

Commission 7 – Cadastre and Land Administration Report 2016

General Remarks

The Mission of Commission 7 is:

- to provide a global forum for enhancing and exchanging knowledge about cadastre, land administration and land management
- to encourage the development of pro-poor land management and land administration tools
- to promote the importance of sustainable land administration infrastructures as being essential for sustainable development and economic growth
- to underpin the use of innovative and advanced technology in cadastre and land administration;
- to raise awareness of the role of surveyors in land administration matters to the public and among stakeholders.

Based on results from previous years, Commission 7 has provided assistance and knowledge for the implementation of the overall FIG strategy as far as related to cadastre and land management.

There is a focus on

- providing visions for future cadastre and land management
- taking the role as a mastermind in developing effective land management
- thinking about new models of land administration for sustainable development
- initiating professional discussions on new business models as required by a changing society
- securing land tenure and advocating citizens' rights

acting from a pragmatic perspective of what is achievable in a surrounding of cultural and social diversity and how commitment among stakeholders can be created for the benefit of the society and for the reputation of the profession in providing sustainability and advocacy to citizens, land owners and stakeholders.

Besides organizing or co-organizing events within the scope of Commission 7, representatives of the Commission take part in a considerable number of events all over the world.

Events which have been attended during the past year by the Chair G. Schennach

- Inaugural Meeting on an International Land Measurement Standards Coalition (ILMSC) at FAO of the UN, 9–10 June 2016, Rome/Italy
- Sixth Session of the United Nations Committee of Experts on Global Geospatial Information Management (UN-GGIM) at the United Nations Headquarters, 1-5 August 2016, New York/US
- 2nd Meeting of the FIG Task Force on Real Estate Market Study, 17 September 2016, Cape Sounio/Greece
- High-Level Joint FIG/World Bank Conference on Sustainable Real Estate Markets, Policy Framework and Necessary Reforms, 19-20 September 2016, Athens/Greece

- General Assembly of the Council of European Geodetic Surveyors CLGE and International Seminar on Cooperation of public and private sector in Land Management, 22-23 September 2016, Riga/Latvia
- FIG Commission 7 Annual Meeting 2016 and International Geoconference on Cadastre 4.0 - Transparency-Participation-Collaboration, 25-26 October 2016, Coimbra/Portugal
- 45. Slovenian Surveying Days 2017 and 200th Anniversary of Slovenian Cadastre, 23-24 May 2017, Kranj/Slovenia

Working Group 7.1 – Fit-For-Purpose Land Administration

Chair: Dr. Ir. Christiaan Lemmen, The Netherlands, email: Chrit.Lemmen@kadaster.nl

Policy Issues

- identify role of Fit-For-Purpose Land Administration in relation to sustainable land use, food security, climate change etc. in the post-2015 Development Agenda
- implementing the ‘Continuum of Land Rights’ and the STDM into operation at country level including innovative methodologies for fast and low cost recording of land rights and appropriate land rights for future housing, including proposals for innovative land rights (new models of leasehold, tenure of public land etc.)
- identify the value of land consolidation and land readjustment for rural and urban areas in poverty prevention programmes
- develop the second edition of the Land Administration Domain Model with ISO on behalf of FIG by integrating partners from local-national, regional and international organisations, NGOs, NPOs, insurances, re-insurances, bank companies, bar associations
- promoting the development of innovative hard- and software solutions for land administration
- identify the needs for further development, quality improvement and system optimisation after Fit-For-Purpose Land Administration is implemented

Achievements 2016

- Fit For Purpose guidelines (Enemark, McLaren, Lemmen) have been launched
- Preparations for the development of the Land Administration Domain Model, ISO 19152, Edition II
- Symposium on Land Consolidation and Readjustment for Sustainable Development from 9 – 11 November 2016, Apeldoorn, The Netherlands
- Co-authoring a White Paper on operational standards for land administration for the pre-conference event to the World Bank Conference on Land and Poverty 2017
- Presentations and publications

Conferences/Seminars/Workshops 2016

- During the Land and Poverty Conference 2016 an event on ‘Architecture and Services for Imagery Based Land Administration Registration’ was organised. The event was co-organized by World Bank, the Global Land Tool Network, FIG and the Open Geospatial Consortium. One of the principles of a FFP approach is in the use of imagery for boundary identification. During this event the need for infrastructure for provision of the imagery was discussed in order to support the collection of evidence from the field. Services for data access, transport and distribution are needed in this context. Also requirements and the options for business models were discussed. There

are challenges in relation to the inclusion of spatial units for land administration linked with legal/administrative data on land use rights and right holders. OGC established the ‘OGC Land Administration Domain Working Group’ in June 2016. This group is chaired by Prof Peter van Oosterom from Delft University of Technology, The Netherlands, Dr Mohsen Kalantari from Melbourne University, Australia and the chair of the WG 7.1.

- The Symposium on ‘Land consolidation and land readjustment for sustainable development’ was organised on 9-11 November 2016 in Apeldoorn/the Netherlands. Over 200 participants from 50 countries from all over the world took part. Co-organisers were the FAO of the UN, Landnet, FIG Commissions 7 and 8 and Kadaster, Netherlands – with support from UN Habitat, the Global Land Tool Network and the World Bank. Focus was on urban and rural environment and to applications for sustainable development. Land consolidation and land readjustment is basically about improving the structure of people to land relationships for one or more purposes. This is usually associated with broad economic and social reforms. As an implementation tool for spatial planning this can be combined with the development of infrastructure, public services and water management. The symposium was concluded with the ‘Apeldoorn declaration on land consolidation and land readjustment for sustainable development’. Here it is said that there are some common principles in the use of the tools – but no one-size-fits-all-solutions of land consolidation and land readjustment exist. A comprehensive approach in land consolidation and land readjustment favours a sustainable development in the way that it benefits the people, planet and economic profit. The FAO Voluntary Guidelines, the UN 2030 Agenda for Sustainable Development and the New Urban Agenda from UN Habitat should guide the application of Land Consolidation and Land Readjustment. In all cases it is relevant to recognise a plurality of tenure types that are relevant in negotiations around and planning for land consolidation and land readjustment.
- Co-organising the meeting of the UN Expert Group on Land Administration and Management (UN-EG-LAM) in Delft, 14-15 March 2017. On the Agenda was the country implementation of the global agenda where tenure issues are concerned with a focus on Fit-For-Purpose approaches in Land Administration and on Standardisation on Land Administration.
- Organising a Workshop with the Global Land Tool Network (GLTN), the International Standardisation Organisation (ISO) on the development of requirements for land administration operational standards and for the second edition of the Land Administration Domain Model within ISO TC211 – to be held on 16-17 March 2017.

Publications 2016

- du Plessis, J., Augustinus, C., Barry, M., Lemmen, C.H.J. and Royston, L. (2016) The continuum of land rights approach to tenure security: consolidating advances in theory and practice. Worldbank conference on land and poverty, March 2016, Washington DC, US
- McLaren, R., Enemark, S., Lemmen, C.H.J., Antonio, D. and Gitau, J. (2016) A guide for building fit-for-purpose land administration systems in less developed countries: capacity development, change management and project delivery. Worldbank conference on land and poverty, March 2016, Washington DC, US
- Lemmen, C.H.J., Enemark, S., McLaren, R., Antonio, D., Gitau, J., Dijkstra, P. and de Zeeuw, K. (2016) Guiding principles for building fit-for-purpose land administration systems in less developed countries: providing secure tenure for all. Worldbank conference on land and poverty, March 2016, Washington DC, US
- Enemark, S., McLaren, R., Lemmen, C.H.J., Antonio, D. and Gitau, J. (2016) Scaling up responsible land governance: a guide for building fit-for-purpose land administration systems in less developed countries. Worldbank conference on land and poverty, March 2016, Washington DC, US

- Sengupta, A., Lemmen, C.H.J., Devos, W., Bandyopadhyay, D. and van der Veen, A. (2016) Constructing a seamless digital cadastral database using colonial cadastral maps and VHR imager: an Indian perspective. *Survey review*, 48 (2016)349. April 2016
- Sylla, O. (interviewee) , Lemmen, C.H.J. (interviewer) and van Wegen, W. (interviewer) (2016) Realising solutions for land governance issue: GIM international interviews Oumar Sylla. *GIM International*, 30 (2016)4 pp. 12-15.
- Enemark, S., McLaren, R. and Lemmen, C.H.J. (2016) Fit-for-purpose land administration: guiding principles for country implementation: Nairobi, UN/HABITAT/GLTN/Kadaster, 2016.
- Enemark, S., McLaren, R. and Lemmen, C.H.J. (2016) Building fit-for-purpose land administration systems: guiding principles. FIG working week, May 2016, Christchurch, New Zealand
- Lemmen, C.H.J., Enemark, S. and McLaren, R. (2016) Building fit-for-purpose land administration systems: providing security of tenure for all. FIG working week, May 2016, Christchurch, New Zealand
- Lemmen, C.H.J., Knight, P., Beentjes, B., Vos, J., de Boer, A., Unger, E.M., Dijkstra, P. and van der Heide, J. (2016) Blockchain - bitcoin functionality in land administration: powerpoint. FIG working week, May 2016, Christchurch, New Zealand
- Molendijk, M., Lemmen, C.H.J., Bennett, R.M. and de Zeeuw, K. (2016) A variety of continuums for citizen centric land administration: powerpoint. FIG working week, May 2016, Christchurch, New Zealand
- McLaren, R., Enemark, S. and Lemmen, C.H.J. (2016) Guiding principles for building fit-for-purpose land administration systems in developing countries : capacity development, change management and project delivery. FIG working week, May 2016, Christchurch, New Zealand
- Unger, E.M. (interviewee) and Lemmen, C.H.J. (interviewer) (2016) Inspiring and empowering the agents of change: GIM international interviews Eva-Maria Unger. *GIM International*, 30 (2016)5
- Lemmen, C.H.J., Friis-Hansen, L. and Potsiou, C. (2016) It's always about people!: Recovery from disaster: FIG working week 2016, New Zealand. *GIM International*, 30(2016)6
- Groenendijk, E.M.C., Lemmen, C.H.J. and Bennett, R.M. (2016) Educational tools for fit-for-purpose land administration: experiences and lessons from Mozambique. *GIM International*, 30(2016)8
- Reichardt, M. (interviewee) and Lemmen, C.H.J. (interviewer) (2016) Open standards developed for procurement and implementation of land administration systems: GIM International interviews Mark Reichardt, President and CEO of OGC. *GIM International*, 30(2016)8
- Van Bochove, D., de Bruin, L. and Lemmen, C.H.J. (2016) From bitcoins to bitsquares. *GIM International*, 30(2016)9
- Zlatanova, S., Li, K.J., Lemmen, C.H.J. and van Oosterom, P. (2016) Indoor abstract spaces: linking IndoorGML and LADM. FIG workshop on 3D cadastres, Athens, Greece, October 2016. FIG, 2016
- Çağdaş, V., Kara, A., van Oosterom, P., Lemmen, C.H.J., Isikdag, Umit., Kathmann, R. and Stubkjaer, E. (2016) An initial design of ISO 19152:2012 LADM based valuation and taxation data model. 3D Geoinfo conference, Athens, Greece, October 2016. Peer reviewed Annals, Volume IV-2/W1. ISPRS, 2016
- Zlatanova, S., van Oosterom, P.J.M., Lee, J., Li, K.J. and Lemmen, C.H.J. (2016) LADM and IndoorGML for support of indoor space identification. 3D Geoinfo conference, Athens, Greece, October 2016. Peer reviewed Annals, Volume IV-2/W1. ISPRS, 2016

Actions to be taken in 2017

- Co-editing of LADM Edition II Development with ISO
- Cooperation with the Young Surveyors Network on standardisation of the Social Tenure Domain Model during the FIG Working Week in Helsinki/Finland

Events 2016

- Land and Poverty Conference 2016, Washington DC, US, March 14th -18th, 2016. Theme of the Land and Poverty Conference 2016 was ‘Scaling up Responsible Land Governance’. The guiding principles for country implementation of the Fit-For-Purpose (authored by Stig Enemark, Robin McLaren and Christiaan Lemmen) approach in land administration were presented and very well received. The FFP approach provides new innovative solutions to build affordable, pro-poor, scalable and sustainable systems to identify the way all land is occupied and used. It is a countrywide solution encompassing all tenure types and creating integrated and scalable land administration solutions. It is highly participatory, can be implemented quickly and will provide security of tenure for all. Most importantly, the FFP approach

can start very quickly using a low risk entry point that requires minimal preparatory work. It can be applied to all traditions in land tenure across the globe. This approach has been recognised and is supported by the World Bank. The guidelines are based on a joint FIG and World Bank publication from 2014 (FIG publication No 60)

- The United Nations Committee of Experts on Global Geospatial Information Management (UN-GGIM), in collaboration with the Government of Ethiopia and the United Nations Economic Commission for Africa (UNECA) organised a High Level Forum on United Nations Global Geospatial Information Management in Addis Ababa, Ethiopia, from 20-22 April 2016. The High Level Forum was opened by H.E. Dr. Mulatu Teshome, President of the Federal Democratic Republic of Ethiopia. Christiaan Lemmen (FIG) could bring some opening remarks on behalf of the Joint Board of Geospatial Information Societies. Christiaan congratulated UN GGIM on behalf of the Chair of the Board - Prof. Chris Rizos - with bringing 'Good Land Governance for the 2030 Agenda' to the context of geospatial information management. He stated that good land governance requires good land administration. Land administration documents and informs about who is owning or using what and where. It is an overview of people to land relationships. It is linking people to space. At a global level, 70% of those relations are not documented. Christiaan further stated that information about who, what and where can only be generated with the support of the geospatial disciplines. The Joint board of Geospatial Information Societies deals with a broad range of geospatial technologies and applications. They range from satellite and drone imaging and mapping, to geodesy, precise positioning, geo-information science, cartography, spatial data infrastructure and many surveying sub-disciplines. Land administration has a geospatial component providing overview of parcels or spatial units. Relationships between people and land may be of a formal, informal or customary nature. Many of those relations are not recognised. In this moment there is no inclusiveness for all. Meanwhile, populations and cities are growing and the pressure on land and natural resources is continuing to increase significantly. This leads to disputes and conflict. A Fit-For-Purpose approach for Land Administration has been developed by global stakeholders. It is a gender sensitive, transparent and highly participatory approach. With the support of geospatial technologies this approach can be implemented quickly. The Forum raised political awareness and highlighted the importance to decision makers of the need for timely and fit for purpose land administration and management. An Expert Group chaired by Kees de Zeeuw, the Netherlands and co-chaired by Mahashe Chaka, Lesotho will develop further proposals now. The major objectives of the Group of Experts are to play a leading role at the policy level by raising political awareness and highlighting the importance to decision makers of the need for timely and fit for purpose land administration and management and to encourage the use of geospatial information tools and systems to improve the legal certainty of all citizens in the world with respect to the registration of the relation between people and land.
- FIG Working Week in Christchurch, New Zealand, 2 – 6 May 2016
- Presentation given during the YSN event in Amsterdam, 5 June 2016
- FOSS4G, 25-26 August 2016, Bonn/Germany. Presentation given during the Land Administration Topic Talk of the FOSS4G, joining the discussions. There was also a remarkable keynote from Klaus Deininger, World Bank, during this event
- FIG Commission 7 Annual Meeting, Coimbra/Portugal, 24–28 October 2016. Several sessions and discussions of FFP land administration

Co-operation

There is a cooperation on the development of operational standards in Land Administration with the:

- World Bank
- United Nations Committee of Experts on Global Geospatial Information Management UN GGIM
- Global Land Tool Network
- Royal Institution of Chartered Surveyors RICS
- Open Geospatial Consortium OGC
- International Society on Photogrammetry and Remote Sensing
- International Organisation for Standardisation ISO
- FIG Standards Network
- Joint FIG Commission 3 and 7 WG on 3D Cadastre
- Young Surveyors Network

*Christiaan Lemmen, Chair of WP 7.1
Vice Chair of FIG Commission 7*

Working Group 7.2 – Land Management in Climate Change and Pre- and Post-Disaster Areas

Chair: Daniel Páez (PhD), Colombia, email: dpaez@uniandes.edu.co

Policy Issues

- assessment of land tenure in post-disaster areas
- pre-disaster assessment / documentation of land tenure
- legal/institutional/technical Fit-For-Purpose methods to secure land rights in pre- and post-disaster areas
- impact of climate change on land tenure / loss of land, land use changes
- compensation for value changes, consolidation of agricultural land, adjustment of urban land in post disaster regions
- new technologies for data capture in pre-disaster areas / validation of third party data
- cooperation models with public authorities / voluntary guidelines in conflicts
- capacity building in disaster response bodies
- spatial data infrastructures for pre-, during and post-disaster response (link to FIG Commission 3)

Achievements 2016

- Development of a website to share information www.pointshare.org
- Presentations of activities in multiple forums and share of information

Conferences/Seminars/Workshops

- Technical Session and presentations at FIG Working Week, 2-6 May 2016, Christchurch/NZ
- 2nd Assembly and Conference of the Interamerican network for Cadastre and Land Registration, 29 Sept – 1 Oct 2016, organised by the Organization of the American States (OEA), 25 countries attended, Panama City/Panama

- Land and Poverty Conference 2016 on Scaling up Responsible Land Governance, Washington DC/US, 14-18 March 2016
- UN-GGIM: Americas and Latin America Geospatial Forum, 3-6 April 2017, Santiago/Chile
- Presentation and Meeting of WG at FIG Commission 7 Annual Meeting 2016 and International Geoconference on Cadastre 4.0 - Transparency-Participation-Collaboration, 25-26 October 2016, Coimbra/Portugal

Publications

A number of publications has been finalised and others are still on the agenda.

Actions to be taken in 2017

Organisation of the FIG Com 7 Annual Meeting II/2017 and the international Conference on the topic "Cadastre for emergencies and disasters: Challenges and opportunities for islands and coastlines" to be held on 4–8 Dec 2017, Cartagena/Colombia.

This event addresses besides the FIG Commission 7 community a wider audience from the region and partners from NGOs. The website has already been launched at

<http://fig717.net/en/home-2/>

Co-operation

Chair of WG 7.2 is currently cooperating with the Colombian government to support with expertise and professional advice as dealing with impacts from the recent disaster.

Outcomes

PointShare is an initiative of the WG 7.2 of FIG Commission 7 in association with the University of the Andes (Colombia), in order to inform, investigate and gather information by sharing data and developing technologies for land management in climate change and pre-post disaster areas.

What can you find?

- Commission 7 (Cadaster & Land Administration) of the International Federation of Surveyors (FIG) sharing information tool
- Self-help tool and free Access to information, publications and researches
- e-Learning development for information sharing and downloading

1. Publications and general information



Daily publications and general information of interest. Recent researches, regional, thematic and global publications, in topics related to climate change adaptation, land administration, disaster risk management or natural disasters will be published.

2. e-Learning material and social networks



Sharing service blog, self-help and interactive material is available here. Users can share information, ask for questions, suggestions or just comments about topics of interest. Social network component is necessary to share information.



3. Sharing data, cloud points, orthophotos

Free Access Data for sharing. Cloud points and orthophotos available for downloading.

*Daniel Páez (PhD), Chair of WP 7.2
Vice Chair of FIG Commission 7*

Working Group 7.3 – Crowdsourcing of Land Rights

Chair: Dr Robin McLaren, United Kingdom, email: robin.mclaren@KnowEdge.com

This progress report has been prepared by Robin McLaren, chair of Working Group 7.3 Crowdsourcing Land Rights, and details progress against the agreed Work Plan 2015 -2018.

Work Plan 2015 - 2018

This section describes the originally agreed Work Plan for Working Group 7.3 for the period 2015 – 2018.

Policy issues

- Family of mobile devices supporting remote and in-situ capture of evidence of land rights
- Global platforms managing evidence of land rights and obligations
- Service delivery models
- Scalability and capacity building of trusted intermediaries and land owners
- Role of social media / validation of third party data
- Impact on perception of security of tenure
- Managing unintended consequences and privacy
- Cooperation with Public Authorities in recognition or conversion of informal rights
- Link to Working Group 7.1 Fit-For-Purpose Land Administration
- Impact on Land Professionals and associate curriculum

Chair

Robin McLaren, United Kingdom, email: robin.mclaren@KnowEdge.com

Specific project(s)

The aims of Working Group 7.3 have been have been modified and reduced compared to the original ambitious aims originally established. Now the Working Group will just create an inventory of existing crowdsourcing approaches to capturing evidence of land rights within the Land Administration domain; both formal and informal.

Workshop(s)

- Participation in Workshops / Conferences.
- International joint FIG Commission 7 and Commission 3 Seminar 2015 (Malta/Europe).
- Commission 7 Annual Meeting in Coimbra/Portugal.

Publication(s)

- An inventory of existing crowdsourcing approaches to capturing evidence of land rights within the Land Administration domain; both formal and informal.

Timetable

- Final Report on the inventory of existing crowdsourcing approaches will be presented in FIG Congress 2018.

Beneficiaries

Citizens, FIG member associations, international and regional NGOs and NPOs, CSOs, governments, decision makers, GIS developers and users, producers of survey equipment and software providers.

Deliverables in 2016

- Papers and discussion on crowdsourcing presented at the FIG Commission 7 Annual Meeting and GeoConference in Coimbra/Portugal in October 2016
- Presentations at the World Bank Land and Poverty Conference in Washington DC in March 2017.

Activities planned for 2017

Working Group 7.3 members will meet during the FIG Working Week in Helsinki in May 2017 and will focus on agreeing a template for creating an inventory of existing crowdsourcing approaches to capturing evidence of land rights within the Land Administration domain; both formal and informal.

The scope of the inventory will include:

- The range of devices in the mobile ecosystem, such as tablets, cameras, GNSS, mobile remote sensing / photogrammetry and mobile power, are enabling citizens or trusted intermediaries to directly capture evidence of land rights. An increasing number of crowdsourcing of land rights initiatives are emerging to provide increased security of tenure to vulnerable communities. Initiatives highlighted below will provide a source of innovative approaches.
- **Rights Resources Initiative (RRI)** – RRI's forest tenure database is an interactive tool to compare changes in legal forest ownership from 2002 to 2013 between countries, regions, and lower- and middle-income countries. The quantitative approach monitors spatial forest tenure data—that is, who owns how many hectares of a given forest. RRI recognizes four categories of land ownership: owned by Indigenous Peoples and local communities, designated for Indigenous Peoples and local communities, administered by governments, and owned by individuals and private firms. Learn more about these categories here. This statutory forest dataset currently covers 52 countries containing nearly 90% of the world's forests. Much of the information is crowdsourced.
<http://www.rightsandresources.org/en/resources/tenure-data/tenure-data-tool/>
- **Rainforest Foundation UK** - Rainforest Foundation UK's "Mapping for Rights" program has been active in the Democratic Republic of Congo. It trains forest people to map their land using GPS devices, marking the areas they use for activities such as hunting and fishing -- as well as their sacred sites -- and the routes they use to access these vital areas. The information captured is used to

create a definitive map of the land used by these semi-nomadic communities, which can be used to challenge decisions that see them excluded from areas of forest <http://ictupdate.cta.int/en/Feature-Articles/Crowdsourced-land-rights/%2869%29/1353928539>

- **Open Tenure (SOLA)** - Open Tenure supports a crowd sourcing approach to the collection of tenure related details by communities. Once the community has discussed and agreed to the way tenure right claims will be collected, moderated and displayed a Community Server will be established (possibly as a cloud-based server) and community members with specific roles in this process will be trained http://www.fao.org/fileadmin/user_upload/nr/land_tenure/OPEN_TENURE.pdf
 - **Landmapp** – Landmapp is a mobile platform that provides smallholder farmer families with documentation of their land. They also provide them a profile with which they can access technical and financial services that are precisely tailored to their circumstances <http://www.landmapp.net>
 - **Cadasta Foundation** – This foundation is implementing a global platform to manage crowdsourced land rights information. It is due for release in 2016 and could provide a common platform for all the currently discrete land rights initiatives to manage evidence of land rights and create transparency and publicity <http://cadasta.org>
 - **STDM** - A pro-poor, gender responsive and participatory land information model recognising the need for legal pluralism and a broader set of person-land relationships found in legitimate tenure types. GLTN have also produced a STDM solution, based on QGIS, that manages land rights data in the STDM model <http://www.stdm.gltn.net/>; FIG/GLTN, 2010
 - **USAID Mobile Applications to Secure Tenure (MAST)** - USAID has completed an innovative pilot that utilised an easy-to-use, open-source mobile application that can capture the information needed to issue formal documentation of land rights. Coupled with a cloud-based data management system to store geospatial and demographic information, the project is designed to lower costs and time involved in registering land rights and, importantly, to make the process more transparent and accessible to local people. The project was implemented in rural Tanzania working directly with villagers (trusted intermediaries) to map and record individual land rights, strengthen local governance institutions, and build government capacity.
1. There are a number of emerging innovative technologies that could potentially be game changers within land administration. These innovations will be scanned and investigated, including:
- The DigitalGlobe's Tomnod platform (<http://www.tomnod.com>) is using Artificial Intelligence (AI) powered by crowdsourcing to automatically identify features of interest in satellite and aerial imagery. Tomnod runs crowdsourcing campaigns that attract 10,000s of volunteers around the globe. One campaign is mapping populations across Ethiopia. Population data is important for growing economies and stopping the spread of preventable diseases. Volunteers are supporting the mapping of Ethiopia by validating the results of a village detection image-mining algorithm. These techniques could equally be applied to efficiently mapping land parcels.
 - Facebook recently used artificial intelligence software to scan 14.6 billion satellite images to identify human-built structures, through automatic feature extraction, in 20 countries across Africa. The social network hopes to use the information to determine where internet-beaming Aquila drones would best be deployed. New

valuable sources of data to prioritize and implement security of tenure could be achieved through new partnerships.

- An increasing number of satellites, especially micro / nano satellites, are being commissioned within the Earth Observation domain that are delivering a range of resolutions of imagery. This range of imagery, from satellite to drones, provides significant opportunities to support the FFP Land Administration approach.
2. Crowdsourcing is also being applied within formal land administration systems to validate and improve the quality of the land registration and cadastral information. Approaches, such as those employed in Ukraine, will be included in the inventory.

*Dr Robin McLaren, Chair of WP 7.3
Vice Chair of FIG Commission 7*

Working Group 7.4 – Citizen Cadastre

Chair: Gyula Iván (M.Sc.), Hungary, email: ivan.gyula@fomi.hu

Policy Issues

- land tenure and culture and society needs
- multi-dimensional and multi-temporal cadastre
- security of land tenure
- alternative forms of land tenure in changing society (generation property, affordable land, temporary urban and agricultural land tenure) complementary to WG 7.1
- role of land owner as key stakeholder
- privacy issues / access to data for citizens
- responsibilities of public authorities / cooperation models / fraud prevention
- analysis of trust in different land administration models
- assessment models for performance of land administration systems
- training of land owners / capacity building in institutional bodies
- building codes and IPMS
- standards for data in land administration
- representation in Joint WG on 3D Cadastre of Commission 3 and 7

Achievements 2016

Due to the structural changes in the Hungarian Land Administration, to which the chair is affiliated, there were no major achievements from the Working Group directly. However at the Annual Meeting of Commission 7 and in the Geoconference in Coimbra/Portugal many issues of the WG7.4 policy were presented and discussed, but these were not directly influenced by the leadership of the WG.

WG7.4 has plans for improving activities in 2017, which ideas can be found in “Actions to be taken in 2017”.

Conferences/Seminars/Workshops

WG 7.4 supported the thematic preparations for the Cadastre 4.0 Workshop in 2016 and will support for the organisation of the agenda for the Commission 7/8/9 Workshop in Bucharest/Romania in September 2017 and for the Annual Meeting in Cartagena/Columbia in December 2017.

Publications

Conrad Tang's and Haongdong Zhang's questionnaire: <http://goo.gl/forms/O34LVGyTbQ> were prepared and sent out and results analysed for presentation in various events inside and outside FIG.

Actions to be taken in 2017

Because of the limited actions taken in 2016, WG 7.4 will improve their activities in 2017. Such actions should be as follows, according to the workplan:

- land tenure and culture and society needs
- multi-dimensional and multi-temporal cadastre
- security of land tenure
- alternative forms of land tenure in changing society (generation property, affordable land, temporary urban and agricultural land tenure) complementary to WG 7.1
- role of land owner as key stakeholder
- privacy issues / access to data for citizens

Events

FIG Commission 7 Annual Meeting in Cartagena/Colombia 2017. A Technical Session on WG 7.4 activities, such as societal needs, migration, e-public administration, 3D issues, security for citizen and new forms of land tenure etc. will be arranged. Final themes will be launched after consultations in the Commission before summer 2017.

Co-operation

There is no direct cooperation with other FIG Commissions or WGs till now. Since FIG WW 2015 Sofia, the HongKong University of Technology has shown their interest for permanent involvement into the work of WG 7.4. This partnership has been developed continuously and will be further extended by additional interest groups.

*Gyula Iván (M.Sc.), Chair of WP 7.4
Vice Chair of FIG Commission 7*

Joint Working Group on 3D Cadastre of Commission 3 and 7

Chair: Prof. Dr. Ir. Peter van Oosterom, Commission 3, The Netherlands,
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- The key event was the 5th FIG 3D Cadastres workshop being organized in Athens, 18-20 October 2016.
- The FIG 3D Cadastre Working Group website has been updated with the latest literature from various events (FIG working weeks, World Cadastre Summit, Joint International Geoinformation Conference) and journals (Land Use Policy, ISPRS International Journal of Geo-Information); see <http://www.gdmc.nl/3DCadastres/literature/>
- At the FIG WW 2016 in Christchurch/New Zealand, 2-6 May 2016 <http://www.fig.net/fig2016/> there were several 3D Cadastres sessions:
 - 4 May 2016, 11:00-12:30 hours TS03C: 3D Models for 3D Tenure
 - 5 May 2016, 16:00-17:30 hours TS08C: GIS, 3D Data and Cadastre
- The special issue of Land Use Policy (LUP, <http://www.journals.elsevier.com/land-use-policy/>) on Land Administration Domain Model (LADM, ISO 19152) has been published

as Volume 49, December 2015, pages 527-689.

See <http://www.sciencedirect.com/science/journal/02648377/49>

- The “3D Athens 2016 Joint International Conference”, 18 - 21 October 2016 in Athens including the “11th 3D GeoInfo Conference”, the “5th International FIG Workshop on 3D Cadastres” and the ISPRS “3D Indoor Workshop”. Participants from all continents of the world presented 90 papers, 30 of which within the 3D Cadastres workshop, 10 in the Indoor 3D workshop and 4 posters at the joint event. The conference hosted 11 industrial talks, including among others a speech on “3D PointCloud Management” by Mike Horhammer (Oracle) and other interesting participations shaping the future of 3D geoinformation. The 3D GeoInfo and Indoor3D peer reviewed papers have been published in the ISPRS Annals/ Archives, reflecting the latest achievements and future trends in this important field (see http://3dathens2016.gr/site/?page_id=23954), while the 3D Cadastres papers have been published by the FIG, on - line available at <http://www.gdmc.nl/3DCadastres> (all open access).
- At the the 99th OGC Technical Committee Meeting, 20 – 23 June 2016, Dublin/Ireland (see <http://www.ogcnetwork.net/node/1985>), a new Domain Working Group on Land Administration was proposed: Land Admin DWG. 3D Cadastres has been mentioned several times as one of the activities of this new OGC DWG during its first meeting in Dublin. The charter document is posted <http://www.opengeospatial.org/projects/groups/landadmin>.
- In 2016 a collaborative research was initiated aiming at developing a LADM based international information model for one of the current 'LADM external' registrations, namely in terms of a Valuation Module. The purpose of this research is to define the semantics of valuation information maintained by public authorities especially for recurrent taxes on immovable property, and to extend the scope of LADM from a fiscal perspective to provide an information model that could be used to construct information systems for immovable property valuation (including the 3D aspect). This questionnaire is supported by FIG Presidency and Chair of FIG Commission 9 Valuation and the Management of Real Estate. The result of the questionnaire will be used as source data for the elaboration of the LADM Valuation Extension Module. More info and completed questionnaires as received so far can be found on <http://isoladm.org/ValuationQuestionnaire>.
- The 6th Land Administration Domain Model (LADM 2017) workshop was organized in Delft, the Netherlands, 16-17 March 2017. The focus was on the functionality of the second edition, with a.o. sharing current LADM/STDM experiences and discussed the possible extensions of conceptual model LADM (incl. 3D). Operational Standards in Land Administration including addressing the technical models for LADM (database schema, exchange formats): CityGML, IndoorGML, InfraLand (InfraGML), LandXML, and (Geo)BIM were a second focus. The workshop was concluded with a summary of the preliminary workshop decisions/proposals, a time schedule and agreements on coordination between ISO, OGC, FIG, IHO, UN GGIM, WB, UN Habitat GLTN and FAO.

Activities planned for 2017/2018:

The future 3D GeoInfo and 3D Cadastres events have also been planned ahead.

- 3D GeoInfo 2017 will be organized in Melbourne as part of the 3D Australia Conference 2017 (24-27 October), which also includes 3D Cadastres symposium and training (24 October) and the BIM-GIS Integration Workshop (25 October); see <http://3dgeoinfo2017.com/>.
- In 2018 there will be a joint 3D GeoInfo and 3D Cadastres event (combined with ISPRS Technical Commission IV, Spatial Information Science), in Delft/The Netherlands.

- Finally, Singapore will host 3D GeoInfo in 2019.

Work in progress:

FIG publication '3D Cadastre Best Practices: Legal Aspects, Initial Registration, 3D Data Management, and Visualization'

*Prof. Dr. Ir. Peter van Oosterom,
Chair of Joint WP on 3D Cadastre*

Cadastral Template 2.0

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The Cadastral Template is a collection of descriptions of cadastral systems, which has been established in 2003 by a group from the University of Melbourne (Prof. Dr. Ian Williamson, Prof. Stig Enemark, Dr. Abbas Rajabifard, and Dr. Daniel Steudler). The data has been published online at www.cadastraltemplate.org, updated, and maintained ever since. In 2010 the online handling has been adapted, so that delegates can directly update their own country data. As of December 2016, there are cadastral descriptions of 55 countries across all continents (compare the following map).



During the 2016 Annual Meeting of Commission 7 in Coimbra, Portugal, the national delegates focused in particular on Sections D (Cadastral Mapping) and E (Reform Issues) of the template.

The Cadastral Template will continuously be updated and maintained, in order to serve as an information resource for cadastral systems.

FIG Standards Network

Representative: Chair: Dr. Ir. Christiaan Lemmen, The Netherlands, email:
Chrit.Lemmen@kadaster.nl

The Network is continuing the work of a former FIG Task Force which was established in 1998 in response to concerns from the Commissions, the Council and the General Assembly that standards were becoming increasingly important in the work of surveyors and that the issue was not being addressed sufficiently by FIG.

Commission 7 is represented in the FIG Standards Network by Dr. Ir. Christiaan Lemmen (NL). All Working Groups are linked to the topics and co-operate as required.

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www.fig.net/commission7

April 2017

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