Initial Registration of 3D Parcels
Position Paper 2

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1. INTRODUCTION

This is a discussion paper for initiating an on-going conversation on "Initial Registration of 3D Parcels" in the working session at the 4th International Workshop on 3D Cadastres.

The working session will focus on 3D registration from multiple points of view.
Figure 1 shows the aspects of 3D registration that will be discussed in the working session. The aim of the discussion is to critically analyse the most distinguishing features of 3D registration. Concentrating on the main topics and their related sub-topics will enable to further consolidate experiences and knowledge on the primary step towards the realisation of 3D cadastre.

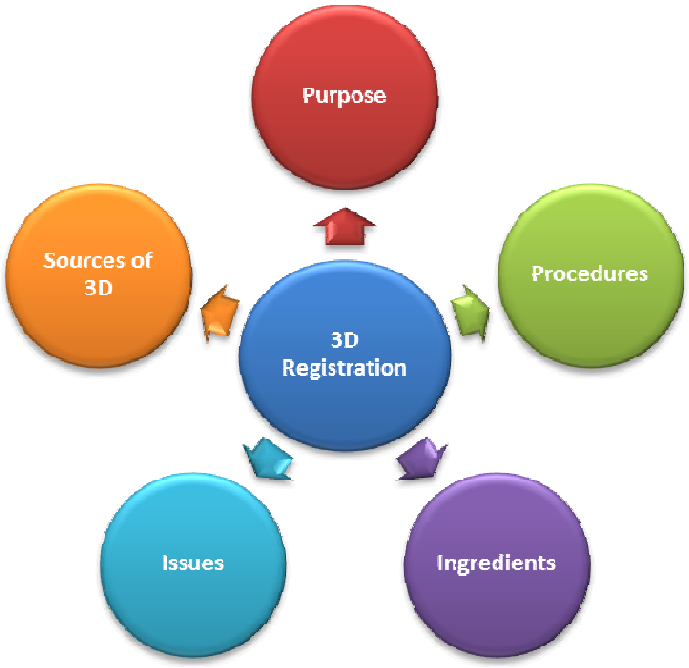

Figure 1. Aspects of 3D registration to be examined in this working session

2. STATE-OF-THE-ART

The objective of the working session is to explore common and specific issues, approaches and solutions that cadastral jurisdictions face towards the implementation of 3D cadastre and more specifically toward 3D registration. The legal and technical practices used to create 3D entities vary from jurisdiction to jurisdiction (Van Oosterom, Stoter, Ploeger, Thompson and Karki 2011).

To initiate the session, the current status of 3D registration is to be discussed with examples relating to participant's jurisdictions as well as Queensland, Australia. In Queensland, 3D plans in the current form has been created since 1997 and has found acceptance in the public, the surveyors and the registering authorities. Building format plans and Volumetric format plans deal with 3D spatial paper-based representation and are created distinct from the 2D Standard format plans.

There is sufficeint legislative support for 3D cadastral registration (Karki 2013). Policy documents and technical documents cover both 2D and 3D surveying and registration. Surveyors are comfortable with the three formats of plans and the Surveyors Board of Queensland requires graduate surveyors to demonstrate competency in surveying and mapping of 3D plans to become cadastrally endorsed surveyors.

Paper-based volumetric plans show isometric views to depict 3D spatial unit, while building plans show sketches of building numbers, locations, levels and layout. The DCDB still does not store 3D, and there is no automated validation, and no digital lodgement of 3D yet. Network volumetric objects are sliced into individual parcels based on the surface 2D parcel but can be traced as a network due to common feature id such as "Clem 7 tunnel" in all the volumetric slices.

3. KEY ISSUES

For the purpose of the session, the following questions provide an outline to kick off the discussion; it is not meant to limit the scope to these topics only.

3.1 Purpose

- Why do we need to register 3D parcels?
    - (Mortgage, Certainty of ownership, Financial Transactions, Ease of administration, Visualisation, Validation …)

3.2 Procedures

- The broad steps for registering a spatial unit can be Planning; Surveying; Registration of Rights; and Data Management with varying degrees of complexities. How does 3D registration vary in complexity, order or details?
- What are the procedural differences between:
    - 2D/3D rights registration
    - 2D/3D sub-division

    - 2D/3D surveying
    - 3D building/volumetric format
- In a 2D/3D co-existence, as is the case in most jurisdictions which have 3D spatial units, how is encroachment determined?

3.3 Ingredients

- What makes a 3D cadastre? What are the essential ingredients?
- How is it different to 2D registration?
- Is 3D registration enough to consider it to be a 3D cadastre?

3.4 Issues (Technical and Legal)

- What is the legal status of a DCDB?
- What changes does the current legislation require to support 3D cadastral implementation?
- Why is necessary to solve validation, visualisation and data management issues for a full 3D implementation?

3.5 Sources of 3D

- What are the sources of creation of 3D spatial units?
    - (Subdivision into 3D; subdivision of 3D; excision of 2D/3D; reservation of disjoint spaces; easements, covenants, leases; …)
- Can BIMS be used for 3D registration?
- Are there any other sources of 3D objects (e.g. 3D space prior to construction; legal objects like carbon abatement zones, pollution zones, any other reserved zones; network objects), and how to deal with various legal status over each other?

4. POSSIBLE SOLUTIONS

The future issues identified in the 2nd working group regarding digital submission and lodgement format still remains current and needs to be progressed further. Shared experiences of issues and current practices in technical and legal aspects will assist to consolidate learnings.

REFERENCES

Karki, S (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

Van Oosterom, P, Stoter, J, Ploeger, H, Thompson, R, Karki, S. (2011). World-wide Inventory of the Status of 3D Cadastres in 2010 and Expectations for 2014. FIG Working Week, Marrakech, Morocco.

BIOGRAPHICAL NOTES

Sudarshan Karki is a surveyor with experience in the spatial information field since 1995. At present he is working as a Principal Project Officer in the Queensland Flood Mapping Program in the Department of Natural Resource and Mines, Queensland Government. He completed a Master of Spatial Science Research in 3D Cadastre at the University of Southern Queensland and is currently pursuing his PhD.

Rod Thompson has been working in the spatial information field since 1985. He designed and led the implementation of the Queensland Digital Cadastral Data Base, and is now principal advisor in spatial databases. He obtained a PhD at the Delft University of Technology in December 2007.

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