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3D Real Property Legal Concepts and Cadastre - A Comparative Study of Selected Countries to Propose a Way Forward

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Outline

- Introduction
- Legal issues examined
- Case studies
- Conclusions
- Further research
Introduction (1/2)

• Role of Cadastre
• Complex RRRs on land
• 3D aspects of RRRs

How can rights in 3D space be secured?

• Partition of 3D space
• “Concept” of 3D property

Source: Platt, 1991
Introduction (2/2)

This paper

✓ Compares and discusses 3D property concepts in selected countries

➢ Common legal background
➢ Different stages of 3D Cadastre development

Overview report 4th International Workshop on 3D Cadastres – Legal Framework of 3D Cadastres Working Session (Dubai, 2014)

1. Position paper (Paasch and Paulsson, 2014), Results (Paasch, 2014)
Legal issues examined (1/2)

Selected countries

- Austria
- Brazil
- Croatia
- Greece
- Poland
- Sweden

Each co-author was asked to provide

- Background data
- Current status of 3D objects recording
- Legal definition and delimitation of 3D objects
- Types of rights registered in 3D
Legal issues examined (2/2)

- Civil Law jurisdictions
- Administrative differences
- Differences in cadastral infrastructure
- Differences in 3D Cadastre legislation implementation

Deeds registration

Variety of 3D objects

Municipal Cadastres

Centralised cadastral systems

Title registration

Roman Law based Civil Law

3D Cadastre legislation

Introduction of 3D Cadastre legislation
under discussion

Unified Cadastre and Land Registry

Ongoing cadastral survey
Case studies (1/5)

Background

• Austrian Cadastre since 1817
• Brazil Federal rural cadastre, municipal urban cadastres
• Ongoing Hellenic Cadastre

• Similar types of objects recorded (land parcels, buildings, apartments)
• Special cases of real property units

Source: http://geosampa.prefeitura.sp.gov.br
Source: Kitsakis and Dimopoulou, 2014
Source: Lantmäteriet, the Swedish mapping, cadastral and land registration authority
Case studies (2/5)

Status

• Roman principles
• Registration as 2D projections
• Descriptive data of 3D objects
• 3D RRRs not registered

Sweden
✓ Condominium legislation (2009)

Registration of different object types
Ownership - Building rights

Source: Paasch et al., 2016
Case studies (3/5)

**Legal definition of 3D objects**

- No legal definition of 3D objects
- Restrictions by Property Law, specific legislation

- Different types of 3D objects nationally
- 3D characteristics simplified in 2D
- 3D restrictions not always presented to cadastral maps

Sweden
- Precise 3D property definition

Source: NCMA, National Mapping and Cadastre Agency, Greece
Case studies (4/5)

Rights that can be registered in 3D

- No 3D registration of rights
- Registration based on relative 2D objects
- Elevation data on survey plans

- Same as in 2D (Croatia)
- 3D RRRs do not differ from 2D (Sweden)
- Themed Cadastres (Archaeological, Utilities etc)

Presentation to cadastral maps
- 2D
- 2.5D
- Separate layers
- Specific symbology

Source: Lantmäteriet, the Swedish mapping, cadastral and land registration authority (2004)

Source: BEV, Federal Office of Metrology and Surveying, Republic of Austria
## Case studies (5/5)

<table>
<thead>
<tr>
<th>Country</th>
<th>Background</th>
<th>Status</th>
<th>Rights registered in 3D</th>
<th>Legal definition of 3D objects</th>
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</thead>
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<tr>
<td>Austria</td>
<td>Focus on digitising cadastral archive</td>
<td>Registration of 2D spatial restrictions</td>
<td>✗</td>
<td>✗</td>
</tr>
<tr>
<td>Brazil</td>
<td>Urban cadastre under municipalities’ authority</td>
<td>Building rights - ownership difference</td>
<td>✗</td>
<td>Parcels identification from unit number based on orthogonal projection</td>
</tr>
<tr>
<td>Croatia</td>
<td>No registration of parts of land legally partitioned</td>
<td>Apartment ownership kind of 3D registry</td>
<td>Same as in 2D</td>
<td>Rights on use of limited space registered on a 2D parcel</td>
</tr>
<tr>
<td>Greece</td>
<td>2D registration</td>
<td>Significant number of laws regulating objects with 3D characteristics</td>
<td>✗</td>
<td>✗</td>
</tr>
<tr>
<td>Poland</td>
<td>2D registration</td>
<td>Registration of land parcels, buildings, apartments</td>
<td>✗</td>
<td>✗</td>
</tr>
<tr>
<td>Sweden</td>
<td>Complex RRRs on real property</td>
<td>3D Cadastre legislation</td>
<td>No difference with 2D real property – No limitations in 3D RRRs</td>
<td>✓</td>
</tr>
</tbody>
</table>
Conclusions (1/2)

High level of variation regarding

- Cadastral administration and infrastructure
- Implementation of 3D Cadastre legislation

- No statutory definition for 3D property (except Sweden)
- Condominium
- 2D representation of 3D units
  - Different 3D objects in each country
  - Different methods of recording 3D objects

Still unresolved

- Management of cross boundary objects
- Relation between 3D real property and constitutional stipulations
- Cooperation with other professionals
Conclusions (2/2)

Need of

- **Re-defining** real property in 3D space
- Establishment of **legal instruments** to subdivide, consolidate and manage 3D real property
- Introduction of **3D Public Law regulations**
- **3D Cadastral survey** procedures
- **Transition** from 2D real property to 3D
Further research

- **Legal amendments** required, **departments** or expert fields that should be involved

- Establishment of independent from national legislation **theoretical framework**, based on international **LADM** standard

- **Exploitation** of Building Information Modelling (**BIM**) for 3D cadastral purposes

- Interdisciplinary approach in cooperation with **other professionals**, e.g. lawyers, economists, spatial planners...

- **Extend research** to other countries
Thank you!