

## DOMAIN DESCRIPTION TECHNICAL ASPECTS

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The technical working session will focus on:

- a short inventory of 3D examples that cause complications in the current cadastres;
- a selection of consensus items that requires technology to assure a uniform, sustainable and efficient cadastral registration in the future;

These are intended to be the starting points for further consideration. It may be helpful to make an inventory of available resources, such as existing implementations, tools or software.

For initial consideration, we have three basic questions related to the 3D cadastre.

- 1) What are the preconditions for a 3D cadastre? Suggested items include:
  - The existence of a functioning 2D cadastral system (descriptive or coordinate based)
  - The existence of a functioning DBMS as starting point to maintain 3D objects
  - The ability to integrate changes into the current cadastral system
  - Integration with other registrations, systems or “spaces”:
    - cable/pipe registration
    - ‘natural’ resources
    - height registrations
  - Preconditions to the use of distributed sources or loosely-coupled distributed systems
  - Pricing and accessibility of data
  - Linking (2D/3D) spatial data with administrative systems

- Remote access by clients (Web GIS, LBS technology, graphic interfaces)
- 2) What are the technological problems/challenges of a 3D Cadastre?
- 3D visualization and validation
  - Relationships between “as-designed” and “as-built” information
  - Defining and modelling the 3D geometry of world objects that is relevant for cadastral registration: e.g. isolated 3D objects vs. 3D object clusters such as apartment blocks
  - Defining necessary basic primitives (TIN/TEN, Voronoi diagrams, polyhedrons, CAD models)
  - Defining and modelling the required topological relations in 2D or 3D: what relations should be stored explicitly and what relations should be maintained implicitly (i.e. they can be derived on the fly when needed)
  - Designing data structures and data models (spatial and non-spatial), e.g. with UML
  - Obtaining the required 3D data
  - The relationship between building models and terrain elevation models for vertical data (e.g. relative to surface level or in a National Reference System)
  - Visualising 2D and 3D data
  - Including the 4th dimension (temporal aspects)
  - The required link with administrative systems for transaction management: e.g. a new parcel with a new owner is one transaction, therefore should both the spatial and the administrative part of the system be locked at the same time?
  - 3D or 4D spatial indexing and clustering
- 3) Other technological aspects that might need attention:
- 3D GIS
  - 3D CAD
  - Virtual Reality
  - (geo) VRML
  - OpenGIS and ISO solutions on 3D Geometry and 3D topology,
  - Feature Specifications for SQL
  - OODBMS vs RDBMS