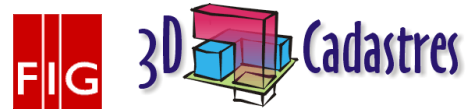


3rd Questionnaire 3D-Cadastral: status August 2019



Slovenia

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?	NO	NO (In the proposal of the new Real estate Act, this issue has not been considered; additionally, there are several cases where 3D parcels are not within one surface parcel)
1.2. Are 2D and/or 3D ambulatory ² boundaries permitted?	NO	
1.3.a. Is it allowed to have 3D parcels (spatial units) not related to physical constructs or objects? (e.g. airspace, subsurface volumes)	NO	
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)?	/	
1.4. Are disconnected parts of a single 3D parcel allowed?	YES, for condominium units that are defined based on 2D+ (vectors data for floor plans) floor plans (and not as a 3D parcel)	
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).?	Currently, the system does not include 3D-parcels, a land parcel is represented in 2D as polygon feature, but according to the principle "superficies solo cedit", RRR extend above and below the land parcel defined on the Earth’s surface. Exceptions are (1) the right of superficies (the right to own a building above or beneath the land owned by a third person), and apartment ownership (condominium). The right of superficies and apartment rights separate the	

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.

	ownership of physical objects from the land itself.)	
1.6. Are curved surfaces to bound the 3D parcels allowed?	NO	
1.7. Must the curved surfaces (if allowed) be cylindrical sections, or any other constraint?	/	
1.8. Any other constraints – e.g. all surfaces must be horizontal or vertical?	NO	
1.9. Is there legislation (law and/or regulations) for 3D descriptions of parcels? If so please, mention law and article(s).	NO	
1.10. Is the legal text available in original language?	YES	
1.11. Is the legal text (relevant part) available in English translation?	YES	
1.12. Do you have example descriptions of typical 3D parcels; either ‘prototype’ or ‘operational’?	YES (prototypes)	
1.13. Is there a formal model for the 3D parcels (UML style); e.g. based on ISO TC211 series (especially LADM, ISO 19152)?	NO	
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	
1.15. Are legally restricted spaces, above or below, such as polluted areas considered as 3D parcels?	NO	
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,...)	NO	
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?	NO	
1.18. Is there any organised legal instrument for the management of common property?	YES	
1.19. Which agency is responsible for the recording of titles information?	Land registry (Court)	

1.20. Which agency is responsible for recording cadastral transactions?	State Surveying and Mapping Agency	
1.21. Are transactions for standard 2D lots and 3D lots done by the same agency or titles office?	YES (2D lots and condominium units)	
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?	2D floor plans combined only with floor and ceiling height, do not provide enough information for unambiguous 3D reconstruction of building units	

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)	YES, but in separate Utility cadastre	NO (We are preparing new legislation where this issue will be included in spatial akct)
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 (not officially, but data is open and can be used in a GIS) b) YES c) NO d) NO	
2.3. Does the jurisdiction have private networks? If so please, mention law and article(s).	NO	
2.4. If so, are they registered as 3D property parcels (spatial units)?	NO	
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).	YES (Rules on the contents and the manner of maintaining the actual land use database, Official Gazette of RS, 9/2004 and 7/2018)	
2.6. Is the text of laws and regulations (relevant part) available in English translation?	YES	
2.7. Do you have example descriptions of typical 3D parcels (spatial units) for networks; either 'prototype' or 'operational'?	YES (prototype)	
2.8. If the network (legal) objects break at the surface parcel, how do you deal with intersecting networks or vertically parallel networks?	The network objects do not have a legal meaning	
2.9. Any other geometric issues related to the registration of networks?	Many (historic) data on networks are of low quality due to the various data sources	

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	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,...)	The right of superficies (for buildings) and apartment rights (at least 2 in a building) separate the ownership of physical objects from the land itself. No infrastructure objects can be registered.	
3.3. Does the jurisdiction have construction/building units? If so please, mention law and article(s).	YES, Law of Property Code (Official Gazette of RS, 87/2002 and 91/2013, articles 105 and 256)	
3.4. Is the legal text available in original language?	YES	
3.5. Is the legal text (relevant part) available in English translation?	YES	
3.6. Do you have example descriptions of typical 3D parcels; either ‘prototype’ or ‘operational’?	YES (prototype)	
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, as the wall thickness is not considered. Not strictly specified in the legislation.	
3.8. Is common property inside the building registered? If so, how?	YES, like other building units, based on floor plans	
3.9. Who owns the common property inside the building?	Co-ownership (in shares) or common ownership	
3.10. Who owns the land on which the apartment is built?	Co-ownership, the exception is the established right of superficies	
3.11. Do you allow sub-division of apartments or apartment blocks?	YES, If building permit allows it	
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)	Building identifier plus building unit identifier and this data is linked to the parcel number (currently we have a separate Land Cadastre and Building Cadastre). Register of adress is connected to buildings.	A unique Real Property Cadastre will be introduced
3.14. Any other geometric issues?	Only building unit polygons in each floor can be registered, without additional internal building (unit) geometric information	

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?)	YES, in an absolute spatial reference system	
4.2. Are the cadastral database coordinates authoritative?	Yes, if surveyed after 2000	
4.3. If not, what is the authoritative source of X/Y coordinates?	For elder data on parcel boundaries, the reconstruction of historic maps and documents is required where data quality has to be considered	
4.4. Do you have parcels defined by the walls of a building (with no recorded geometry)?	NO	
4.5. What is the spatial reference system for X/Y Coordinates?	EPSG 3796 (D96/TM)	
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.)?	For parcels: the neighbouring parcels, control measurements, topographic content, boundary marks For buildings: Building unit outlines for each floor and building outline	
4.7. Have there been any changes made in the way cadastral information is recorded and represented from a historical point of view?	Land consolidation is an important activity resulting also in new cadastral maps; Currently, the positional and geometric accuracy improvement (PAI) of cadastral maps is going on	Completed PAI and homogenisation project of the cadastral index map
4.8. Any other X/Y coordinate issues?	The processes presented in 4.7 are ongoing, some pilots for new cadastral survey in the areas of old graphical cadastral survey (from 19 th century) are carried on as well	

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?	We use absolute heights (Slovenian official height datum) but relative heights are also available (e. g. building height, floor height)	
5.2. Are height values reduced to a standard datum (absolute)? If so, what is the spatial reference system for this 3 rd ordinate?	Slovenian official height datum (with relation to the Adriatic Sea)	
5.3. In principle possible to store both relative and absolute height values?	YES	
5.4. Is the earth surface (elevation) explicitly stored (in the DCDB or other accessible register)?	YES, but not in cadastral database	
5.5. What is the source of height values for the 2D surface parcel?	Height attribute of boundary point is optional	
5.6. How is elevation information recorded in the cadastral plan or database?	As attribute	
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.)?	Can be used for 3D reconstruction of buildings LOD1, Floor plans visualized in 3D to clarify the RRR situation	
5.8. Any other 3 rd dimension ordinate value issues?		

6. Temporal Issues

	Status 2018	Expectations 2022
6.1. Are temporal limits part of the definition of a parcel (2D or 3D)?	NO (but time attributes are recorded in the cadastral database – the date of the change)	
6.2. Are moving parcels allowed?	NO	
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?	NO	
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?	/	
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.	/	
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)?	NO	
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?	Partly, but not completely for all history (for most case the archive has to be opened and a solution has to be provided based on the archive data)	
6.9. For Cadastral transactions, how far in time do buyers need to make a search to ensure the title or deed is legal?	The last recorded data is legally binding and provides full information needed for a transaction	
6.10. Any other temporal issues?	/	

7. Rights, Restrictions and Responsibilities

	Status 2018	Expectations 2022
7.1. Range of RRR on 3D parcels.	ALL (but not on 3D parcel – 2D parcel with exceptions: the right of superficies and condominium, see Chapter 1)	
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).	NO	
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).	NO	
7.4. Are there RRRs that are only allowed in 3D (and not valid for 2D)	NO	
7.5. Is there specific legislation (laws, regulations) defining 3D RRR types? If so, provide details, e.g. references to documents/ articles.	NO	
7.6. Can 3D sub-surface/above-surface parcel be owned by someone other than the person owning the land parcel?	YES, the right of superficies, and apartment ownership – both applied for buildings only	
7.7. What applications do you foresee for 3D land administration?	Clear representation of RRR situation, integration with other emerging 3D spatial data – many applications can be foreseen with such integration	
7.8. Are the administrative source documents (source of RRRs) title or deed based?	Title based	
7.9 Who is responsible for the correctness of the specified 3D boundaries in spatial source documents (which authority)?	Licensed surveyor	
7.10. Is registration of 3D parcels done inside the cadastral mapping agency, the land registry or elsewhere?	Surveying and Mapping Authority (cadastral agency)	
7.11. Are 3D registrations handled by the same organisation that handles traditional (2D) land administration?	YES (the right of superficies and condominium)	
7.12. Do you supply paper-based titles or deeds or proof of ownership? If yes, does this contain depictions of the 2D	YES Generally NO	

or 3D parcel?		
7.13. Is the 3D registry separate or integrated with the 2D registry?		
7.14. Any other RRR issues?		

8. DCDB (The Cadastral Database)

	Status 2018	Expectations 2022
8.0. Is database schema LADM based?	NO	
8.1. Does the DCDB contain representation of 3D parcels (in any form)?	YES, vector geometries of building footprint and floor plans (for the cases of condominium, see Chapter 1)	
8.2. If so, how are they represented (in the DCDB)?	Polygons	
8.3. If so, how are they presented on cadastral “maps” (including screen presentations)?	NOT included in cadastral maps	
8.4. Are there possibilities to store geometry of 3D parcels in the DCDB?	NO	
8.5. Is it possible to manage a 3D topological structure in the DCDB?	NO	
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?	No overlapping for each storey	
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,...)?	Polygons can be lifted to the attribute heights	
8.8. What Spatial DBMS software do you use? Any 3D capabilities included and used?	Oracle	
8.9. Do you have any validation rules for 3D representation in the database?	The sum of floor heights should not exceed building height	
8.10. What (GIS/CAD) software is used for updating, editing, analysis, and visualization of the cadastral data? Any 3D capabilities included and used?	Special local SW for 3D capture and visualisation.	
8.11. What web software is used for remote data access/distribution and visualization? Any 3D capabilities included and used?	/	
8.12. Is your DCDB organised as Multi-Layers or Object Oriented or some other data model?	Multy-Layers	
8.13. How do you query 3D objects in your DCDB?	-	
8.14. Is it possible to query neighbourhood parcels to a 3D object,	Only horizontally	

vertically as well as horizontally?		
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?	Data acquisition is in 3D, archiving in 2D, the exception is condominium	
9.2. If so, how are they represented?	Floor plans for each storey	
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.	YES – sub law regulation (considered vector data for buildings)	
9.4. Is sketch level allowed (low geometric quality, but in principle enough to indicate the 3D object)?	NO	
9.5. Is it possible to define a 3D parcel by referring to other 3D real world objects/ topography (and not specifying coordinates)?	NO	
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....?		
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)?		
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)?	Building footprint	
9.10. What form of 3D data acquisition is used (CAD, terrestrial surveying, sketches, stereo/oblique images, laser scanning,...)?		
9.11. What software do you use for creating and processing survey plans? Any 3D capabilities included and used?		
9.12. Can 3D parcels be subdivided,		

consolidated or nullified?		
9.13. Is there any existing technical circular or directive to assist Surveyors in 3D data collection in the field?		
9.14. Are the surveyors required to undertake a field survey for 3D cadastral data?		
9.15. Are building construction plans used to compile 3D cadastral information for apartments?	Can be used by surveyors only as information, but should be checked and measured in the field	
9.16. Is 2D/3D field survey done by private licensed surveyors or by government surveyors?	Private licensed surveyors	
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 for 2D.	
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)?	YES, for parcels (Land Cadastre) the documentation is different than the one for buildings (Building Cadastre)	
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.?)	Parcel: all the stated elements Building: Floor plans, cross sections, Identifiers	
9.21. Are authoritative cadastral surveys carried out by government surveyors or private licensed surveyors or both?	Private licensed surveyors	
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	
9.23. How much time does it usually take for a subdivision process to complete?	1-2 Month	
9.24. What is the legal source for cadastral representation (e.g. cadastral plans, or DCDB or index plans or descriptive sketch/text etc.?)	DCDB	
9.25. What is the positional accuracy of the cadastral plans (e.g. boundaries may be accurate but may not be referenced in datum properly)?	For new ones the a-axes of standard error ellipse is 4 cm	

9.26. Any other survey plan issues?		
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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 NO	
10.2. Are specific file formats or standards used to distribute 3D Cadastral information? (e.g. LandXML, CityGML, BIM/IFC, 3D pdf,...)	For buldings GML.	
10.3. Are there specific cartographic styling rules for representing 3D cadastral plans, or to represent 3D cadastral objects on 2D cadastral maps?	NO	
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?	NO	
10.5. Is the 3D Cadastral information accessible in integrated manner with the 2D Cadastral information?	NO	
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)?	NO	
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)	NO	
10.8. Are 2D/3D cadastral data available to the general public or just to the relevant parties?	Yes, but the registration documentation only to the relevant actors	
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?	1 m ² (It could be also smaller but its area is rounded to 1 m ²)	
11.2. What is the largest 2D and 3D parcel that is present allowed to be registered in the land administration?	Ni limits	
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,...)	Average: 2D 3560 m ² for parcel Average for buildings depends on type of buildings.	
11.4. How many 2D and 3D parcels do you currently have in your land administration?	2D 5 680 000 parcels 1200.000 buildings.	
11.5. Which year did you start registering 3D parcels in the land administration?	2000 (not real 3D-parcels – condominiums)	
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	a) 20271km ² b) 5.680.000 parcel c) 1.200.000 buildings d) 2.000.000	
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?	New legislation and a unique Real Property Cadastre
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?	- To legally define a 3D-real property unit; - To include other building objects registration in the cadastre (tunnels, underground garages, bridges etc); - To develop a feasible solution (also from the financial point of view)
12.5. In case of not yet fully operational status, were there any 3D Cadastre registration pilots to take steps towards more full implementation?	Under research
12.6. In case of known legal barriers, have there been made progress in creating and adopting new legislation to support 3D land administration?	Under research
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)	Slovenia
13.2. Your name, function/position and your organization	Assoc. prof. dr. Anka Lisec (head of the Chair of Geoinformatics and Real Estate Cadastres) and Jernej Tekavec, University of Ljubljana, Faculty of Civil and Geodetic Engineering
13.3. Contact details: address email, telephone	Jamova cesta 2, SI-1000 Ljubljana, Slovenia +386 1 4768 500 anka.lisec@fgg.uni-lj.si, jernej.tekavec@fgg.uni-lj.si
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