

International Panorama of Cadastre in 3D



Peter van Oosterom

(with support of Rod Thompson, Eftychia Kalogianni,
Chrit Lemmen, Abdullah Kara, Agung Indrajit, ...)

CONTRIBUTION OF THE CADASTRE TO THE WELFARE STATE: TAXATION AND OTHER
SERVICES

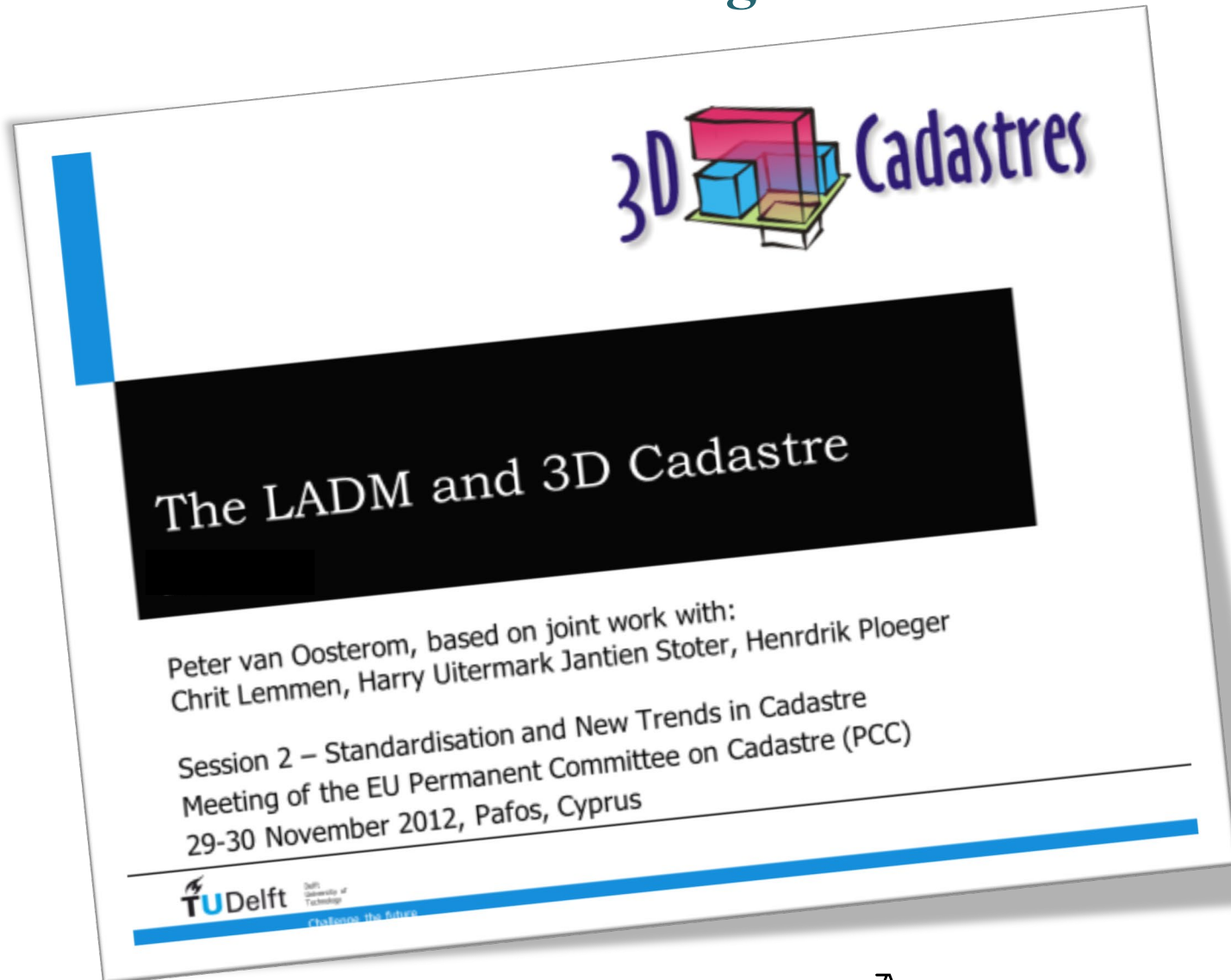
JOINT CONFERENCE OF THE PCC AND CLRKEN OF EUROGEOGRAPHICS AND ASSEMBLY
OF THE STANDING COMMITTEE OF THE CADASTRE IN THE EUROPEAN UNION



October 2023, Madrid, Spain



More than a decade ago



A few days after the meeting

INTERNATIONAL
STANDARD

ISO
19152

First edition
2012-12-01

**Geographic information — Land
Administration Domain Model (LADM)**

*Information géographique — Modèle du domaine de l'administration
des terres (LADM)*

Supporting 2D and 3D

A representative from Cyprus
asked:

LADM Implementations

Scotland



Indonesia



Colombia



Mozambique



Malaysia



Montenegro



Honduras



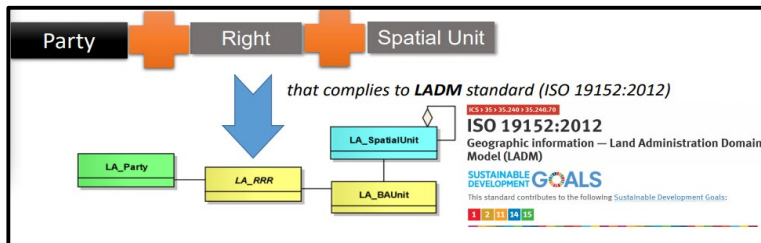
Serbia



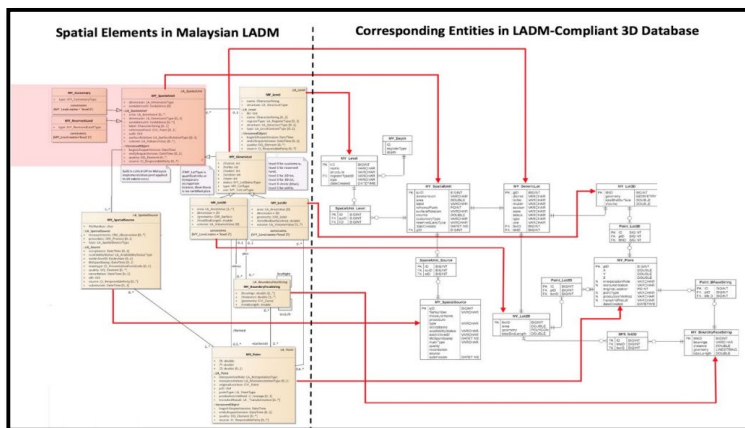
Albania



Uganda



Aditya et al., 2019



Rajabifard et al., 2019

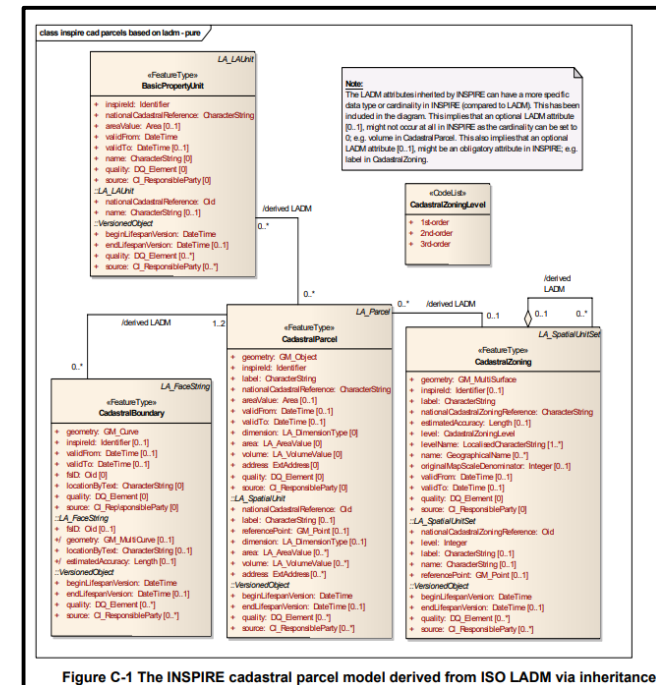


Aditya et al., 2019



INSPIRE Cadastral Parcels

UN-Habitat 17 countries STDM



LADM adopted & published as national standard

✓ Czech technical standard by the Czech Office for Standards

LADM translation

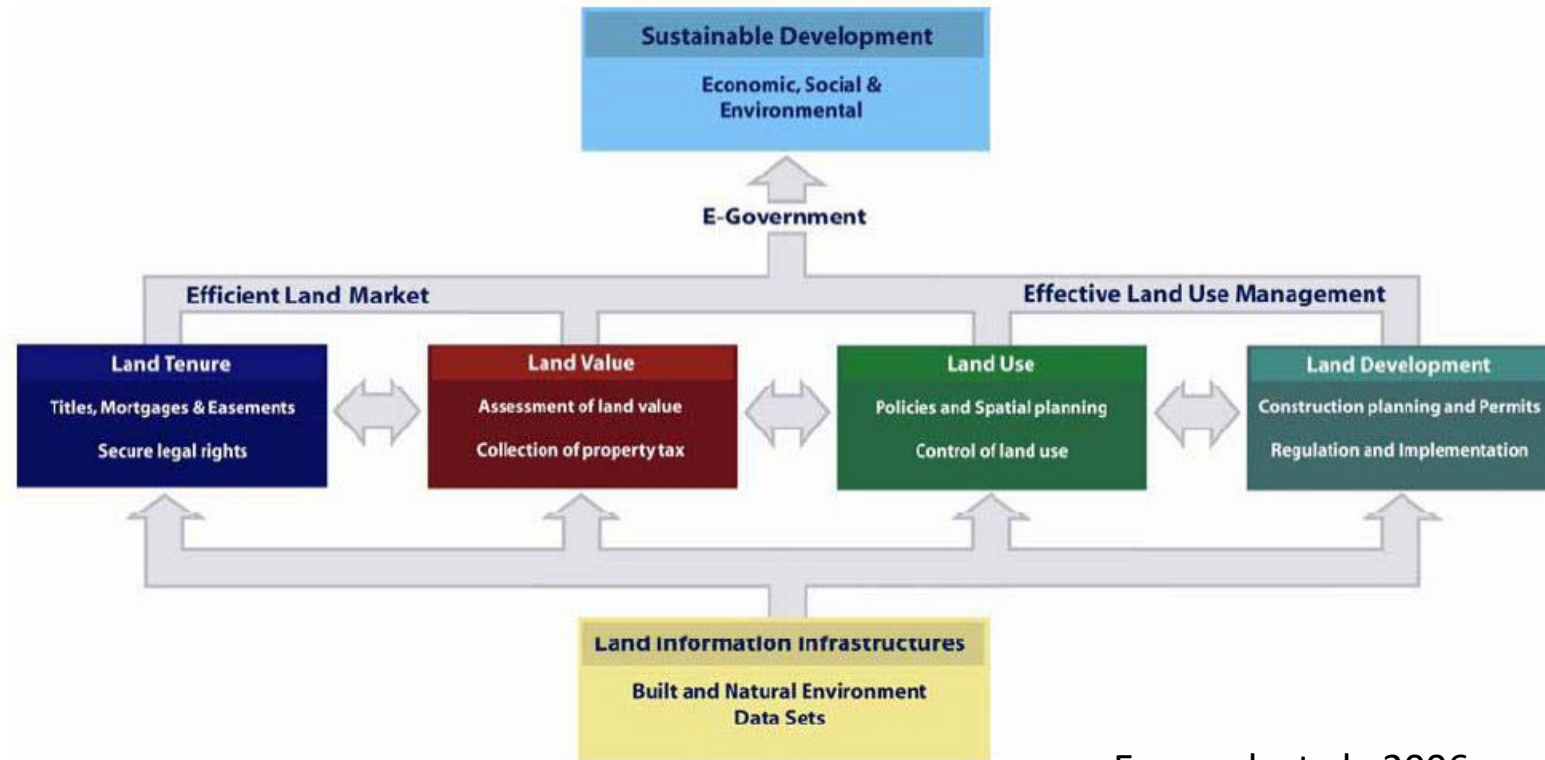
- ✓ ISO languages (English and French)
- ✓ Spanish,
- ✓ Czech,
- ✓ Chinese,
- ✓ Korean,
- ✓ Russian

Land Administration

process of recording and disseminating information about:

- ownership [RRRs]
- value
- [planned] use of land and associated resources

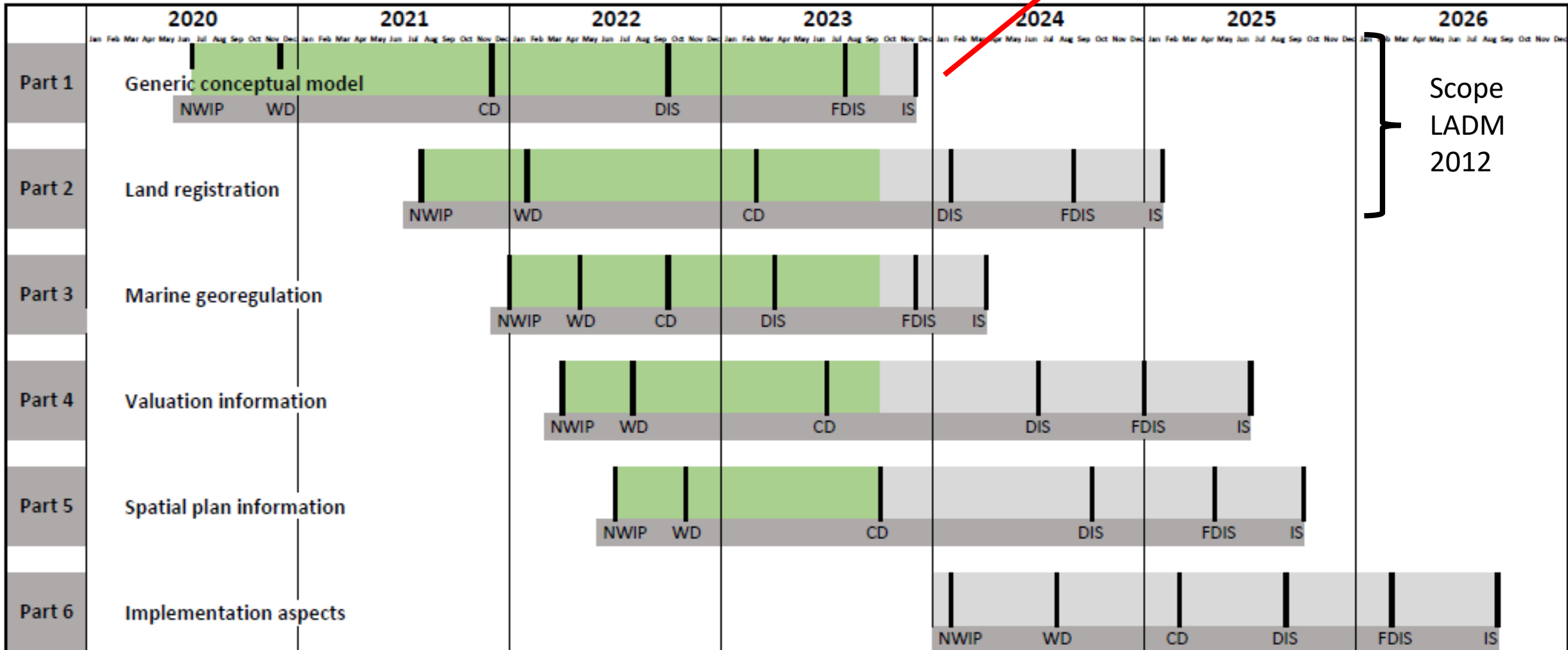
UN-ECE, 1996



Enemark et al., 2006

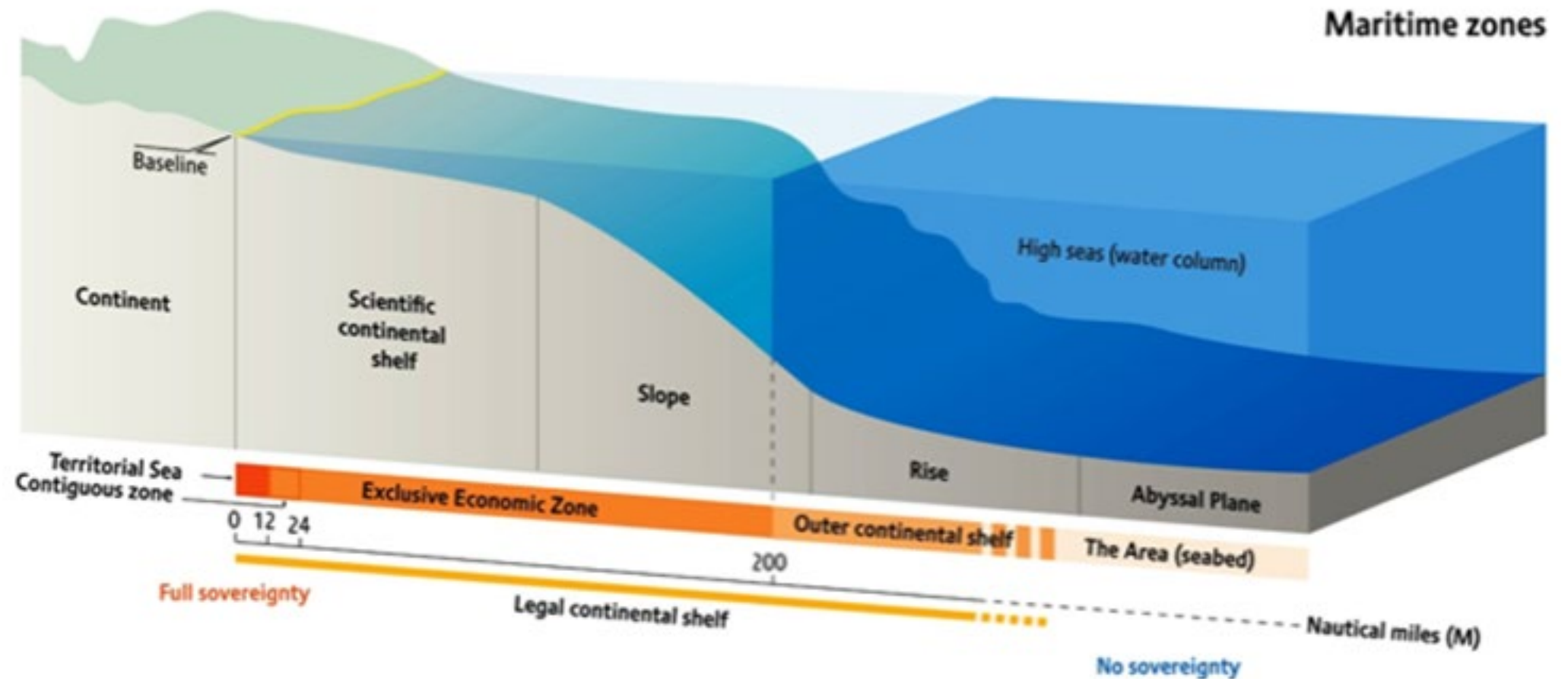
LADM Revision – Multipart

Again, international standard shortly after a PPC meeting?



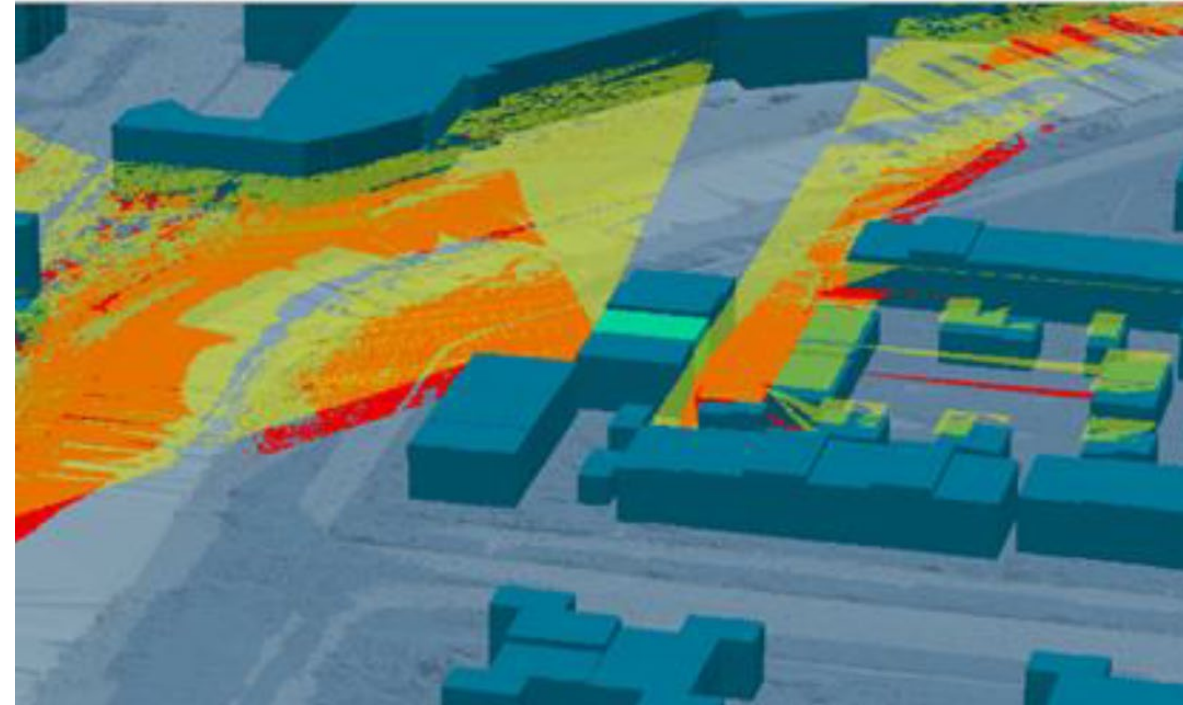
It should be noted that 3D representations are relevant for all parts

LADM Part 3 Marine Georegulation and IHO S-121 (International Hydrographic Office)



LADM Part 4 Valuation information, relevance of 3D

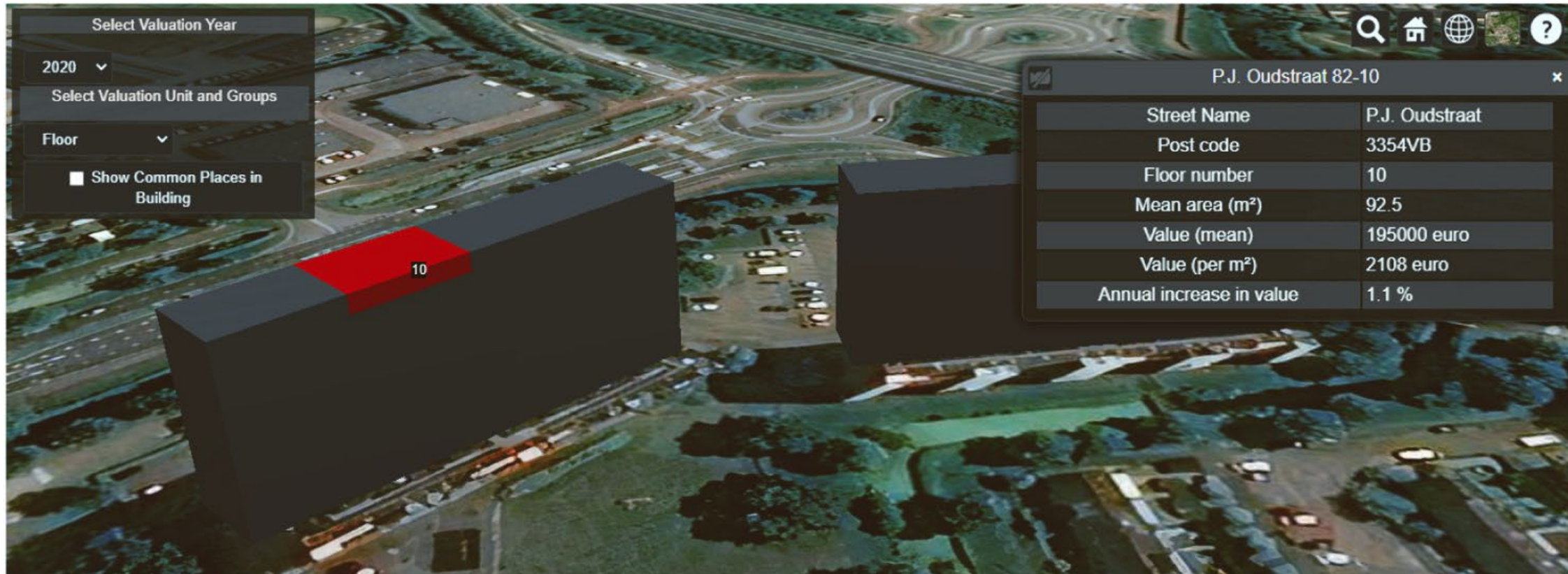
- 3D RRRs (legal) and 3D physical objects
- **3D view analysis** (lake, ocean, golf and mountain view)
- 3D noise analysis (e.g. airport and neighborhood noise)
- 3D hazard analysis
- 3D crime analysis
- 3D insolation analysis (sunlight and daylight analyse)
- 3D distance to points of interest (central business district, metro station, busy road, beach, waste, school, ...)



Viewshed polygons for two levels:
yellow=visible from top, red=one level lower

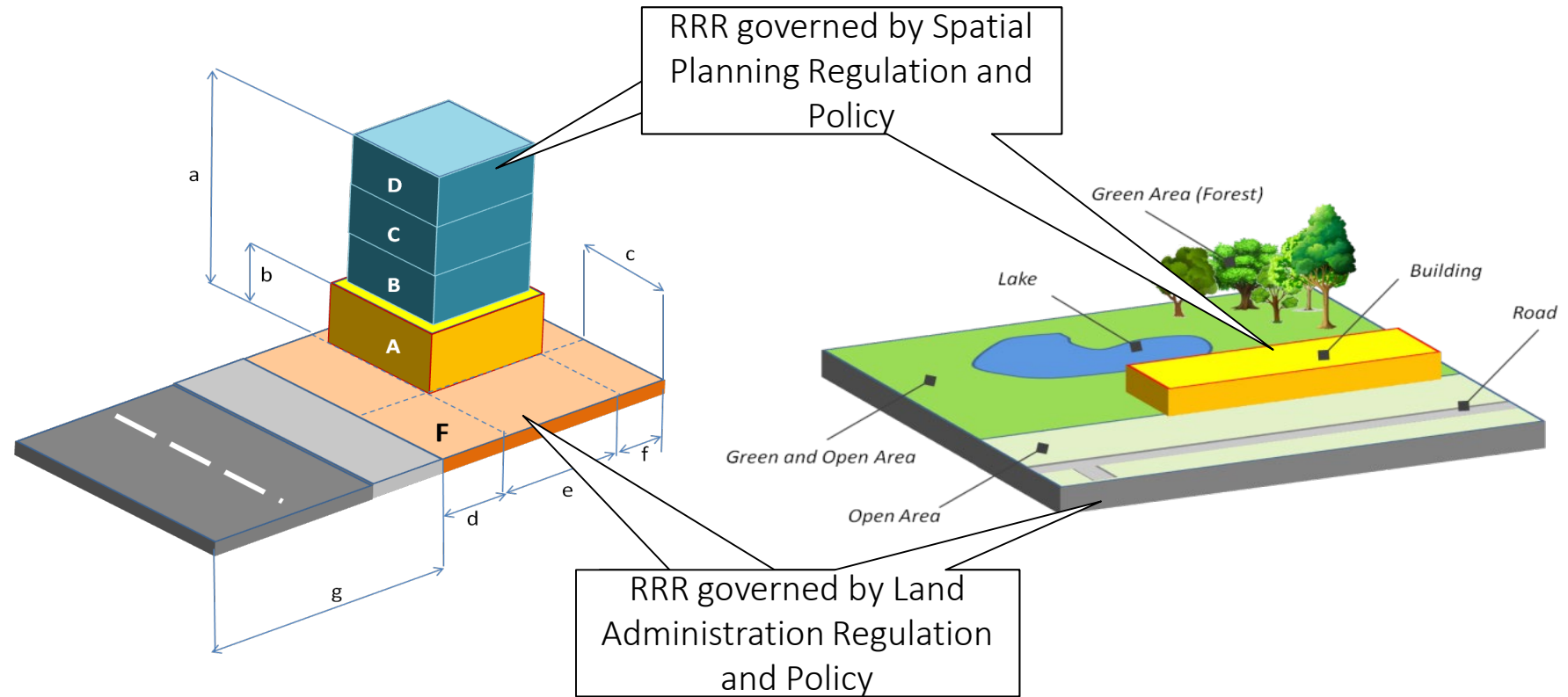
Screenshot from The Netherlands 3D valuation dissemination prototype

<https://nlvaluation.landadmin.org/>



- Supporting different aggregation levels (unit, floor, building,...)
- Multiple years can be selected

Spatial planning information as part of complete land administration

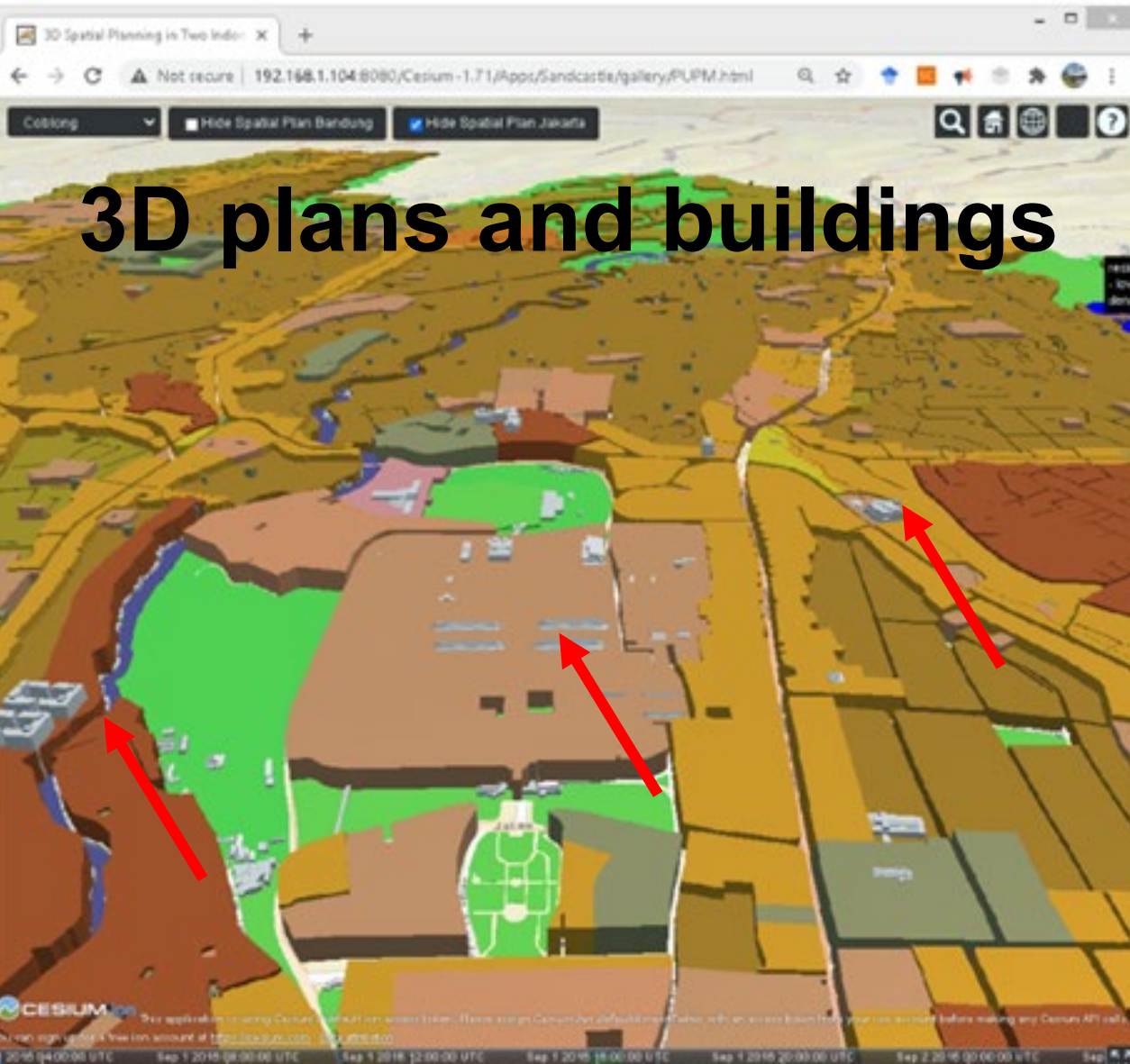


Spatial planning regulates total height of a building on a parcel

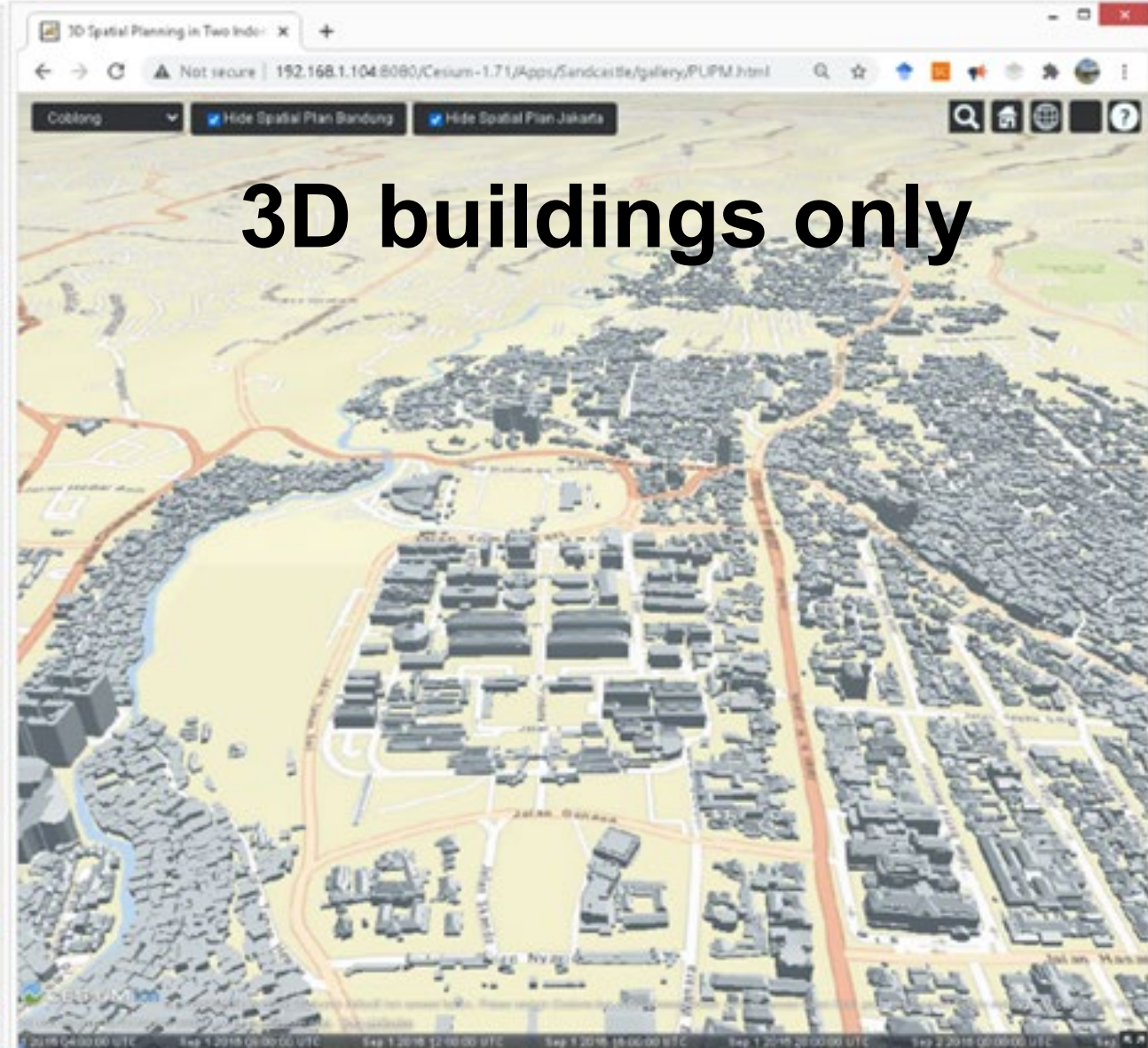
Spatial planning regulates ratio of the land use over an area

LADM Part 5 Implementation - 3D spatial plans

<http://pakhuis.tudelft.nl:8080/edu/cesium74/pupm/> (Agung Indrajit)

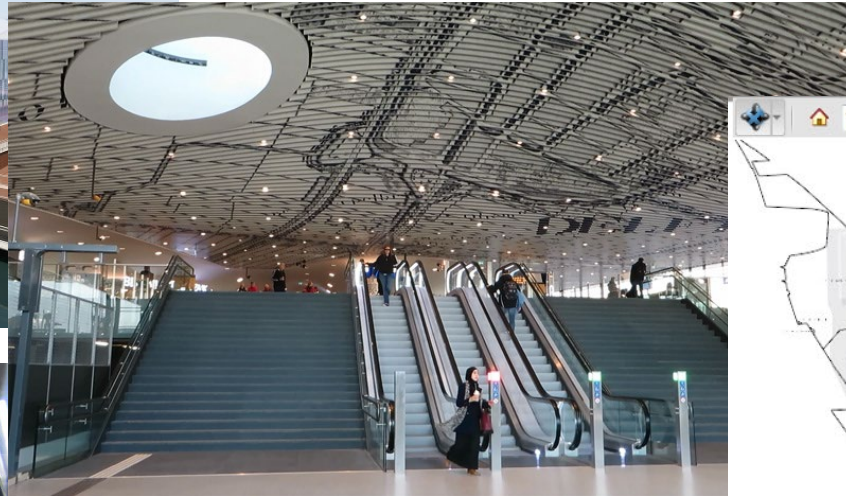


3D plans and buildings

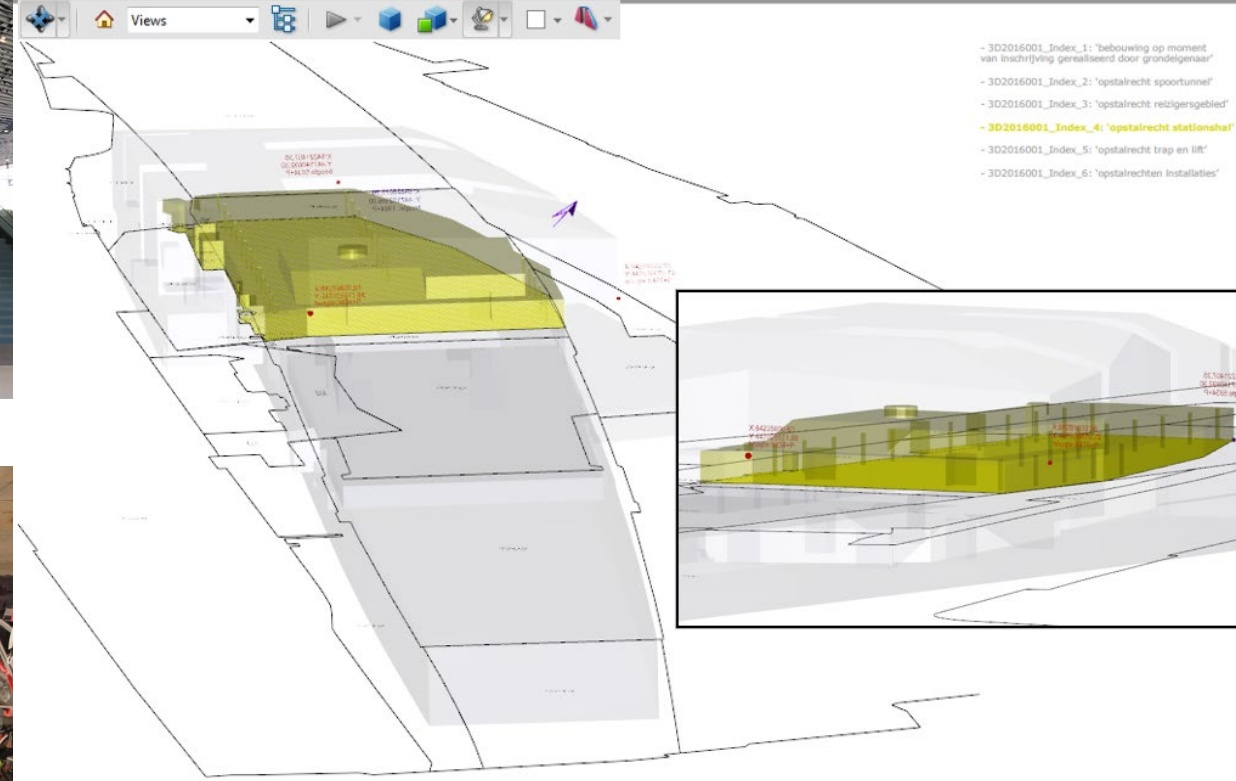


3D buildings only

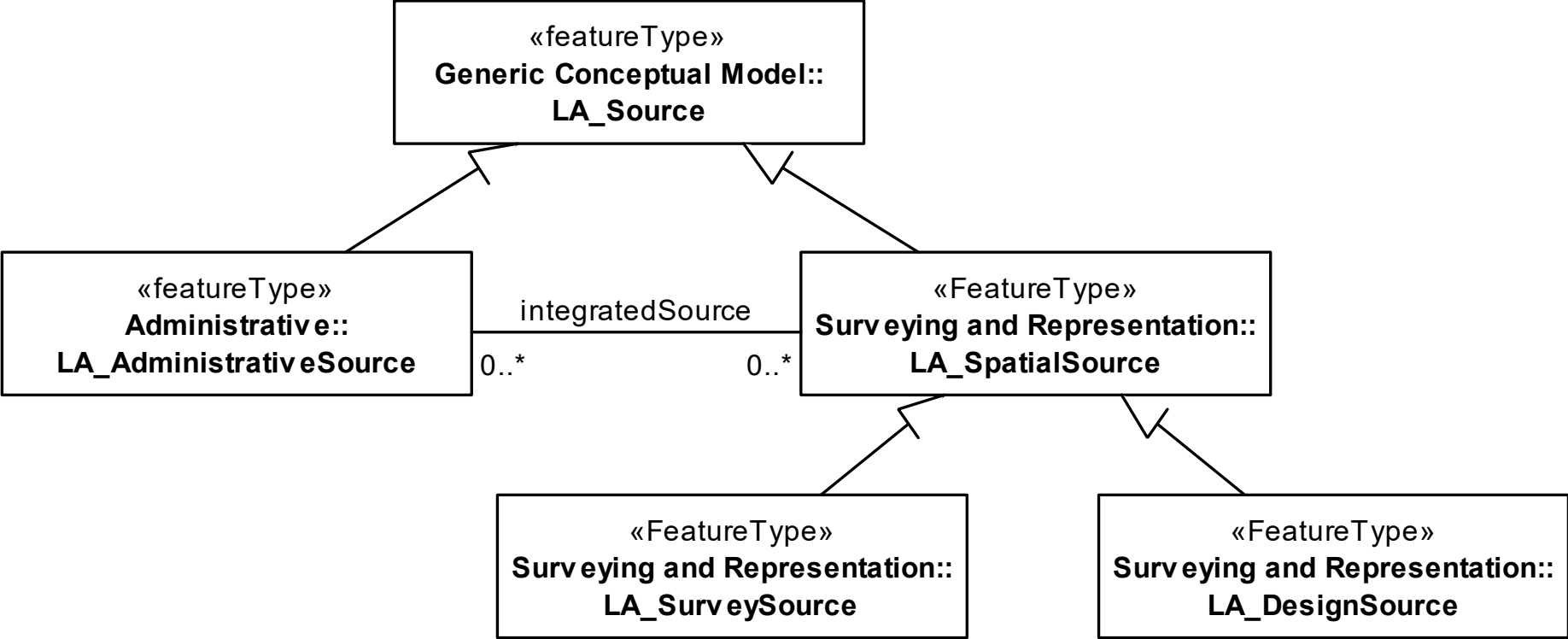
First 3D cadastral registration of multi-level ownerships rights in the Netherlands, March 2016:



Delft railway station → 6 owners
Volumes per owners defined in 3D pdf deed
(approach not used in other cases)

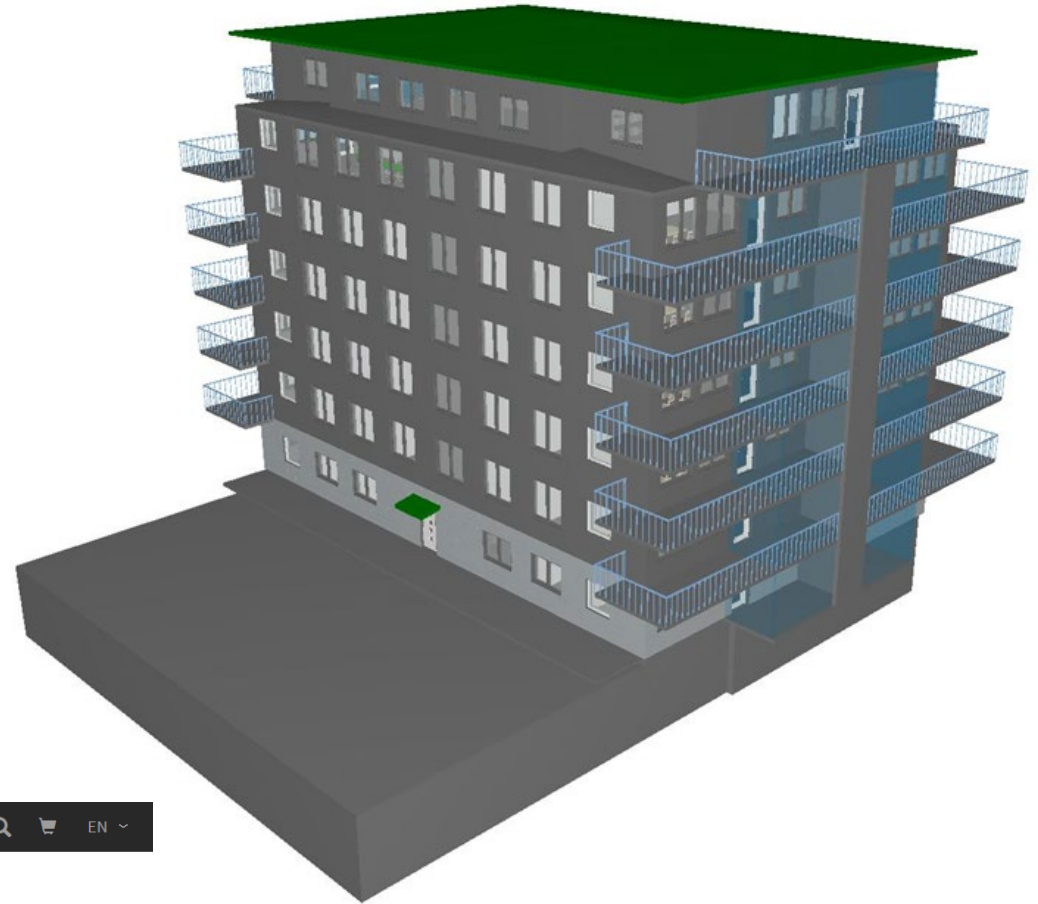


New in LADM part 2: Design sources and Refined Survey Model



Design sources for apartments: BIM IFC

- Open data format for BIM
- Most used data model in AEC sector
- NL: BIM mandatory for buildings > €10M
- Rijksvastgoeddienst, BIM Loket
- **No legal space in IFC**
- ISO 16739-1:2018

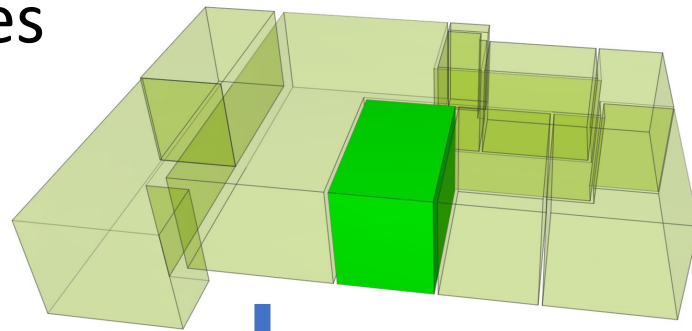


Proposed Solution

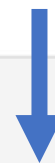
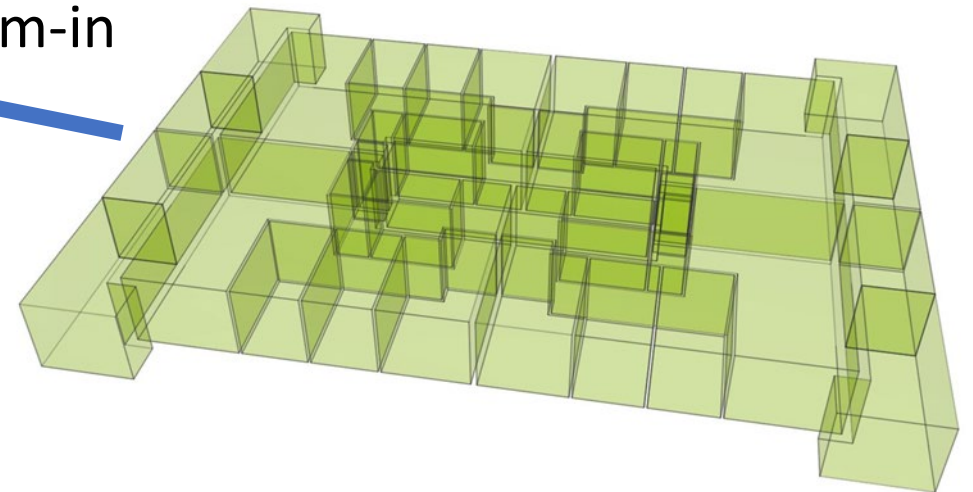
- Add User Defined Property Sets for **IfcSpaces**
- IfcSpace one out of 800 IFC entities



IfcSpaces



Zoom-in



UD Property set

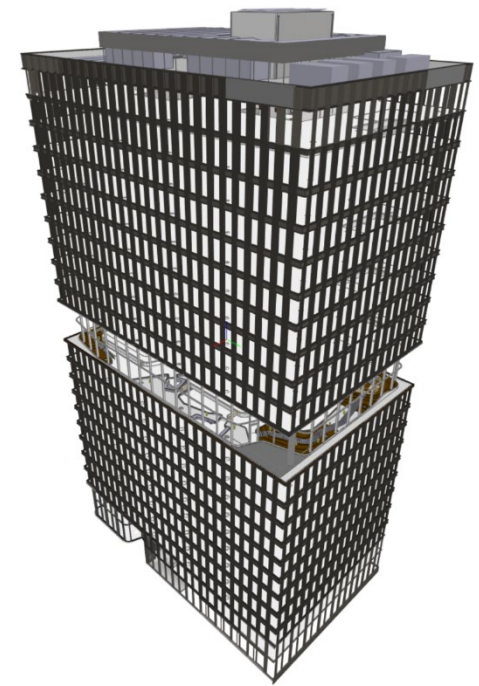
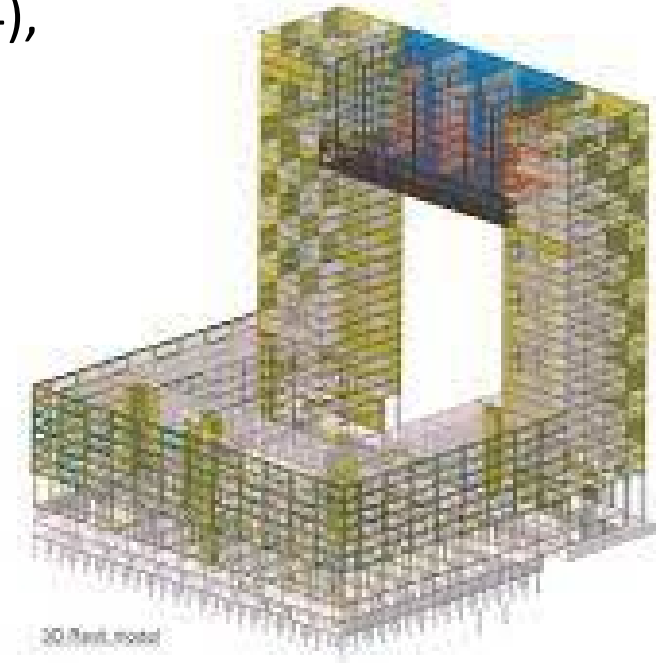
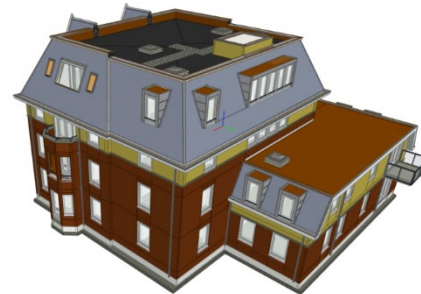
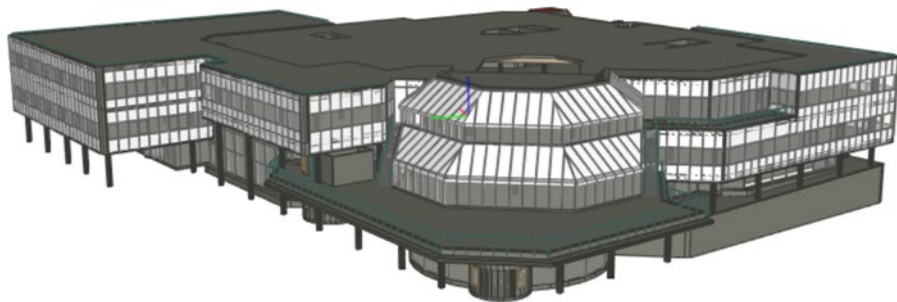
INFO						
Space.4.8 : Room[133]						
Identification	Location	Quantities	Profile	Relations	Space Boundaries	S
Hyperlinks	Pset_AirSideSystemInformation			Pset_CadastralInformation		Pset_ProductR
Property	Value					
complexnumber	8897 A					
indexnumber	15					
municipality	Delft					
parcelnumber	8897					
section	A					
spacetype	Private					

MSc GIMA thesis **Jennifer Oldfield, 2016**

MSc Geomatics thesis **Roeland Meulmeester, 2019**

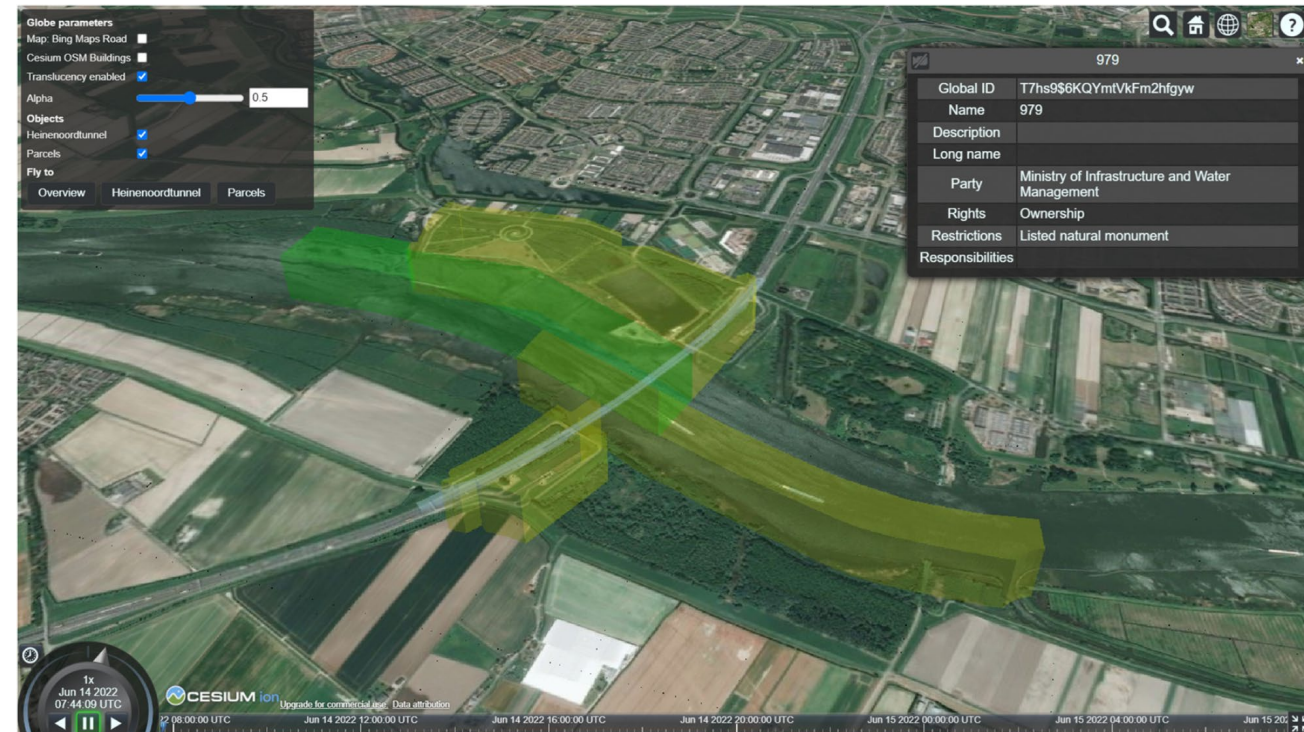
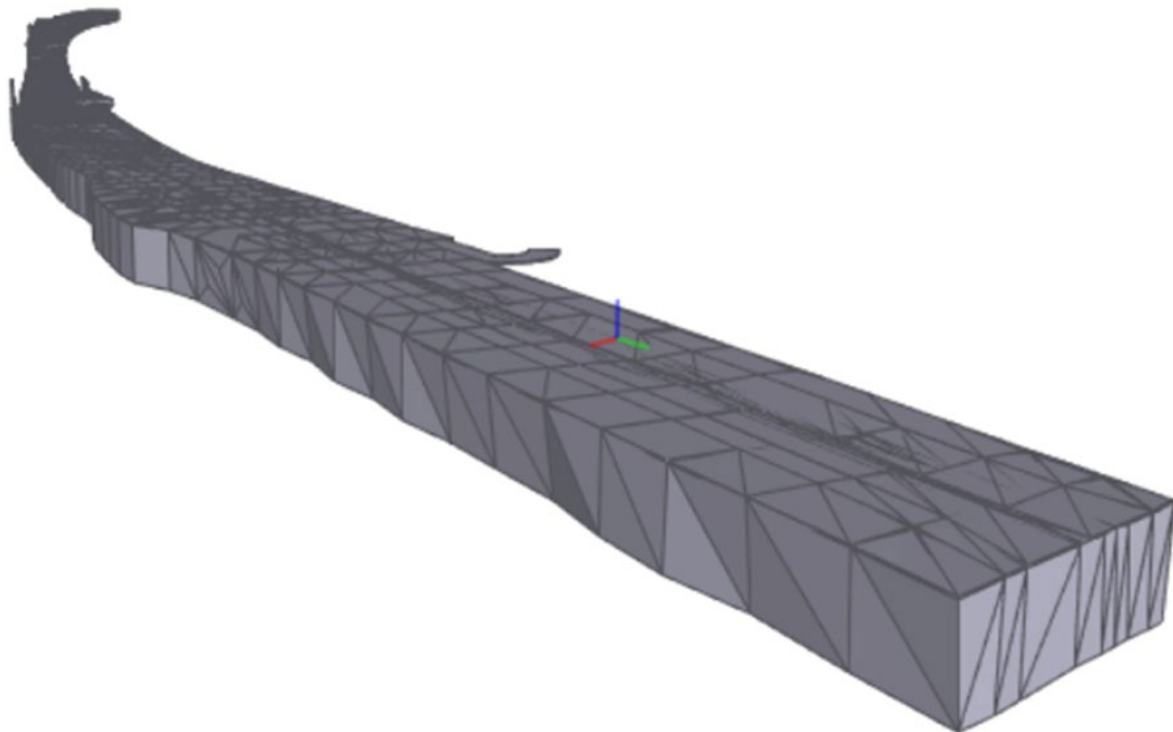
Validation rules and checking

- Collect real world examples of BIM/IFC models
- Define guidelines for valid BIM/IFC for 3D Land Administration:
 1. Legal Spaces: ifcSpace present
 2. Relation to the LAS: unique identifier per apartment
 3. Geometries: valid polyhedral spaces, closed
 4. Spatial Relations: no overlaps, no gaps
 5. Levels of Georeferencing: LoGeoref 10 (postal address), 20 (WGS84), 30 / 40 (Cartesian CRS), 50 (any CRS specified by EPSG) according to Clemen and Hendrik (2019)
- MSc GIMA thesis of **Marjan Broekhuizen, 2021**



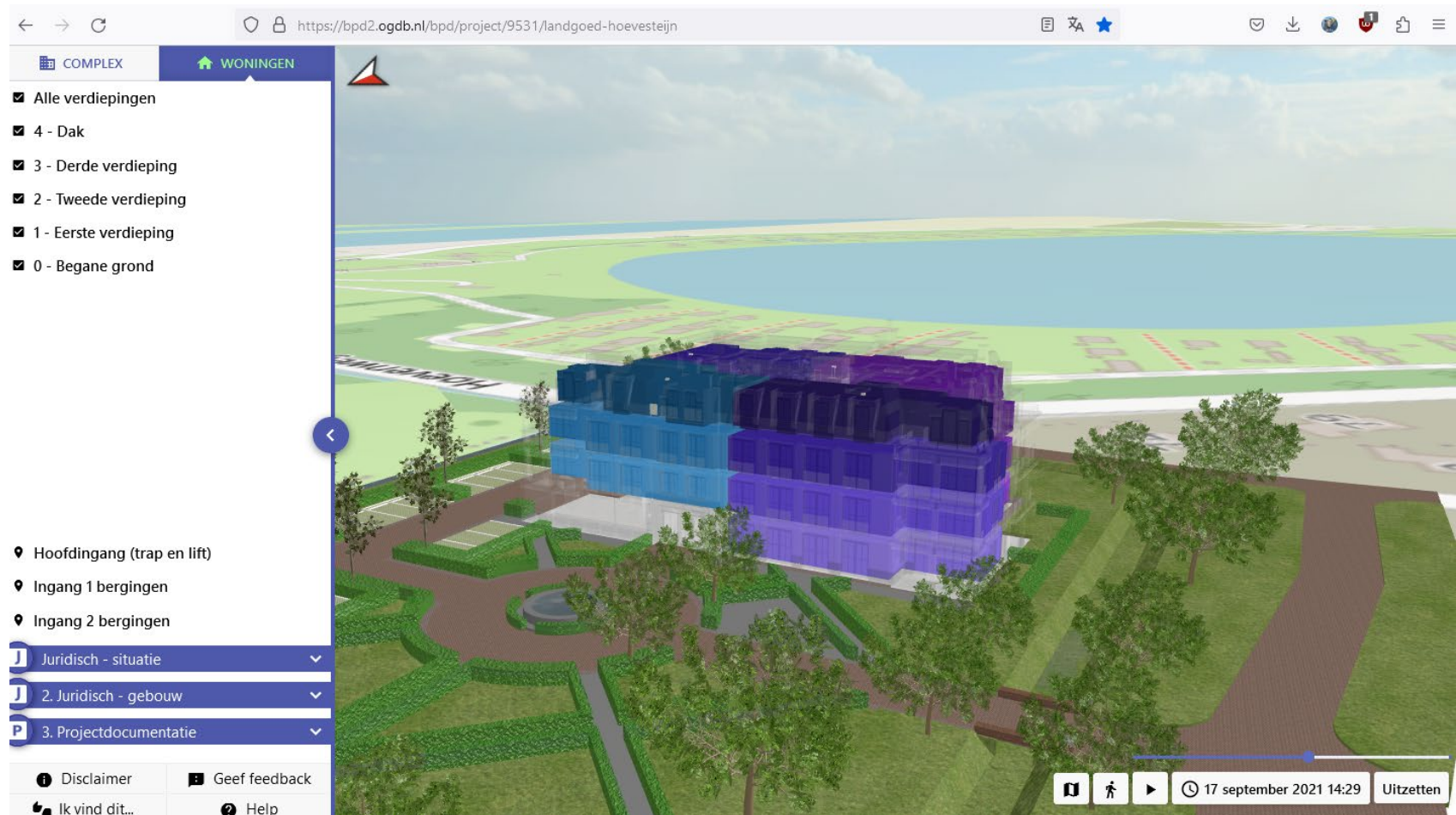
What about underground legal spaces (tunnels/utilities)?

- Several cases, not many IFC
- Most cases in other format (first convert to IFC)
- Heinenoordtunnel was direct in IFC (RWS was exception)
- 3D Web-dissemination of the legal space via Cesium JS
- MSc Geomatics thesis **Rohit Ramlakhan, 2022**



Dutch Notaries initiated BIM Legal

- Launched in 2021 aiming at potential buyers
- Very positive responses, including an legal innovation award
- **Kadaster continues**



<https://bpd2.ogdb.nl/bpd/project/9531/landgoed-hoeversteijn>

3D Land Administration questionnaire

- Review and update of current 3D Land Administration (Cadastre) developments
- All relevant issues incorporated, different sections in questionnaire
- Keep track of development worldwide
- Assist researchers etc. with snapshot of past, current situation, and future plans
- 4th questionnaire can be compared to the earlier editions, every 4 years
- Submission via off-line word doc by email or google form (new)
- All completed questionnaires on-line at <http://www.gdmc.nl/3DCadastres/participants/>

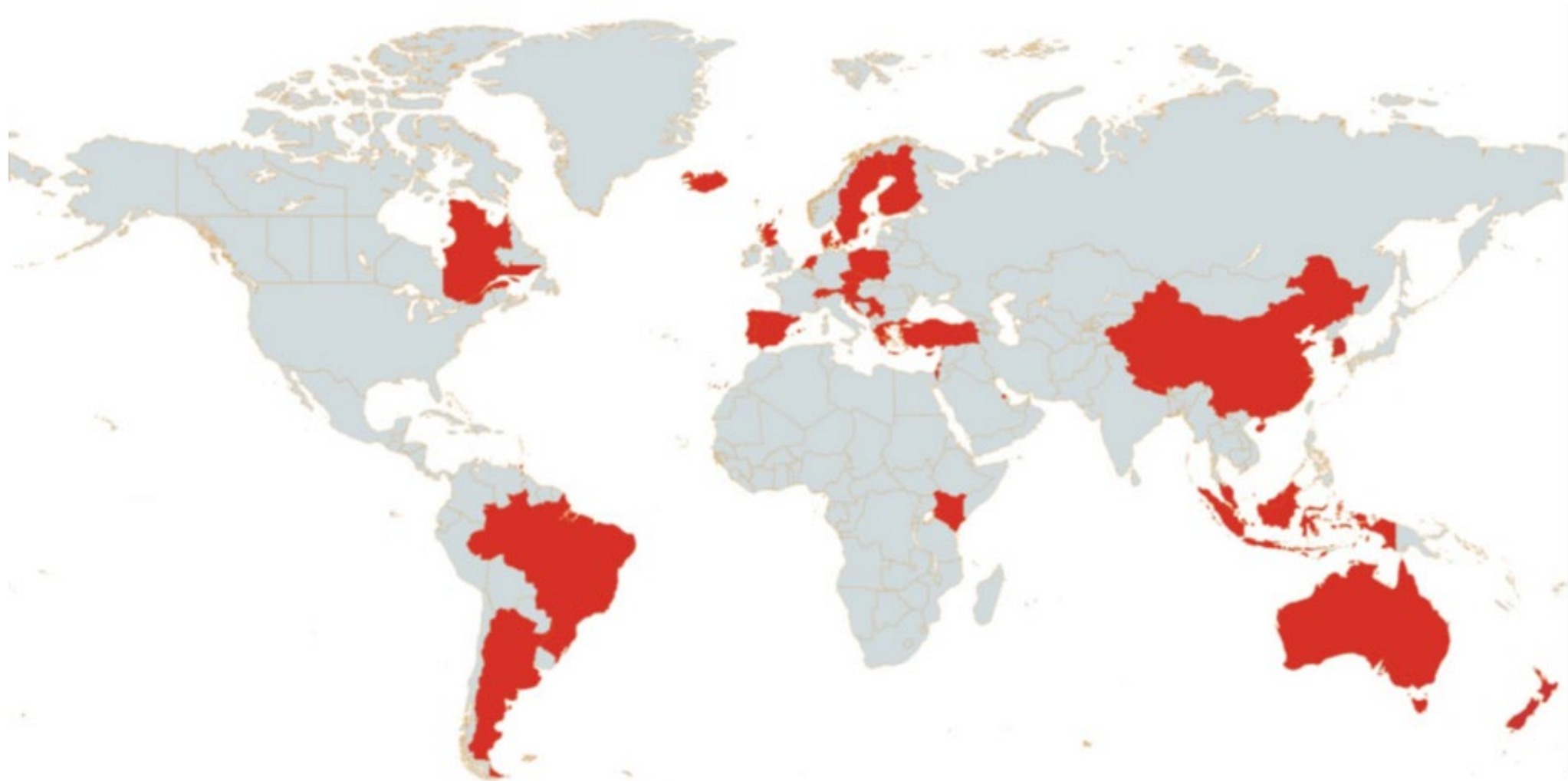
→ How to better compare the progress of the various countries?

Questionnaire design

- As similar as possible to the first one
– enable to track changes over time
- Understanding data distribution
- Numerical analysis - benchmark
- Expected vs. realised development
→ 2026 and 2022 in the last case

1. General/applicable 3D real-world situations
2. Infrastructure/utility networks
3. Construction/building units
4. X/Y Coordinates
5. Z Coordinates/height representation
6. Temporal Issues
7. Rights, Restrictions and Responsibilities
8. DCDB (The Cadastral Database)
9. Plans of Survey (including field sketches)
10. Dissemination of 3D Cadastral information
11. Statistical information
12. Reflection
13. Contact details

37 states completed the 4th Questionnaire of 3D Land Administration: current status of 2022 and expectations for 2026



Received responses

Country (- State)	2010	2014	2018	2022	Participants
Argentina	2010	2014	2018	2022	Diego Alfonso Erba, Ramiro Alberdi
Australia					Ali Aien, Behnam Atazadeh, Ben Cowie, Murray Dolling, Mohsen Kalantari, Sudarshan Karki, Davood Shojaei, Rod Thompson, Adrian White
AUS - Queensland	2010	2014	2018	2022	
AUS - Victoria	2010	2014	2018	2022	
AUS - NSW			2018	2022	
AUS - Western Australia				2022	
Austria	2010			2022	Rainer Feucht, Gerhard Muggenhuber, Gerhard Navratil
Bahrain	2010			2022	Neeraj Dixit, Ammar Rashid Kashram, Eleni Tziortzioti
Brazil	2010	2014		2022	Andréa Flávia Tenório Carneiro, Suzana Daniela Rocha Santos e Silva
Canada - Québec	2010	2014	2018	2022	Francois Brochu, Louis-André Desbiens, Guillaume Devost, Marc Gervais, Pierre Giguere, Alain Gregoire, Christian Lord, Jacynthe Pouliot, Francis Roy
China	2010	2014	2018	2022	Renzhong Guo, Zhang Ning, Shen Ying
Costa Rica		2014	2018		Andres Hernández Bolaños
Croatia	2010	2014	2018	2022	Miodrag Roic, Nikola Vucic
Cyprus	2010	2014	2018	2022	Elikkos Elia, Andreas Hadjiraftis
Czech Republic		2014	2018	2022	Karel Janecka
Denmark	2010	2014		2022	Lars Bodum, Jesper Paasch, Esben Munk Sørensen
Finland	2010	2014	2018	2022	Jani Hokkanen, Arvo Kokkonen, Markku Markkula, Tarja Myllymäki
France	2010				Claire Galpin, Hervé Halbout
Germany	2010	2014	2018		Markus Seifert
Greece	2010	2014	2018	2022	Efi Dimopoulou, Eftychia Kalogianni, Panagiotis Lolonis
Hungary	2010	2014	2018		Gyula Iván
Iceland				2022	Katrín Hólm Hauksdóttir
India	2010	2014	2018		Tarun Ghawana, Pradeep Khandelwal
Indonesia	2010		2018	2022	Trias Aditya, S. Subaryono
Israel	2010	2014	2018	2022	Yerach Doytsher, Joseph Forrai, Kseniya Khasanshina, Gili Kirschner, Yoav Tal
Italy	2010				Diego Navarra, Bruno Razza, Enrico Rispoli, Fausto Savoldi
Kazakhstan	2010				Natalya Khairudinova
Kenya	2010	2014	2018	2022	David Siriba
Macedonia	2010	2014			Gjorgji Gjorgjiev, Vanco Gjorgjiev
Malaysia	2010	2014	2018	2022	Teng Chee Hua, Alias Abdul Rahman
Montenegro				2022	Aleksandra Radulovic
Nepal	2010			2022	Babu Ram Acharya, Susheel Dangol, Tanka Prasad Dahal
The Netherlands	2010	2014	2018	2022	Rohan Bennett, Benedict van Dam, Eric Hagemans, Chrit Lemmen, Hendrik Ploeger, Martijn Rijdsdijk, Martin Salzmann, Jantien Stoter, Eva-Maria Unger, Jaques Vos
New Zealand			2018	2022	Trent Gulliver
Nigeria	2010	2014	2018		Thomas Dabiri
Norway	2010	2014			Lars Elsrud, Olav Jenssen, Lars Lobben, Tor Valstad
Poland	2010	2014	2018	2022	Jaroslaw Bydlosz, Marcin Karabin
Portugal		2014	2018	2022	José Paulo Elvas Duarte de Almeida, João Paulo Fonseca Hespanha de Oliveira, Mateus Magarotto
Russian Federation	2010				Sergey Sapelnikov, Natalia Vandysheva link to Pilot 3D Cadastre in Russia
Serbia		2014	2018	2022	Rajica Mihajlovic, Aleksandra Radulovic, Nenad Visnjevac
Singapore		2014	2018	2022	Wu Defu, Victor Khoo, Kean Huat Soon
Slovenia			2018	2022	Anka Lisec, Jernej Tekavec
South Korea	2010	2014	2018	2022	Youngho Lee
Spain	2010	2014	2018	2022	Amalia Velasco
Sweden	2010	2014	2018	2022	Magdalena Andersson, Peter Ekbäck, Jesper Paasch, Jenny Paulsson
Switzerland	2010	2014	2018	2022	Helena Aström Boss, Robert Balanche, Laurent Niggeler
Trinidad and Tobago	2010	2014	2018	2022	Charisse Griffith-Charles
Turkey	2010	2014	2018	2022	Mustafa Aslan, Cemal Biyik, Fatih Döner
United Kingdom					Alan Howie, Marguerite le Riche, Gareth Robson, Carsten Rönsdorf
England and Wales	2010				
Scotland			2018	2022	

Compare received responses to previous editions

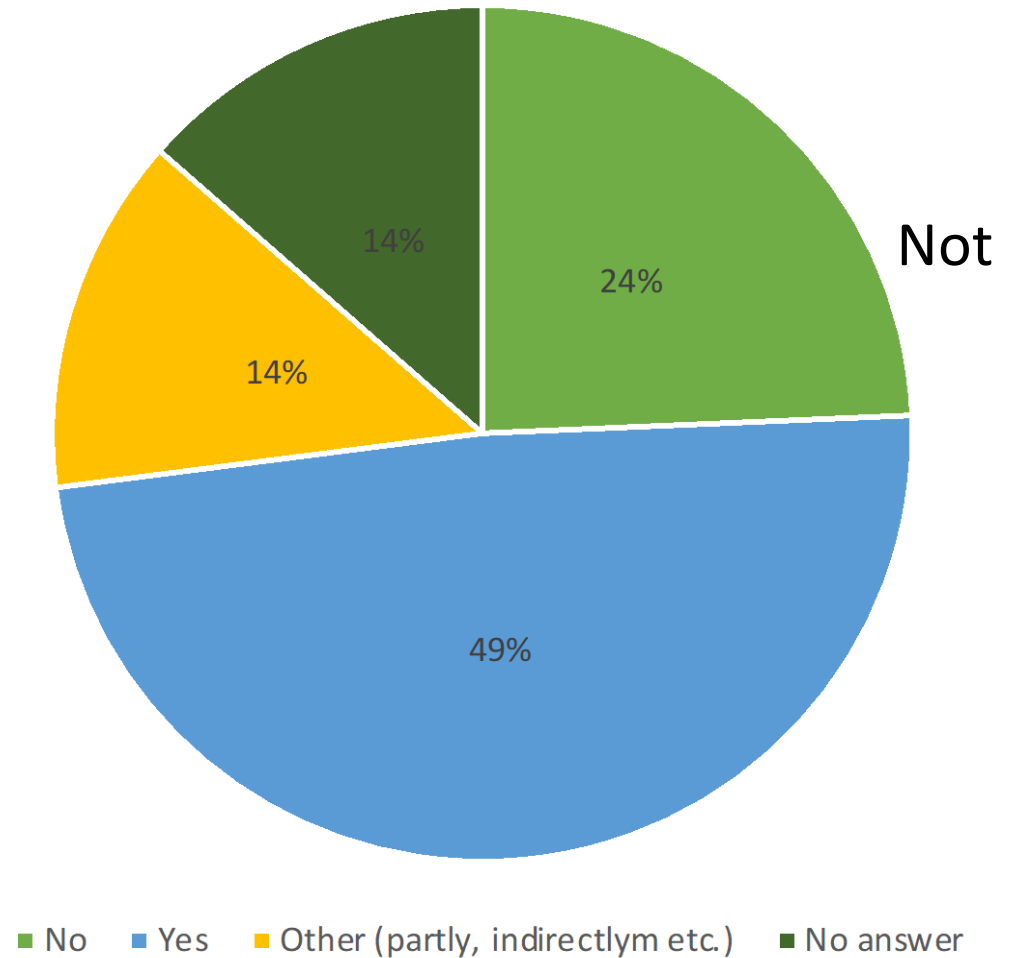
#					Countries/ Jurisdictions that participated	Number of countries that participated
	2010	2014	2018	2022		
1	√	√	√	√	Argentina, Queensland and Victoria from Australia, Quebec from Canada, Shenzhen provincial city from China, Croatia, Cyprus, Finland, Greece, Israel, Kenya, Malaysia, Poland, South Korea, Spain, Sweden, Switzerland, The Netherlands, Trinidad and Tobago, Turkey	19
2				√	Argentina, Queensland, New South Wales, Western Australia and Victoria from Australia, Austria, Bahrain, Brazil, Quebec from Canada, Shenzhen provincial city from China, Croatia, Cyprus, Czech Republic, Denmark, Finland, Greece, Iceland, Indonesia, Indonesia, Israel, Kenya, Malaysia, Montenegro, Nepal, New Zealand, Poland, Portugal, Scotland, Serbia, Singapore, Slovenia, South Korea, Spain, Sweden, Switzerland, The Netherland, Trinidad and Tobago, Turkey	37
3	√	√	√	NO	Germany, Hungary, Delhi State from India, and Delta State from Nigeria NGA	4
7				√	Hong Kong, Iceland, Montenegro, Philippines , new countries	4

Existence of legislation for the description of 3D parcels (2022)



Question 1.9.

Is there legislation (law and/or regulations) for 3D descriptions of parcels?



LADM and 3D

- 4 countries answered that ISO19152:2012 LADM is used as the formal model for the 3D parcels: **China (Shenzhen), Finland, Malaysia and Scotland**
- 35% of the total countries that participated, declared that their cadastral database is (partially) based on LADM

Typical responses

1. General/applicable 3D real-world situations

This part of the questionnaire refers to the applicable 3D real-world situations to be registered by 3D parcels. It also addressed the types of 3D geometries, which are considered to be valid 3D representations for these parcels.

	The Netherlands 2010	The Netherlands 2014
1.1. Are all 3D parcels constrained to be within one surface (2D) parcel?	Rights referring to the use of a limited space will be registered in the cadastre on a 2D parcel. However the right registered might refer to a construction or space on several 2D parcels. Yes. It is allowed, but not demanded to record a 3D drawing in the land registers. Such a 3D drawing is linked to the parcel in the Cadastre registration and can be uploaded through the internet in a few minutes	We intend to demand recording of 3D drawings in land registers in specific cases. These cases are described by a working group with two professors of civil law, registrars and representatives of of Royal Dutch Association of Notaries
1.2. Are ambulatory ² boundaries permitted?	No, in case of growth and exit of rivers and of Dunes civil boundaries can change without the recording of a deed. In that case the cadastre boundary follows the legal boundary. The Cadastre parcel number is changed	
1.3. Is it allowed to have 3D parcels not related to physical constructs or airspace, subsurface	An apartment right consists among else of a right to use a specific	We intend to demand recording of 3 D drawings in land

5. Z Coordinates/height representation

	The Netherlands 2010	The Netherlands 2014
5.1. Are the Z coordinates of 3D parcels relative to local ground?	No guidelines.	
5.2. Are Z coordinates reduced to a standard datum (absolute)? If so, what is the spatial reference system for the Z coordinate?		
5.3. In principle possible to store both relative and absolute Z coordinate?		
5.4. Is the earth surface (height) explicitly stored (in the DCDB or other accessible register)?		
5.5. What is the source of elevation for the 2D surface parcel?		
5.6. Any other Z coordinate issues?		

...repeated 4 times per country

1. General/applicable 3D real-world situations

This part of the questionnaire refers to the applicable 3D real-world situations to be registered by 3D parcels. It also addressed the types of 3D geometries, which are considered to be valid 3D representations for these parcels.

	Status 2014	Expectations 2018
1.1. Are all 3D parcels (3D spatial units in LADM terminology) constrained to be within one surface 2D parcel?	<p>Rights referring to the use of a limited space will be registered in the cadastre on a 2D parcel. However, the registered right might refer to a construction or space on several 2D parcels.</p> <p>Yes. It is allowed but not required to record a 3D drawing in the land register. Such a 3D drawing is linked to the parcel in the Cadastre registration and can be uploaded through the internet in a few minutes.</p>	<p>We intend to require the recording of 3D drawings in the land register in specific cases. These cases are described by a working group consisting of two professors of civil law, registrars, and representatives of the Dutch Royal Association of Notaries</p>
1.2. Are 2D and/or 3D ambulatory ² boundaries permitted?	<p>No. In case of growth and exit of rivers and Dunes, civil boundaries can change without the recording of a deed. In that case, the cadastral boundary follows the legal boundary. The cadastral parcel number is left changed.</p>	
1.3.a. Is it allowed to have 3D parcels (spatial units) not related to physical constructs or objects? (e.g. airspace, subsurface volumes)	<p>An apartment right consists among else of an exclusive right to use a specific part of a real estate. This part could</p>	<p>We intend to require the recording of 3D drawings in the land register in specific cases. These cases</p>

5. Z Coordinates/height representation

	Status 2014	Expectations 2018
5.1. Are the Z coordinates of 3D parcels relative to local ground?	No guidelines.	Expected to be available
5.2. Are Z coordinates reduced to a standard datum (absolute)? If so, what is the spatial reference system for the Z coordinate?	Under research	
5.3. In principle possible to store both relative and absolute Z coordinate?	Under research	
5.4. Is the earth surface (height) explicitly stored (in the DCDB or other accessible register)?	No	
5.5. What is the source of elevation for the 2D surface parcel?	N/a	
5.6. Any other Z coordinate issues?		

...repeated many times, same set of other countries (QLD)



1. GENERAL/APPLICABLE 3D REAL-WORLD SITUATIONS

This part of the questionnaire refers to the **applicable 3D real-world situations to be registered by 3D parcels**. It also addressed the types of 3D geometries, which are considered to be valid 3D representations for these parcels.

Questions	Status 2022	Expectations 2026
1.1. Are all 3D parcels (3D spatial units in LADM terminology) constrained to be within one surface 2D parcel?	<p>Primary tenure 3D parcels are initially created through excision from a base 2D parcel. Subdivision of a 2D parcel to create a 3D parcel results also in a 2D 'remainder' or balance parcel.</p> <p>3D parcels may also be used to define secondary interests (i.e., sub-lease or easement). Secondary interests are always constrained to the extent of the primary tenure, whether they be defined by either 2D, or 3D parcels.</p>	No change expected
1.2. Are 2D and/ or 3D ambulatory ² boundaries permitted?	Both 2D and 3D ambulatory boundaries are permitted. For example, the ambulatory boundary feature originating from a standard format (2D) lot. may be used as the basis	No change expected

5. REPRESENTATION OF 3rd DIMENSION: HEIGHT (OR DEPTH)

This section refers to the representation and registration of the **third dimension**.

Questions	Status 2022	Expectations 2026
5.1. Are the height values of 3D parcels relative to local ground?	Registration: extent of volumetric parcels may be defined with combination of polar dimensions and rectangular co-ordinates; and levels on the Australian Height Datum. Approximate ground levels are sometimes shown.	No change expected
5.2. Are height values reduced to a standard datum (absolute)? If so, what is the spatial reference system for this 3rd ordinate?	Where so, it is Australian Height Datum (AHD 71)	No change expected
5.3. In principle, is it possible to store both relative and absolute height/depth values?	Registration: possible in principle but does not occur in practice.	No change expected
5.4. Is the earth surface (elevation) explicitly stored (in the DCDB or other accessible register)?	Not in the DCDB. There are other state datasets for topographical data.	Future spatial cadastres will better facilitate presentation of (DCDB) land boundaries relative to terrain and other state datasets.
5.5. What is the source of height values for the 2D surface parcel?	None, bearings and horizontal distance at average local terrain high	No change expected

Analysis

- Not always easy to compare the countries over time and to each other
- Reason the text is nice proza, but hard to assess
- Questions we would like to answer with our analysis
 - Are countries making progress?
 - How do countries compare to each other?
 - In which 3D aspect is a country strong/mature (and is improvement needed)?

Approach

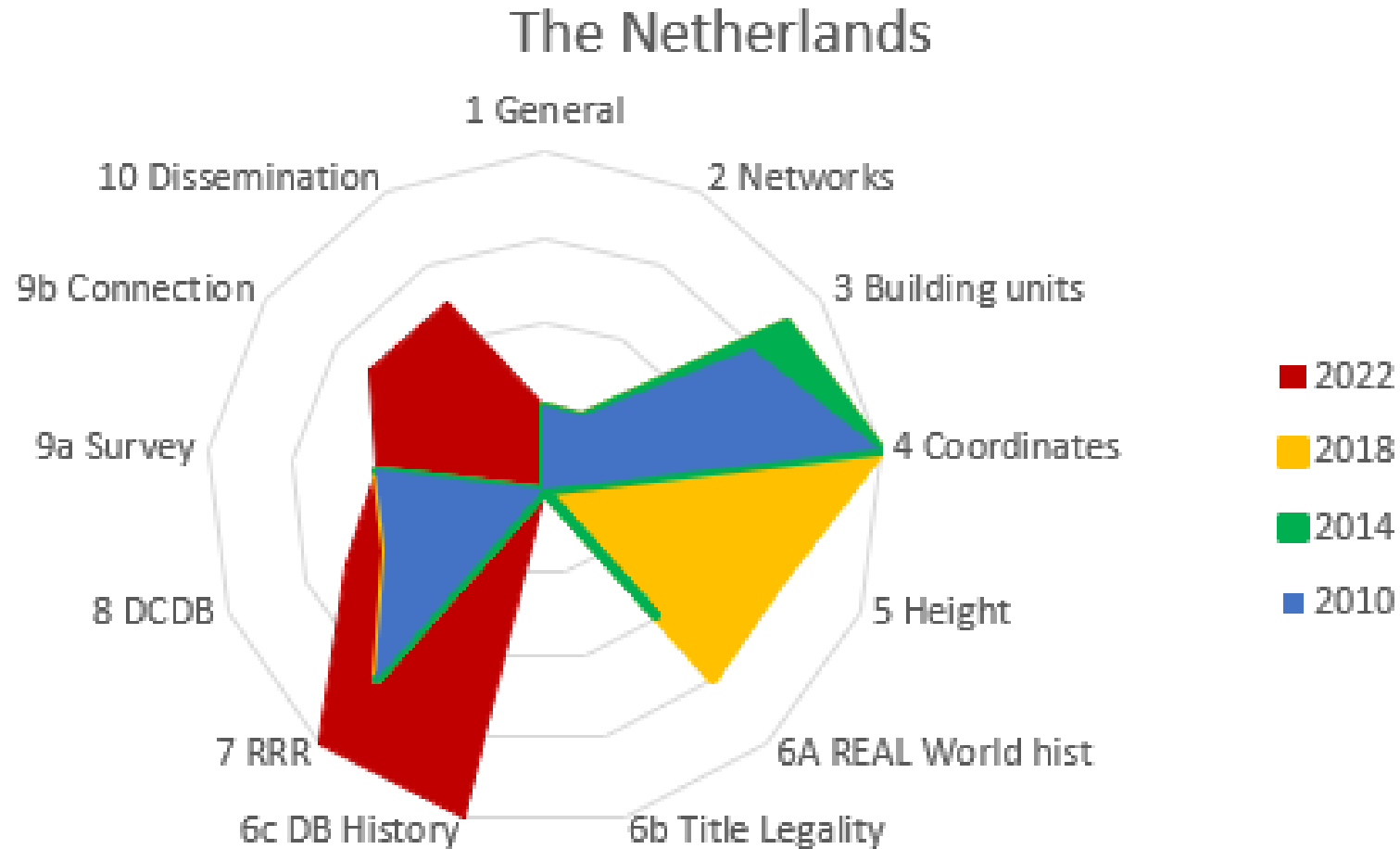
- Criteria for 3D (in line with questionnaire sections) are the basis for scoring
- Before scoring a **rubric** has been developed for all the 3D criteria
- For every country, for all the completed questionnaires:
 - **We** translated the text in the responses to a score
- Results are visually presented, analysed and

Rubric

Scoring	Description
SECTION 1 - GENERAL/ APPLICABLE 3D REAL-WORLD SITUATIONS	
0	3D spatial units are not recognised
2	3D spatial units recognised, but not as part of Cadastre/ LAS (with different legal system from 2D)
4	Legislation existing for 3D spatial units
6	Strata units and common property are recognised
8	Fully general 3D volumes are treated as first-class cadastral objects
10	Full LADM based support of 3D volumes.

SECTION 5. - REPRESENTATION OF 3rd DIMENSION: HEIGHT (OR DEPTH)	
0	No ground surface model or definition of 2D parcel elevations exists
2	2D parcels are defined in relation to local ground level, but not quantified
4	Jurisdictional height datum exists and is referenced
6	Ground surface elevation model exists but not is referenced by DCDB
7	Z-values are assigned on cadastral corners
8	Ground surface elevation model is carried within the DCDB (or is strongly connected)
10	Digital twin of the jurisdiction exists, including ground surface elevations

What happened in



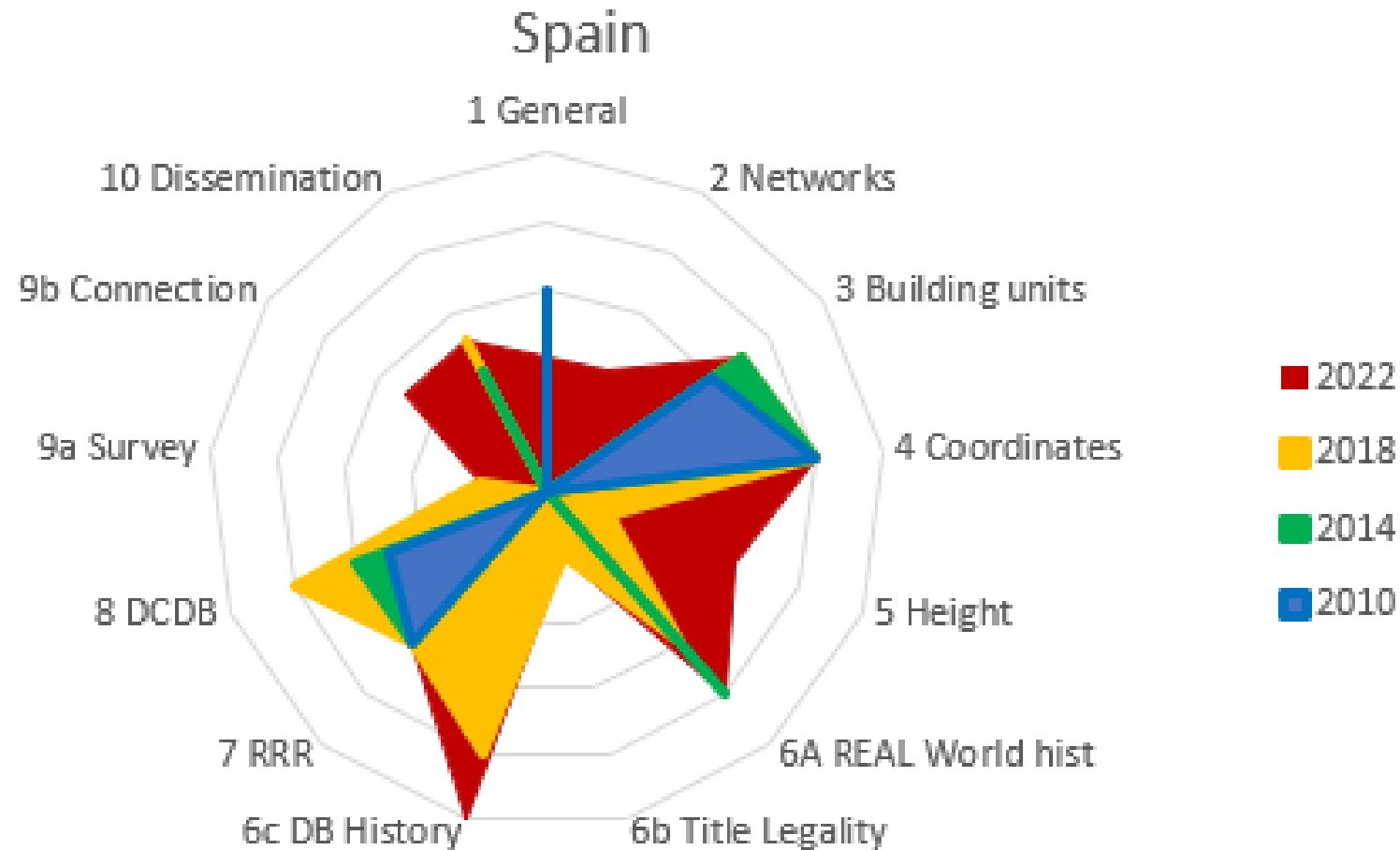
- Assuming progress score polygon are stacked, latest on the bottom
- This coloring shows when certain progress was

What happened in



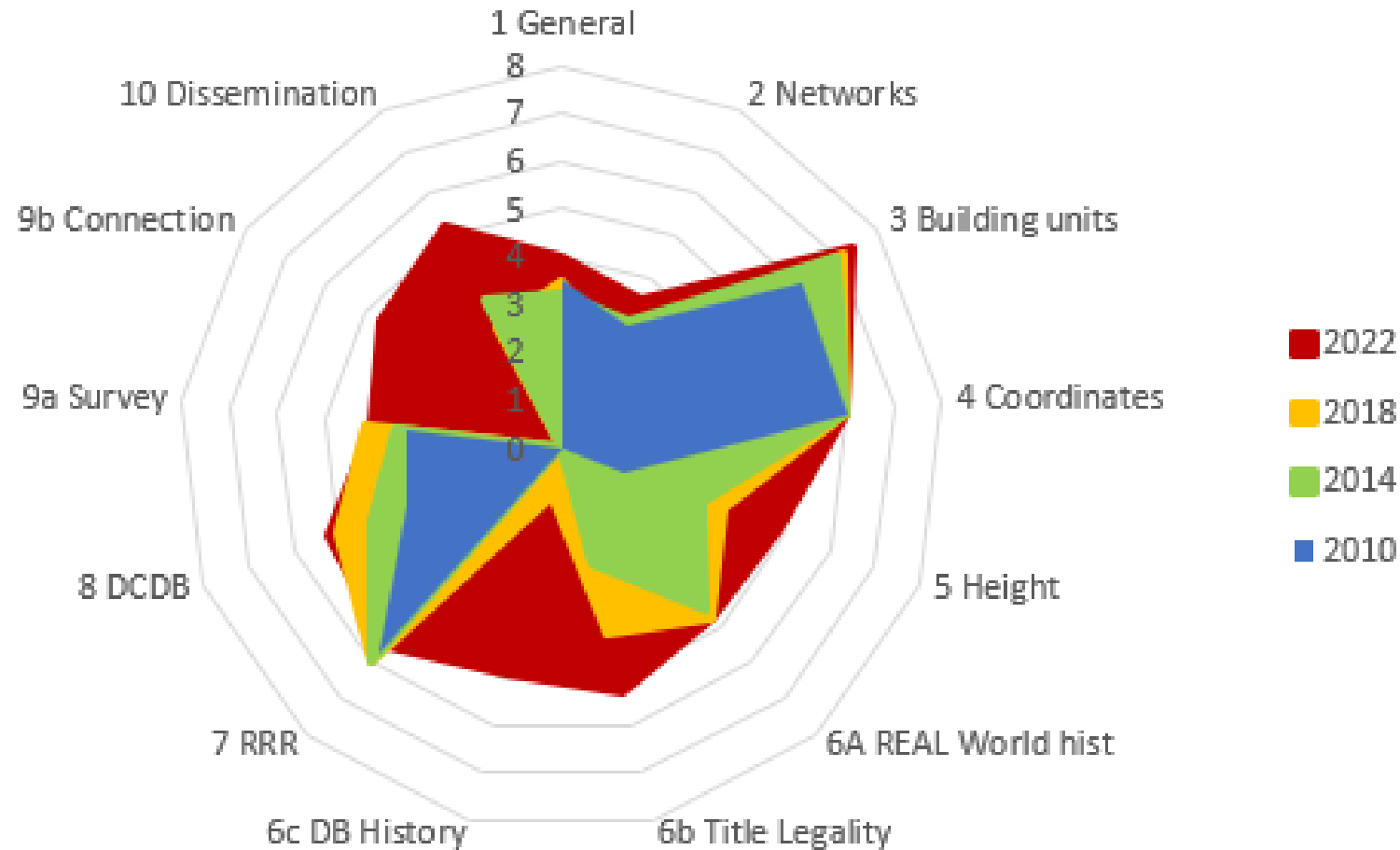
- Nice gradual growth over 4 time-spans
- Sections 1 (General) and 2 (legal spaces networks) scores rather low

What happened in



- Nice gradual growth over 4 time-spans
- Sections 6b (Title Legality) and 9a (Survey) scores rather low

All together, average of the jurisdictions



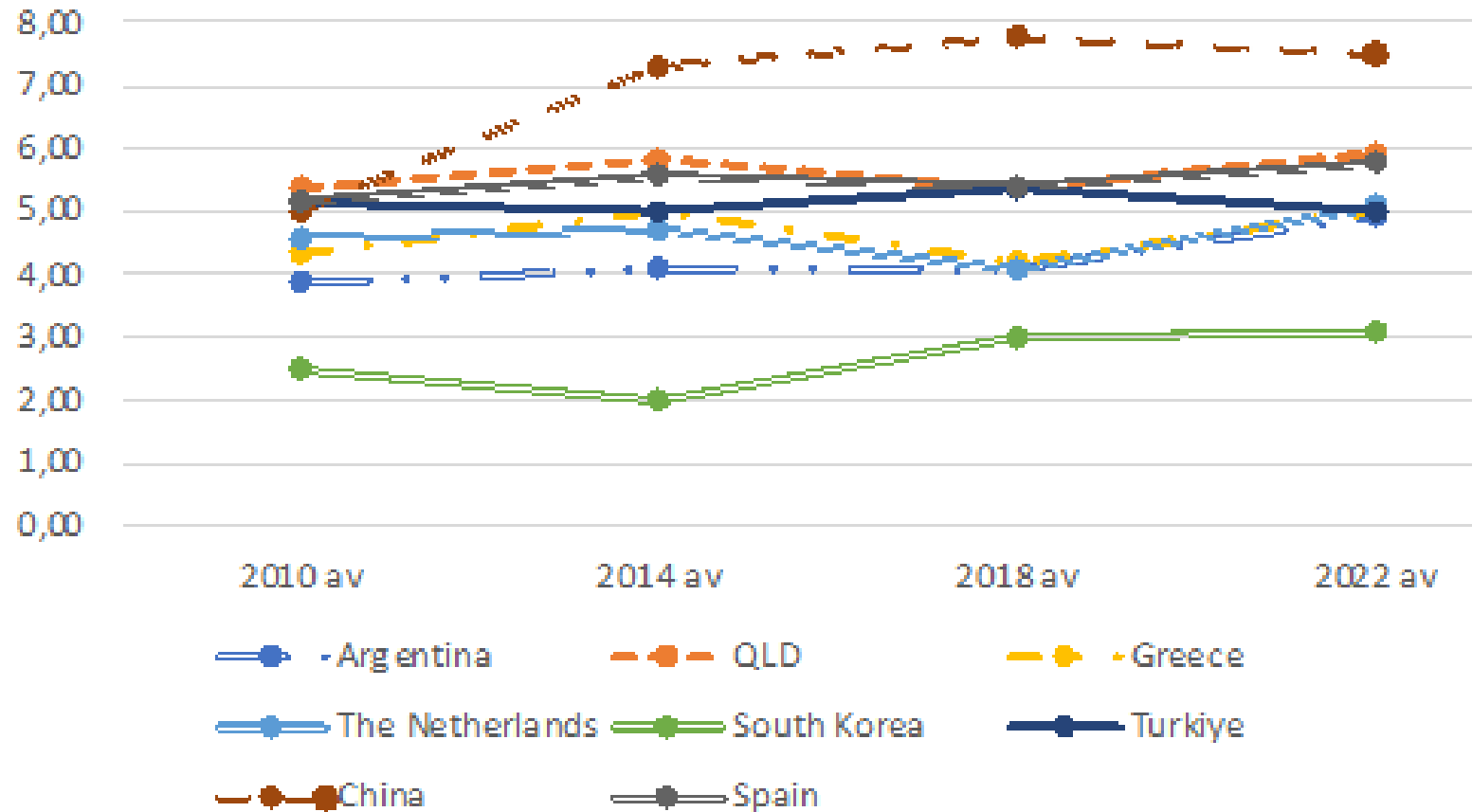
- Nice gradual growth over 4 time-spans
- 3D legal spaces of building units scores highest, networks lowest

Scoring, the year 2022, work in progress....

			1 General	2 Networks	3 Building units	4 Coordinates	5 Height	6A REAL World hist	6b Title Legality	6c DB History	7 RRR	8 DCDB	9a Survey	9b Connection	10 Diss- emination	3D parcels	2D parcels million	sq km million	pop million	Manhattan dist	avg
2	Argentina	2022	4	4	7	2	8	4	5	6	4	2	6	7	5	0	18,4	2,78	47,4	64	4,92
3	QLD	2022	8	4	8	2	2	4	10	8	8	5	8	5	5	377.000	2,24	1,7	5,3	77	5,92
4	NSW	2022	8	4	8	2	10	10	10	7	8	5	6	5	6	100.000	4,5	0,81	8,1	89	6,85
5	Greece	2022	0	2	7	8	2	10	5	7	6	5	4	5	4	0	4	0,132	10,43	65	5,00
6	The Netherlands	2022	2	2	7	8	6	6	0	8	8	5	4	5	5	2	9	0,041	17,5	66	5,08
7	South Korea	2022	0	2	9	0	0	0	10	0	6	4	0	5	4	0	45		55	40	3,08
8	Turkiye	2022	6	5	7	10	7	0	10	0		4	2	5	4	23.000.000	58,7	0,784	88	60	5,00
9	China	2022	8	5	7	10	8	6			6	9	6		10					75	7,50
10	Spain	2022	4	4	7	8	6	8	2	10	6	8	2	5	5	200.000.000	53,1	0,506	47,42	75	5,77
11	Malaysia	2022				10	8													18	9,00
12	Kenya	2022	4	4	7	10	2													27	5,40
13																					
14	Total	2022	32	28	59	48	39	38	42	39	44	42	32	37	42	223377002	190,44	5,943	271,05	522	42,26923
15	average	2022	4	3,5	7,375	6	4,875	4,75	5,25	4,875	5,5	5,25	4	4,625	5,25	27922125,25	23,805	0,742875	33,88125	65,25	5,283654

- Even with rubric, the scoring is still hard, or even ambiguous
- May be we should consider 'self-scoring'

Visually presenting some aggregated results



- Most countries make very slow progress, according to their responses

Conclusion

- Scope of LADM is getting wider to cover all Land Administration functions (tenure, valuation, plan information)
- LADM share is quite significant (and in 4 countries even including 3D)
- Design sources (BIM/IFC) are being used more and more:
 - **general boundaries approach for apartments**
- More systematic analysis of all questionnaires (2022, 2018, 2014, 2010) for many countries was conducted based on a rubric
- Quite often the responded texts were not easy to interpret and score
- **Feedback of countries on their scores (given by us) is appreciated**
 - **May be corrections are needed**
 - **In next edition (2026) introduce, self-scoring?**
 - **Question: merge this questionnaire and the cadastral template?**

Thanks for listening!