

FIG
2018
ISTANBUL

XXVI FIG CONGRESS

6–11 May 2018, İstanbul

*Presented at the FIG Congress 2018,
May 6-11, 2018 in İstanbul, Turkey*



FIG publication 3D Cadastres Best Practices

9-5-2018

Peter van Oosterom (editor)

TS04C: Best Practices 3D Cadastres, Tuesday, 8 May 2018

XXVI FIG Congress, 6-11 May 2018, İstanbul Congress Center, Turkey

Overview

1. Introduction
2. Working group
3. History of publication
4. Contents
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Best Practices 3D Cadastres

Extended version



Editor: Peter van Oosterom

FIG Publication

- of the International Federation of Surveyors (FIG) joint Working Group on 3D Cadastres
 - commission 3 'Spatial Information Management' and
 - commission 7 'Cadastre and Land Management'
- FIG publication '3D Cadastres Best Practices' provides a clear and comprehensive overview for both the newcomers and experts in the 3D Cadastres community
- At the end of the two most recent 4-year terms, it was decided to collect the best-known practices in a single FIG publication



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News in 2018



FIG publication - Best Practices 3D Cadastres

April 2018

We are happy to bring you the result of the publication from the International Federation of Surveyors (FIG) joint commission 3 'Spatial Information Management' and commission 7 'Cadastre and Land Management' Working Group on 3D Cadastres. The FIG publication '3D Cadastres Best Practices' provides a clear and comprehensive overview of the newcomers and experts in the 3D Cadastres community.

At the end of the two most recent 4-year terms, it was decided to collect the best-known practices in a single FIG publication. Key authors were invited to lead a chapter on one of the following topics:

- Chapter 1. Legal foundations (Dimitrios Kitsakis),
- Chapter 2. Initial Registration of 3D Parcels (Efi Dimopoulou),
- Chapter 3. 3D Cadastral Information Modelling (Peter van Oosterom),

News in 2018

- FIG Annual Review
- Interview FIG President in Coordinates Magazine
- FIG Publication - Best Practices 3D Cadastres
- FIG Young Surveyors Asian Pacific Meeting 2018 in Japan
- Copernicus Masters 2018
- FIG General Assembly 2018 - Agenda and Invitation
- Delegation from Henan, China visits FIG office - the Danish Geodata Agency receives their member certificate
- Worlds' first Global Surveyors Day 2018
- First Global Surveyors Day - 21 march 2018
- Surveyors Council of Nigeria Train the Trainer Workshop 2018

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Airspace sold

STATE cabinet has approved the sale of airspace over the South Bank rail corridor, which will allow planned offices to extend over the rail lines.

Premier Peter Beattie and Transport Minister Steve Bredhauer said the sale fuelled a new era in Brisbane city development.

“Mirvac and South Bank Corporation approached the Government proposing to buy this airspace because Mirvac wants extra floor space for offices it plans to build on an adjacent lot,” Mr Beattie said.

International Federation of Surveyors

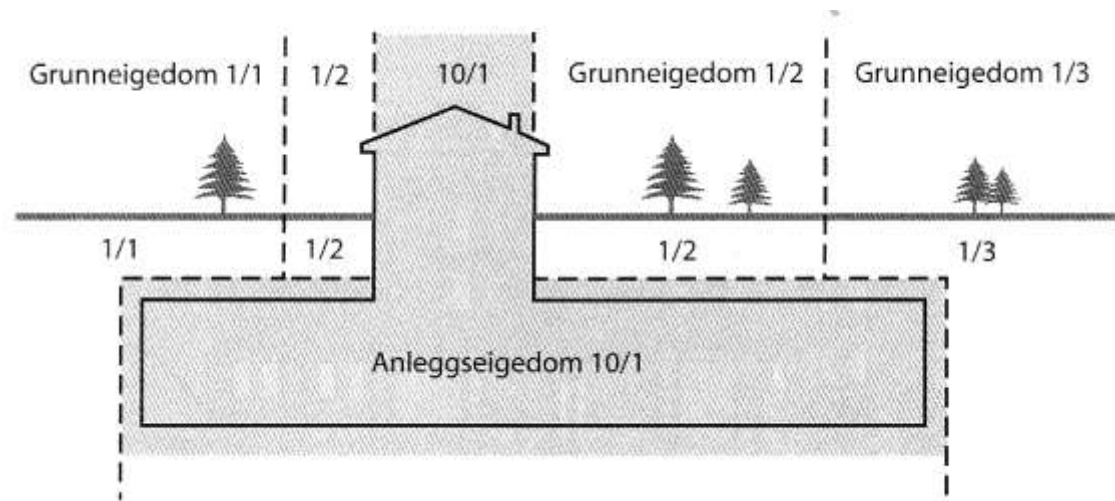
- FIG working group **3D Cadastres since 2002**
First chairs: Yerach Doytsher and Hendrik Ploeger
International Federation of Surveyors, founded 1878 (NGO)
- 3D Cadastres sessions at every FIG WW or congress since
- Working group **3D Cadastres**, scoping questions:
 1. What are the types of 3D cadastral objects?
Related to (future) **constructions** (buildings, pipelines, tunnels, etc.)
any part of the 3D space, both airspace or subsurface?
 2. 3D Parcels for infrastructure objects, such as long tunnels, pipelines, cables: **divided by surface parcels** or one object?
 3. For representation of 3D parcel, has legal space **own geometry** or specified by referencing to existing topographic objects



FIG Working group objectives

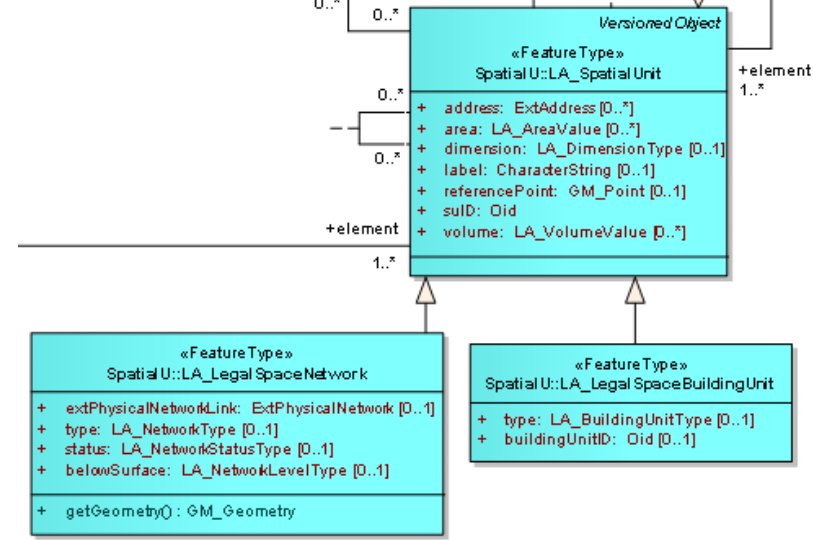
- Common understanding of terms and issues involved;
ISO 19152 Land Administration Domain Model: LADM with 3D
- Guidelines/checklist for implementation of 3D-Cadastral:
'best practices' legal, institutional and technical aspects

Note: 3D Parcels in
broadest sense:
land & water spaces,
both above & below
surface.

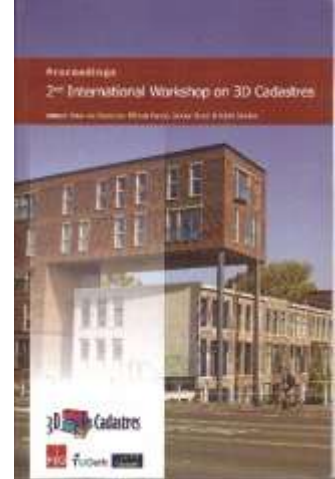


Topics

- 3D-Cadastres and **models**: role of earth surface, 3D parcels open at top and bottom, topology structure, relative height,...
- 3D-Cadastres and **SDI**: legal objects (cadastral parcels and associated rights) and their physical counterparts (buildings or tunnels) result into two different, but related registrations
- 3D-Cadastres and **time**: partition of legal space into **4D parcels**: no overlaps or gaps in space of time
- 3D-Cadastres and **usability**: graphic user interface (GUI) for interacting with 3D cadastral data; e.g. Google Earth



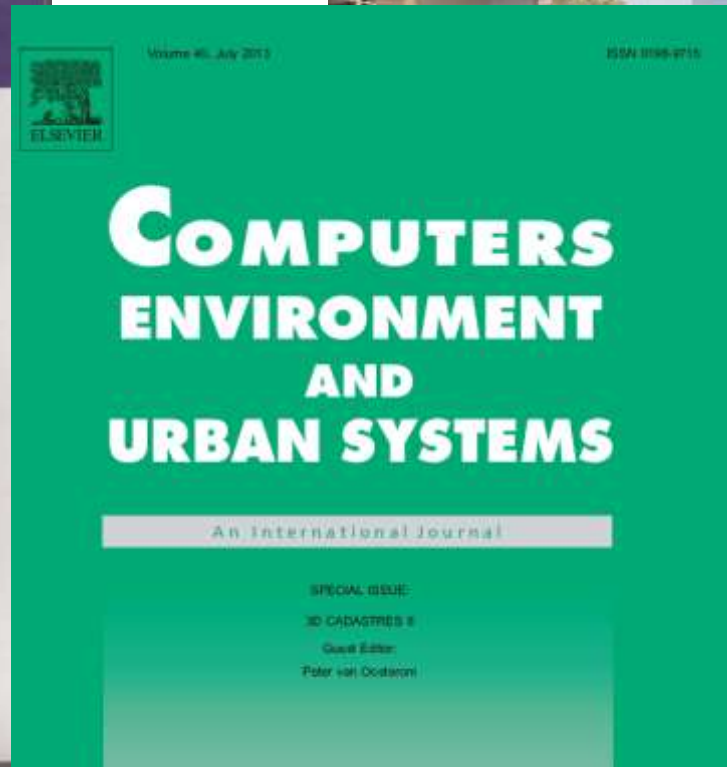
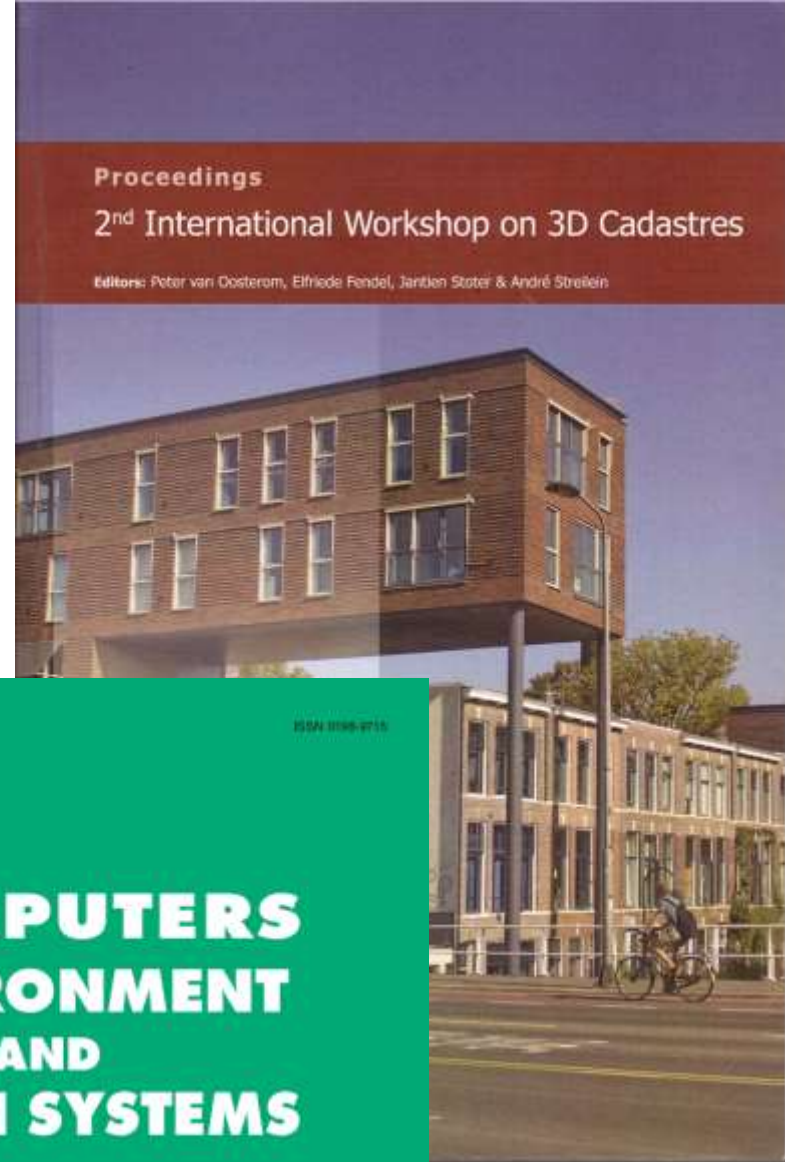
Results term 2010-2014 (FIG has 4-year terms)



- 2010: creation of web-site and interest-group www.gdmc.nl/3DCadastres
- 2010: initial questionnaire status 3D Cadastres
- 2011: 2nd workshop on 3D-Cadastres, Delft, The Netherlands
- 2011-13: 3D Cadastres session at FIG working weeks
- 2012: 3rd workshop on 3D-Cadastres, Shenzhen, China
- 2012: ISO 19152 LADM published as standard (incl. 3D)
- 2013: CEUS special issue 3D Cadastres
- 2014: presentations at the FIG-congress

- Despite plans: no best practices publication

CEUS special issue & Proceedings



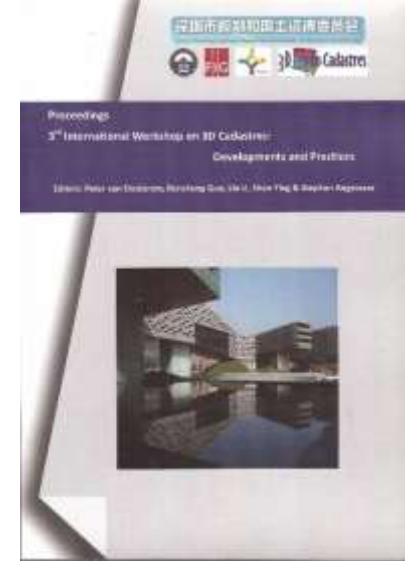
Term 2014-2018

FIG 3D Cadastres Working Group

- 3D Cadastre is here to stay and #implementations increase
- LADM conformance
- In 3D even more need to connect to other registrations via SDI: buildings, tunnels, cables/pipelines, terrain elevation, etc. (physical and legal 3D objects should be aligned)
- New focus topics:
 1. Experiences of operation 3D Cadastral systems (law, organization, technology)
 2. 3D Cadastre in mega-cities, often in Latin-America (Brazil, Mexico), Asia (China, Malaysia, Korea, Singapore) and Africa (Nigeria)
 3. 3D Cadastre usability studies, web-dissemination and 3D cartography
 4. 3D Cadastre as part full life cycle in 3D

Results & plans 2014-2018

- 2014-18: Web-site and interest-group www.gdmc.nl/3DCadastres (inc. literature)
- 2014: second questionnaire status 3D Cadastres
- 2014: 4th workshop on 3D-Cadastres (9-11 nov, Dubai) in cooperation with the 3D GeoInfo
- 2015-17: 3D Cadastres session at FIG working weeks
- 2016: 5th workshop on 3D-Cadastres (18-20 oct, Athens)
- 2017: IJGI special issue 3D Cadastres
- 2018: **FIG-publication Best practices 3D-Cadastres**
- 2018: 6th workshop on 3D-Cadastres (2-4 oct, Delft)





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GIS 2014

DUBAI | NOVEMBER 9-13, 2014



We invite you to join us for the 9th International 3D GeoInfo Conference and the 4th International FIG 3D Cadastres Workshop hosted by the American University in Dubai (AUD). The Cadastres Workshop will be held from the 9 to 11 November 2014, followed by the 3D GeoInfo from 11 to 13 November 2014.

Participating Organizations





5th International FIG Workshop on 3D Cadastres



The **5th International FIG Workshop on 3D Cadastres** will be organized in **Athens Greece, 18 (afternoon) -20 (morning) October 2016**. Together with the 11th 3D GeoInfo Conference (20-21 October 2016), this is part of the Joint 3D Athens Conference 2016, Greece (<http://www.3dathens2016.gr/>).

The increasing complexity of infrastructures and densely built-up areas requires a proper registration of the legal status (private and public), which can only be provided to a limited extent by the existing 2D cadastral registrations. The registration of the legal status in complex 3D situations will be investigated under the header of 3D Cadastres. The 5th International Workshop on 3D Cadastres addresses the developments in the following areas:

- 3D Cadastre operational experiences (analysis, LADM based, learn from each other, discover gaps)
- 3D Cadastre cost effective work flow for new/updated 3D parcels = 4D (part of whole chain: from planning/design/permit in 3D, to registration/use in 3D)
- 3D Cadastre web-based dissemination (usability, man-machine interfaces, including mobile/AR)
- Legal aspects for 3D Cadastre, best legal practises in various legislation systems
- Focus on large cities, including developing countries

The intention is to also include the presentation of overview reports with the progress in the last years in four key areas of 3D Cadastres:

1. Legal framework 3D Cadastres



6th International FIG Workshop on 3D Cadastres 2-4 October 2018, Delft, the Netherlands

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- Scope
- Realization
- Timetable
- Participants
- Organization
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- Workshop 2018**
- Workshop 2016
- Workshop 2014
- Workshop 2012
- Workshop 2011
- Workshop 2001

Workshop Home

The 6th International FIG Workshop on 3D Cadastres will take place in Delft, the Netherlands, from 2 October (afternoon) until 4 October (morning) 2018. It will be a joint event [Geo Delft Conference 2018](#) with:

- [ISPRS Commission IV](#) (1-5 October 2018)
- [3D GeoInfo](#) (1-2 October 2018)
- [SDSC](#) (Smart Data and Smart Cities) (4-5 October 2018 - 2018 website not yet available)

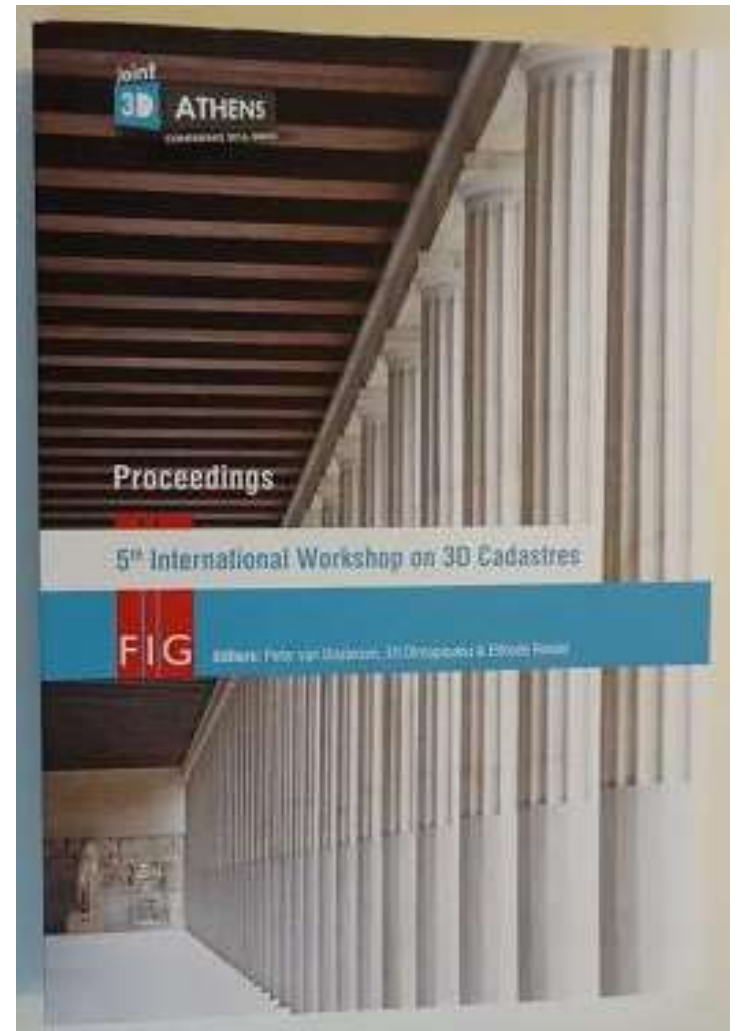
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The Workshop on 3D Cadastres addresses developments in the following areas:

- 3D Cadastre operational experiences (analysis, LADM based, learn from each other, discover gaps)
- 3D Cadastre cost effective workflow for new / updated 3D parcels = 4D (part of whole chain: from planning / design / permit in 3D, to registration / use in 3D)
- 3D Cadastre web-based dissemination (usability, man-machine interfaces, including mobile/AR)
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Back in memory lane...

- Plans for FIG publication Best Practices date back to 2010
- Efi Dimopoulou (NTUA) made team enthusiastic again as part of preparation for 3D Athens (2016)
- Four lead authors were invited to submit an overview report on one of the following topics:
 1. 3D Real Property Legal Concepts and Cadastre
 2. Initial Registration of 3D Parcels
 3. 3D Data Management
 4. 3D Cadastre Visualization
- There are included in proceedings FIG 3D Cadastres 2016

Maturing

- Athens reports 2016 were reviewed, and comments provided
- Chapter '3D Data Management' was split into 2 chapters:
 1. 3D Cadastral Information Modelling
 2. 3D Spatial DBMS for 3D Cadastres
- Author teams were reinforced with new authors

- Teams produced 5 chapters for FIG publication Best Practices
- Before FIG WW 2017, Helsinki each chapter was reviewed twice by authors of the other chapters (for coherence)

- Reviews were discussed in Helsinki
- Given the growing size of the publication it was decided to produce two versions:
 1. Extended version (about 250 pages), mainly on-line
 2. Normal version (about 70 pages), on-line and print

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Extended version published!

Lead author in **bold**, presenter at FIG 2018 congress in *italics*

- Chapter 1: Legal foundations
Dimitrios Kitsakis, *Jesper Paasch*, Jenny Paulsson, Gerhard Navratil, Nikola Vučić, Marcin Karabin, Mohamed El-Mekawy, Mila Koeva, Karel Janečka, Diego Erba, Ramiro Alberdi, Mohsen Kalantari, Zhixuan Yang, Jacynthe Pouliot, Francis Roy, Monica Montero, Adrian Alvarado, and Sudarshan Karki
- Chapter 2: Initial Registration of 3D Parcels
Efi Dimopoulou, Sudarshan Karki, *Miodrag Roić*, José-Paulo Duarte de Almeida, Charisse Griffith-Charles, Rod Thompson, Shen Ying, Jesper Paasch, and Peter van Oosterom

Contents, continued...

- Chapter 3: 3D Cadastral Information Modelling
Peter van Oosterom, *Chrit Lemmen*, Rod Thompson, Karel Janečka, Sisi Zlatanova and Mohsen Kalantari
- Chapter 4: 3D Spatial DBMS for 3D Cadastres
Karel Janečka, Sudarshan Karki, Peter van Oosterom, Sisi Zlatanova, Mohsen Kalantari, and Tarun Ghawana
- Chapter 5: Visualization and New Opportunities
Jacynthe Pouliot, Claire Ellul, Frédéric Hubert, Chen Wang, Abbas Rajabifard, Mohsen Kalantari, Davood Shojaei, Behnam Atazadeh, *Peter van Oosterom*, Marian de Vries, and Shen Ying

Colophon

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International Federation of Surveyors (FIG)
Kalvebod Brygge 31-33
DK-1780 Copenhagen V
DENMARK

Phone: +45 3886 1081
Fax: +45 3886 0252
E-mail: FIG@fig.net
Website: www.fig.net

Published in English

Copenhagen, Denmark

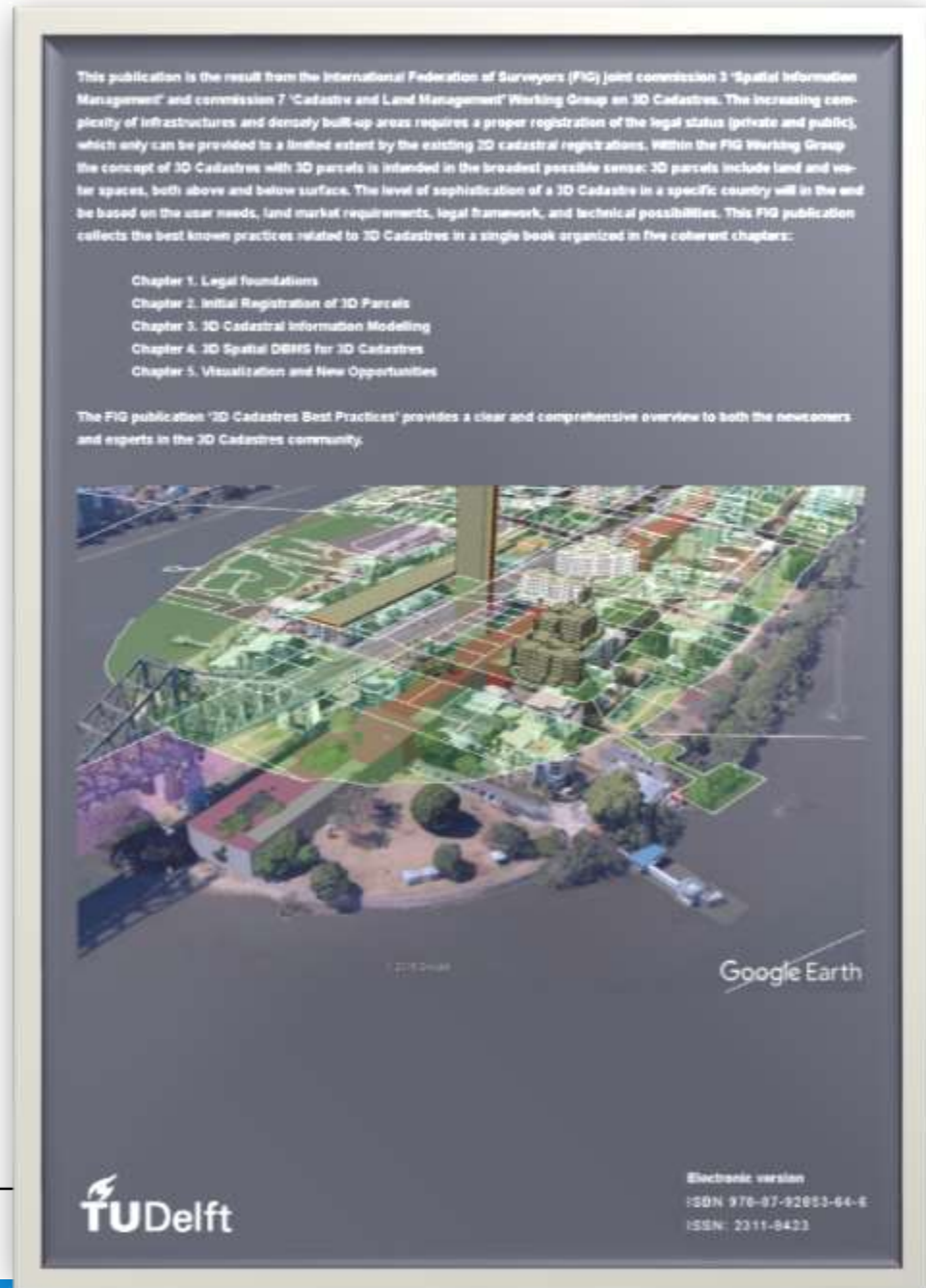
ISBN 978-87-92853-64-6
ISSN: 2311-8423

Published by
International Federation of Surveyors (FIG)

Design cover: Itziar Lasa Epelde, TU Delft, The Netherlands

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Term 2018-2022

FIG 3D Cadastres Working Group

- Alias Abdul Rahman and Peter van Oosterom will be co-chairs
- Many of previous terms topics still valid:
 1. Experiences 3D Cadastral systems (law, organization, technology)
 2. 3D Cadastre in mega-cities (developing countries)
 3. 3D Cadastre usability studies, web-dissemination and 3D cartography
 4. 3D Cadastre as part full life cycle in 3D
- New/more emphasized topics:
 1. Revision of LADM, ISO 19152 (with more explicit 3D)
 2. Relation with design world CAD/BIM/IFC
 3. 3D survey/point cloud based (reference data)
 4. Technical encodings
 5. 3D legal developments
 6. Valuation and 3D Cadastres
 7. Marine Cadastres
 8. (open source) software implementations

Term 2018-2022

FIG 3D Cadastres Working Group

- What activities?
 1. New questionnaire 2018-2022 (a lot of work)
 2. Future 3D Cadastres workshops
planning: when, where South/Middle/North America?
 3. Sessions at future FIG Working Weeks, especially 2020!
 4. Collaborate with ISO TC211 and OGC (the DWG Land admin)
 5. Special issue 3D Cadastres in journal Land Use Policy (LUP), 2019
 6. Update of FIG publication Best Practices 3D Cadastres (2022)
- This year:
 1. Shorter version of FIG publication (12 pages per chapter)
 2. 3D Cadastres workshop (as part of Geo Delft 2018 conferences)
short promo video at end of this session

The logo features the word 'amsterdam' in a stylized font. The 'am' is white on a red background, and 'sterdam' is white on a blue background. Above the 'm' are three red tulips. To the left, 'FIG' is written in white on a red background. Below 'amsterdam' is 'WORKING WEEK 2020' in blue and '10 - 14 MAY' in red.

amsterdam
FIG
WORKING WEEK 2020
10 - 14 MAY

Smart Surveyors for Land and Water Management

