dynamic systems);
- Relevant modules for the 'Optical 3D Measurement Techniques' series.

Chair

Thomas Wunderlich (Germany)

Vice-chair: Peter Kyrinovic (Slovakia)

Specific project(s)

- Engineering surveying procedures for power plants;
- Engineering surveying procedures for linear and circular accelerators;
- Engineering surveying procedures for nuclear research facilities;
- New techniques for as-built documentation and facility inventory;
- Industrial metrology in production, assembling and finishing processes;
- In-situ calibration of industrial robots.

Workshop(s)

- INGEO 4th International Conference on Engineering Surveying, Slovakia 2007,
- Tutorials as part of the "International Course for Engineering Surveying", Graz (Austria), 2007

Contributions to the FIG Working Weeks and to FIG Congress;

Specific seminars or workshops on dedicated topics.

Publication(s)

Proceedings of the meetings (by the host).

Beneficiaries

- Dialogue with manufacturers to realise competent consumer wishes;
- Advising optimal instrument for each special application of a mission catalogue;
- Development of suitable planning tools for extensive scanning tasks;
- Software improvements to increase variety of best-fitting objects;
- Monitoring of CAD-SW behaviour under heavy scanning data load;
- Expansion of application fields.

The surveyors, designers and manufacturers are waiting to acquire more expertise in these special applications.

The group of professional which have the benefit of the results consist of engineers dealing with quality control of large objects or structures, scientific laboratories dealing with particle accelerators and detectors, fusion rings, gravitational antennas, power lasers, etc., scientists

and engineers dealing with large scale metrology and accurate positioning in R&D sectors or in industry, finally universities and manufacturers involved in the development of special instruments.

WG6.3 – Engineering Survey Data Bases and Facility Management

Policy issues

- Focus on the role of the surveying engineer as the responsible manager of spatially referenced information;
- Support for the co-ordination of the activities of other disciplines.

Chair

Lothar Gründig (Germany)

Vice-chair: Vladimir Seredovich (Russia)

Specific project(s)

- Concepts of data models for the Mapping of relevant 4D or 5D project data, covering 3D geometry, time, and descriptive attributes;
- Exchange, provision and presentation of facility management data in computer networks;
- Data integration for this subject, taking into accounts the presence of redundant data and different sources of information;
- The automation and combination of feasible data acquisition techniques.

Workshop(s)

- Workshop on Engineering Survey Data Bases and Facility Management, DDMM 200x, Berlin, Germany;

FIG WWs;

Sessions and contributions to joint seminars, workshops and symposia.

Publication(s)

Proceedings of the meetings (by the host).

Beneficiaries

Surveying engineers, engineers and managers involved in facility management tasks.

WG6.4 – Engineering Surveys for Construction Works and Structural Engineering

Policy Issues

- Promoting the use of adapted survey techniques in industry & engineering;
- Promoting a multidisciplinary collaboration between survey engineers, civil engineers, structural & mechanical engineers;
- Promoting the understanding of fibre optic sensors, e.g. interferometric sensors;
- Study the use of embedded sensor arrays and the role of advanced surveying techniques for structural monitoring;

- Creating an awareness of surveyors through a task force 'Fibre optic sensors' of the rapidly emerging technology of fibre optic sensors as "non-geodetic" sensors to measure deformations (strain) and temperatures in civil engineering structures

Chair:

Gethin Wyn Roberts (UK)

Vice-chair: Joel Van Cranenbroek (Switzerland)

Specific Projects

- Precise methods and equipment for staking out during construction and structural works;
- QC and documentation for as build compared to as designed;
- Precise methods and equipment for engineering surveys for visualisation and photo match;
- Precise methods and equipment for remote surveys;
- Dynamic Monitoring of Buildings and Structures;
- Offshore construction surveys.

Workshops

- Regular symposia and exchanges between researchers and concerned professionals;
- Tutorials as part of the "International Course for Engineering Surveying", Graz (Austria), 2007
- Workshop on Automatic and multi-sensor measuring Systems, 2009;

Contributions to various joint meetings and FIG WVs and Congress.

Publications

Proceedings of the meetings (by the host).

Web page

Beneficiaries

- Surveying profession becoming involved in this developing technology which will partly replace current geodetic techniques;
- Surveyors wanting to acquire information about fibre optic sensors as used in "smart civil engineering structures";
- Engineers who has to decide about the best techniques to monitor civil Engineering structures;
- Universities teaching advanced sensor technology.
- Engineering surveyors and engineers involved with construction and setting out will benefit, as well as structural engineers, current buildings and future building designs.

5. Task Forces

Task Force 1 '**Terrestrial Laser Scanners**'; Chair: Maria Tsakiri (Greece); Co-chair:
Cross commission TF in co-operation with C5

Task Force 2 '**Optimal Use of Interferometric Synthetic Aperture Radar (InSAR)**'; Chair:
Chris Rizos (Australia); Co-chair:

Task Force 3 '**Crustal Deformation**'; Chair: Stathis Stiros (Greece); Co-chair:

Task Force 4 '**Monitoring and Analysis of Cyclic Deformations and Structural Vibrations**'; Chair: Gethin Wyn Roberts (UK); Co-chair: Philip Collier (Australia)

Task Force 5 '**Fibre Optic Sensors**'; Chair: Helmut Woschitz (Austria); Co-chair:

Task Force 6 '**Terrestrial-Based RF Positioning Technologies**'; Chair: Joel Barns (Australia); Co-chair: Xiaolin Meng (UK)

6. Co-operation with sister associations

Commission 6 intends to continue co-operation with sister associations, especially The International Association of Geodesy (IAG). Further more The International Society for Mine Surveying (ISM) and the International Society for Photogrammetry and Remote Sensing (ISPRS) are of interest.

7. Communications

Commission 6 will use general the commission web page with linkages to other relevant web pages to keep commission delegates, other FIG members and the public informed. The secretariat will provide the webmaster.

Commission 6 will provide an annual newsletter with input from the working groups. This will be distributed by e-mail.

8. New partnerships

Commission 6 will try to support the developed partnership with ISM and the IAG Special Commission 4. New partnership could be developed with ISPRS according the increasing input of laser scanning (terrestrial and airborne) to the engineering survey projects.

9. Calendar of events

2007

- Tutorials as part of the "International Course for Engineering Surveying", Graz, Austria;
- INGENIO 4th International Conference on Engineering Surveying, Slovakia;
- FIG Working Week, Hong Kong, China;
- 3D Technique

2008

- 13th International Symposium on Deformation Measurements;
- FIG Working Week, Stockholm, Sweden;

2009

- 14th International Symposium on Deformation Measurements, 2009, Australia;
- FIG Working Week.
- Workshop of the WG6.4 (TF);
- Workshop on Engineering Survey Data Bases and Facility Management;

2010

FIG Congress.

Commission officers

Commission Chair: Alojz Kopacik (Slovakia)

WG1 Chair: N. N. (.....); Vice-chair: Cecilia Whitaker (USA)

WG2 Chair: Thomas Wunderlich (Germany); Vice-chair: Peter Kyrinovic (Slovakia)

WG3 Chair: Lothar Gründig (Germany); Vice-chair: Vladimir Seredovich (Russia)

WG4 Chair: Gethin Wyn Roberts (UK); Vice-chair: Joel VanCranenbroek (Switzerland);

Task Force Chairs:

TF 1 Laser Scanning – common TF with C5; Chair: Maria Thsakiri (Greece)

TF 2 Optimal Use of InSAR – Chris Rizos (Australia)

TF3 Crustal Deformation – Stathis Stiros (Greece)

TF4 Monitoring and Analysis of Cyclic Deformations and Structural Vibrations – Gethin Wyn Roberts (UK)

TF5 Fibre Optic Sensors – N. N. (Austria)

TF 6 Terrestrial-Based RF Positioning Technologies – Joel Barns (Australia)

Commission secretary: N. N. (.....)

Prof. Alojz Kopacik

Chair Elect of Commission 6

July 2006