Portuguese Cadastre. 
Actual state, case studies, projects, data infrastructure

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Summary
Evolution
Actual state
Case studies
   Albergaria - Cadastral data acquisition operation
   Lisbon - cadastral data interoperability
IS cost-benefit analysis
Projects
   Execution of Cadastre Real Property
Data infrastructure
   Project computerization of the Geometric Registration Rural Property
   SINEGIC Information System
Royal Charter
- execution of geometric registration of urban and rural property
- mandatory registration of ownership of the property right

José António D’Ávila concluded that the register should be:
- the map of the country
- the description of the real property
- inventory of the value of the country
- the repository of the titles of their owners

Letter of the Law of August 26, 1848
Creation of property tax

Government Gazette. n.º 225, of October 28
- execute the Charter Corográfica 1:100 000 mapping (to obtain support planning of roads)

Starts the collection of taxes based on the information of Department of Finance
Evolution

Publication of the Charter Corográfica
1:100 000

It is created a finances service of Geometric Register
- registration tax purposes
- composed of discontinuous and unrelated plants
Decree law n.º 11 859

- Determines that the General Services Administration Geodetic, Topographic and Cadastral proceed to the organization of geometric registration of rural property of the continent and adjacent islands
- this register should be the basis for
  - identification of rural property
  - calculation of property tax rustic
  - remodeling of the system of rural property
  - large-scale survey of the country chart

Evolution

Creation of Cadastral and Geographic Institute
- Remodeling Services Geodetic, Topographic and Cadastral
- National authority in cartography, geodesy and cadastre
From 1926 to 1995 was executed the Geometric Registration of Rural Property:
- 12 districts
- 8 municipalities in the Autonomous Regions
- Without recourse to documentary evidence
- Tax purposes
- Only rustic property

In 1995 was regulated the Cadastre of Real Property (Decree-Law n.º 172/95, of July 18)
Cadastre of Real Property was changed:
- from tax purpose to multipurpose
- beyond the acquisition of rustic property has also acquisition of Real property cadastre

Were executed more 9 municipalities
Creation of the **National System Operation and Management of Cadastral Information (SiNeRGIC)**

Acquiring and managing cadastral data with a global purpose, involving it in the legal real property market:
- Who needs this information?
- How is this information needed?
- When is this information needed?

**Evolution**

1801 1848 1852 1904 1921 1926 1995 2006

**Actual State**

- **Rural property cadastre**
  - Area: 50%
  - from tax purpose to multipurpose

- **Cadastre of real property**
  - Area: 1.5%
Promote Unique Parcel Identification

Future
Understand the reality

Case studies:
- Albergaria’s cadastral data acquisition operation
- Lisbon’s cadastral data interoperability operation

IS cost-benefit analysis

Albergaria case study - Cadastral data acquisition operation
Choice criteria

- Inexisting Geometric Registration of rural Property data for that area
- Parcel and Owner Registry data is integrated in database
- Fragmented land structure area
- Parish with less then 2 500 ha
- Suitable to move human resources and equipment
Newspaper advertising

Public announcement
Public presentation of the cadastral operation

PT-TM06/ETRS89 - European Terrestrial Reference System 1989

<table>
<thead>
<tr>
<th>Reference ellipsoid</th>
<th>GRS80</th>
</tr>
</thead>
<tbody>
<tr>
<td>Semi-Major Axis: a</td>
<td>6 378 137 m</td>
</tr>
<tr>
<td>Semi-Minor Axis: b</td>
<td>6 356 752,314 m</td>
</tr>
<tr>
<td>Flattening: f</td>
<td>1 / 298,257 222 101</td>
</tr>
</tbody>
</table>

Cartographic projection: Gauss-Krüger

Latitude of the origin of rectangular coordinates: 39º 40' 05'',73 N
Longitude of the origin of rectangular coordinates: 08º 07' 59'', 19 W

False Origin coordinates: Easting: 0 m Northing: 0 m

Reduction coefficient: 1,0

Planning

Reference system
Planning

Base Map

<table>
<thead>
<tr>
<th>Digital orthophotomaps</th>
</tr>
</thead>
<tbody>
<tr>
<td>Geometric resolution</td>
</tr>
<tr>
<td>Color model</td>
</tr>
<tr>
<td>Radiometric resolution</td>
</tr>
</tbody>
</table>
Planning

Addicional GNSS base station instalation

- Location: Field office headquarters (Fire Department building)
- ADSL connection with DGT headquarters
- Integration of ground station with National GNSS Network
- Used only by survey project team
- Installation limited to the duration of the project

Planning

Data model definition
Planning

Ownership declarations

Execution - office

Main goals
- Support in completing ownership declarations
- Clarify the real property demarcation instructions
- Receive declarations according the established rules
- Management declarations
Execution - office

Main goals (continuation)
- Support the mapping approximate location of the property (by base map use)
- Management of data quality control procedures
- Support of survey team

Execution - office

Human resources
- Coordination by one person (Surveying Engineer)
- Two persons (survey experts)

Equipment
Execution - office

Dataflow

validation of the database with Vectorial data
Execution - office

Coordination of the survey team
- Continuous monitoring of survey team
- Daily briefing with survey experts

Participation and collaboration of the population

Execution - office

Documents submitted by the owners
- Ownership Registry documents
- Certificates of notarial acts
Execution – survey work

Main goals
- Collect cadastral data using new technologies and innovative methodologies
- Interpret the existing boundary marks, set the geometric configuration of each real property and, if possible, establish a link with a ownership declaration

Execution – survey work

Human resources
- Coordination by one person (Surveying Engineer)
- Six survey teams (Two survey experts each)
Execution – survey work

Equipment (Per team survey)
- A tablet PC
- A total station
- A RTK GNSS receiver
- A mobile phone

Dataflow
Execution – survey work

Boundary marks

Coordination of the survey team in the back-office

- From the data ownership declaration analysis resulted a list of unidentified real properties
- The list was further distributed by the survey team
Execution – survey work

Participation and collaboration of the population

Public Consultation

Participation and collaboration of the population

Public Consultation Offices
Public Consultation

Consultation
- supervised by a team constituted by a cadastral specialist, a tax issues specialist, an ownership property specialist and a local authorities delegate

Public Consultation

Complaints Analysis and Resolution
Results

Final

<table>
<thead>
<tr>
<th>Description</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total area cadastral data collect</td>
<td>1400 ha</td>
</tr>
<tr>
<td>Total area of real properties with geometric configuration established</td>
<td>1115 ha</td>
</tr>
<tr>
<td>Deferred cadastral areas</td>
<td>10 ha</td>
</tr>
<tr>
<td>Total area data considered provisional and / or inconclusive</td>
<td>275 ha</td>
</tr>
</tbody>
</table>
Albergaria case study conclusions

- owners collaboration is essential for real properties identification
- the use of "informants" enhances recognition of properties and boundaries (but does not solve the problem of identifying the real properties data integrated by the project partners)

Lisbon case study - cadastral data interoperability

- Chosen two parish from the city of Lisbon (Prazeres and Alcantara)
- Participation of partners
Cadastral data interoperability

Main goals

- Use municipal base map (from Lisbon) in a cadastral database analysis
- Analyze linkage between data owner registry database and data taxes database
- Collect cadastral data using the base map previously existing in Municipality of Lisbon
Metodology adopted

Association of data, using toponymic elements, without survey work, based especially on the base map 1: 2 000

Cadastral data vs base map

Lisbon case study results

Alcântara
Lisbon case study results

Lisbon case study conclusions

Real properties integrated in ownership database, but with different data in taxes database.

With this methodology, the linkage between cadastral database are difficult.
IS cost-benefit analysis

"Study and implementation of a cost-benefit analysis to SiNErGIC"
- Coordinated by Prof. Augusto Mateus
- Developed by Augusto Mateus & Associados
- Price Waterhouse & Coopers (PWC) collaboration

(Source: http://www.ordemengenheiros.pt/ingenium/ing109.pdf)
Projects – Execution of Cadastre Real Property

Running in 7 municipalities
Envolvement of strategic partners:
- Institute of land registers
- Finance Service
- City Councils

DGT is responsible for:
- monitoring of project
- quality control

Invitation to tender private company

Projects – Goal

Characterize rural and urban real property geometrically, associating them with all the data declared by the owner and harmonize with Institute of Land Registers and Finance Service.

Promote Parcel Identification with all our strategic partners
Projects – Ownership declaration

Data required:
- Name of owner
- Tax Identification number
- Usual residence
- Description of the land registry
- Article number (Finances)
- Location of the property
- Property designation

Projects – Demarcation

Main rules:
- According to documentation
- In the presence of confining
- With proper demarcation in rural and urban real property
Implementation of land registration in the municipality of Loulé began 2013, July 1. Awareness actions have been done in all parishes.

Projects – Loulé

The awareness actions took place as planned with more people in rural areas and with less people in urban areas.

Main issues:
- How to fill ownership declaration
- How to present the data declared according to the physical reality of the real properties
- How to find some of the real properties
- How to get to the rural properties
Projects – Loulé

- Delivery 1
- Delivery 2
- Delivery n
- Delivery of provisional data
- Acceptance or rejection
- Start of the Public Consultation
- Delivery of definitive data
- Acceptance or rejection of definitive data
- End of the Public Consultation

Projects – Loulé / Methodology QC

- Intermediate delivery
- Definition of the sample
- Distribution by control teams
- QC positional
- QC declarative
- QC association between the property and the declaration
- Compilation of results
- Issue report
Projects – Loulé / Methodology QC

Issue report of QC and Supervision:
- Awareness of the company’s mistakes
- Decision support for the acceptance or rejection of the data collected in the operations of running the cadastre
Projects – Loulé / in conclusion

Main difficulties of the projets are:
- orography (high mountains)
- population decrease (desertification)
Data infrastructure

Computerization project of the Geometric Registration Rural Property
SiNErGIC Information System - Conception

Future Actions

Cadastre Business Model Definition

Cadastre Acquisition Operations Nation-wide

IS implementation completed

New challenges
New demands