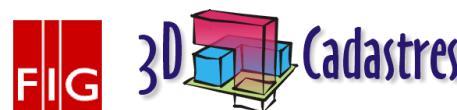


3rd Questionnaire 3D-Cadastral: status January 2019



Indonesia

This questionnaire is an activity of the FIG working group 3D-Cadastral 2018-2022. The purpose of the survey is to make a world-wide inventory of the status of 3D-Cadastral at this moment and the plans/expectations for the near future (2022). By sharing this information, it should be possible to improve cooperation, learn from each other and support future developments. This is the third time that the questionnaire on 3D-Cadastral is conducted by the FIG working group on 3D-Cadastral. The first time was in 2010 in order to document the status in 2010 and expectations back then for 2014. This was followed by second questionnaire in 2014 (with status 2014 and expectations 2018). The earlier responses have been analysed and reported on (van Oosterom et al. 2011, Karki 2013, van Oosterom et al. 2014). For more information on the FIG working group on 3D-Cadastral see the website www.gdmc.nl/3DCadastral. Now a few notes and suggestions, which should be helpful when completing the questionnaire:

- The conceptual model used as background for the 3D Cadastres questionnaire is the ISO 19152 standard (ISO, 2012): the Land Administration Domain Model (LADM).
- In this questionnaire the concept of 3D-Cadastral with 3D parcels (or 3D spatial units in LADM terminology) is intended in the broadest possible sense. However, what exactly is (or could be) a 3D parcel is dependent on the legal and organizational context in the specific country (state, province). 3D parcels include land and water spaces, both above and below surface.
- A more formal definition: A 3D parcel is defined as the spatial unit against which (one or more) unique and homogeneous¹ rights (e.g. ownership right, lease or other land use right), responsibilities or restrictions are associated to the whole entity, as included in a Land Administration system.
- As the definition above is quite abstract, it is tried in the questions to be more specific and real world situations are used. Many examples with partial/preliminary answers from 2010 and 2014 are available on-line at <http://www.gdmc.nl/3DCadastral/participants/>. Inspecting some of the completed 2010 and 2014 questionnaires from different other countries might help when formulation the answers for your jurisdiction.
- A 3D parcel is a 'legal object' describing a part of the space. Often there is a relationship with a real world/physical object, which can also be described in 3D. Please be aware of the difference between these two types of objects and that the focus in the context of 3D-Cadastral is on spaces of the legal objects and not the registration of the physical objects as such.
- If a certain question is not relevant or if you have no clue what to respond, do not spend any time on this (and leave the field blank).
- The questionnaire has been prepared by Rod Thompson, Sudarshan Karki, Alias Abdul Rahman, Hendrik Ploeger, Christiaan Lemmen, Anna Shnaidman, Peter van Oosterom. The questionnaire is grouped in the number of blocks. This has no meaning in the sense of priority and it is often the case that a question could belong to multiple blocks. Please do not feel disturbed by this.
- Similar to the earlier Questionnaires on 3D-Cadastral, the completed forms will be made available on website of FIG working group on 3D Cadastres.
- Please complete this questionnaire before *15 December 2018* and send it to A.Shnaidman@tudelft.nl (or Anna Shnaidman, TU Delft, OTB, P.O. Box 5043, 2600 GA Delft, The Netherlands).

¹ Homogenous means that the same combination of rights equally apply within the whole 3D spatial unit. Unique means that this is the largest spatial unit for which this is true. Making the unit any larger would result in the combination of rights not being homogenous. Making the unit smaller would result in at least 2 neighbour 3D parcels with the same combinations of rights.

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 2018	Expectations 2022
1.1. Are all 3D parcels (3D spatial units in LADM terminology) constrained to be within one surface 2D parcel?	Yes, but formal registration is only applied to apartment rights (so called HMSRS or ownership rights of strata title)	Formal registration should not only be limited to apartments (mix use 3D spatial units as offices/shops, apartment rooms)
1.2. Are 2D and/or 3D ambulatory ² boundaries permitted?	3D boundaries formally refer to 2D parcel boundaries. Hanging rooms/buildings over other 2D ownerships must be approved by local government and must have legal agreements between land owners, but no 3D spatial description	Legal registration to 3D spaces/boundaries requires (digital) representations of 3D boundaries
1.3.a. Is it allowed to have 3D parcels (spatial units) not related to physical constructs or objects? (e.g. airspace, subsurface volumes)	Yes, but legal agreements and central/local government approval are required	Yes
1.3.b. If 1.3.a positive: approximately what proportion of new 3D parcels (spatial units) would involve such cases (not related to physical object)?	Current phenomenon allow mix-use bridge, mix use shops/cafes/offices/hotel over road or other 2D parcels	Legal framework should be determined clearer than now
1.4. Are disconnected parts of a single 3D parcel allowed?	Most probably not allowed	Not allowed
1.5. Spatial limitation – e.g. must the 3D parcel be related to a closed volume or is it allowed to have ‘open’ or unbounded 3D parcels (e.g. towards the sky).?	Most probably allowed if its built on its own 2D parcel	Allowed with restrictions (legally registered and approved)
1.6. Are curved surfaces to bound the 3D parcels allowed?	Most probably allowed if its built on its own 2D parcel	Yes
1.7. Must the curved surfaces (if allowed) be cylindrical sections, or any other constraint?	No criteria for this but as long as the building permit is given and the building is built on its own parcel, it is possible to have such curved surfaces	No
1.8. Any other constraints – e.g. all	Idem with 1.7.	

² An ambulatory boundary is a boundary of a land parcel which follows the movements of a natural feature such as a river. Its position determined at points of time (when a survey is carried out), but between such “fixes”, the definition of the property is the position of the real world natural feature.

surfaces must be horizontal or vertical?		
1.9. Is there legislation (law and/or regulations) for 3D descriptions of parcels? If so please, mention law and article(s).	Law No 20/2011 on Apartment and Government Regulation 4/1988 (as an implementing rules for former Apartment Law No. 16/1985) article 41 about 3D geometric definition of strata title. Unfortunately government regulation for new apartment Law 20/2011) were not available.	New Land Law (currently discussed in parliament) should cover 3D parcel registration (3D cadaster + registration of rights restrictions and responsibilities based on clear 3D geometric representation of RRR)
1.10. Is the legal text available in original language?	Yes	
1.11. Is the legal text (relevant part) available in English translation?	No	
1.12. Do you have example descriptions of typical 3D parcels; either 'prototype' or 'operational'?	Yes	
1.13. Is there a formal model for the 3D parcels (UML style); e.g. based on ISO TC211 series (especially LADM, ISO 19152)?	Yes, university research product of master thesis	Yes
1.14. Are natural resources (groundwater, mining rights, geo-thermal extraction and storage) shown in your land administration? If yes, are they considered as 3D parcels (spatial units) with RRRs attached? What about mining concessions (could be limited in time)?	No	Yes
1.15. Are legally restricted spaces, above or below, such as polluted areas considered as 3D parcels?	Not yet	Yes
1.16. Are spatial plans considered as 3D parcels (as rights or restrictions are related to them)? Sometimes also called spatial development plans, zoning plans or physical plans (land use, urban, regional, environmental,...)	Not yet	Yes
1.17. Is there a Marine Cadastre? And if so, are 3D parcels included in this registration. Is the IHO Maritime Limits and Boundaries standard (S121) in use or under implementation?	Yes, but not 3D	Yes with 3D
1.18. Is there any organised legal instrument for the management of common property?	Yes	Yes
1.19. Which agency is responsible for the recording of titles information?	ATR/BPN ministry of Agrarian and Spatial Planning/ National Land	

	Agency	
1.20. Which agency is responsible for recording cadastral transactions?	ATR/BPN ministry of Agrarian and Spatial Planning/ National Land Agency at local level	
1.21. Are transactions for standard 2D lots and 3D lots done by the same agency or titles office?	Yes	
1.22. Are there any 3D storage permissions recorded (e.g. underground storage of CO2)?	No	
1.23. Any other geometric issues related to 3D parcels?	3D geometric representations are not stored in national land information system	

2. Infrastructure/utility networks

This refers to the situation where an infrastructure network is considered to be defined within the land administration. For example in some jurisdictions, an underground network might be privately constructed for the purpose of leasing space in it for other organisations to run cabling. In this case, a network, or part of that network may be considered to be a real estate object.

	Status 2018	Expectations 2022
2.1. Do you register networks as an entity in the land administration? (e.g. subterranean conduit networks)	No	No
2.2. If so, then (a) can the network structure be viewed graphically in the land administration? (b) can the network structure be traced in the database(s)? (c) are networks registered by means of a cadastral identifier (such as a 'parcel number')? (d) are RRRs and parties attached to these network objects?	(a) No (b) Yes but not in land administration system (c) No (d) Not yet	(a) ideally yes (b) ideally yes (c) ideally yes (d) ideally yes
2.3. Does the jurisdiction have private networks? If so please, mention law and article(s).	yes, water and telecommunication networks , many legal/institutional law attached to infrastructure installation	In process
2.4. If so, are they registered as 3D property parcels (spatial units)?	No	In process
2.5. Is the text of relevant laws or regulations (question 2.3) available in original language? If so, give references to relevant document(s).	Law on telecommunications Local law on clean water	
2.6. Is the text of laws and regulations (relevant part) available in English translation?	No	
2.7. Do you have example descriptions of typical 3D parcels (spatial units) for networks; either 'prototype' or 'operational'?	No	No plan yet by govt
2.8. If the network (legal) objects break at the surface parcel, how do you deal with intersecting networks or vertically parallel networks?	Network has been registered thus not considered as legal objects but only seen as "use rights"	No plan
2.9. Any other geometric issues related to the registration of networks?	In reality many overlapping and conflicting overlays but no institution/agency is mandated for coordination in terms of spatial management	No plan

3. Construction/building units

This refers to 3D properties that are related to constructions and apartment (condominium) buildings. The individual units are often defined by the actual walls and structure of a building, rather than by metes and bounds. E.g. “unit 5 on level 6 of ... building”.

	Status 2018	Expectations 2022
3.1. Do you register legal spaces for 3D construction/building units (separate from the land)?	Yes	
3.2. If so, what are the conditions for doing so, and what are the most important types? E.g. apartment units (at least 2 or more in building), or also other buildings or even more general constructions (infra related; such as bridge, tunnel or even other, such as windmills,..)	Building is not registered as a property, but 3D parcel (apartment) must be within the building. Share parts and shared units were also entitled for land registration as “common rights”	Bridge, tunnel and other infrastructure will be registered
3.3. Does the jurisdiction have construction/building units? If so please, mention law and article(s).	Yes, Apartment Law And for building construction there is Building Law	
3.4. Is the legal text available in original language?	Yes	
3.5. Is the legal text (relevant part) available in English translation?	No	
3.6. Do you have example descriptions of typical 3D parcels; either ‘prototype’ or ‘operational’?	Yes	
3.7. What would be typical 3D boundaries in an apartment complex: middle of the wall and floor/ceiling, or walls, floors/ceiling as neutral/shared 3D space? Is it mentioned in any legislation or is it the convention?	Middle of the wall (specified in government regulation 16/85) and ceiling/floor as boundaries	
3.8. Is common property inside the building registered? If so, how?	Yes, as a package to property registration of apartment rooms, the developer must submit certificate of the common land parcel, floor plan (2D/3D) and shared proportional values (<i>Nilai Perbandingan Proporsional</i> – in local) that encompasses proportional values of floor plans of each room including common property (e.g. parking lots, corridor, common rooms)	
3.9. Who owns the common property inside the building?	The association/group of apartment owners (specified	

	in law)	
3.10. Who owns the land on which the apartment is built?	Can be individual or a group of people (different with apartment owners)	
3.11. Do you allow sub-division of apartments or apartment blocks?	Yes for apartments meet the criteria (e.g, eligible minimum areas)	
3.12. Can the land on which the building is built be sub-divided or sold or mortgaged without the consent of majority of the apartment owners?	No	
3.13. What is the numbering convention for apartments (please specify in terms of cadastral parcel as well as street addressing)	Numbered based on : Building Unit/Tower Name/Number – Floor – Rooms	
3.14. Any other geometric issues?	No	

4. X/Y Coordinates

	Status 2018	Expectations 2022
4.1. Do the plans of survey guarantee X/Y coordinates? (and are they relative or in an absolute spatial reference system?)	Only focus on area (X,Y of any floors in or within the apartment) on a plane reference system (TM-3)	
4.2. Are the cadastral database coordinates authoritative?	Yes for land parcels but only points for individual apartments	
4.3. If not, what is the authoritative source of X/Y coordinates?	All are registered and stored at National land registration Information System (geoKKP)	
4.4. Do you have parcels defined by the walls of a building (with no recorded geometry)?	No that I know	
4.5. What is the spatial reference system for X/Y Coordinates?	TM-3	
4.6. When owners receive or purchase a copy of the plan what can they see on the plan to help them identify their parcel/lot (e.g. bearings and distance, identifying corners or recovery marks, neighbouring lots, coordinates etc.)?	Distances and orientation on the letter measurements	
4.7. Have there been any changes made in the way cadastral information is recorded and represented from a historical point of view?	Yes for 2D but not for apartment units	
4.8. Any other X/Y coordinate issues?	No	

5. Representation of 3rd dimension: height (or depth)

	Status 2018	Expectations 2022
5.1. Are the height values of 3D parcels relative to local ground?	Yes	Should operational
5.2. Are height values reduced to a standard datum (absolute)? If so, what is the spatial reference system for this 3 rd ordinate?	Not yet	Yes
5.3. In principle possible to store both relative and absolute height values?	Only 2D	3D
5.4. Is the earth surface (elevation) explicitly stored (in the DCDB or other accessible register)?	No	Yes
5.5. What is the source of height values for the 2D surface parcel?	Ellipsoid Datum (WGS 84) but not recorded on the system	Mix of global geoid and local observations
5.6. How is elevation information recorded in the cadastral plan or database?	No	Yes
5.7. Do you expect the elevation recorded in cadastral plans to be used for any other purpose (e.g. city models or civil constructions etc.)?	Not yet implemented	Should be implemented
5.8. Any other 3rd dimension ordinate value issues?	Yes	

6. Temporal Issues

	Status 2018	Expectations 2022
6.1. Are temporal limits part of the definition of a parcel (2D or 3D)?	By system no	
6.2. Are moving parcels allowed?	Not yet defined	
6.3. Are there any limitations on the range of temporal limits? (e.g. only on 3D apartments).	No	
6.4. Are there any attempt to integrate 3D space and temporal representations, into a single 4D space/time representation?	It has been implemented for all property registration especially for 2D but nt with 3D (because no required 3D geometries stored in databases only points)	
6.5. In the case of tidal boundaries, what happens to the 3D ambulatory parcel if the 2D land parcel changes extent due to the movement of High Water Mark?	Not yet defined but that happens	
6.6. In case 3D Marine Cadastre is present and moving boundaries are allowed, how is this represented? E.g. using 4D geometry and topology.	Not yet defined	
6.7. Can time bound rights be created and extinguished in the title? (e.g. temporary titles created for a period and when the time is up it can be extinguished)?	Yes	
6.8. Is it possible to identify all the changes made by any operator to the cadastral plans or database and to rollback if there is an error made?	By GeoKKP system yes but not specifically to 3D	
6.9. For Cadastral transactions, how far in time do buyers need to make a search to ensure the title or deed is legal?	By procedure should be directly after the title is delivered to land/property owners	
6.10. Any other temporal issues?	It is not implemented in 3D LIS but the prototype has been built	Should be included in the national system

7. Rights, Restrictions and Responsibilities

	Status 2018	Expectations 2022
7.1. Range of RRR on 3D parcels.	Only Rights	3R + BIM
7.2. Are there any limitations on the range of rights related to 3D spatial units? (e.g. subterranean parcels must be owned by Govt).	Leashold apartment are commonly offered/given to specific community (e.g. students, subsidised households)	
7.3. Are there any limitations on the range of restrictions or responsibilities related to 3D spatial units? (i.e. currently in use and related to 2D spatial units, but that would not be applicable to 3D).	currently in use and related to 2D spatial units, but that would not be applicable to 3D	
7.4. Are there RRRs that are only allowed in 3D (and not valid for 2D)	Maximum Building/Tower developments	
7.5. Is there specific legislation (laws, regulations) defining 3D RRR types? If so, provide details, e.g. references to documents/ articles.	Not yet	
7.6. Can 3D sub-surface/above-surface parcel be owned by someone other than the person owning the land parcel?	Yes	
7.7. What applications do you foresee for 3D land administration?	Property registration only (but not with 3D geometries)	Property registration and use/spatial plan/zonation
7.8. Are the administrative source documents (source of RRRs) title or deed based?	Yes - Land Title/Certificate - Floor Plan - Proportional shared values	
7.9 Who is responsible for the correctness of the specified 3D boundaries in spatial source documents (which authority)?	Land office	
7.10. Is registration of 3D parcels done inside the cadastral mapping agency, the land registry or elsewhere?	Cadastral mapping and land registry (Kementrian ATR/BPN)	
7.11. Are 3D registrations handled by the same organisation that handles traditional (2D) land administration?	Yes	
7.12. Do you supply paper-based titles or deeds or proof of ownership? If yes, does this contain depictions of the 2D or 3D parcel?	Paper-based titles	
7.13. Is the 3D registry separate or integrated with the 2D registry?	Integrated	
7.14. Any other RRR issues?	No	

8. DCDB (The Cadastral Database)

	Status 2018	Expectations 2022
8.0. Is database schema LADM based?	Yes	
8.1. Does the DCDB contain representation of 3D parcels (in any form)?	Not required	
8.2. If so, how are they represented (in the DCDB)?	Points	
8.3. If so, how are they presented on cadastral “maps” (including screen presentations)?	Only 2D common parcels are presented but apartments built/located on it not presented individually only linked to textual databases on their individual apartments’ right registration	
8.4. Are there possibilities to store geometry of 3D parcels in the DCDB?	Not yet	
8.5. Is it possible to manage a 3D topological structure in the DCDB?	Not yet implemented	
8.6. Are constraints/rules defined for valid 3D objects (closed volume, no overlap, no gap in 3D)? What about rules for a mix of 2D and 3D representations?	Not yet implemented	
8.7. How can internal and external user query and visualize the 3D content supporting rotating, slicing, transparency, perspective (3D web/view service, 3D pdf documents,...)?	Not yet implemented	
8.8. What Spatial DBMS software do you use? Any 3D capabilities included and used?	Oracle Spatial	
8.9. Do you have any validation rules for 3D representation in the database?	Not yet implemented	
8.10. What (GIS/CAD) software is used for updating, editing, analysis, and visualization of the cadastral data? Any 3D capabilities included and used?	AutoCAD Map	
8.11. What web software is used for remote data access/distribution and visualization? Any 3D capabilities included and used?	Not yet implemented	
8.12. Is your DCDB organised as Multi-Layers or Object Oriented or some other data model?	OO but Not yet implemented for 3D	
8.13. How do you query 3D objects in your DCDB?	Textual query	

8.14. Is it possible to query neighbourhood parcels to a 3D object, vertically as well as horizontally?	No only limited to neighbouring 2D land parcels	
8.15. Any other DCDB issues?		

9. Plans of Survey (including field sketches)

	Status 2018	Expectations 2022
9.1. Do the survey plans carry 3D parcel representations?	Yes	
9.2. If so, how are they represented?	Simple volumes	
9.3. Is there specific legislation (regulations) describing the requirements for Plans of Survey in 3D? This could cover: a. accuracy/quality, b. 3D survey method, c. conceptual information model survey plan, d. portrayal rules for graphic representation, e. format or encoding for submission. If so, please give link to the relevant documents.	a. accuracy : distances tied to 2D survey b. 3D survey method: distance measurements (length and diagonal) using distometers based on 3D floor plan or with Total Station c. validating floor plan d. no specified e. CAD submission	
9.4. Is sketch level allowed (low geometric quality, but in principle enough to indicate the 3D object)?	Yes, because it is not specified yet	Strictly specified
9.5. Is it possible to define a 3D parcel by referring to other 3D real world objects/ topography (and not specifying coordinates)?	Yes	
9.6. In what format are the 3D parcels submitted for registration; attached to legal document in a single pdf (which has good 3D capabilities) or in an extension of (city)GML for 3D parcels, or....?	Only survey activities to validate area	
9.7. Are the 3D parcels somehow checked for spatial validity; e.g. volume is closed, does not overlap with neighbour volume (and also no unwanted 3D gaps)?	Yes see 9.6	
9.8. Do you have examples of (prototype or production) 3D survey plans available?	Yes	
9.9. Are any reference objects visible on the survey plan (e.g. real buildings, roads, that is 3D topography)?	No	
9.10. What form of 3D data acquisition is used (CAD, terrestrial surveying, sketches, stereo/oblique images, laser scanning,...)?	Terrestrial survey and laser distance	
9.11. What software do you use for creating and processing survey plans? Any 3D capabilities included and used?	CAD	But not 3D representations
9.12. Can 3D parcels be subdivided,	As long as legal	

consolidated or nullified?	requirements (Akte pemisahan – deed separation and NPP are renewed, they can be extended/grouped)	
9.13. Is there any existing technical circular or directive to assist Surveyors in 3D data collection in the field?	Yes in 2013	
9.14. Are the surveyors required to undertake a field survey for 3D cadastral data?	Yes	
9.15. Are building construction plans used to compile 3D cadastral information for apartments?	Yes	
9.16. Is 2D/3D field survey done by private licensed surveyors or by government surveyors?	Both can do	
9.17. Are plans of survey created for each new 2D/3D parcel or are they updated in an index map or a cadastral database.	Yes but only as points	
9.18. Do you show dimensions or isometric views of 3D parcels on survey plans (do you also store this in a database)	No	
9.19. Do the cadastral survey plans differentiate between different types (e.g. volumetric plans, building plans and standard 2D plans)?	No	
9.20. What are the usual elements shown on the plan (e.g. North Arrow, Marks table, Observation table, Administrative data, Plan face and dimensions etc.?)	North Arrow, Administrative data, plan face and dimension	
9.21. Are authoritative cadastral surveys carried out by government surveyors or private licensed surveyors or both?	In case licensed surveyors did, validation and verification were required to be done by land office	
9.22. What is the legal description of a cadastral boundary (e.g. coordinates or bearing and distance or lines on plan or any other)?	Coordinates (X,Y) Distance and height measurements	
9.23. How much time does it usually take for a subdivision process to complete?	Up to 90 days for first registration	
9.24. What is the legal source for cadastral representation (e.g. cadastral plans, or DCDB or index plans or descriptive sketch/text etc.?)	Cadastral maps (to show common parcels)	
9.25. What is the positional accuracy of the cadastral plans (e.g. boundaries may be accurate but may not be referenced	Referred to common land parcels	

in datum properly)?		
9.26. Any other survey plan issues?		

10. Dissemination of 3D Cadastral information

	Status 2018	Expectations 2022
10.1. Is there a general purpose web-based dissemination of 2D cadastral (graphical or text) information (e.g. a portal for the public or for professionals)? If yes, does it include 3D data?	Yes Not include 3D data	
10.2. Are specific file formats or standards used to distribute 3D Cadastral information? (e.g. LandXML, CityGML, BIM/IFC, 3D pdf,...)	Not yet specified The proootype by ATR/BPN (2013) in KML	Should be specified
10.3. Are there specific cartographic styling rules for representing 3D cadastral plans, or to represent 3D cadastral objects on 2D cadastral maps?	Not yet implemented	
10.4. Are there specific cartographic styling rules for 3D cadastral maps (models; e.g. as disseminated in 3D pdf)? If yes, are there 3D specific cartographic rules developed or being developed?	Not yet implemented	
10.5. Is the 3D Cadastral information accessible in integrated manner with the 2D Cadastral information?	Yes as textual information	
10.6. Are there specific symbols on the 2D cadastral map (paper, digital or web-based) indicating the presence of 3D Cadastral objects (and in web-context perhaps even linked)?	Yes digital and web-based	
10.7. Is the legal information (RRRs and Parties) available in integrated manner in dissemination portal with the 3D Cadastral objects? (even if source of legal data may be a different organization, but then use information infrastructure approach)	Not yet implemented	
10.8. Are 2D/3D cadastral data available to the general public or just to the relevant parties?	No	
10.9. Any other 3D cadastral information dissemination issues?		

11. Statistical information

This part of the questionnaire refers to statistical information (and is most relevant for jurisdictions with parts of 3D Cadastre registration operational, but all are encouraged to complete this section, and especially the expectations for 2022).

	Status 2018	Expectations 2022
11.1. What is the smallest 2D and 3D parcel that is present/ allowed to be registered in the land administration?		
11.2. What is the largest 2D and 3D parcel that is present allowed to be registered in the land administration?		
11.3. What is the typical (or average) size of 2D and 3D parcels which are registered in the land administration? Subdivide by nature of 3D parcel when relevant (e.g. related to building, apartment, airspace, tunnel,...)		
11.4. How many 2D and 3D parcels do you currently have in your land administration?		
11.5. Which year did you start registering 3D parcels in the land administration?		
11.6. What is the ratio of 3D parcels in rural vs. urban areas?		
11.7. Please specify names of cities or towns or suburbs or regions or locations where there are significant numbers of 3D parcels.		
11.8. Please provide the following data: (a) Size of jurisdiction in square kilometres (b) Current number of 2D parcels (c) Current number of 3D parcels (d) Current population		
11.9. Approximately what are the proportions of various types of the 3D parcels (related to apartments, subsurface parking, subsurface shopping centres, bridges, tunnels, airspace, utility networks, etc)?		
11.10. Approximately what surface area of the jurisdiction is affected by 3D parcels (the total area of all the footprint of all 3D parcels).		
11.11. Any other interesting statistical fact(s)?		

12. Reflection

This section is only relevant in case also in 2010 and/or in 2014 the 3D cadastres questionnaire for your jurisdictions was completed (otherwise skip this section).

	Remarks
12.1. Compared to the 2010 and 2014 expectations, which 3D land administration developments did go faster than expected?	
12.2. Same question, but now, which developments did go slower than expected?	
12.3. If some (limited) form of 3D Land administration functionality has become available, what are the observed benefits? And for who?	
12.4. What are the (top-3) challenges of issues to be addressed to realize further 3D Land administration progress?	
12.5. In case of not yet fully operational status, were there any 3D Cadastre registration pilots to take steps towards more full implementation?	
12.6. In case of known legal barriers, have there been made progress in creating and adopting new legislation to support 3D land administration?	
12.7. Any other reflections?	

13. Other Issues

Please include any other issues that may be of interest in an international context. For example, in some foreign jurisdictions 3D parcels can only be separated by horizontal planes.

	Remarks
13.1. Country (State, Province)	
13.2. Your name, function/position and your organization	
13.3. Contact details: address email, telephone	
13.4. Other issues	

References

ISO 19152:2012 'Geographic information - Land Administration Domain Model (LADM),
http://www.iso.org/iso/iso_catalogue/catalogue_tc/catalogue_detail.htm?csnumber=51206

Peter van Oosterom, Jantien Stoter, Hendrik Ploeger, Rod Thompson and Sudarshan Karki (2011).
World-wide Inventory of the Status of 3D Cadastres in 2010 and Expectations for 2014. presented at
the FIG Working Week 2011, Marrakech, 21 p.
http://www.gdmc.nl/3DCadastres/literature/3Dcad_2011_02.pdf

Sudarshan Karki (2013). 3D Cadastre Implementation Issues in Australia. MSc Thesis, University of
Southern Queensland (Master of Spatial Science Research), 162 p.,
http://eprints.usq.edu.au/23560/1/Karki_2013_whole.pdf

Peter van Oosterom, Jantien Stoter, Hendrik Ploeger, Christiaan Lemmen, Rod Thompson, Sudarshan
Karki (2014), Initial Analysis of the Second FIG 3D Cadastres Questionnaire: Status in 2014 and
Expectations for 2018, In: Proceedings 4th International Workshop on 3D Cadastres, pp. 55-74,
http://www.gdmc.nl/publications/2014/Second_FIG_3D_Cadastres_Questionnaire.pdf