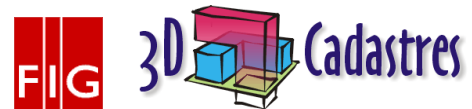


3rd Questionnaire 3D-Cadastres: status January 2019



Trinidad and Tobago

This questionnaire is an activity of the FIG working group 3D-Cadastres 2018-2022. The purpose of the survey is to make a world-wide inventory of the status of 3D-Cadastres 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-Cadastres is conducted by the FIG working group on 3D-Cadastres. 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-Cadastres see the website www.gdmc.nl/3DCadastres. 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-Cadastres 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/3DCadastres/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-Cadastres 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-Cadastres, 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).

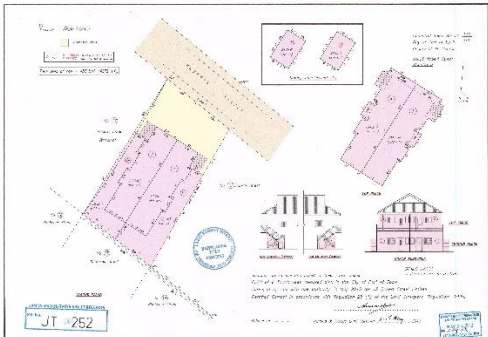
¹ Homogenous means that the same combination of rights equally apply within the whole 3D spatial unit. Unique means that this is the largest spatial unit for which this is true. Making the unit any larger would result in the combination of rights not being homogenous. Making the unit smaller would result 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. Different strata (condominium) rights limits may be shown in vertical section within the 2D parcel but they are constrained to be in the one parcel.	There are still plans to create legislation for the rights above surface (condominiums) but no plans to change or create a new graphic way of presenting them.
1.2. Are 2D and/or 3D ambulatory ² boundaries permitted?	2D ambulatory boundaries are permitted, both riparian and littoral. 3D ambulatory boundaries do not exist.	There has been no discussion on changing to 3D boundaries including ambulatory.
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. Condominium rights relate to the physical building. Mineral mining rights refer to each surface parcel downward.	No plans to change.
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)?	N/A	No plans to change.
1.4. Are disconnected parts of a single 3D parcel allowed?	Only in the instance of the common areas being tied to the condominium parcel. They cannot be transferred separately.	No plans to change.
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).?	The parcels are not spatially or graphically defined in 3D	No plans to change.
1.6. Are curved surfaces to bound the 3D parcels allowed?	If the physical structure has curved surfaces then this is shown in cross section to define the extent.	No plans to change.
1.7. Must the curved surfaces (if allowed) be	The surfaces conform to the physical structure.	No plans to change.

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.

cylindrical sections, or any other constraint?		
1.8. Any other constraints – e.g. all surfaces must be horizontal or vertical?	The surfaces conform to the physical structure.	No plans to change.
1.9. Is there legislation (law and/or regulations) for 3D descriptions of parcels? If so please, mention law and article(s).	Land Surveyors Rules – Rule 19. “The following plans shall be prepared for all Townhouse Schemes and Condominium schemes: (1) A location plan which shall record the cadastral data including “common areas” and sufficient measurement to be able to replace all structures (2) Strata plans for all floors within the condominium scheme (3) Elevation plans showing each façade view”.	No plans to change.
1.10. Is the legal text available in original language?	N/A. The country is English-speaking	No plans to change
1.11. Is the legal text (relevant part) available in English translation?	N/A. The country is English-speaking	No plans to change
1.12. Do you have example descriptions of typical 3D parcels; either ‘prototype’ or ‘operational’?		No plans to change
1.13. Is there a formal model for the 3D parcels (UML style); e.g. based on ISO TC211 series (especially LADM, ISO 19152)?	The legal registry is currently proposing to introduce the LADM ISO 19152 for an upgraded registry of title. However the registry is not responsible for the graphic description of the parcel.	It is hoped that this revision to the registry will motivate adoption of the formal model for the graphics in the cadastre.
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	No. These rights are not shown. Mining concessions on land cover the whole 2D parcel. Mining concessions in the marine environment are leased by blocks and the RRRs are included in the deed. Other natural resource rights are not shown. Reserves such as gas pipelines are shown as 2D parcels. Mining rights are linked to the surface parcels. Oil mining leases in the marine	No plans for change.

mining concessions (could be limited in time)?	environment are also linked to the surface parcel	
1.15. Are legally restricted spaces, above or below, such as polluted areas considered as 3D parcels?	Restrictions and all RRRs are sometimes listed in the deed or are listed in planning policy. They are not graphically depicted.	No plans for change
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,...)	These development areas are described verbally in development plans. Spatial plans are completely separate from the cadastre and not related to the parcel. They are managed by the Town and Country Planning Division of the Ministry of Planning. https://www.planning.gov.tt/content/town-and-country-planning-division-services They are not 3D.	No plans for change
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?	There is no marine cadastre. Only lease blocks for oil and gas exploration and extraction are indicated graphically at the state institution with responsibility for oil and gas matters. https://ngc.co.tt/wp-content/uploads/pdf/publications/Energy-Map-of-Trinidad-Tobago-2017.pdf S121 is not used.	No plans for change
1.18. Is there any organised legal instrument for the management of common property?	No. Management of common property in condominiums is done under the company's legislation https://rgd.legalaffairs.gov.tt/laws2/Alphabetical_List/lawspdfs/81.01.pdf where all owners collectively own the parcel and individuals own shares in the property.	Condominium legislation is still being considered.
1.19. Which agency is responsible for the recording of titles information?	The Land Registry of the Registrar General's Department, Ministry of Legal Affairs. http://www.legalaffairs.gov.tt/Land.html	No plans for change
1.20. Which agency is responsible for recording cadastral transactions?	The Surveys and Mapping Division, Ministry of Agriculture, Land, and Fisheries. https://agriculture.gov.tt/divisions-units/divisions/survey-mapping/	No plans for change
1.21. Are transactions for standard 2D lots and 3D lots done by the same agency or titles office?	All title processes are done by the Registrar General. All cadastral boundary processes are done by the Surveys and Mapping Division.	No plans for change

1.22. Are there any 3D storage permissions recorded (e.g. underground storage of CO2)?	No	No plans for change
1.23. Any other geometric issues related to 3D parcels?	No.	

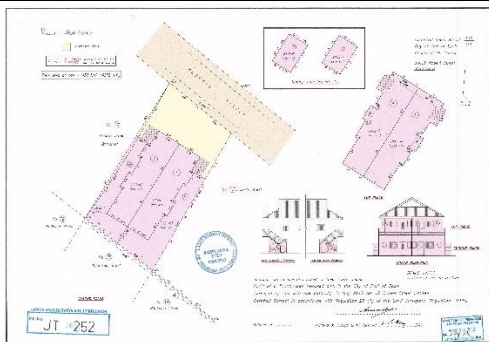
2. Infrastructure/utility networks

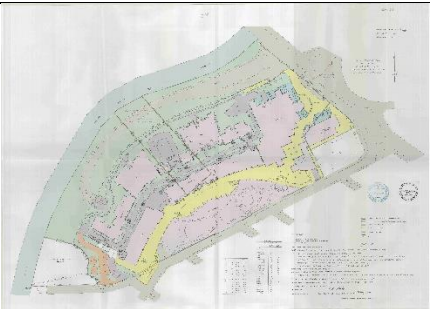
This refers to the situation where an infrastructure network is considered to be defined within the land administration. For example, in some jurisdictions, an underground network might be privately constructed for the purpose of leasing space in it for other organisations to run cabling. In this case, 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)	Pipeline networks for example are registered as a general plan denoting acquisition from the parent parcels.	No plans for change
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) The land administration is an index to the plan so the structure can be viewed in 2D. (b) Yes. (c) They are recorded as a plan number as the graphical aspect is separated from the legal aspect. (d) No. Not in the database.	No plans for change.
2.3. Does the jurisdiction have private networks? If so please, mention law and article(s).	All networks; water and sewer, electricity, gas, are owned by statutory agencies.	No plans for change.
2.4. If so, are they registered as 3D property parcels (spatial units)?	No.	No plans for change.
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).	N/A. The country is English-speaking	No plans for change.
2.6. Is the text of laws and regulations (relevant part) available in English translation?	N/A. The country is English-speaking	No plans for change.
2.7. Do you have example descriptions of typical 3D parcels (spatial units) for networks; either 'prototype' or 'operational'?		No plans for change.
2.8. If the network (legal) objects break at the surface parcel, how do you deal with intersecting networks or vertically parallel networks?	All are shown overlapping in 2D.	No plans for change.
2.9. Any other geometric issues related to the registration of networks?	No.	

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)?	No. Condominiums registered as shares of parcel.	No plans for change.
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,..)	N/A	No plans for change.
3.3. Does the jurisdiction have construction/building units? If so please, mention law and article(s).	No.	No plans for change.
3.4. Is the legal text available in original language?	N/A. The country is English-speaking	No plans for change.
3.5. Is the legal text (relevant part) available in English translation?	N/A. The country is English-speaking	No plans for change.
3.6. Do you have example descriptions of typical 3D parcels; either ‘prototype’ or ‘operational’?		No plans for change.
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 and floor, ceiling, walls. This is determined by practice of the land surveyor.	No plans for change.
3.8. Is common property inside the building registered? If so, how?	It is registered and coloured on the plan to differentiate it from individual parcels.	

		
3.9. Who owns the common property inside the building?	The individual unit owners also own shares in the common areas.	
3.10. Who owns the land on which the apartment is built?	The company comprised of all the owners.	
3.11. Do you allow sub-division of apartments or apartment blocks?	No. The planning agency is authorised to determine if subdivision is allowed.	
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)	There is no convention within the parcel. Street addressing is usually decided on by the developer and managed by the postal agency.	
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?)	No. Parcels are relative to each other.	No plans for change.
4.2. Are the cadastral database coordinates authoritative?	No.	No plans for change.
4.3. If not, what is the authoritative source of X/Y coordinates?	The location of the marked boundaries is authoritative.	No plans for change
4.4. Do you have parcels defined by the walls of a building (with no recorded geometry)?	This is found with older parcels with on survey.	No plans for change
4.5. What is the spatial reference system for X/Y Coordinates?	UTM zone 20. Naparima datum.	No plans for change
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.)?	Bearings and distances, boundary marks put or found, neighbouring lots, one approximate coordinate.	No plans for change
4.7. Have there been any changes made in the way cadastral information is recorded and represented from a historical point of view?	No. Technology changes have impacted on the presentation from manual to digital and CAD presentation, and from compass bearings to theodolite and total station to GNSS data acquisition.	No plans for change
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.	No plans for change
5.2. Are height values reduced to a standard datum (absolute)? If so, what is the spatial reference system for this 3 rd ordinate?	No.	No plans for change
5.3. In principle possible to store both relative and absolute height values?	Yes.	No plans for change
5.4. Is the earth surface (elevation) explicitly stored (in the DCDB or other accessible register)?	The elevations are in the digital topographic map, not the digital cadastral index.	No plans for change
5.5. What is the source of height values for the 2D surface parcel?	Ground. Mean sea level is used if available for construction or more usually arbitrary control.	No plans for change
5.6. How is elevation information recorded in the cadastral plan or database?	Elevation recorded in cross section.	No plans for change
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.)?	No. Topographic data is separate.	No plans for change
5.8. Any other 3rd dimension ordinate value issues?	No.	

6. Temporal Issues

	Status 2018	Expectations 2022
6.1. Are temporal limits part of the definition of a parcel (2D or 3D)?	No.	No plans for change.
6.2. Are moving parcels allowed?	No.	No plans for change.
6.3. Are there any limitations on the range of temporal limits? (e.g. only on 3D apartments).	No.	No plans for change.
6.4. Are there any attempt to integrate 3D space and temporal representations, into a single 4D space/time representation?	No.	No plans for change.
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?	This will also change to the 2D parcel limits.	No plans for change.
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.	The cadastral plan indicates the date of survey of the boundary.	No plans for change.
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.	No plans for change.
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?	Yes, for authorised operators at Surveys and Mapping.	No plans for change.
6.9. For Cadastral transactions, how far in time do buyers need to make a search to ensure the title or deed is legal?	20 years.	No plans for change.
6.10. Any other temporal issues?	No.	

7. Rights, Restrictions and Responsibilities

	Status 2018	Expectations 2022
7.1. Range of RRR on 3D parcels.	Not recorded in the cadastre.	No plans for change.
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.	No plans for change.
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.	No plans for change.
7.4. Are there RRRs that are only allowed in 3D (and not valid for 2D)	No.	No plans for change.
7.5. Is there specific legislation (laws, regulations) defining 3D RRR types? If so, provide details, e.g. references to documents/ articles.	All laws leave the graphical definition up to the rules of the Director of Surveys and these rules only provide for 2D delimitation of parcels. For example in the Mining legislation: Minerals Act Chapter 61:03 the following occurs: Form of Licence. 21. (1) Subject to this Act, every licence issued under this Act shall— (a) be in such form and be subject to such terms and conditions as may be prescribed; (b) specify the limits of the area in respect of which the licensee is authorised to explore for or mine, process, import or export minerals; and (c) not be transferred or assigned without the written approval of the Minister. And also: 35. (1) The holder of a licence shall— (a) in furtherance of mining operations avoid damage to any adjoining or third party property;	No plans for change.

	(b) have the boundaries to his property properly demarcated at all times, and shall maintain a buffer zone of ten feet from the boundaries of the said property on all sides; and (c) on completion of the operations authorised by the licence or on the date of expiration of his licence, whichever occurs earlier, rehabilitate and restore the land to the satisfaction of the Director	
7.6. Can 3D sub-surface/above-surface parcel be owned by someone other than the person owning the land parcel?	Yes. However, then above surface parcel/building is not recorded in the Land Registry.	No plans for change.
7.7. What applications do you foresee for 3D land administration?	Enhanced management of transactions for condominiums, mining rights, planning areas.	
7.8. Are the administrative source documents (source of RRRs) title or deed based?	The majority of parcels in the country are under the deed system. A minority are under a title system.	Systematic titling legislation has been approved since 2000 and the process continues to be proposed but not yet implemented.
7.9 Who is responsible for the correctness of the specified 3D boundaries in spatial source documents (which authority)?	The Director of Surveys in the Surveys and Mapping Division, Ministry of Agriculture, Land and Fisheries.	No plans for change.
7.10. Is registration of 3D parcels done inside the cadastral mapping agency, the land registry or elsewhere?	The parcel plans are accepted, sometimes checked for only subdivisions under title registration, and registered by the Director of Surveys in the Surveys and Mapping Division. The Land Registry of the Registrar General's Department accepts plans already certified by the Director of Surveys.	No plans for change.
7.11. Are 3D registrations handled by the same organisation that handles traditional (2D) land administration?	Yes.	No plans for change.
7.12. Do you supply paper-based titles or deeds or proof of ownership? If yes,	The Registrar General supplies certified titles and	No plans for change.

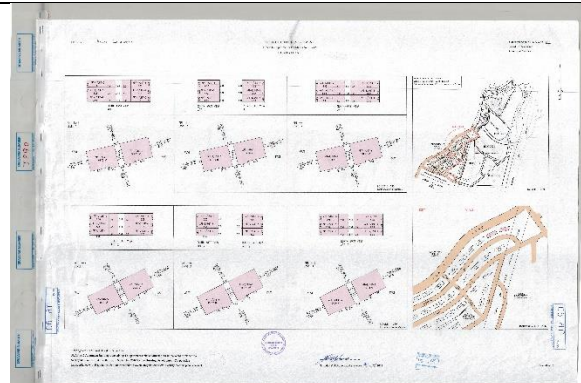
does this contain depictions of the 2D or 3D parcel?	deeds. These contain depictions of the 2D or 3D parcel. Some older deeds only have verbal descriptions.	
7.13. Is the 3D registry separate or integrated with the 2D registry?	Integrated.	
7.14. Any other RRR issues?	No	

8. DCDB (The Cadastral Database)

	Status 2018	Expectations 2022
8.0. Is database schema LADM based?	No.	This may change in the near future.
8.1. Does the DCDB contain representation of 3D parcels (in any form)?	No.	No plans for change.
8.2. If so, how are they represented (in the DCDB)?	The 2D polygons are an index to the survey plan.	No plans for change.
8.3. If so, how are they presented on cadastral “maps” (including screen presentations)?	The 2D survey plan is indexed.	No plans for change.
8.4. Are there possibilities to store geometry of 3D parcels in the DCDB?	A CAD drawing may be possible.	No plans for change.
8.5. Is it possible to manage a 3D topological structure in the DCDB?	No.	No plans for change.
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.	No plans for change.
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 possible.	No plans for change.
8.8. What Spatial DBMS software do you use? Any 3D capabilities included and used?	Trimble software used.	No plans for change.
8.9. Do you have any validation rules for 3D representation in the database?	No.	No plans for change.
8.10. What (GIS/CAD) software is used for updating, editing, analysis, and visualization of the cadastral data? Any 3D capabilities included and used?	Trimble software used. No 3D capabilities used.	No plans for change.
8.11. What web software is used for remote data access/distribution and visualization? Any 3D capabilities included and used?	Trimble software used. No 3D capabilities used.	No plans for change.
8.12. Is your DCDB organised as Multi-Layers or Object Oriented or some other data model?	Object oriented.	No plans for change.
8.13. How do you query 3D objects in your DCDB?	Not done.	No plans for change.
8.14. Is it possible to query neighbourhood parcels to a 3D object, vertically as well as horizontally?	Not possible.	No plans for change.
8.15. Any other DCDB issues?	No.	

9. Plans of Survey (including field sketches)

	Status 2018	Expectations 2022
9.1. Do the survey plans carry 3D parcel representations?	Yes, condominiums do.	No plans for change.
9.2. If so, how are they represented?	Different strata (condominium) rights limits may be shown in vertical section within the 2D parcel but they are constrained to be in the one parcel.	No plans for change.
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.	All rules for parcel presentation are created, and approved by the Land Survey Board	No plans for change.
9.4. Is sketch level allowed (low geometric quality, but in principle enough to indicate the 3D object)?	Yes. There is no requirement for precision and polygon closure for cross section views.	No plans for change.
9.5. Is it possible to define a 3D parcel by referring to other 3D real world objects/ topography (and not specifying coordinates)?	No.	No plans for change.
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....?	2D survey plan.	No plans for change.
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)?	No.	No plans for change.

9.8. Do you have examples of (prototype or production) 3D survey plans available?		
9.9. Are any reference objects visible on the survey plan (e.g. real buildings, roads, that is 3D topography)?	Buildings, fences, roads are approximately indicated.	No plans for change.
9.10. What form of 3D data acquisition is used (CAD, terrestrial surveying, sketches, stereo/oblique images, laser scanning,...)?	CAD, terrestrial surveying	No plans for change.
9.11. What software do you use for creating and processing survey plans? Any 3D capabilities included and used?	AutoCAD. If 3D is used, these data are not submitted to the cadastre.	No plans for change
9.12. Can 3D parcels be subdivided, consolidated or nullified?	If approved by the Planning authority.	No plans for change
9.13. Is there any existing technical circular or directive to assist Surveyors in 3D data collection in the field?	No.	No plans for change
9.14. Are the surveyors required to undertake a field survey for 3D cadastral data?	Yes, in most instances. No, where the information can be derived from the engineering building drawing.	No plans for change
9.15. Are building construction plans used to compile 3D cadastral information for apartments?	Yes.	No plans for change
9.16. Is 2D/3D field survey done by private licensed surveyors or by government surveyors?	Both can perform these surveys once licensed and registered.	No plans for change
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.	All subdivisions, new surveys, redefinitions, must be represented on a plan for submission to the cadastre for plan registration (not parcel registration). They are then updated on an index map.	No plans for change
9.18. Do you show dimensions or isometric views of 3D parcels on survey plans	Dimensions and cross sections are shown. These are scanned and stored as 2D plans in the database.	No plans for change

(do you also store this in a database)		
9.19. Do the cadastral survey plans differentiate between different types (e.g. volumetric plans, building plans and standard 2D plans)?	No.	No plans for change
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.?)	1 The following data shall be shown on cadastral survey plans: (1) Unique Parcel Reference Numbers (if available) (2) The cadastral sheet number. (3) The development or village name. (4) The county. (5) The ward. (6) The municipality where appropriate. (7) The Survey Order number, and file number. (8) The area of the parcel both in numbers and in words. (9) The bearing and distance of every boundary line, and sufficient data to be able to check closure and the area of the parcel. (10) The co-ordinates of at least one station on the survey derived from survey observations or the approximate co-ordinates of at least one station on the survey as obtained from topographic data derived from 1994 or later photography and obtainable at the offices of the Director of Surveys. Whether the co-ordinates are derived from control, or are approximate, must be denoted on the plan. Such co-ordinates are NOT part of the legal definition of parcels. (11) The names of all known neighbours, or information which may be used to identify the neighbours. (12) All structures existing on the site. Where the dimensions of a structure are not measured, the approximate position of the structure shall be shown in broken black lines. (13) The position of all walls fences and drains etc in relation to the boundaries. (14) All encroachments with the approximate area of the encroachment if possible. This includes overhead and	No plans for change but rules can be updated to keep pace with technology.

	underground encroachments. Encroachments shall be differentiated from the surrounding parcel by the addition of an area symbol (15) The widths, names and types of all roads. (16) The diameter and type of all utility pipelines where the reserves of these affect the allowable use of the land as defined by the planning authority. (17) All utility poles where these fall within the limits of the parcel being surveyed. (18) The scale at which the plan is drawn as a representative fraction e.g. 1:2500. (19) The grid north which in every case shall be at the top, right of the plan, and if practicable shall be parallel to the side of the sheet and indicate the grid projection used. The dimensions of such grid north must not exceed 8 cm x 2 cm (20) The projection – UTM Zone 20 (21) The date, signature and the seal of the TTLS. (22) The procès verbal should contain a statement of professional responsibility in accordance with Regulation 25 (1) of the Land Surveyors Regulations 1998 e.g.	
9.21. Are authoritative cadastral surveys carried out by government surveyors or private licensed surveyors or both?	Both, once they are licensed and registered for the year.	No plans for change
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)?	Bearings and distances.	No plans for change
9.23. How much time does it usually take for a subdivision process to complete?	Application for approval for subdivision, survey, approval of survey plan, registration of plan may take 3 months or longer.	No plans for change
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 plans.	No plans for change

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)?	Boundaries may be relatively accurate to the neighbouring parcel but approximate coordinates from hand held GPS units are given for location purposes that may be 5 m. off.	No plans for change
9.26. Any other survey plan issues?	No.	

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?	There is a portal for the public that is often inaccessible. There is a portal for professional cadastral surveyors: http://www.surveys.gov.tt/Account/Login?ReturnUrl=%2F These do not include 3D data except for the cross sections that can only be accessed by professionals.	No plans for change
10.2. Are specific file formats or standards used to distribute 3D Cadastral information? (e.g. LandXML, CityGML, BIM/IFC, 3D pdf,...)	N/A. There is no requirement to submit 3D cadastral information to the state.	No plans for change
10.3. Are there specific cartographic styling rules for representing 3D cadastral plans, or to represent 3D cadastral objects on 2D cadastral maps?	The Director of Surveys and the Land Survey Board make rules for the representation of plans. Land Surveyors Rules – Rule 19. “The following plans shall be prepared for all Townhouse Schemes and Condominium schemes: (1) A location plan which shall record the cadastral data including “common areas” and sufficient measurement to be able to replace all structures (2) Strata plans for all floors within the condominium scheme (3) Elevation plans showing each façade view”.	No plans for change
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?	None currently	No plans for change
10.5. Is the 3D Cadastral information accessible in integrated manner with the 2D Cadastral information?	N/A	No plans for change
10.6. Are there specific symbols on the 2D cadastral map (paper, digital or web-based)	N/A	No plans for change

indicating the presence of 3D Cadastral objects (and in web-context perhaps even linked)?		
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. Planning authority does not have this information in digital form.	No plans for change
10.8. Are 2D/3D cadastral data available to the general public or just to the relevant parties?	The public can access the 2D plans with 3D cross sections on them.	No plans for change
10.9. Any other 3D cadastral information dissemination issues?	No	

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?	The Planning authorities control subdivisions and do not normally approve subdivisions of parcels to less than 465sqm. Volumes are not used.	No plans for change
11.2. What is the largest 2D and 3D parcel that is present allowed to be registered in the land administration?	There is no limit.	No plans for change
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,...)	465sqm is the typical size for residential parcels but there are larger and smaller building units registered. There are also larger and smaller pipeline spaces.	No plans for change
11.4. How many 2D and 3D parcels do you currently have in your land administration?	At the land registry, this number cannot be determined from records. At the cadastre, this number cannot be determined from records. A rough estimate is 500,000.	No plans for change
11.5. Which year did you start registering 3D parcels in the land administration?	Probably in the 1970s when condominiums became prevalent.	No plans for change
11.6. What is the ratio of 3D parcels in rural vs. urban areas?	Most are in urban and suburban areas for residential purposes. There are very few if at all in rural areas.	No plans for change
11.7. Please specify names of cities or towns or suburbs or regions or locations where there are significant numbers of 3D parcels.	Port of Spain, San Fernando, Diego Martin, Westmoorings.	
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	Number of parcels is not available from the database as the cadastre is not current.	The cadastre is proposed to be updated with the 60,000 plans not included.

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)?	Most are apartments. There are no subsurface shopping centres, airspace, tunnels, registered.	No plans for change
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).	This is difficult to determine as the cadastre is not current.	The cadastre is proposed to be updated with the 60,000 plans not included.
11.11. Any other interesting statistical fact(s)?	No.	

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?	New aerial photography and attendant orthophotos at 25 cm resolution was acquired for the country. LiDAR data was acquired for the country. These data could be used to advance the 3D cadastre.
12.2. Same question, but now, which developments did go slower than expected?	Updating of the revised georeferenced cadastral index has not been completed.
12.3. If some (limited) form of 3D Land administration functionality has become available, what are the observed benefits? And for whom?	None available.
12.4. What are the (top-3) challenges of issues to be addressed to realize further 3D Land administration progress?	Convincing the Government of the benefits Acquiring financial support for the development Capacity building of relevant personnel
12.5. In case of not yet fully operational status, were there any 3D Cadastre registration pilots to take steps towards more full implementation?	No.
12.6. In case of known legal barriers, have there been made progress in creating and adopting new legislation to support 3D land administration?	No.
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)	Trinidad and Tobago
13.2. Your name, function/position and your organization	Dr Charisse Griffith-Charles Senior Lecturer in Cadastral Systems, Land Administration The Department of Geomatics Engineering and Land Management, The Faculty of Engineering, The University of the West Indies, St. Augustine.
13.3. Contact details: address email, telephone	Room 116, Department of Geomatics Engineering and Land Management, The Faculty of Engineering, The University of the West Indies, St. Augustine. Charisse.Griffith-Charles@sta.uwi.edu 868 662 2002 ext 82520
13.4. Other issues	

References

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