

FIG COMMISSION 3

Spatial Information Management, a Key Discipline for Managing Spatial and Temporal Dynamics



One of the most impressive examples of how phenomena evolve over time and space is the spread of the SARS-CoV-2 virus. Knowing in real-time where a local outbreak occurs, how outbreaks evolve over time, how many people are affected at any given location is of utmost importance to take appropriate measures. As with many other applications, well-established spatial information

management, including an implemented system for digital information exchange can help to provide the required spatial information in near real time.



Commission 3 at a glance

Commission 3 of the International Federation of Surveyors FIG has the task of providing an international discussion and development forum to promote professional practice and standards in the field of Spatial Information Management. Formally, each FIG Member Association can appoint a delegate to the commission. In practice, the work is done by a group of volunteer experts from different parts of the world.

In a highly interconnected world interoperability is an indispensable precondition for information exchange. FIG Commission 3 – Spatial Information Management considers interoperability to consist of legal interoperability (aligned legislation and legal meaning), organisational interoperability (coordinated processes), and technical interoperability. We focus mainly on technical interoperability of geospatial data: at system level (data exchange through networks, computers, applications, and web services), at syntactic level (common data formats defined for data encoding, decoding, and representation), at structural level (pre-defined data models, data structures, and data schemes), and at semantic level (common vocabularies). Spatial Data Infrastructures (SDI) provide ‘a framework of policies, institutional arrangements, technologies, data, and people that enables the sharing and effective usage of geographic information by standardizing formats and protocols for access and interoperability’ (1).

Commission’s Work plan 2019 to 2022

In the current working period, from 2019 to 2022, the commission is working on several issues:

- Geospatial Information Infrastructures and their integration and enablement for smart cities at the local, regional and global levels, with Open Spatial Data Infrastructures OpenSDI as the overarching theme for the current working period,
- Opportunities and challenges of Geospatial Big Data GBD, proposing a framework for obtaining, processing, presenting, sharing and best using GBD together with data derived from traditional surveying methods,
- Initiatives and projects that make use of user-generated spatial content. Considering the event and dynamic evolution of Volunteered Geographic Information (VGI) focus is given to collection, processing, mining, interpretation, administrative, and analysis,
- Contributions to the upcoming revision of ISO19152:2022 (LADM) by further developing the 3D aspects in this international standard,
- Gain a better understanding of developing useful GIS tools for spatial planning, based on the different phases in the spatial planning cycle. Having appropriate and user friendly GIS tools available will create a positive spin-off in terms of enhancing information transparency and increase inclusiveness among participating stakeholders,

- Contributions to the UN Sustainable Development Agenda 2030 Goals, such as 'Sustainable Cities and Communities', 'No Poverty', 'Zero Hunger', 'Climate Action', by raising awareness on how society -professionals/business, governments and people- can benefit from enhancing the usability of user generated content, Volunteered Geographic Information VGI and Geospatial Big Data GBD,
- Building a close partnership with FIG Young Surveyors Network within Commission's scope by addressing the link between the changing role of surveyors in the society based on the near future geospatial technologies and next generations.



Figure 1: Annual meeting within the Romanian Surveying week, Cluj-Napoca, Romania, September 2019.

Commission's Working Groups

Commission's work is organized in different Working Groups.

- Working Group 3.1 – Geospatial Information Infrastructure for Smart Cities, Chair Prof Kevin McDougall (Australia). The key aim of the working group is to contribute to improved decision making and outcomes in society through sharing knowledge and advances in geospatial information infrastructure and technology and their integration and enablement for smart cities at the local, regional and global levels.
- Working Group 3.2 – Geospatial Big Data: collection, processing, and presentation, Chair Prof Charalabos Ioannidis (Greece). The working group contributes to UN SDG 11 (Sustainable Cities) but also to SDG 1 (No Poverty) and SDG 2 and 3 (Zero Hunger) and 13 (Climate Action).
- Working Group 3.3 – User-Generated Spatial Content Empowering Communities, Chair Prof Sagi Dalyot (Israel). The emphasis of the working group is on the investigation and identification of initiatives and projects that make use of user-generated spatial content as an enabler to processes, infrastructures and services to communities.
- Working Group 3.4 – 3D Cadastres (Joint Working Group with Commission 7), Chair Prof Peter van Oosterom (The Netherlands). The working group contributes to the upcoming revision of ISO19152:2022 (LADM) by organizing workshops in collaboration with ISO TC221 and OGC, and by creating publications such as a special issue on 3D Cadastres in the scientific journal ISPRS IJGI.
- Working Group 3.5 – GIS Tools for Spatial Planning (Joint Working Group with Commission 8), Chair Dr Enrico Rispoli, Italy. The working group aims to gain a better understanding of developing useful GIS tools given a particular planning exercise, based on the different phases in the spatial planning cycle.
- Working Group 3.6 – Geospatial Next (Joint Working Group with Young Surveyors Network) Chair Cemal Özgür Kivilcim (Turkey). The working group maintains and strengthens the link with next generations within the scope of the commission by proposing and organizing events such as online/in demand podcasts, trainings, workshops, special sessions in the annual meetings.

Commission's FIG Working Week 2020 Technical Programme

All in all, the Technical Programme of Commission 3 – Spatial Information Management consists of 75 papers organized in 9 Technical Sessions.

The first four Technical Sessions focus on the application of SDI technology in the field of Spatial Planning. Consequently, all four Technical Sessions, **TS01E and TS02E 'Mapping, Planning, Development and SDI' I and II**, **TS03E 'Geospatial Technology for Spatial Planning'**, and **TS04 'Where Spatial Planning and Geo-Information Meet'** were organized as joint sessions together with Commission 8 – Spatial Planning and Development. Sustainable development needs appropriate planning, planning requires trustworthy spatial information that can be provided by a well-developed Spatial Data Infrastructure SDI. Easy to understand maps are the interface to all parties involved in the process. The first two sessions, TS01E and TS02E, aim to discuss these aspects from the perspectives of different countries with different stages of development. The contributions come from Africa (Cameroon, Ghana, Nigeria), Asia (Azerbaijan, Bahrain, China), Europe (Germany, Italy, Netherlands, Norway, Poland, Romania, Slovenia, Turkey), and South America (Colombia). With case studies from many different countries, both sessions provide a broad overview of different challenges and solutions with a focus on Spatial Planning.

The session **TS03E 'Geospatial Technology for Spatial Planning'** offers a series of practical use cases for the implementation of Geographic Information Systems (GIS) in spatial planning. Spatial planning is by nature closely related to the use of GIS tools. GIS tools as part of feasible Spatial Data Infrastructures have a great potential to support spatial planning practice in all phases of the spatial planning circle. The session supports this statement by presenting various use cases. The session **TS04I 'Where Spatial Planning and Geo-Information Meet'** intends to highlight the connection between the two disciplines. Using geo-information is one key to making spatially informed decisions for sustainable spatial development. At the interplay of both disciplines, we discuss what geo-information has to offer to spatial planning and vice versa.

Commission 3 is closely linked to Commission 7 –Cadastre and Land Management through the topic 3D cadastre. Traditionally, planar and height information in surveying and in many other disciplines has been and is processed largely independent of each other. The session **TS04E 'Including the Third Dimension in Geospatial Information'** illustrates new developments how all three dimensions can be processed simultaneously in integrated workflows.

Geospatial analytics provides the tools to unleash the full potential of comprehensive geospatial data sets, and potentially integrating information from many different data sources. Session **TS05E 'Geospatial Analytics Use Cases'** demonstrates the applicability of state-of-the-art analysis methods by presenting various use cases. Geospatial analysis takes place in a highly dynamic field of technological progress. The session **TS06E 'Emerging Technologies for Geospatial Analysis'** aims to demonstrate the potential of new key concepts such as big data, internet of things, digital twins, semantic technologies, augmented reality for geospatial analysis.

The sessions **TS07E 'Integrated Geospatial Information Management'** and **TS08E 'From Closed to Open: Open Data, Open Source'** strive to put both the management and the content of Spatial Data Infrastructures into a broader context. Starting from the development of SDI's, geospatial information management is in constant evolution to integrate geospatial information available outside traditional SDI's

into an integrated framework. In the first session progress in the development of SDI and in the integration of exterior information are presented. In recent years, citizen participation in the provision of software solutions and geospatial information has evolved in an unprecedented way. The presentations of the second session demonstrate both the use of open data and participatory approaches to the generation of high-quality spatial content (2).



Figure 2: Surveying for Land Registry in Columbia by amateurs (Source: (2))

Conclusions

Spatial Information Management is a key discipline for managing spatial and temporal dynamics, regardless of whether the dynamics are high or low, simple or complex to understand. By bringing together experts from around the world Commission 3 seeks to monitor developments in selected areas of interest, such as Geospatial Information for Smart Cities, use of Geospatial Big Data and user-generated spatial content, application of GIS tools in spatial planning.

Further information

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