



3-D Cadastre in Greece. Legal, physical & practical issues. Application on Santorini island.



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Cadastral systems

- ✓ Ensure & protect property registered rights
- ✓ Constitute a tool for development

The Hellenic Cadastre

- ✓ in progress
- ✓ designed as a parcel-based LIS
- ✓ expected to cover 16% of urban, 10% of agricultural & 7% of forestland areas in 447 municipalities within the ongoing program
- ✓ 3^d dimension is not part of the strategic planning of the project, despite the particularities of the Greek territory



"bi-dimensional Cadastre System"

Existing legislation

Superficies solo cedit

- ✓ Cadastral Legislation: (L.2308/1995, L.2664/1998, L.3127/2003, L.3212/2003 & L.3208/2003)
- ✓ Cadastral Law of the Dodecanese islands
- ✓ The concept of Byzantine-Roman Law: "superficies solo cedit"
What lies above or below surface belongs to the owner of the corresponding land-parcel
- ✓ Civil Code of 1946

Horizontal ownership

- ✓ Law 3741/1929 (about "ownership per floor" / "ownership of Mines")
- ✓ Current Civil Code (about "horizontal co-ownership")

Complex properties

- ✓ Civil Code ("legal implantation right on foreign land", "surface or separate ownership legal right on a plantation, trees or constructions on foreign land")
- ✓ Customary laws of Cyclades islands (possessor of the ground-floor is the sole owner of the land-parcel & the subsoil)

Why registering the 3rd dimension ?

Particularities of the Greek territory might suggest or even force such an evolution:

- ✓ complexity of Greek legislation on Cadastral information registration (Settlements with their own unique legislation – ownership status)
- ✓ intense relief of land, complex constructions, multi-level buildings
- ✓ due to the extended history of the Hellenic Nation, most of the contemporary settlements were built on the ruins of older cities
- ✓ 3^d dimension (from the property's surface) would probably cure the above

on the other hand:

- ✓ Hellenic Cadastral project has already exceeded the total forecasted cost
- ✓ extra economic burden from the 3^d dimension
- ✓ already many applications of disagreement
- ✓ no international applied experience existing

3D Registration

Case 1 – Constructions over a public road



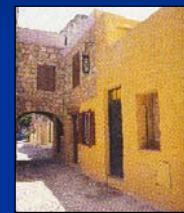
Athletic premises plus auxiliary and recreational facilities and open spaces over "Attica Road" (Attiki Odos)



"Seiros" is an Auto-route service providing station for motorists. An aerial construction can be seen above the National Road on the 35th km, covering the whole width of the road.

3D Registration

Case 2 – Constructions over a communal arcade



ex.1

ex.2

ex.3

3D Registration

Case 3 – Constructions under or over bridges



Many independent properties located under the bridge of Arachova (town centre)

Case 4 – Underground Constructions

For example, commercial stores, garages, storage facilities in metro stations / underground tunnels / subway passages

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3D Registration

Case 5 - Underground Constructions with a surface entrance



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3D Registration

Case 6 – Properties with access from neighboring ones

“floor properties”

Case 7 – Complex ownership and property-use situations



A typical example of a settlement's vertical development in Karpathos island

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Mixed Land - Use

Land-use in areas where Urban Planning exists is strictly categorized

Mixed-use (for example athletic premises with commercial stores) can be achieved through: Administrative Acts, Presidential Decrees or Ministerial Decisions

Examples:

- ✓ Constructions for the Olympic Games of 2004 (athletic premises, hotels, road network)
- ✓ Hospitals, juridical buildings etc
- ✓ Complex building-use in the same land-parcel (commercial-residential) example: Army Share Fund



In those cases, 3D cadastral registration is advisable

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Public Utilities Organizations' networks

- Registration of the Greek Telecommunications Authority network



SmallWorld software, object-oriented database

Fig.7: Main window:
The piping level is active
Secondary window:
Cross-section dimensioned

- Registration of water-supply and sewerage networks



Fig.8: The position of the pipes is presented approximately, since there is not any metric data available

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Application

STUDY AREA : Santorini island



Castell is a small settlement in Pyrgos community

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Cadastral map (NGRS 87)



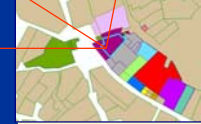
The map was updated by field-surveying & Height information was collected

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Horizontal levels were created, to facilitate the floor-property ownership emulation



| FID | Shape | AREA | PERIMETER | SYSTEM | SPTES3D | ELEV1 | ELEV2 |
|-----|---------|------------|------------|--------|---------|-------|-------|
| 1 | Polygon | 22.5481725 | 23.687491 | 2 | 0 | 7 | 4.3 |
| 2 | Polygon | 6.520791 | 13.3897133 | 3 | 0 | 7 | 0 |
| 4 | Polygon | 62.637232 | 36.166964 | 4 | 0 | 11.3 | 0 |
| 5 | Polygon | 12.953395 | 15.077744 | 5 | 0 | 4.9 | 0 |
| 6 | Polygon | 8.847991 | 15.525847 | 6 | 0 | 8.7 | 0 |
| 7 | Polygon | 8.756432 | 15.071144 | 7 | 0 | 4.9 | 0 |



Software : ArcGIS 8.2
3D visualization : 3D Analyst module

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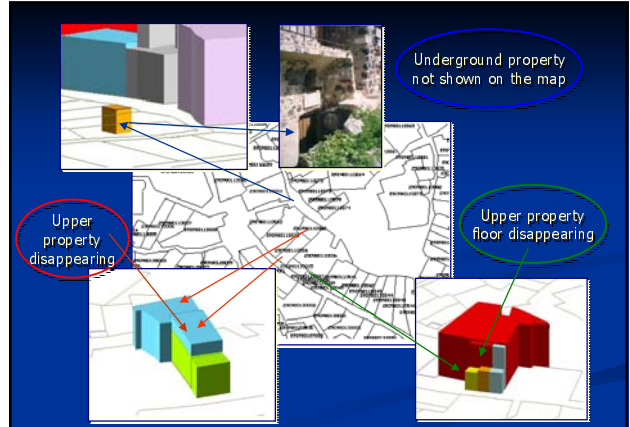


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CONCLUSIONS

A 3D Cadastral system, is a system which provides information about land-use, above and below the surface of the earth, aiming to its best and profitable exploitation.

A successful 3D Cadastral system constitutes a unique tool, a lever for sustainable development in urban and land planning and in every aspect of technical, financial, social and legal issues of everyday life. It can also be used as a means for political decisions and pressure.

A contemporary 3D Cadastral system should evolve through:

- ✓ the modernization of the relative legal frame (evolution of a Cadastral Code)
- ✓ the reformation of the specifications of the project
 - different confrontation of old, contemporary and future constructions
 - progressively appending a field of hypsometrical information
 - providing simple ownership status properties with a floor reference
- ✓ the detachment of properties from the corresponding land-parcel

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FIG Working Week 2004: "The Olympic Spirit in Surveying"



TS 25.6: Appropriate Technologies for Good Land Administration II – 3D Cadastre

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