FIG Commission 3
Spatial Information Management

Work Plan 2023–2026

1. Theme

Equal, Liveable, Available and Affordable Spaces

2. Perspective

The FIG organization outlines new perspectives and actions in which the land surveyors and geomatic specialists transform plans and ideas into realities, whereas the academics contribute new understandings and technologies to mitigate them. Commission 3's task is to provide new perspectives to promote professional practices and standards in the field of Spatial Information Management. These will support and maintain productive discussions among the different stakeholders to ensure sustainable and equal environments for future generations. As Part of FIG's responsibility towards the 2030 Agenda and the UN Sustainable Development Goals (UN, 2015), and FIG's aim to tackle global challenges, commission 3 will support international spatial-related domains and policy development spheres as featured in the SDGs.

We are amid a new digital and technological era, in which the land surveyor is transforming her/his profession and activities, requiring her/him to gain new skills and knowledge. Cities are getting bigger, populations are growing larger, ubiquitous information technologies are evolving, and as such, new perspectives of spatial data collection, spatial data handling and spatial information management are sought and required. Our theme "equal, liveable, available, and affordable spaces" supports the FIG Council vision to serve society for the benefit of people and planet.

On the one hand, new expertise and knowledge are made, related to, among others, 3D land administration, spatial information management and analysis, emerging technologies, geospatial planning and standards, and new perspectives of spatial data sources and analysis. On the other hand, these are still not made global to all corners of the world, such that disparities continue to increase among different communities. Commission 3 will aim to actively realize the adoption of new spatial data and information working methodologies and technologies, together with the strengthening of joint-activities and collaborations of stakeholders, aiming to focus on developing countries.

Commission 3 will aim to push forward the proactive land surveyor's role, specifically related to spatial data and information, focusing on professionalism and skills, technological development, and services. Through knowledge exchange and productive discussions, the dissemination of know-hows and practices will be made possible and accessible to all, in support of equal, livable, available, and affordable spaces, as advocated in the spatial-related SDG indicators, among others: clean water and sanitation (SDG 6), sustainable cities and communities (SDG 11), and climate action (SDG 13).

Commissions 3 will aspire to strengthen FIG as a scientific platform of first-rate research publications among its sister organizations and the academics and motivate FIG delegates to publish and present high-quality publications and presentations in FIG events and scientific journals. This will also be achieved through joint working groups with sister commissions, FIG Task Forces, and outreach to sister geomatics organizations (e.g., ISPRS, UN-GGIM).

3. Mission statement

The mission of Commission 3 in 2023-2026 is to establish:

- **Know-how dissemination:** Continue to push forward the role of Commission 3 as an international originator of spatial information expertise and excellence, disseminating geospatial/SDI knowledge, skills, and know-hows to expert domains outside the geospatial realm, with defined domains and pathways to support global sustainability, geospatial planning and standards, and socio-technical systems. Emphasis will be given to new professionals in the geomatics and surveying field through the Young Surveyors network.

- **Open data and supporting communities:** Introduce citizens as the greatest resource to mitigate urban challenges by providing new ideas and data that will help monitor, manage, and make cities livable. Through local involvement, promoting the use of open data and community-based geospatial initiatives to improve urban infrastructure and living conditions, focusing on developing regions, towards sustainable urban development, as envisioned in the SDGs.

- **Extend the scientific footprint**: Promoting the role of spatial information management, the role of mapping and geoinformation, the role of the land surveyor, and the role of land. To achieve the aforementioned, Commission 3 will foster the publication of high-quality research reports and papers in the spatial domain, together with supporting scholars from the academia to realize a synthesis of practical and theoretical aspects within the commission work. Commission 3 outcomes will be published in special issues of international scientific journals (e.g., Survey Review, Digital Earth, ISPRS Journal of Geo-Information) and as a FIG publication.

Planned deliverables:

- Hold half of the annual Commission 3 meetings in developing countries.
- Publish in 2 special issues of international peer-reviewed scientific journals.
- Publish 2 FIG article of the month and 1 FIG publication.
- Establish 3 working groups joint with sister FIG commissions (Commission 7, 8 and 9) and the Young Surveyors Network.
- Collaboration with FIG Task Forces (FIG and the SDGs, the Role of FIG in International Trends and Future Geospatial Information Ecosystem).
- Collaboration with sister international agencies (ISPRS, UN-GGIM), industry, and international networks.

4. General

Commission 3 term 2023-2026 work plan builds on the progress made in the previous term, together with the result of an extensive work done during the past year, as part of fruitful discussions and meetings. These led to the restructuring of commission 3 and the roles its working groups will play in achieving the commission's missions, also aiming to achieve productive joint work with sister FIG commissions and FIG Task Forces.

FIG Commission 3 working groups for term 2023-2026 are:

- **Working Group 1:** Geospatial data: professionalism, technology, and services
- **Working Group 2:** Urban challenges in developing countries (joint WG with Commission 9)
- **Working Group 3:** GIS for sustainable (geo-)spatial planning (joint WG with Commission 8)
- **Working Group 4:** LADM and 3D LA (joint WG with Commission 7)
- **Working Group 5**: Geospatial next (joint with the Young Surveyors Network)

Events will mainly include FIG Working Weeks and Commission 3's annual meetings and workshops. Venues of commissions 3 events will be determined in the future, most probably in respect to the home countries of its working groups' chairs and other partners (e.g., EGOS). Progress, promotion and call for papers will be made via FIG website and Commission 3 webpage:

- FIG 2023 Working Week – Orlando, Florida, USA
- FIG Commission 3 Annual Meeting 2023 – Tel-Aviv, Israel (in conjunction with GeoInt360)
- FIG 2024 Working Ghana – Accra, Ghana
- FIG Commission 3 Annual Meeting 2024 – TBD/Varaždin, Croatia
- FIG 2025 Working Week – Brisbane, Australia
- FIG Commission 3 Annual Meeting 2025 – TBD/Nairobi, Kenya
- FIG 2026 Congress – Cape Town, South Africa
- FIG Commission 3 Annual Meeting 2026 – TBD

5. Working Groups

Working Group 3.1 – Geospatial Data: Professionalism, Technology, and Services

Prof. Dr.-Ing. Markus Schaffert

Working Group 1 goal is to disseminate geospatial data/SDI knowledge, know-how, state-of-the-art and skills, including working methodologies with open spatial data and geospatial analytics.

Spatial data plays an important role in the transformation towards a more sustainable future. However, data alone is not enough for this purpose, and it must be handled in a way that is application-oriented and appropriate for the respective target group. On the other hand, there are users from other sectors that often do not have sufficient knowledge on how geospatial data can be used in their profession (in general) and initiate sustainable transformation (in particular).

The aim of this Working Group is to disseminate geospatial/SDI knowledge, skills and know-how to expert domains outside the geospatial realm. This starts with basic skills, such as awareness for the quality of data and analyses or data literacy. Depending on the needs, this can also include advanced concepts such as linked open data, artificial intelligence - etc. This way, experts from non-technical or data-driven professions will become aware of how to use geospatial data more profoundly in their domain and in the interests of sustainability. Vice versa, geomatic experts will become aware of how to get more involved in other domains and sustainability-oriented activities. This transfer of knowledge will be focused to some defined domains and certain pathways to sustainability. In addition, research is performed on how proper data management can look like in socio-technical systems.

VISION:

- Turning data into information by combining (open) geospatial data and using geospatial analytics and GeoAI in domain-specific contexts;
- Transforming geo-information into knowledge by identifying ways to better communicate data/maps to other scientific fields;
- Experts from non-technical or data-driven professions will become aware of how to use geospatial data more profoundly in their domain and in the interests of global sustainability;
- Geomatic experts will become aware of how to get more involved in other domains and sustainability-oriented activities;
- The defined domains are strongly linked to the SDGs. Geospatial information should contribute more profoundly to supporting these goals by serving society and supporting global challenges.

AGENDA:

- Contributing to sessions at the FIG WWs and Commission 3 annual meetings. Papers will be written for the FIG WWs.
- Strengthen cooperation with professionals and industry.

POLICY ISSUES:

- Affordable and clean energy; Industry, innovation, and infrastructure; Sustainable cities and communities; Life on land (SDGs 7, 9, 11, 15).

BENEFICIARIES:

- Citizens, (geo) data experts, experts of other domains (e.g., property valuation, land management, urban planning), local public authorities.

KEYWORDS:

- Geodata Literacy, Participatory Mapping, Spatial Data Infrastructure, GeoAI, Spatial Information Management, Transformation to Sustainability, Data Quality, Data Standards.

Working Group 3.2 – Urban Challenges in Developing Countries (Joint WG with Commission 9)

Dr. David N. Siriba

Working Group 2 goal is to support local communities with accessible and affordable geo-related working methodologies to support urban challenges.

The World Cities Report 2020 reaffirms that sustainable urbanization remains central to overall sustainable development by creating economic, social, and environmental value that supports the fight against poverty, inequality, climate change and other global challenges. Despite that, the challenges of urbanization in developing countries remain, including urban sprawl, slums, inadequate urban infrastructure (e.g., transportation, water, and accessibility), human insecurity, air, and water pollution, and vulnerability to disasters are common.

Cities and people who live in developing countries are increasingly looking for ways to innovate to make their cities more livable. Among the strategies that are becoming ever common is the sharing of anonymized open data and leveraging open-source software as low-cost alternatives in contributing to increased economic development, as well as resilience in planning and service provision. While there have been various efforts in leveraging open data in the transportation sector, in much of the developed economies, this has largely been on experimental basis in the developing economies and mainly in the land administration sector. This Working Group, working jointly with Commission 9, will focus on how crowdsourced spatial data (Open Data, VGI), open-source software and community-based initiatives and contributions can be utilized to address the urbanization problems in developing economies.

VISION:

- Towards global sustainable urban development; as envisioned in SDG 11 and new urban agenda, urbanization should not be at the expense of rural development, but rather be symbiotic and mutually enhancing;
- Promote of citizens as a city's greatest resource who provide new ideas and data that will help monitor, manage and make urban area better places, and thus benefit people;
- Enhance the use of VGI and open data by municipalities in monitoring and improving the urban infrastructure and living conditions;
- Strengthening joint work with municipalities and other stakeholders in these efforts;
- Transfer knowledge/restructure policies to address urban challenges in developing countries.

AGENDA

- Analyze the conceptualizations of contributed and crowdsourced initiatives in developing economies in addressing real estate and urbanization challenges;
- Host a workshop in Nairobi jointly with the Institution of Surveyors of Kenya (ISK).

POLICY ISSUES:

- No poverty; Good health and well-being; Decent work and economic growth; Sustainable cities and communities; Life on land (SDGs 1, 3, 8, 11, 15)

BENEFICIARIAS:
Citizens, communities, land surveyors, valuers, planners, scholars, municipalities, city authorities.

KEYWORDS:
User-Generated Spatial Content, Crowdsourcing, Volunteered Geographic Information, Participatory Mapping, Spatial Information Management and Environmental Knowledge.

Working Group 3.3 – GIS for Sustainable (Geo-)Spatial Planning (Joint WG with Commission 8)

Enrico Rispoli

Working Group 3 will focus on the study of current and future GIS - and other digital tools - for geospatial planning, services, and applications aimed to tackle global challenges. Focus will also be given to e-government applications, and data standards.

In a constantly changing society, it is advisable to interpret the data of the territory, and to identify the challenges of balanced economic growth that should be addressed, considering the needs and preferences of the inhabitants. The challenges arise on a global level in relation to the objective of working to ensure a future that supports a "Sustainable World", and to solve the various issues affecting the environment due to human impact. Research should not be limited to the knowledge of the territory, and consider global processes and interrelations.

Geodetic and geodata professionals, including engineers, planners and scientists, should assume a more incisive role of promoters to respect the environment and to engage their responsibility. This, by putting the principles of sustainable and inclusive development, reuse of heritage, coast protection, provision of social infrastructure (social housing), of hydrological invariance, and protecting territories designed for vegetation and fauna. Working Group 3 of FIG Commission 3 has the goal to promote and support work and research on digital geospatial planning that addresses services, e-government applications, and data standards. These support sensitizing decision-making bodies, stakeholders, and investors to implement global forecasting and prevention policies related to, among others, sustainable planning, natural disasters and environmental protection.

VISION:

- Promoting research and practices related to GIS and other digital methods and tools that support global sustainable development, especially of urban areas and emerging countries with high index of spatial development;
- Focusing on studies that monitor spaces as the first prerogative of control of the fragility and vulnerability of the territory;
- Supporting the use of spatial data and information tools by land surveyors, geodata professionals and decision-makers to serve the goals of good governance;
- Promoting suitable GIS and digital tools designed for spatial planning, based on the different phases of spatial planning lifecycle. Having accessible, applicable and user-friendly computerized tools supporting a positive spin-off, in terms of enhancing data and information transparency to increase inclusiveness and equality among participating stakeholders;
- Endorsing actions that present how the geodetic profession, at all levels, is committed to sustainability, ensuring maintaining a safe and habitable environment for future generations;
- Promoting the research and presentation of papers that represent best practice on the SDGs (for members from developed countries examples of eco-sustainable development, energy saving, and pollution reduction; for members from developing countries examples of projects and works for the mitigation or solution of natural problems, which negatively affect the normal standard of living). Digital geospatial planning, starting from the in-depth knowledge of local data, should contribute more profoundly to supporting these Goals.

AGENDA:

- Continuing to organize workshops with Commission 8 and other partners as EGOS (The European Group of Surveyors) - etc.;
- Continuing to promote specialized scientific and professional sessions during the FIG WWs, Commission 3 Annual Meetings - etc.
- Strengthen cooperation with stakeholders and industry.

POLICY ISSUES:

- No poverty; Zero hunger; Clean water and sanitation; Affordable and clean energy; Sustainable cities and communities; Responsible consumption and reduction, Climate action (SDGs 1, 2, 6, 7, 11, 12, 13).

BENEFICIARIES:

- Citizens; Environment; Land; Territory; Nature; Decision Makers.

KEYWORDS:

- Sustainable Development; Climate Change; Global Challenges and Goals; Digital Geospatial Planning; Prevention Policies; Coast Protection; No Overbuilding.

Working Group 3.4 – LADM and 3D LA (Joint WG with Commission 7)

Prof Peter van Oosterom

Working Group 4 will focus on continuing the establishment and promotion of land administration standards to support global tenure security.

The initial edition of LADM (Land Administration Domain Model, ISO 19152:20212) already included support for 3D representations of spatial units, and the seamless integration of 2D and 3D spatial units. Providing 3D representations improves clarity about the legal spaces, increases the spatial readability, and therefore improves the trust in the land administration.

During the UN-GGIM Meeting of the Expert Group on Land Administration and Management, held in March 2017 in Delft, The Netherlands, it was concluded that a revision of the LADM Edition I is required to provide better tools for tenure security and better coverage of land administration in a broader scope: next to land tenure, also marine geo-regulation, valuation, and spatial plan information. The 3D representations are hence further refined in the multipart Edition II (under development) and equally applicable to the new wider scope. 3D representations are needed due to the complexity and higher density in urban spaces.

LADM allows the implementation of relevant parts of international guiding documents, such as the New Urban Agenda (UN, 2017), the Voluntary Guidelines on the Responsible Governance of Tenure of Land, Fisheries and Forests in the Context of National Food Security (FAO, 2012), the Continuum of Land Rights (UN-Habitat, 2008), the Fit-for-purpose land administration: guiding principles for country implementation (FIG/World Bank, 2014) and the Framework for Effective Land Administration (UN GGIM, 2020). All those fit well into the context of implementation of the Sustainable Developments Goals (SDGs).

Currently LADM and 3D LA are addressed within different FIG Working Groups, one is the Joint FIG Commissions 3 and 7 on 3D (running for about 20 years). Those WGs are now joining forces into one, the new joint commission 3 and 7 Working Group 'LADM and 3D LA'. Given the wider scope of the LADM Edition II, collaborations with more FIG commissions, mainly 4, 8 and 9, will be explored. Active collaboration among the members of Working Group 4 through the preparation of proposals for funded research projects, joint educational activities, organisation of events - etc.

VISION:

- Research interest on 2D and 3D Land Administration with a wider perspective, including the spatial development lifecycle of a 2D + 3D object (land/ marine/ air parcel, infrastructure object, underground object, etc.); i.e., the phase of design, planning, constructing, financing, etc., with focus on the reuse of information between those stages. Standardization plays a dominant role and in this scene, where standardization activities (in various levels) in the wider field of geoinformation are of the interest of this Working Group;

- Go beyond the state-of-the-art technological tools and methodologies; i.e., for all parts 3D representations in data acquisition - both sources from survey (GNSS HAS, scan-to-BIM, etc.) and design (BIM, etc.), storage, and dissemination/ visualization is of increasing importance;
- Making 3D legal spaces part of the Digital Twins (pair of physical reality with its digital topographic shadow), resulting in a so-called Digital Triplet: reality, topography, and legal spaces;
- 3D Land Administration System operational experiences (analysis, LADM based, learn from each other, discover gaps), 3D LAS cost effective workflow for new / updated 3D parcels = 4D (part of whole spatial development lifecycle: from planning / design / permit in 3D, to registration / use in 3D), 3D LAS web-based dissemination (usability, man-machine interfaces, including mobile/AR), Legal aspects for 3D LAS, best legal practices in various legislation systems;
- Focus on large/mega cities, including developing countries, as in these cities the spatial complexity is very high, and the changes are fast;
- Implementation aspects to be standardized in LADM part 6 as joint activity with OGC and the industry partners, e.g., Esri, Trimble, Leica, Oracle - etc.

AGENDA:

- 2023: LADM Workshop at 26th AGILE conference; 9th Int. FIG Workshop on 3D Land Administration and LADM, 11-13 Oct., Gavle, Sweden; Other: CAAD Futures 23;
- 2024: 10th International FIG Workshop on LADM and 3D LA, fall 2024, Malaysia;
- 2025 and 2026 Annual Workshops LADM/3D LA (combined with Annual meeting C7, C3);
- During FIG WW/ Congress special sessions on LADM/3D LA.

POLICY ISSUES:

- Industry, innovation, and infrastructure; Sustainable cities and communities; Life below water; Life on land (SDGs 9, 11, 14, 15 – with LADM revision, including land use planning, valuation, marine environment information);
- FELA Pathways: 4. Data; 5. Innovation; 6. Standards.

BENEFICIARIES:

- Governmental Organisations; Industry; Academia; Organisations; Professionals; Education programs.

KEYWORDS:

- Land Administration and Management; 3D; Tenure Security; Legal; Spatial Units.

Working Group 5 - Geospatial Next (Joint WG with the Young Surveyors Network)

Cemre Şahinkaya

Working Group 5 will focus on introducing new initiatives and practices of the geospatial community through the cooperation of new professional networks.

Many applied and study fields are closely intertwined today with the surveying profession. It has become increasingly common for different stakeholders to benefit from these often-interdisciplinary practices and studies to contribute to them from different circles. In particular, technologies that emerge in daily life, such as the Industrial Revolution 4.0, data science, artificial intelligence and robotics promise new potentials that can bring together many various disciplines and practices while opening new doors.

As an organisation that considers the potential of emerging geomatics science together with the needs and preferences of both experts and users, FIG supports the adaptation and familiarity of young surveyors to professional life. Therefore, the creation of a platform where early career surveyors can present their current work and ideas has been strongly supported. In this context, Working Group 5 'Geospatial Next' was established in 2018 as a sub-group of Commission 3 with the initiatives of former Young Surveyors and the support of FIG. The Working Group not only provides a platform for surveyors, academicians, and researchers to present and promote their work, but also aims to develop cooperation with the Young Surveyors. In addition, developing cooperation with other commissions in line with common themes focused on geospatial data and information and spatial information management is another issue that the working group plans to focus on.

Working Group 5 aims at continuing to act as a bridge between the Young Surveyors and commissions in this term, also producing, carrying out and promoting own inclusive projects in a wide range of fields, such as geospatial information systems and management, spatial planning, land management, and sustainability for communities, citizens, scholars, crowdsourced initiatives, local and regional organizations. It is envisaged that these activities will be carried out in both digital and physical environments, thus also maintaining existing and developing new networks, to expand the team and organize creative events and projects with an open and supportive approach for the new term.

VISION:

- Development of projects and activities focusing on themes, such as crowdsourcing, Volunteered Geographic Information (VGI), participatory mapping and Spatial Information Management (SIM);
- To create a platform for Young Surveyors and early career surveyors and researchers to produce innovative and sustainable studies that tackle global challenges - and to promote them;
- In co-operation with Young Surveyors and other commissions with similar objectives, to ensure that this platform has a wide network, is inclusive and gender equal.

AGENDA:

- FIG and Commission 3 meetings, working weeks and activities will be participated actively and contributed with articles;
- Activities and workshops will be planned in cooperation with Young Surveyors and other commissions when common themes and goals are achieved in addition to the innovative and up-to-date project initiations;
- Special presentation on FIG WW 2025.

POLICY ISSUES:

- Decent work and economic growth; Industry, innovation, and infrastructure; Sustainable cities and communities; Partnership for the goals (SDGs 8, 9, 11, 17).

BENEFICIARIES:

- Young surveyors, scholars, citizens, crowdsourced initiatives, local and regional organizations.

KEYWORDS:

- Sustainability, Crowdsourcing, Volunteered Geographic Information (VGI), Participatory Mapping and Spatial Information Management (SIM), Inclusiveness, Gender Equality.

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