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The Developing Role of the Surveyor in a Developing World

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24-9-2018

FIG Seminar

Cadastre in a digital world – Nordic and Global Perspective

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Developing World requires reliable geospatial information

- Expected by society
- Needed after Disasters
- Inspired by rapidly evolving technologies
- Driven by global goals

Are your colleagues ready and equipped to deal with these challenges?

Are students educated to address these issues?

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Hong Kong - Typhoon Mangkhut



Officials and utility companies appeal for public understanding as they race against time to repair train tracks, ferry piers and power lines while removing 1,500 toppled trees blocking critical transport arteries

Source:
[South China Morning Post](#)

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Lombok, Indonesia – earthquake



About 350,000 have been displaced as a result of the tremors.

Source:
[Aljazeera](#)

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Syria – (Post) Conflict



Source:
[Volkskrant](#)

Article 10

The Syrian law empowers local administrations to re-register property ownership within their areas, a move that requires landowners to be present.

“For millions of internally displaced and refugees, such proof [of ownership] will most likely be mission impossible,” said Maha Yahya, director of the Carnegie Middle East Centre in Beirut. “Many left without title deeds, some lived in informal settlements, therefore without legally recognised proof of ownership and for others – mainly refugees – going back to [Syria](#) to provide such proof is tantamount to a suicide mission.

Source:
[The Guardian](#)

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Sweden - Forest Fire



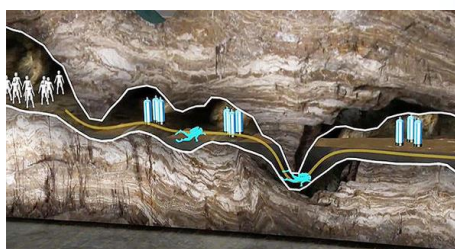
Maps of areas affected by forest fires are difficult to keep updated, as the situation can change rapidly.

Source: [Krisinformation](#)

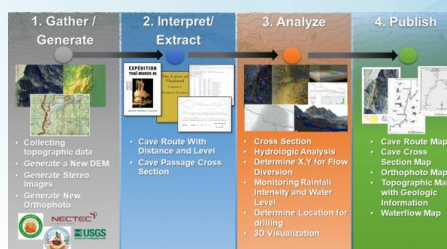
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Thailand – Cave rescue



Source: [Dominica News Online](#)



Early maps shared by others on social media were found to lack the accuracy needed for a real operation.

The first task of the GIS and mapping team was to gather topographic maps, high-resolution Digital Elevation Model data from SRTM and other sources, and essential GIS Layers including the 2D shape of the cave.

Geological and mapping experts considered the absolute and relative accuracy of all topographic data together.

Source: [GIMInternational](#)

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9 | Land administration and SDG's

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GLTN:

“Transparent, inclusive, participatory spatial planning and creating tenure security for all segments of society are pre-requisites for almost all if not all issues of the New Urban Agenda”

10 | <http://habitat3.org/the-new-urban-agenda/>

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Need for Tenure Security

Formal land tenure in the world

	Total	SSA	ECA	LAC	MNA	OECD	SAS	EAP
Private plots in city registered	0.22	0.04	0.32	0.03	0.14	0.68	0.25	0.24
Private plots in city mapped	0.46	0.13	0.60	0.31	0.48	0.97	0.25	0.52
Private plots in country registered	0.22	0.04	0.32	0.03	0.14	0.68	0.13	0.24
Private plots in country mapped	0.24	0.02	0.40	0.03	0.14	0.71	0.13	0.28
No. of countries	189	47	25	32	21	31	8	25

Source: K. Deininger – World Bank (2017)

SSA – Sub-Sahara Africa
 ECA – Europe and Central Asia
 LAC – Latin America and the Caribbean
 MNA – Middle East and North-Africa
 SAS – South Asia
 EAP – East Asia and the Pacific

Perspectives on the developing role of the Surveyor

FIG Definition of the Functions of the Surveyor - 2004

Summary

A surveyor is a professional person with the academic qualifications and technical expertise to conduct one, or more, of the following activities;

- to determine, measure and represent land, three-dimensional objects, point-fields and trajectories;
- to assemble and interpret land and geographically related information,
- to use that information for the planning and efficient administration of the land, the sea and any structures thereon; and,
- to conduct research into the above practices and to develop them.

Call for Change

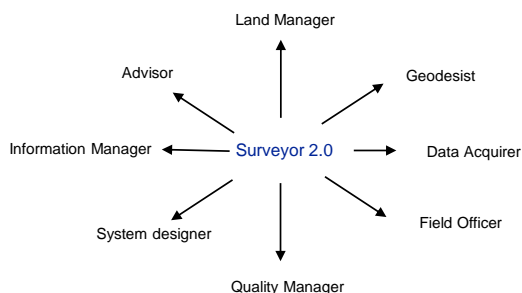
No development will take place without having a spatial dimension

No sustainable development will happen without the footprint of the surveyor

Stig Enemark, Honorary President of FIG

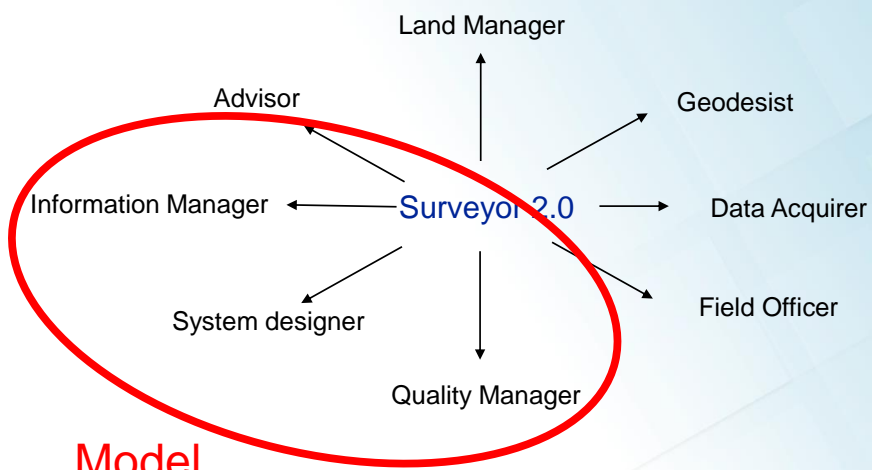
Surveyor 2.0

Presented in 2012 by Christiaan Lemmen, Claire Galpin, Richard Grover, David Mitchell, Daniel Roberge, Gerda Schennach, CheeHai TEO, Peter van Oosterom and Jaap Zevenbergen

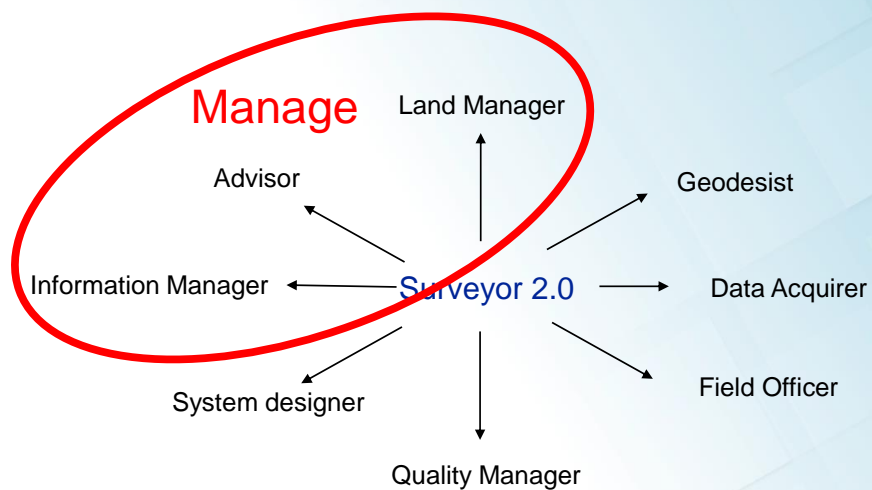


- Measure
- Model
- Manage





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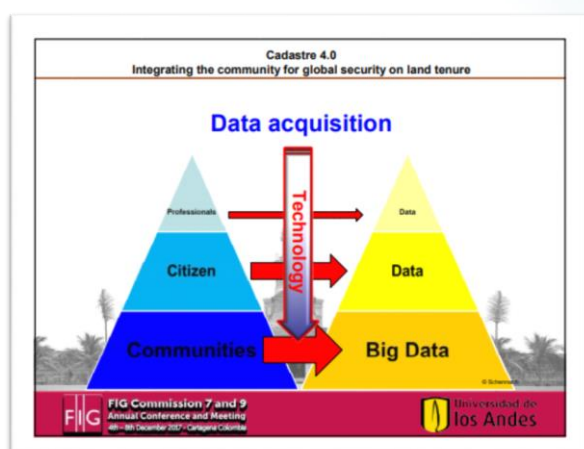
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Cadastre 4.0

Cadastre 4.0 is a system based on fully automatically processing within a network surrounding of people and devices embedded in technological intelligence

*Initiated and presented by Gerda Schennach,
chair FIG commission 7, 2015 – 2019*

Cadastre 4.0



- Cadastre for society gets created by society
- Stakeholders become decisionmakers
- Citizen become shareholders

Cadastre 4.0



Professionals working with Cadastre 4.0 require

- High level qualification
- New skills (soft / technological)
- Broader perspective and understanding

FIG President, Chryssy Potsiou

FIG Congress, Istanbul, May 2018

It is the mandate of FIG to create **“global” surveyors** capable to contribute to the sustainable development agenda.

Surveyors who will have a **“global education”** that covers all fields of **surveying but also who will have an understanding of the “global challenges”** and who will be capable to develop the profession and work efficiently everywhere in order to improve every part of our world, so that nobody will be left behind.

Surveyors all over the world are committed and encouraged to test and **take advantage of the current and emerging technological developments in order to improve their service to Society.**

Chryssy Postsiou FIG President



- Importance of the SDGs
- Use of the crowd
- Increase usability of the data
- Secure property rights for all

Robin McLaren in GIM International - 2017

“To be relevant, we must educate our students and continue to develop the capacity of our professionals to be as creative in business as they are in capturing, managing and analysing geospatial information.

The current limited scope of surveyors is largely a result of being taught ‘what to think’ rather than ‘how to think’ about the geospatial business.

To survive, surveyors will need to **embrace profound change**, move up the food chain by adding considerable value and be proactive in creating new, innovative markets. **Otherwise we will become irrelevant and extinct.**”

Call for action to assess our role and to enable the change

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Colombia - Post Conflict



I work with an GPS antenna
and a mobile device.

26 | <https://www.youtube.com/watch?v=pM9WBVzXSEI&feature=youtu.be>

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Nepal – Post disaster

UN HABITAT FOR A BETTER URBAN FUTURE

GLTN

POLKHA HOUSEHOLD³ ENUMERATION QUESTIONNAIRE

दोस्रो घरघुरी गणना प्रश्नावली

Rev. 17.07.2017

A. ENUMERATION गणना	
1. Questionnaire number* प्रश्नावली नम्बर	
2. Name of enumerator* (Last name, other names) <small>उपनाम: बाबुरामको (बाबु, जना)</small>	
3. English date of enumeration (dd/mm/yyyy) * <small>उपनाम: संकस्य अठ्ठीजी मिति (बन्दी महीना/बसन्त)</small>	
4. GPS ID number <small>जि पि एस आइडी नम्बर</small>	
5. Camera ID number <small>क्यामरा आईडी नम्बर</small>	

B. RESPONDENT उत्तरदाता	
6. Name (Last Name, other names*) <small>नाम, नाम</small>	
7. Mobile number <small>मोबाइल नम्बर</small>	
8. Gender* <small>लिंग</small>	<input type="checkbox"/> Female <small>महिला</small> (1) <input type="checkbox"/> Male <small>पुरुष</small> (2) <input type="checkbox"/> Other <small>अन्य</small> (3)



!Draft! Different Roles in FFP

	Grassroot Surveyors	Land Professional
Approach	<ul style="list-style-type: none"> Review the approach in regards to local circumstances 	<ul style="list-style-type: none"> Define approach
Tools and Manuals	<ul style="list-style-type: none"> Review manuals on usability Use manuals for conducting sensitisation and training 	<ul style="list-style-type: none"> Draft and create manuals Use existing manual for training purposes for the grassroots surveying Conduct tools customisation
A/D Conversion	<ul style="list-style-type: none"> Perform A/D conversion after required training 	<ul style="list-style-type: none"> Check quality after A/D conversion
Data Analysis	<ul style="list-style-type: none"> Analyse data by using predefined basic queries Support the interpretation of analysis results (both basic and complex) 	<ul style="list-style-type: none"> Conduct advanced/complex data analysis
Presentation of Results	<ul style="list-style-type: none"> Present and sharing results to local communities 	<ul style="list-style-type: none"> Support grassroots surveyors bringing institutional knowledge and guidance
Maintenance	<ul style="list-style-type: none"> Purpose dependent 	<ul style="list-style-type: none"> Purpose dependent

Role of the (grassroot) surveyor

Table describes different roles of the surveyors and grass root surveyor while applying Fit-For-Purpose Land Administration. Based on experiences in Nepal, Indonesia, Mozambique and Colombia.

Drafted by Eva Unger and Christiaan Lemmen, 2018.

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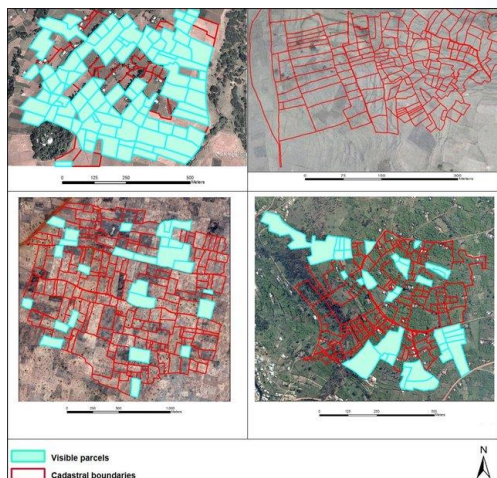
!Draft! Different Roles in FFP

	Grassroot Surveyors	Land Professional
Training	<ul style="list-style-type: none"> Receive training and building confidence and routine through exercising Able to conduct training after successful completion of training from the professional surveyor 	<ul style="list-style-type: none"> Conduct training on methodology; identification; image preparation, interpretation and explanation Create spatial & cadastral intelligence within the grassroots surveyors
Planning & Preparation	<ul style="list-style-type: none"> Organize when and where to conduct communication and data acquisition with the communities 	<ul style="list-style-type: none"> Organize local and / or national support from governmental agencies (decentralize and central approach)
Awareness	<ul style="list-style-type: none"> Build Trust relation with local community 	<ul style="list-style-type: none"> Show support in the field through governmental representative
Validation	<ul style="list-style-type: none"> Conduct validation in the field with the communities 	<ul style="list-style-type: none"> Train grassroots surveyors on how to conduct an inclusive and gender responsive validation in the field
Data Acquisition	<ul style="list-style-type: none"> Conduct field work (data collection by drawing on image or using GPS or other data acquisition method), collecting evidence on existing rights through photos of documents, photo of ID and person, Introduce (communicate purpose and procedure) to household Check data in detail after acquisition 	<ul style="list-style-type: none"> Supervise data organization, data management, tool/hardware management, logistical arrangements Check data on consistency Keep the overview

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Automated Feature Extraction



Visual interpretation of complete cadastral parcels in Ethiopia, Nepal, Rwanda and Ghana (clockwise from top-left).

An approach like this will greatly enhance the application of **FFP approach in Land Administration for cadastral mapping in areas where no reliable data exists**, for e.g. even if a small amount of boundaries could be automatically generated (e.g. 30 percent), potentially large cost reductions in cadastral surveying and mapping could be achieved

Source:
[Divyani Kohli, et al. 2017](#)

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Increasing legal certainty and reliability of the Cadastral Map

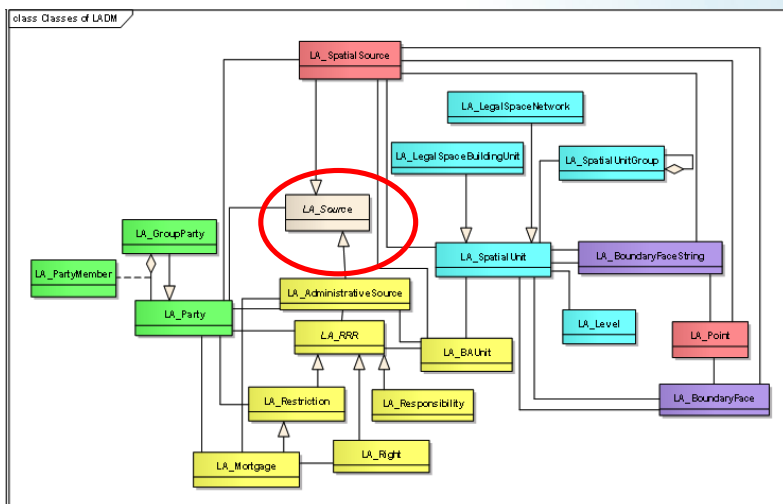


Source:
[Libor Tomandl, Czech Office for Surveying, Mapping and Cadastre, 2017](#)

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Blockchain and Ledger Technologies & LADM



Packages:

- Party Package
- Administrative Package
- Spatial Unit Package – with sub-package Surveying and Representation

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Influence and potential of Lidar

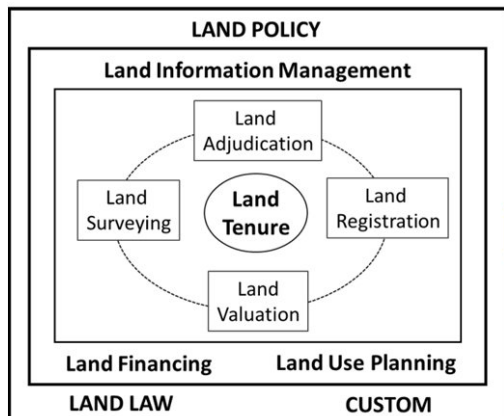
CoE-LaSR Vision



- **“Laser scanning is omnipresent and affecting positively the life of every citizen in modern information society by early 2020s”**
- In the next two decades, new mobile laser scanning systems are making laser scanning more ubiquitous in the same sense as the first personal computing was followed by ubiquitous computing. Even autonomous robots using point-cloud-generating perception sensors may be added to the ecosystem during this timeframe. **What can be said for certain is that during the 2020s and 2030s, there will be a great number of laser scanners omnipresent in everyday life. Mobile Laser Scanning is also one of the main techniques to create local virtual reality.**
- **We are in the middle of disruptive technologies, multidisciplinary work**



Curriculum on Responsible Land Administration



The general objective of the curriculum is to strengthen the capacity of higher education and other relevant networks or institutions globally and provide quality undergraduate and post-graduate courses on the theme of **pro-poor, gender responsive land tools**.

Learning objects will include knowledge of **international conventions and guidelines, as well as good local and regional case studies** that illustrate the importance of responsible approaches to land administration.

Source:

[David Mitchell, et al, 2017](#)



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If we want to

- Contribute to the SDGs & Urban Agenda
- Achieve land rights for all
- Apply Fit-For-Purpose Land Administration
- Add value to society
- Establish Cadastre 4.0
- Involve society
- Use LADM
- Work with efficient and smart tools
- Develop our profession

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**We need smart and creative surveyors
who can adapt to the developing world
and can contribute to a sustainable
environment**

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“The Developing Role of the Surveyor in a Developing World”

We all have a responsibility to ensure that our colleagues are ready and
equipped to deal with these challenges

and that students are educated to address these issues

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Proposal



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FIG Publication on the role and responsibility of the surveyor towards the SDGs

Workshop Spring 2019
Publication May 2020

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