Trends and Expectations Towards to Three-Dimensional Property System in Turkey

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3D Property in Turkish Legislation

- Land ownership extends downwards to the centre of the earth and upwards infinitely into the sky.
- (1) Land parcel, (2) independent and permanent rights and (3) condominium units are registered as an immovable property to the land registry.
- 3D Cartesian coordinates (x, y, z) of the spatial and location informations on the map should be collected in the national data exchange format that will be a basis for GIS. Besides, these informations should be visualized with information technology and cartographic techniques.

- Article 718 of the Turkish Civil Law
  - Article 998 of the Law
  - Condominium Ownership Law (numbered 634)
  - According to the Large Scaled Map Production Regulation
  - According to the General Directorate of Land Registry and Cadastre Circular Letter (numbered 2011/3)
  - General Directorate of Land Registry and Cadastre Circular Letter (numbered 2010/4)
  - According to the Regulation for Title Deed Plans (Official Gazette, no: 26980)
  - According to the most of the jurisdictional decisions
• Existing land titling and property (cadastral) systems have developed around the concept of **a two dimensional mapping system**.

• Determination of these immovables have done in the geometry of point and area (block, parcel, point) by the Cadastre Agency, drawn to the 2D cadastral maps and registered by the Title Deed Agencies.
1. Land Registry and Cadastre Information System (TAKBIS)

- e-government project
- parcel-based Land Information System
- land registry (ownership data) and cadastral (geometry) data are collected in the geo-database.
- serves lots of public institutions...

The system is capable of forming a confidential geometry for the land management applications,

However, there is not enough geometric definition regarding with the management and representation of 3D physical objects like buildings or condominium units.

Data sets, feature classes, and relationships among them (Bank and Mataraci, 2004)
attribute values of condominium units in TAKBIS

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land share

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condominium unit no

TAKBIS condominium right book

owner

usage type

parcel no

tablo no
2. Turkey National GIS (TUCBS)

- e-government project
- Common-national data model
- **Aim**: establishing the infrastructure for Geographical Information System
- **Content**: defining national geo-data standards - geo-portal development analysis - determining institutional and policy requirements
- 5 basic **geo-data theme** have been developed (BI-Building, AD-Address, TK-Land Registry/Cadastre, IB-Administrative Unit and UL-Transportation)
- According to the **TUCBS.BI data theme**; Building information is represented in the **surface geometry**.
- contains INSPIRE **extended 2D** building features.
3. Spatial Property System (MEGSIS)

- **Cadaster data are collected by the center system from local users in the cadaster offices in digital .cad format**
- **Harmonized with land registry data**
- **Web-based application software (open source) ii) International standard map services iii) E-Government Services iv) Orthophoto Services**
- **Collected datas are used in a wide area and data quality is not in the desired level and data model should be updated.**

*in order to be submitted to stakeholder institution, organization, municipalities and citizens by e-government link (OGC Web Services)*
4. Development of the Urban Information System (UIS) Standards

- **Aim**: Composing a common platform for the local governments across the country.

- **Content**: nine work package; legislation, institutional, data/user requirement, international standards analysis, conceptual data model design, determination of the spatial data standards, developing UIS data exchange format, documentation/dissemination, administrative and financial modelling and preparation of the draft legislation.

- **Current Standards**:  
  - geo-data management ➔ ISO/TC211 and OGC  
  - detailed building features ➔ INSPIRE Buildings data specification  
  
  - For 3D requirements ➔ feature data type and definitions (based on BuildingCore3D profile) will be used. (LOD1+Core2D).
  - city furniture, topography and transportaion objects ➔ cityGML

- **Current situation**: UIS standards have been tested with pilot implementations.
4.1 UIS Pilot Projects in Municipalities

3D City Models in Konya Municipality
4.1 UIS Pilot Projects in Municipalities

3D City Model/Implementations in Istanbul Municipality-BIMTAS)

• Visualization purposes
5. 3D Topography and Urban Data Modelling Research and Development Project

• **Aim:** Development of the 3D city data model and sample analysis tools in order to contribute of the improvement of urban analysis, planning, design and decision-making process.

• **Project deliverables:** Data preparation module, visualisation module, quality control module, analysis module, energy efficiency module, urban regeneration and planning module, geological layer and visualization and analysis of mine galleries module, 3D model library and 3D city Model. Some of these modules have been completed such as energy efficiency module and 3D model library and some of them are still in progress.
Trends... Expectations?....

3D Property

What are the expectations from 3D property?

What will the 3D property system serve?

Which problems will be solved such kind of a system?
One of them is vertical ownership condominium units

- We have some problems regarding with establishing condominium ownership accurately!!!
- Condominium right: co-ownership on buildings
- Registration process of condominium units

**Architectural Project**

1st Phase

- Measurements of the condominium unit, annexes and common spaces
- Land shares of the condominium unit
- Number of the apartment, office, shop, cellar or warehouse
- Total building construction area, Floor plans, sections, views, heat insulating project...

**Management plan+construction permit**

2nd phase

1. establishing easement/ servitude right
   - Interlocutory registration

**Occupancy permit+Condominium unit plan/layout plan**

3rd phase

2. establishing condominium right
   - Final-permanent registration
Land share determinations!!!

Importance:
- using rights in common places,
- restoration + maintenance + protection costs,
- executive decision-making in building,
- board of management meetings,
- in case of the expropriation of the whole building,
- management appointments,
- in the case of demolishing of the building,

According to the Condominium Law (no:634);

- Land share should be determined by means of containing the value differentiation between the condominium units,
- Land share revisions are made by court decisions,
- Land share have to be determined in establishment easement/condominium date.
The problem:

1. Architectural projects are prepared when the building is not physically on the land surface and projects prepared in design phase don’t include valuation determinants and are not meaningful for cadastral/registry purposes.

2. It is not easy to show their value on a 2D architectural project (in the digital cad format). However in the project phase land shares are determined over the project documents lacking of scientific determinants.

Example for determination of the land shares with different methods

<table>
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<tr>
<th>Condominium number</th>
<th>Floor Area (m²)</th>
<th>Unit value ($)</th>
<th>Land share (based on area)</th>
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For the same unit architectural project, different land shares are observed.
How could we determine the accurate land share??

- According to the regulations;
- Land share should be determined **value based** (Cond. Law no:634)
  - Area, location, type
  - Floor number
  - Heating system
  - Fabrication cost per m2
  - Environmental features;
    - Solar energy potential
    - Wind
    - Lighting
    - View
    - Orientation
    - etc.
    - .......

(according to the Supreme Court practices)

So, a new valuation process which analyze these factors should be accelerated!!!!!
Determination of the Land Share with BIM Process

• 3D BIM models can provide important approaches for the valuation problems in the determination of the land share...
Conclusion

- When we look back at all of those stages, it can be concluded that 3D buildings have been evaluated in the concept of Urban Information Systems and used for an underlay for municipal requirements (such as; energy simulation, urban design, urban regeneration scenarios, flooding analysis, virtual tours, etc.) by the CityGML based national standards.

- The management of the 3D buildings and its components (like condominium unit) have not been considered in highly detailed level.

- Even if the building is not physically on the land surface, valuation should performed with the real measurements and datas from the 3D virtual building model.

- This kind of a valuation system is not supported by the current land administration system.

- BIM can be used for solving the problems regarding with the vertical landownership (condominium ownership).

- BIM world seems far away from the geospatial world, its functionality and detailed models containing geometric, semantic information can provide useful informations for the surveyors in the management of 3D physical objects (buildings and condominium units).
Thank you for your attention

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