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Report to the 43rd General Assembly FIG Working Week 2020, Amsterdam, the Netherlands

FIG Commission 6 - Engineering Surveys

Report of Activities 2019

1. General

2019 was the first year of activity of the new team that will coordinate the activities of Commission Engineering Surveys (better known as C6) between 2019 and 2022. It was, naturally, a year of the start of a new group that wants to continue the work of a commission that has more than 45 years of existence.

The focus of C6 activity has been innovating because of the changes of the concerns, interests and challenges of the surveyors. Not long ago large structures like dams, bridges, buildings with normal dimensions, tunnels, along with techniques like total stations, levels and GNSS receivers, dominated the events and technical sessions of this commission.

In the last few years the awareness of our planet's fragility, the impacts of severe weather conditions together with inadequate human interventions, as well as the construction of defiant structures due to their size or location, are leading to new challenges. Those challenges demand for professionals with top qualification, that are used to push the techniques to their highest levels of accuracy: the engineering surveyors. New techniques and methodologies - like UAV, Laser Scanners, Radar and digital image processing - along with real (or quasi real) time solutions are assets for these professionals. Events organized by FIG (the Congresses or Working Weeks) or by C6 reflect this evolution.

Naturally, new techniques are tested at universities and other research centers. And it is in FIG events that bring researcher and professionals from enterprises together and enable the exchange of the newest techniques and methods on the one hand and inspiring applications on the other hand.

C6 activity is coordinated by Maria Henriques, Portugal (chair) and Corinna Harmening, Austria (vice-chair). It were created three working groups:

6.1 – Deformation Monitoring and Analysis: Wolfgang Niemeier, Germany (chair) and Vassilis Gikas, Greece (vice-chair);

6.2 – Landslides monitoring: Gilbert Ferhat, France (chair);

6.3 – UAV in surveying: Hans Ni, China (chair).

2. The activity of C6 in 2019

2.1 Unlike the previous “four year” terms, the chairs of FIG 2019-2022 commissions were elected in May of 2018, during the FIG Congress, and, hence, some months before the start of their activity. They didn’t get through an important period of 1.5 years of participation in FIG activity that usually happens between their election and the beginning of their term. This activity includes the participation in ACCO meetings and involvement in the activity of their future commission. For this reason FIG Council and Office organized a two days meeting in FIG Office, in Copenhagen, in January 2019.

The majority of the commissions chairs (including the chair of the Young Surveyors Network) could participate in this important startup meeting. Mikael Lilje, the vice-president responsible for commissions, coordinated the meeting. On the second day, Rudolf Staiger was also present. He shared his vision of FIG challenges for the next few years. During the two days FIG Office collaborators (staff) were present and gave the maximum help.

The two days were important to start the preparation of the Working Week 2019 (with regard to technical sessions) and to become aware of the activity of the other commissions.

The initiative of FIG Council in organizing this meeting was, to me (chair of C6), excellent. FIG Office provided very good conditions, not possible in the ACCO meetings that occur nearby the busy congresses or working weeks. The possibility of being two days concentrated in the work and getting to know each other was most fruitful. Definitely, an initiative to repeat at the beginning of the next term, with the new chairs.

2.2 The second high period of activity was the Working Week (WW), in Hanoi (April, 22th to 26th), which was preceded by ACCO meeting on the 21th of April.

C6 was responsible for coordinating three technical sessions, and joined C10 (Construction Economics and Management) in one session:

Title	Comm.	Chair	Rapporteur	N.pap.
UAV - from Sensors to Applications	6	Joel Van Cranenbroeck	Mehmed Batilović	5
Engineering Surveys – Contribution to Data Collection and Mapping	6	Heinz-Juergen Przybilla	Njike Chigbu	5
Engineering Surveys – Developing our Methods	6	Nguyen Ngoc Bang	Corinna Harmening	5
Digital Construction	10&6	Alan Muse	Mercy Iyortyer	5

At the end of the third day of WW the Commission's Annual Meetings took place, conducted by C6 chair with the help of C6 co-chair, followed by the Commissions dinners. C6 joined C4 and C5, as usual in the last years.

Among several matters discussed, the participants in the annual meeting expressed their concern by the fact that, in some areas, surveyors are considered 2nd order professionals and, also, that engineering survey is exercised by professionals with no skills. They express the wish of having standards related with their activity as well as training courses provided by FIG or with FIG involved in the organization (“FIG stamp”).

Besides these activities, C6 chair was present in several sessions. To highlight: the Speed Networking (organized by Young Surveyors Network), the FIG booth, the meeting of the Task Force on Governance, and the Special Session on the Sustainable Development Goals & FIG. The aim of this meeting was to describe the role, responsibilities and opportunities of FIG members and delegates towards the UN Sustainable Development Goals. The participants were divided in groups and the one that worked with the theme “Engineering Surveys Professionals” identified the goals that these professionals can contribute more significantly to: i) Goal 6: ensure access to water and sanitation for all; ii) Goal 7: ensure access to affordable, reliable, sustainable and modern energy; iii) Goal 9: build resilient infrastructure, promote sustainable industrialization and foster innovation; iv) Goal 11: make cities inclusive, safe, resilient and sustainable.

2.3 The third high point of activity was the successful 4th Joint International Symposium on Deformation Monitoring 2019. Being an organization of the Working Group (WG) 6.1, a complete reference to this meeting will be included in the activity of this WG.

Since the majority of the chairs and co-chairs of the WG participated in this symposium, a meeting was organized the day before the start of the symposium, in order to prepare the activity of the commission.

2.4 Other activities.

In September, C6 chair was invited to be a keynote speaker in the annual symposium of the Engineering Surveying Branch of Chinese Society of Surveying and Mapping, organized by the School of Geodesy and Geomatics of the Wuhan University. The invitation was made by the president of the organizing committee Prof. Jingui Zou, vice-dean of the School and member of the Institute of Surveying Engineering. Prof. Zou, his students and colleagues provided excellent conditions during her stay in Wuhan.

C6 supported the participation of its co-chair, Corinna Harmening, in the 6th Young Surveyors European Meeting held in Porto, Portugal, on the 11th and 12th of October. The meeting was held under the theme “Mapping the path to sustainability”. About 40 European young surveyors came together to exchange and to discuss their ideas, both in the context of scientific lectures, ranging from the use of laser scanning for speleology over modern land administration systems to eye tracking applications, as well as during social activities like a wine tasting and a *Fado* show. The meeting ended with a charity walking tour through the city center of Porto.

Besides her activities in FIG as chair of C6, Maria Henriques was the president of the organizing committee of the international meeting “Geodecision 2019: Geodecision for Sustainable Communities”. This meeting, supported by FIG, was held in Porto, Portugal, from 9 to 11 of October. The session held on the 11th morning was a joint session with the 6th Young Surveyors European Meeting.

Another activity of Maria within FIG is as a member of the Editorial board.

3. Working Groups

For the term 2019-2022, three working groups were established, as indicated in the introduction, being that only one, the WG6.1 - Deformation Monitoring and Analysis, remained from the previous term. For this reason, there is still no relevant activity of the new groups - WG 6.2 - Landslides Monitoring and WG 6.3 - UAV for Surveying, to include in this report.

3.1 Concerning the WG 6.1, a Group that began its activity in 1975, it organized the 4th Joint International Symposium on Deformation Monitoring (JISDM). This was held in Athens, Greece, from the 15th to the 17th of May. With more than 200 participants coming from all continents, this symposium can be considered to be a real success.

The joint symposium was organized by the School of Rural and Surveying Engineering of the National Technical University of Athens and was supported by FIG, IAG and ISPRS. The president of the local organizing committee was Vassilis Gikas, the co-chair of the WG6.1.

The three keynote speakers - Carmelo Gentile, Charalampos (Haris) Kontoes and Dorota A. Grejner-Brzezinska - introduced the latest tendencies in the field of deformation monitoring and shared their vision on the evolution of technologies and methods for monitoring both natural phenomena and man-made structures.

A total of 132 presentations (95 oral and 37 poster) covered several topics that included: i) quality control, quality assurance and optimization techniques in deformation analysis; ii) point cloud-based space-temporal deformations; iii) reference frames and geodynamics; iv) cultural heritage/ bridge / dam / geohazards monitoring; v) multi-sensor systems and new concepts for deformation measurements; vi) UAV for change detection and deformation monitoring.

Special issues of the Journal of Applied Geodesy (De Gruyter), of the Journal of Applied Geomatics (Springer) and of the Journal Sensors (MDPI), that will include an extension of selected articles presented at the symposium, are in progress.

In the closing session the chair of the WG6.1, Wolfgang Niemeier, made a short report of the event and announced that the next JISDM, the 5th, will take place in Valencia, Spain, in 2022.

More information in <https://jisdm2019.org/>

Proceedings in <https://jisdm2019.org/wp-content/uploads/2019/05/JISDM2019-Proceedings.pdf>

3.2 Hans Ni, chair of the WG 6.1, organized the Seminar on Geospatial Information, Ecological Environment and Sustainable Development, held in Deqing, China, on the 15th and 16th of December.

More information in http://fig.net/news/news_2019/12_deqing.asp

4. Cooperation

It was established a cooperation with IAG, especially with the WG 4.1.3 “3D Point Cloud based Spatio-temporal Monitoring”. The contacts, established during 2019 by the board of this group and C6, attracted some authors to the Working Week 2020, making a technical session with the theme “Point Cloud” possible.

Links were also established with the Joint Technical Committee “Natural Slopes and Landslides” of the International Society for Soil Mechanics and Geotechnical Engineering and with the Scientific Commission “Instruments, Mine Surveying Measurements, Mining Cartography” of the International Society for Mine Surveying.

Photos



4th Joint International Symposium on Deformation Monitoring participants



Wolfgang Niemeier, Corinna Harmening, Vassilis Gikas, Maria Henriques, Gilbert Ferhat at the 4th Joint International Symposium on Deformation Monitoring



Working Week 2019 - Presents, chairs and rapporteurs of two C6 technical sessions