

# 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  
SiNERGIC Information System



## Evolution

1801

### Royal Charter

- execution of geometric registration of urban and rural property
- mandatory registration of ownership of the property right

## Evolution

1801

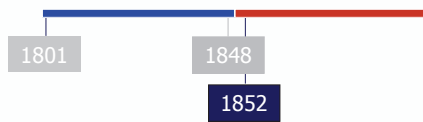
1848

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

## Evolution

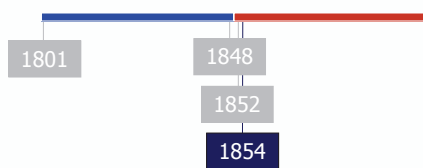


Creation of property tax

Government Gazette. n.º 225, of October 28

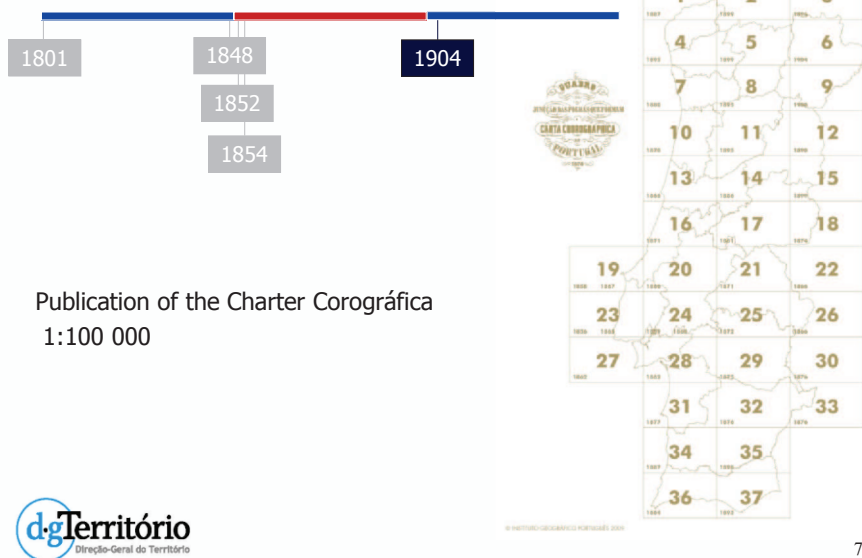
- execute the Charter Corográfica 1:100 000 mapping (to obtain support planning of roads)

## Evolution

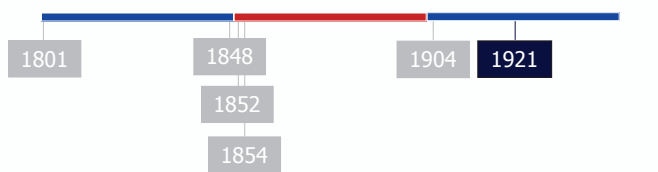


Starts the collection of taxes based on the information of Department of Finance

## Evolution



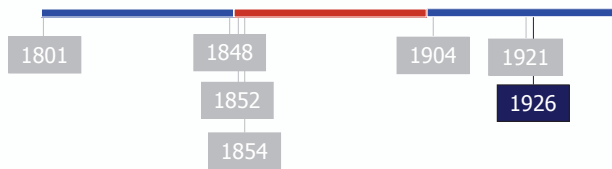
## Evolution



It is created a finances service of Geometric Register

- registration tax purposes
- composed of discontinuous and unrelated plants

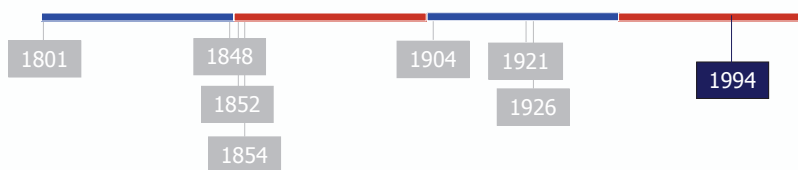
## Evolution



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

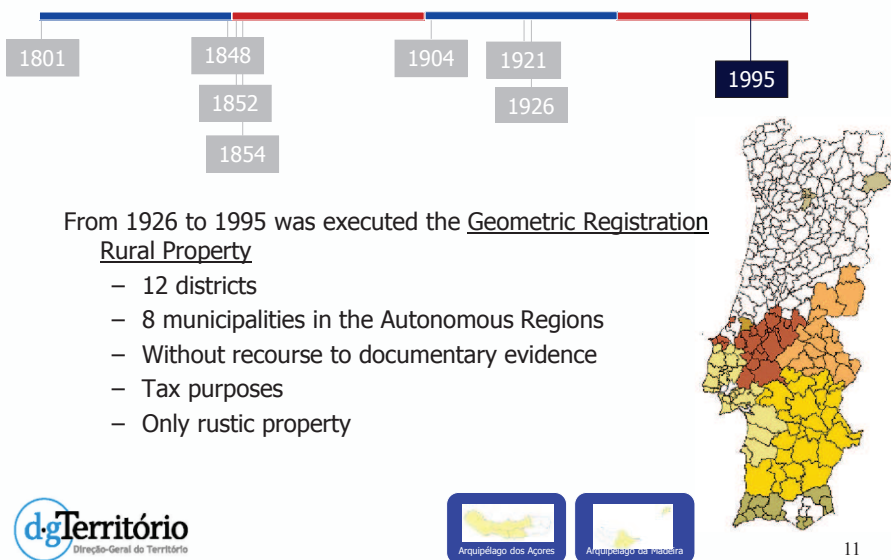
## Evolution



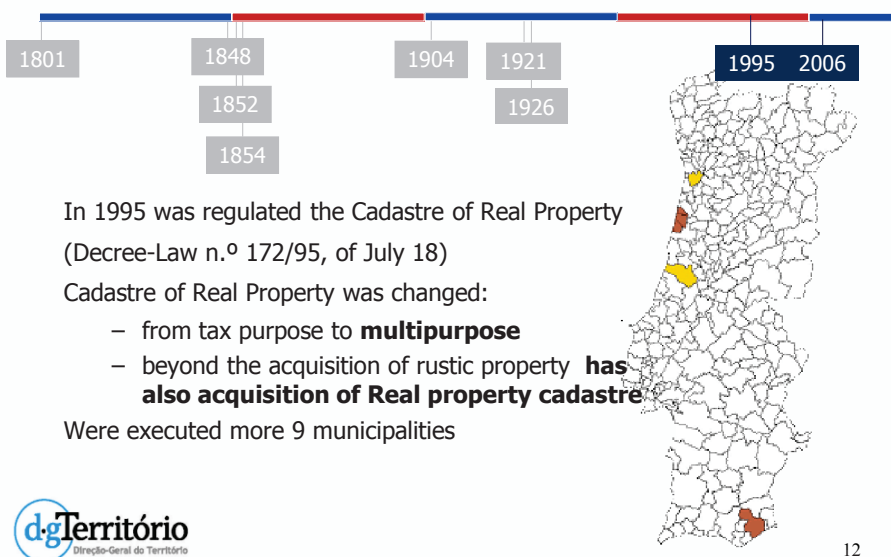
Creation of Cadastral and Geographic Institute

- Remodeling Services Geodetic, Topographic and Cadastral
- National authority in cartography, geodesy and cadastre

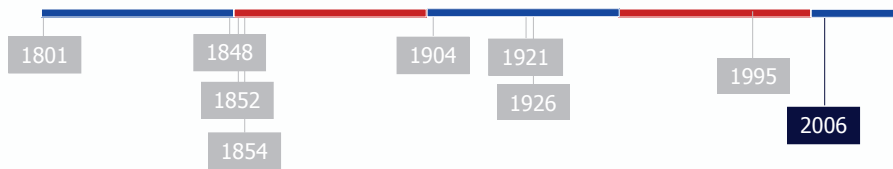
## Evolution



## Evolution



## Evolution



### 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:

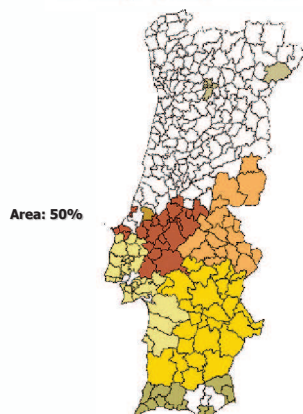
- Who needs this information?
- How is this information needed?
- When is this information needed?



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## Actual State

### Rural property cadastre



Area: 50%

### Cadastral of real property



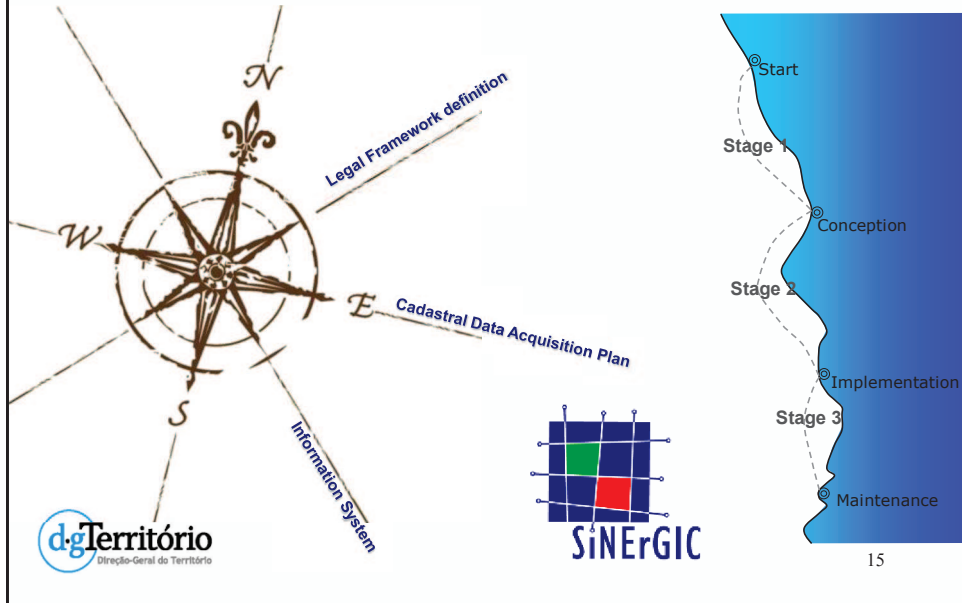
Area: 1,5%

from tax purpose to multipurpose



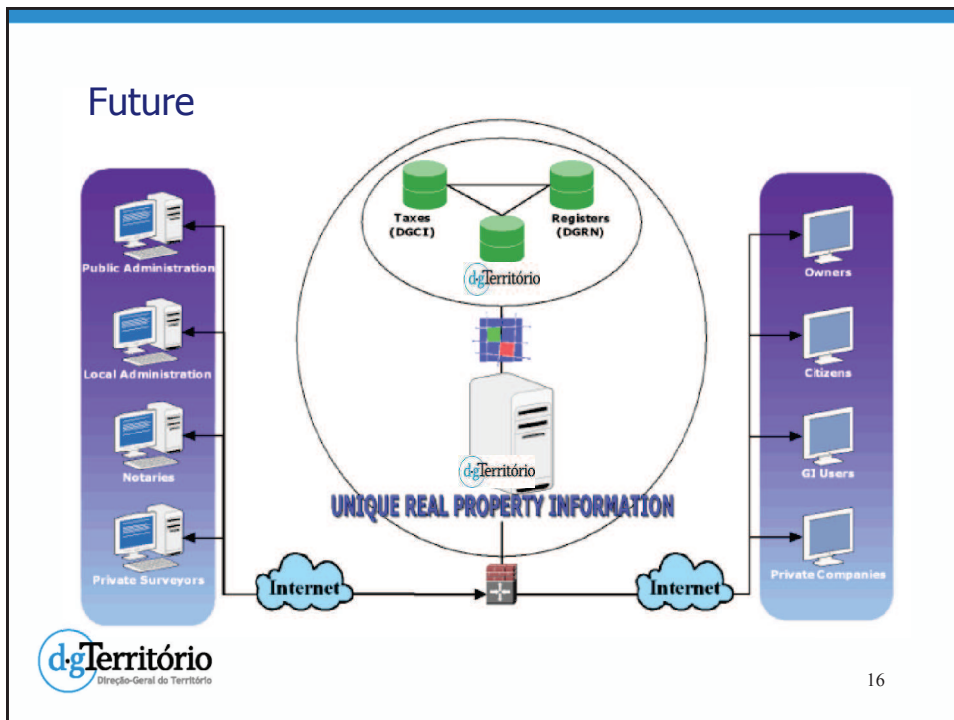
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## Promote Unique Parcel Identification



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## Future



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## Understand the reality

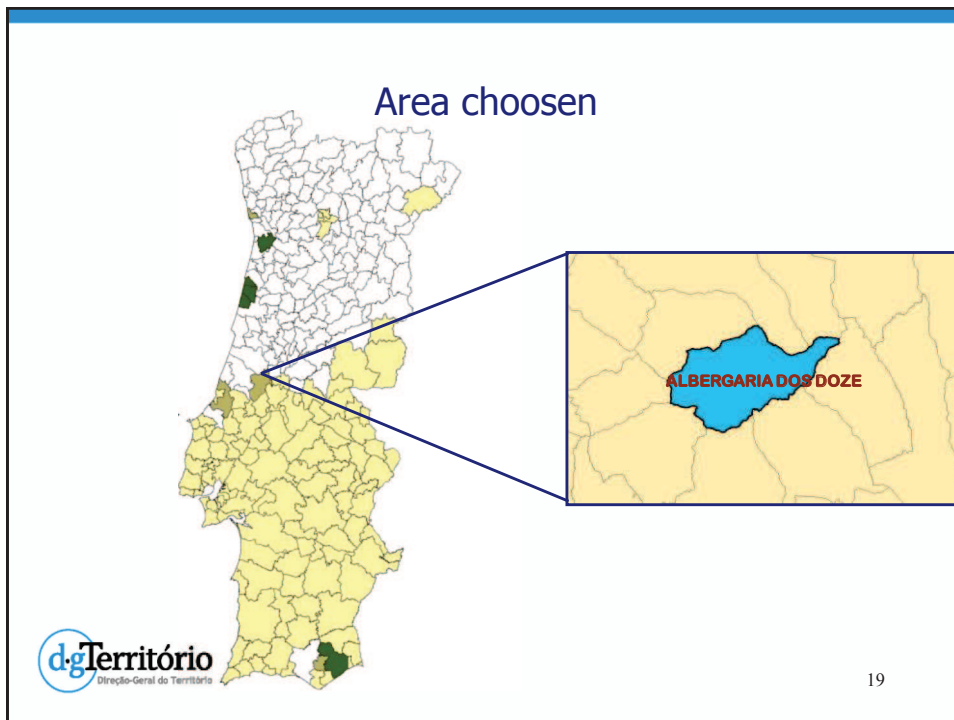
### Case studies:

- Albergaria's cadastral **data acquisition operation**
- Lisbon's cadastral **data interoperability operation**

IS cost-benefit analysis

## Albergaria case study - Cadastral data acquisition operation



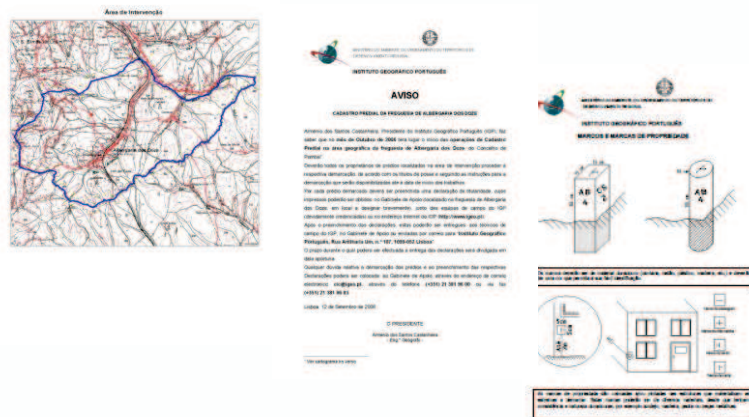


- ### Choice criteria
- Inexisting Geometric Registration of rural Property data for that area
  - Parcel and Owner Registry data is integrated in database
  - Fragmented land structure area
  - Parish with less then 2 500 ha
  - Suitable to move human ressources and equipment
- d.g. Território  
Direção-Geral do Território
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## Newspaper advertising



## Public announcement



## Public presentation of the cadastral operation



## Planning

Reference system

<b>PT-TM06/ETRS89 - European Terrestrial Reference System 1989</b>		
<b>Reference ellipsoid</b>	<b>GRS80</b>	Semi-Major Axis: a = 6 378 137 m Semi-Minor Axis: b = 6 356 752,314 m Flattening: f = 1 / 298,257 222 101
<b>Cartographic projection</b>	<b>Gauss-Krüger</b>	
<b>Latitude of the origin of rectangular coordinates</b>	<b>39° 40' 05'',73 N</b>	
<b>Longitude of the origin of rectangular coordinates</b>	<b>08° 07' 59'', 19 W</b>	
<b>False Origin coordinates</b>	<b>Easting: 0 m Northing: 0 m</b>	
<b>Reduction coefficient</b>	<b>1,0</b>	

## Planning

Base Map

Digital orthophotomaps	
Geometric resolution	0,1 m
Color model	RGB
Radiometric resolution	24 bit



## Planning

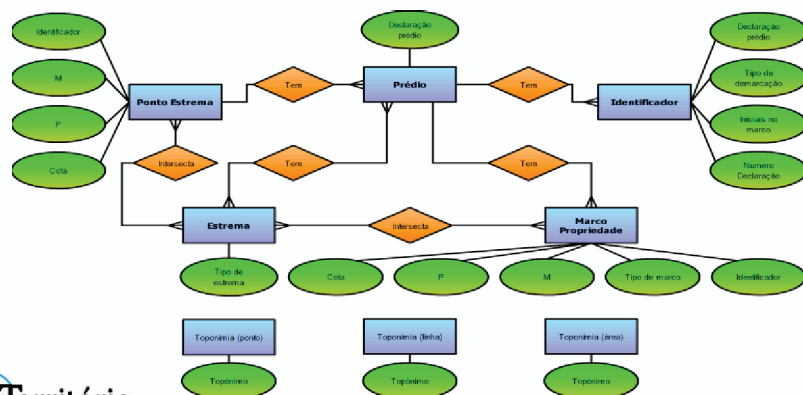
### Additional GNSS base station installation

- 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

The image displays three overlapping forms used for property ownership declarations. The largest form in the foreground is titled 'DECLARAÇÃO PREDIAL SINE-GTIC' and includes sections for 'Dados do Imóvel', 'Dados do Declarante', and 'Declaração'. To its right, two smaller forms are visible: 'DECLARAÇÃO P.T.' (top) and 'DECLARAÇÃO P.M.' (bottom). The forms contain various fields for data entry, including names, addresses, and property details.

## 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)

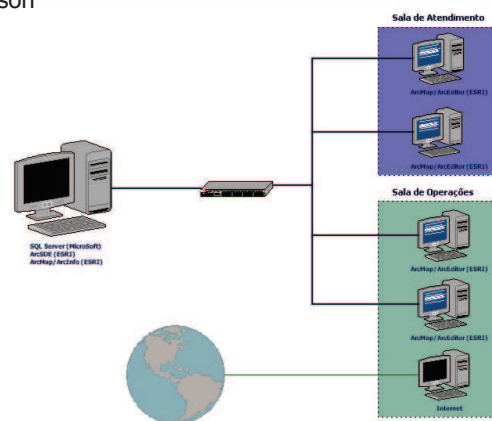
- Support the mapping approximate location of the property (by base map use)
- Management of data quality control procedures
- Support of survey team

## Execution - office

### Human resources

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

### Equipment



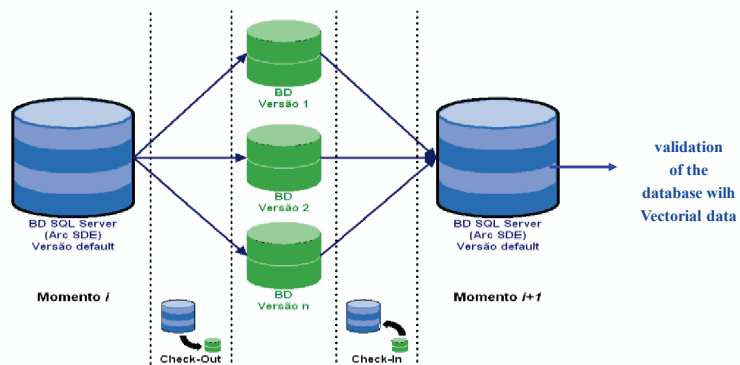


## Execution - office



## Execution - office

Dataflow



## 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

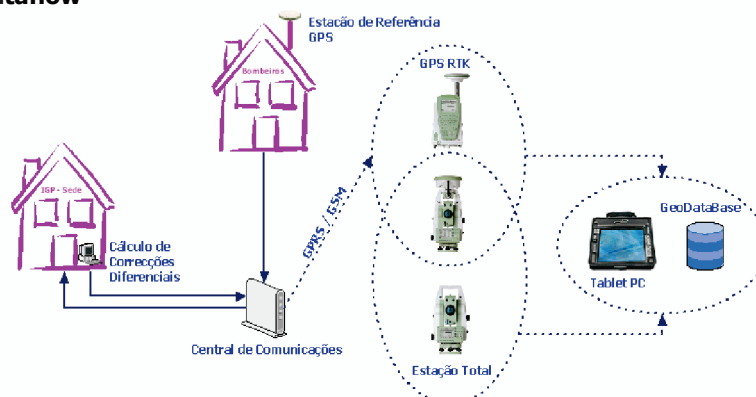
### Equipment (Per team survey)

- A tablet PC
- A total station
- A RTK GNSS receiver
- A mobile phone



## Execution – survey work

### Dataflow



## Execution – survey work

### Boundary marks



## Execution – survey work

### 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



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## Public Consultation

Participation and collaboration of the population



Public  
Consultation Offices

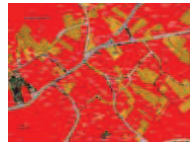


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## Public Consultation

### 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

<b>Total area cadastral data collect</b>	<b>1400 ha</b>
<b>Total area of real properties with geometric configuration established</b>	<b>1115 ha</b>
<b>Deferred cadastral areas</b>	<b>10 ha</b>
<b>Total area data considered provisional and / or inconclusive</b>	<b>275 ha</b>

## Availability of cadastral data in the web





## Albergaria case study conclusions

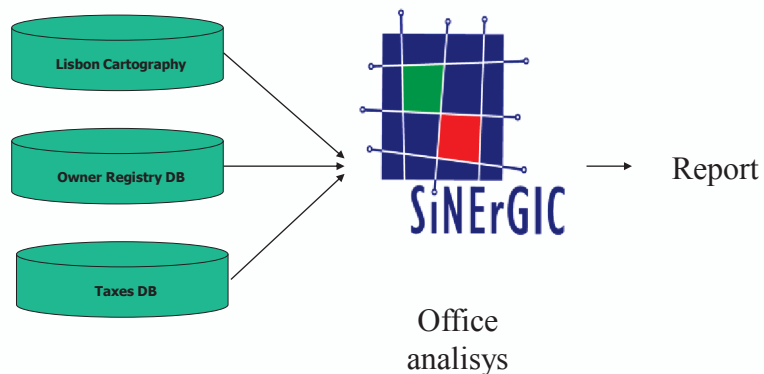
- owners collaboration is essential for real properties identification
- the use of "informants" enhances recognition of properties and boundaries (but does not solve the problem of identifying the real properties data integrated by the project partners)

## Lisbon case study - cadastral data interoperability



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

## Cadastral data interoperability

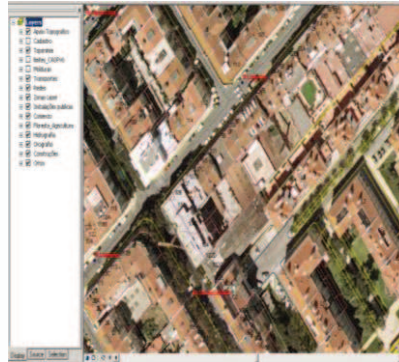


## Main goals

- 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

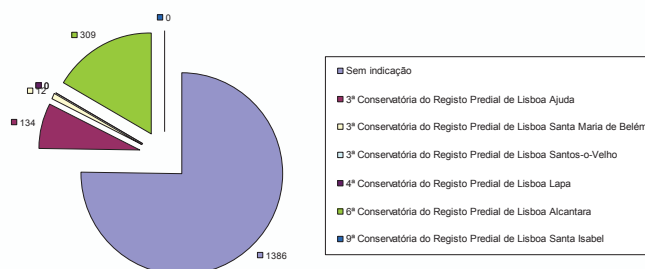
Association of data, using toponymic elements, without survey work, based especially on the base map 1: 2 000



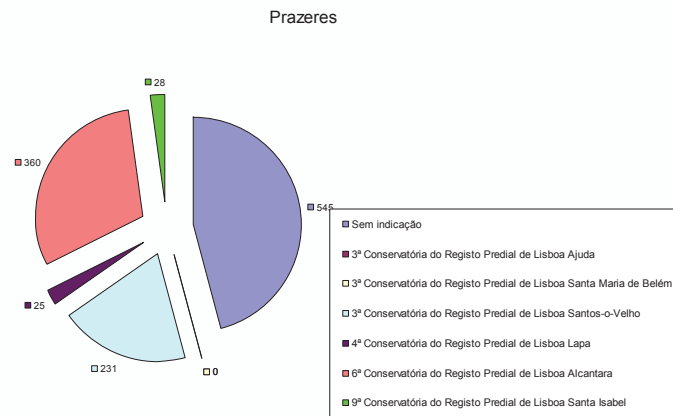
Cadastral data vs base map

## Lisbon case study results

Alcantara



## 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

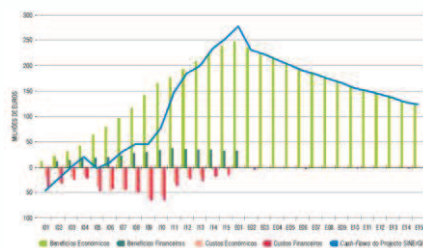
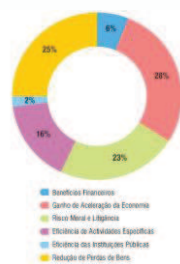
## IS cost-benefit analysis



### "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

## IS cost-benefit analysis



(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

The image shows a form titled 'DECLARAÇÃO DE TITULARIDADE' (Ownership Declaration) from the 'SINERGIC' system. It includes fields for 'Município' (Municipality) and 'Procedimento' (Procedure). The form is divided into several sections: '1. TIPO DE DECLARAÇÃO' (Type of Declaration), '2. IDENTIFICAÇÃO DO DECLARANTE' (Identification of the Declarant), '3. IDENTIFICAÇÃO DO TERRENO' (Identification of the Land), '4. IDENTIFICAÇÃO DO TÍTULO DE PROPRIEDADE' (Identification of the Title of Ownership), '5. IDENTIFICAÇÃO DO TÍTULO DE POSSESSÃO' (Identification of the Title of Possession), '6. IDENTIFICAÇÃO DO TÍTULO DE POSSESSÃO' (Identification of the Title of Possession), '7. IDENTIFICAÇÃO DO TÍTULO DE POSSESSÃO' (Identification of the Title of Possession), and '8. IDENTIFICAÇÃO DO TÍTULO DE POSSESSÃO' (Identification of the Title of Possession).

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



## Projects - Cadastral Data Acquisition Process



## Projects - Cadastral Data Specification





## Projects – Loulé



Implementation of land registration in the municipality of Loulé began 2013, July 1  
Awareness actions have been done in all parishes



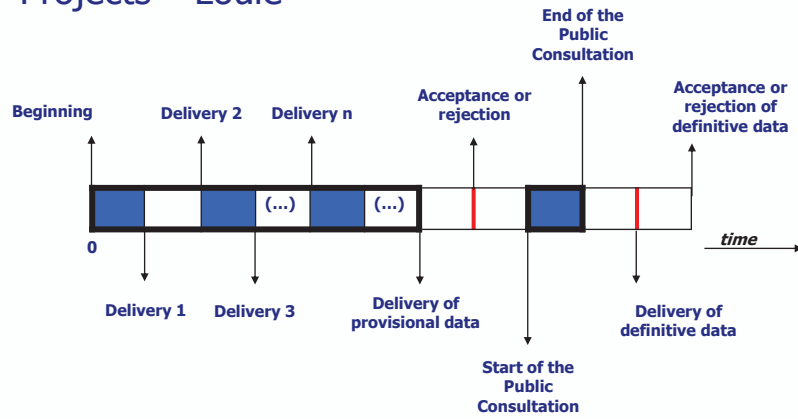
## Projects – Loulé

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

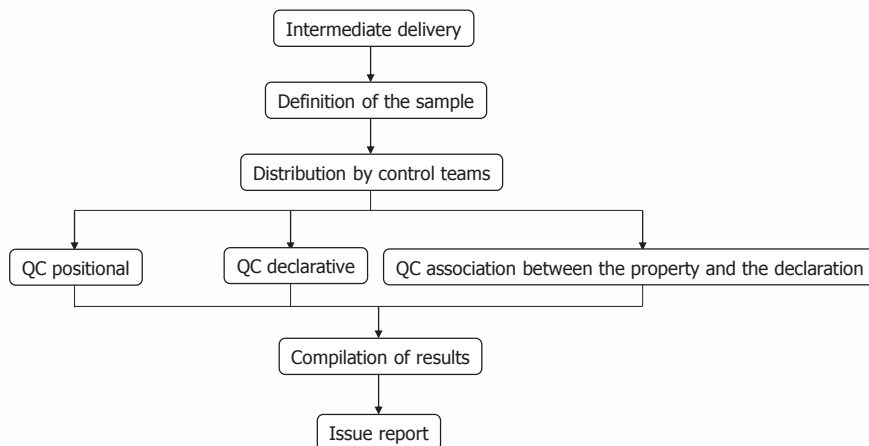
Main issues :

- 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



## Projects – Loulé / Methodology QC



## 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 / Application of private company

Número da declaração	Tipo de Declaração	Data da declaração (dd/mm/aaaa)	Documento	Atualizado por
2885	Primeira	10/Oct/2013	Paulo F. SDO	1
2884	Primeira	10/Oct/2013	Paulo F. SDO	1
1000	Primeira	10/Oct/2013	Paulo F. SDO	1

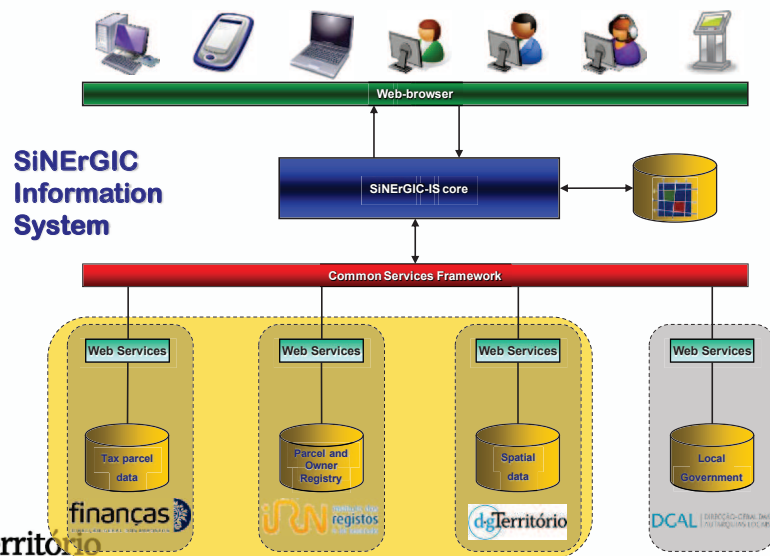
The interface also shows a sidebar with 'Map Settings', 'Object Details', and a 'Details' panel for the selected declaration (ID: 2885), including fields for 'Número da declaração', 'Tipo de Declaração', 'Data da declaração', 'Documento', 'Atualizado por', 'Conselho/Freguesia', 'Observações', 'Titular', 'Representante', and 'Objecto Cadastro'.

## Projects – Loulé / in conclusion

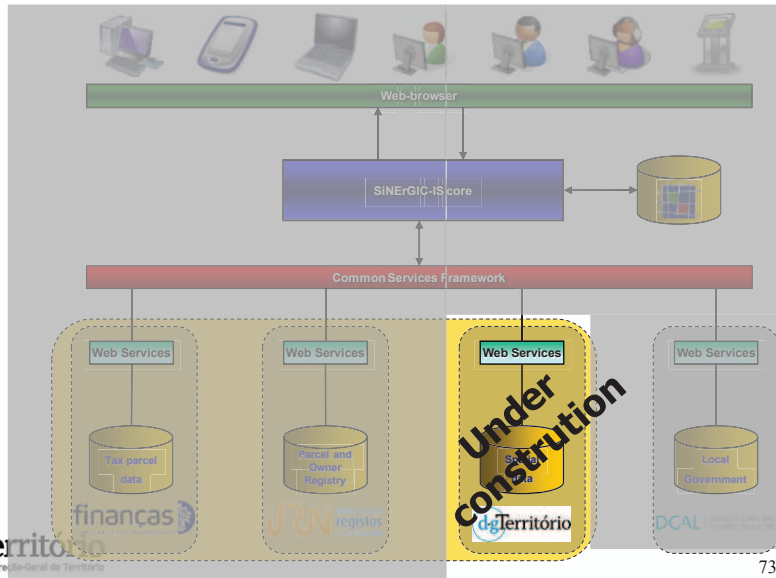
Main difficulties of the projects are:

- orography (high mountains)
- population decrease (desertification)

## Data infrastructure

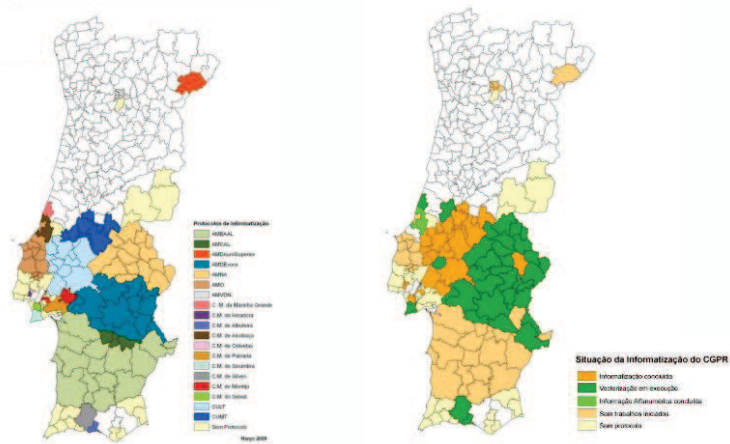


## Data infrastructure



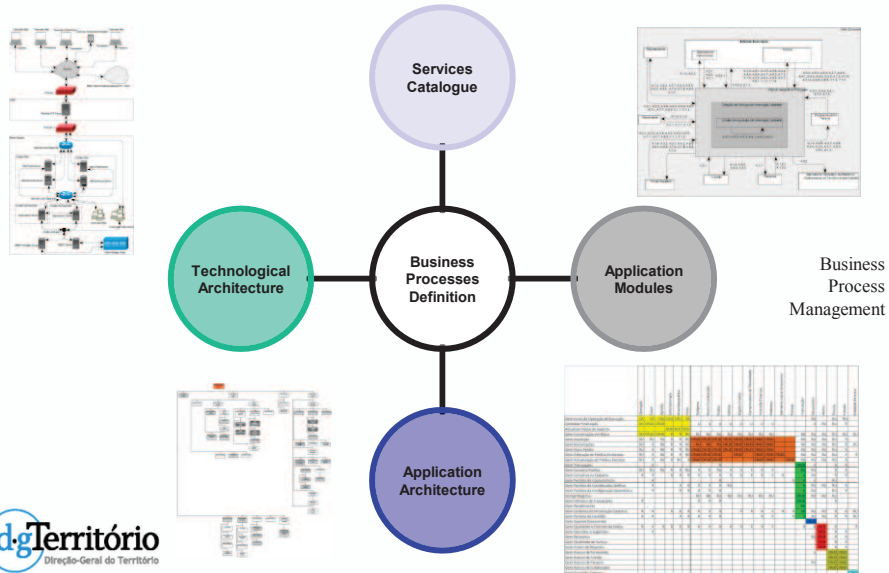
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## Computerization project of the Geometric Registration Rural Property



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## SiNERGIC Information System - Conception



## Future Actions

- Cadastre Business Model Definition
- Cadastre Acquisition Operations Nation-wide
- IS implementation completed

**New challenges**

**New demands**