

Questionnaire 3D-Cadastres: status November 2010

Trinidad and Tobago



This questionnaire is an activity of the FIG working group 3D-Cadastres 2010-2014. The purpose of the survey is to make a world-wide inventory of the status of 3D-Cadastres at this moment (fall 2010) and the plans/expectations for the near future (2014). By sharing this information, it should be possible to improve cooperation, learn from each other and support future developments. For more information on the FIG working group on 3D-Cadastres see the website of this working group www.gdmc.nl/3DCadastres. Now a few notes and suggestions, which should be helpful when completing the questionnaire:

- In this questionnaire the concept of 3D-Cadastres with 3D parcels 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 or 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 below to be more specific and real world situations are used. Also two example sets of partial/preliminary answers are included from Australia, Queensland and The Netherlands, to support the questions and to be of 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 3D parcels (spaces of legal objects).
- 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).

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.

	Trinidad and Tobago 2010	Trinidad and Tobago 2014
1.1. Are all 3D parcels constrained to be within one surface (2D) parcel?	Yes. Different strata (condominium) rights limits may be shown in vertical section within the 2D parcel.	There are only plans to create legislation for the rights above surface but no plans to change or create a new graphic way of presenting them.
1.2. Are ambulatory ² boundaries permitted?	Theoretically perhaps since the 3D parcel is constrained to the 2D parcel but it may not arise since the unit does not physically cross the boundary usually	
1.3. Is it allowed to have 3D parcels not related to physical constructs or objects?" (e.g. airspace, subsurface volumes)	No. Condominium rights relate to the building. Mineral mining rights refer to each surface parcel.	
1.4. Are disconnected parts of a single 3D parcel allowed?	No.	
1.5. Limitation – e.g. must the 3D parcel be described by a boundary definition?	Condominium boundaries are described verbally as floors, wall, ceilings. Car parks are described graphically with dimensions. The graphic plans may show elevations to describe the vertical limits.	
1.6. Are curved surfaces to bound the 3D parcels allowed?	Yes if the apartment is bounded in this way.	
1.7. Must the curved surfaces (if allowed) be cylindrical sections, or any other constraint?	No.	
1.8. Any other constraints – e.g. all surfaces must be horizontal or	No. As the apartment is constructed.	

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.

vertical?		
1.9. Is there generic legislation (law and/or regulations) for 3D descriptions of parcels? If so please, mention law and article(s).	No legislation, but practice has arisen to show vertical sections on cadastral plans to describe apartments.	
1.10. Is the legal text available in original language?	N/A	
1.11. Is the legal text (relevant part) available in English translation?	N/A	
1.12. Do you have example descriptions of typical 3D parcels; either 'prototype' or 'operational'?		
1.13. Is there a formal model for the 3D parcels (UML style); e.g. based on ISO TC211 series?	No	
1.14. Are natural resources (groundwater, mining rights) considered as 3D parcels?	No	
1.15. Are polluted areas considered as 3D parcels (as legal restrictions are associated to these spaces: above and below surface)?	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. Any other geometric issues?		

2. Infrastructure/utility networks

This refers to the situation where an infrastructure network is considered to be defined within the cadastre. 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.

	Trinidad and Tobago 2010	Trinidad and Tobago 2014
2.1. Do you register network parcels? (e.g. subterranean conduit networks)	Yes but they are related to the surface parcels that cross them.	
2.2. If so, can the network structure be traced in the database(s)?	Yes as there would be a physical plan of the network when it is defined.	
2.3. Does the jurisdiction have private networks? If so please, mention law and article(s).	Yes. Gas pipelines fall into this category.	
2.4. If so, are they registered as 3D property parcels?	No as subsurface rights	
2.5. Is the legal text available in original language? If so, give references to relevant document(s).	N/A	
2.6. Is the legal text (relevant part) available in English translation?	N/A	
2.7. Do you have example descriptions of typical 3D parcels for networks; either 'prototype' or 'operational'?		
2.8. If the network (legal) objects break at the surface parcel, how do you deal with intersecting networks or vertically parallel networks?	Only by verbal descriptions or 2D cadastral plans.	
2.9. Any other geometric issues?		

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”.

	Trinidad and Tobago 2010	Trinidad and Tobago 2014
3.1. Do you register 3D construction/building units?	Yes	
3.2. If so, what are the most important types? E.g. apartment units, or also other buildings or even more general constructions (infra related; such as bridge, tunnel or even other, such as windmills,..)	Condominium or apartment.	
3.3. Does the jurisdiction have construction/building units? If so please, mention law and article(s).	Proposed legislation but currently dealt with under companies legislation http://rgd.legalaffairs.gov.tt/Laws2/AlphabeticalList/lawspdfs/81.01.pdf	
3.4. Is the legal text available in original language?	N/A	
3.5. Is the legal text (relevant part) available in English translation?	N/A	
3.6. Do you have example descriptions of typical 3D parcels; either ‘prototype’ or ‘operational’?	Survey plans with elevations	
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?		
3.8. Is common property inside the building registered? If so, how?	They are registered to a Management Company, comprised of the owners, that is registered under the Companies legislation	
3.9. Who owns the common property inside the building?	Management Company	
3.10. Who owns the land on which the apartment is built?	Management Company	
3.11. Any other geometric issues?		

4. X/Y Coordinates

	Trinidad and Tobago 2010	Trinidad and Tobago 2014
4.1. Do the plans of survey guarantee X/Y coordinates? (and are they relative or in an absolute spatial reference system?)	No. Relative dimensions recorded.	It is intended that all parcels will have an absolute coordinate with gradually increased precision
4.2. Are the cadastral database coordinates authoritative?	No. The database is an index to the actual plans.	
4.3. If not, what is the authoritative source of X/Y coordinates?	None	
4.4. Do you have parcels defined by the walls of a building (with no recorded geometry)?	No. Dimensions on survey plan.	
4.5. What is the spatial reference system for X/Y Coordinates?	UTM grid Zone 20 Naparima datum	The intention is to shift to UTM grid zone 20 WGS datum
4.6. Any other X/Y coordinate issues?	Some maps now shifted to UTM grid zone 20 WGS datum	

5. Z Coordinates/height representation

	Trinidad and Tobago 2010	Trinidad and Tobago 2014
5.1. Are the Z coordinates of 3D parcels relative to local ground?	No. Vertical section indicates physical building as heights	
5.2. Are Z coordinates reduced to a standard datum (absolute)? If so, what is the spatial reference system for the Z coordinate?	Vertical section would be shown relative to local ground	
5.3. In principle possible to store both relative and absolute Z coordinate?	N/A	
5.4. Is the earth surface (height) explicitly stored (in the DCDB or other accessible register)?	Topographic database separate with msl heights	
5.5. What is the source of elevation for the 2D surface parcel?	Elevations not recorded in the cadastral data	
5.6. Any other Z coordinate issues?		

6. Temporal Issues

	Trinidad and Tobago 2010	Trinidad and Tobago 2014
6.1. Are temporal limits part of the definition of a parcel (2D or 3D)?	No.	
6.2. Are moving parcels allowed?	Only ambulatory boundaries; littoral and riparian	
6.3. Are there any limitations on the range of temporal limits? (e.g. only on 3D apartments).	N/A	
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?	Not a problem.	
6.6. Any other temporal issues?		

7. Rights, Restrictions and Responsibilities

	Trinidad and Tobago 2010	Trinidad and Tobago 2014
7.1. Range of RRR on 3D parcels.	Tied to the common property in condominiums	No plans for the future
7.2. Are there any limitations on the range of rights? (e.g. subterranean parcels must be owned by Govt).	No.	
7.3. Any other RRR issues?		
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 for mining rights.	
7.7. What applications do you foresee for 3D cadastre?	Marine rights applications, subsurface pipeline and other networks, complex building models	

8. DCDB (The Cadastral Database)

	Trinidad and Tobago 2010	Trinidad and Tobago 2014
8.1. Does the DCDB contain representation of 3D parcels (in any form)?	No.	No concrete plans, just a desire
8.2. If so, how are they represented (in the DCDB)?	Always related to the 2D parcels	
8.3. If so, how are they presented on cadastral “maps” (including screen presentations)?	Can only be determined from attribute information	
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?	N/A	
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,..)?	Cannot	
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?	No	
8.10. What (GIS/CAD) software is used for updating, editing, analysis, and visualization of the cadastral data? Any 3D capabilities included and used?	MapInfo Spatial for visualisation. No 3D capabilities used	
8.11. What web software is used for remote data access/distribution and visualization? Any 3D capabilities included and used?	None	
8.12. Is your DCDB organised as Multi-Layers or Object Oriented or some other data model?	Object Oriented	
8.13. How do you query 3D objects in your DCDB?	Cannot	
8.14. Is it possible to query	No.	

neighbourhood parcels to a 3D object, vertically as well as horizontally?		
8.15. Any other DCDB issues?		

9. Plans of Survey (including field sketches)

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9.1. Do the survey plans carry 3D parcel representations?	Only vertical sections where necessary in condominiums	
9.2. If so, how are they represented?	Vertical sections	
9.3. Is there specific legislation (regulations) describing the requirements for Plans of Survey in 3D? If so, please give link to the relevant documents.	No. The Director of Surveys can make policy	
9.4. Is sketch level allowed (low geometric quality, but in principle enough to indicate the 3D object)?	Only vertical sections	
9.5. Is it possible to define a 3D parcel by referring to other 3D real world objects/ topography (and not specifying coordinates)?	Yes on deed verbal description	
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....?	As cadastral plans in hardcopy.	The intention is to start accepting submission of digital plans
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.	
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)?	No. Buildings and roads may be indicated but no precise dimensions given.	
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?	AutoCAD usually used but final output is 2D cadastral plan.	
9.12. Can 3D parcels be subdivided, consolidated or nullified?	Changes would be noted on new cadastral survey plan in vertical	

	section	
9.13. Is there any existing technical circular or directive to assist Surveyors in 3D data collection in the field?	Only mention of vertical sections	
9.14. Any other survey plan issues?		

10. 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.

10.1. Country (State, Province)	Trinidad and Tobago
10.2. Your name, function/position and your organization	Dr. Charisse Griffith-Charles, lecturer in cadastral systems, University of the West Indies, St. Augustine, Trinidad and Tobago
10.3. Contact details: address email, telephone	Rm 116, Department of Geomatics Engineering and Land Management, Faculty of Engineering, The University of the West Indies, St. Augustine, Trinidad and Tobago Charisse.Griffith-Charles@sta.uwi.edu 868 662 2002 ext 2520
10.4. Other issues	