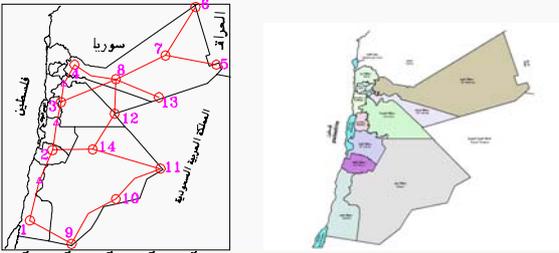


From Pharaohs to Geoinformatics

Building Jordan Digital Cadastral Data Base (JDCDB)



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Contents

- 1** INTRODUCTION
- 2** PLANNING AND METHODOLOGY
- 3** EDGEMATCHING
- 4** DATA INTEGRATION
- 5** FINDINGS

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BACKGROUND

- ❖ DLS is the only governmental organization in Jordan that is responsible for:
 - Land registration.
 - Cadastral surveying.
- ❖ DLS mission/Vision.
- ❖ The maps were established over time by different methods and scales with a lot of imperfections

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BACKGROUND

- ❖ Samples of hard copy maps.



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BACKGROUND

- ❖ These maps don't comply with :
 - Current high prices of lands.
 - The expectations of owners.
 - The conflicts between owners because of parcels boundaries.

→ all these factors are pushing for improving the cadastral information and making it available in an easy and friendly form which resulted in adopting **a large project for the conversion** of these hard copy maps .

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DLS business

- 1.** Expansion of CIS to all 32 Land Registration Directorates (LRDs).

DLS managed to recover the cost of the digitizing process during the first 5 years through selling digital cadastral maps to all public and private institutions .

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DLS business

2. Providing satisfactory services (up-to-date, fast and accurate services) to all customers.

- Citizens getting Automated cadastre sketches and indexes form remote areas.



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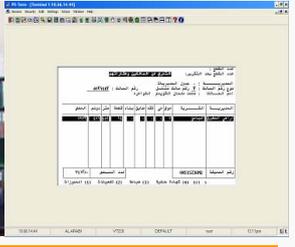
DLS business

3. Computer based inquiry (maps & records) services provided to all DLS customers.

Past Situation



Current Situation

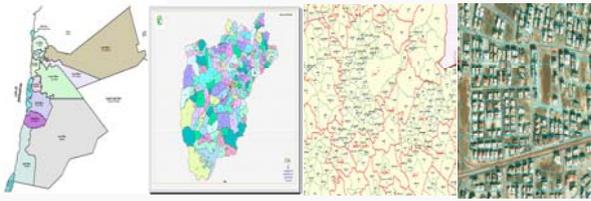


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DLS business

4. Provisions Automated Cadastral Maps on different levels.

Governorates Boundray Villages Boundary District Boundary Parcel Polygons



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DLS business

Example :- Automated Cadastral Indexes

Past Situation



Current Situation



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DLS business

5. Computer Digital Register inquiries.



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DLS business

6. Computer Digital Register Investigations.



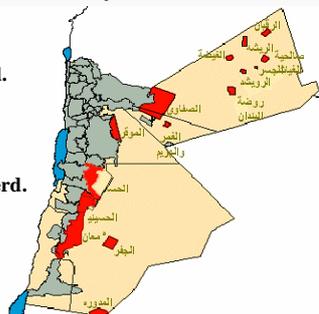
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Objectives

- 1. Protecting lands owned by the state.**

Before 1995:- 20% of the country was cadasterd.

Now :- more than 95% of the country is cadasterd.



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Objectives

- 2. Managing huge information.**
- 3. More reliable land ownership.**
- 4. Higher accuracy for boundary reestablishment.**
- 5. Avoiding damaging the analogue sheets.**
- 6. Avoid manual renewal of analogue sheets.**

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Benefits of the project

- JDCDB is the basic layer for LIS.
- Decreasing transactions' time.
- Real time support for decision making.
- Providing different services.
- Supporting land property valuation.
- Enhancing spatial accuracy by applying the concept of partial renewal.

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Planning Methodology

- Time frame to conclude the project (1995-2000).
- Steering and technical committees supervised and controlled the whole process of the project to insure that the objectives were met.
- 45 workstations, 3 plotters, 3 printers, 2 scanners, 68 employees and proper software have been acquired for the project from the early beginning.
- Requirements (user needs) in JDCDB.

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Scanning process

- Optical Scanning.
- Less size format.
- North to the top.
- Systematic Shrinkage :- Bad status maps handled by adhesive tapes and their accuracy checked by measuring 6 comparison distances.
- Checking :- the distortion in (x,y) not exceed 0.04cm, if the tolerance 0.4mm was overstepped, the scanning process was repeated.
- No edits for raster data.

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Check & Control



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Heads-up digitization

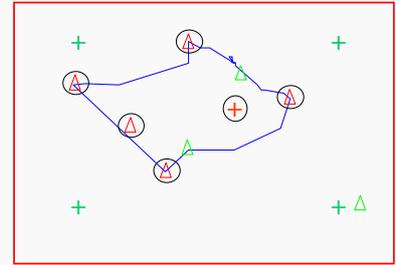
- Heads-up digitization process is cheaper, faster, more consistent coordinates and more accurate than table digitizing.
- Heads-up digitization for poor quality sheets was more effective and easy to learn.



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Transformation/selecting registration points

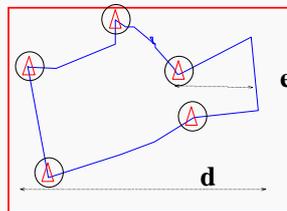
- At least 5 registration points Selected close to the data, and Distances between them were consistent.



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Affine transformation

- paper reports and soft copy.
- Checking (RMSE), (S).
- residuals < 3S.
- Extrapolation is not allowed.



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Transformation/Adding Registration Points



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Building Layers



Reg-distance	Nodes	Labels	Lines
Annotations in 10 levels included registration distances	Settlement - Nodes	Settlement - Labels	Settlement - Lines
	Transaction - Nodes	Transaction - Labels	Transaction - Lines
	Other - Nodes	Other - Labels	Other - Lines
	Trig-txt		Registration

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Final check Plots



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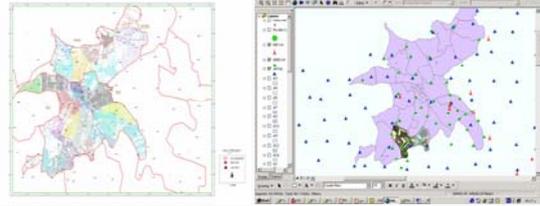
Results: Simple Comparison



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Edgematching (Seamless JDCDB)

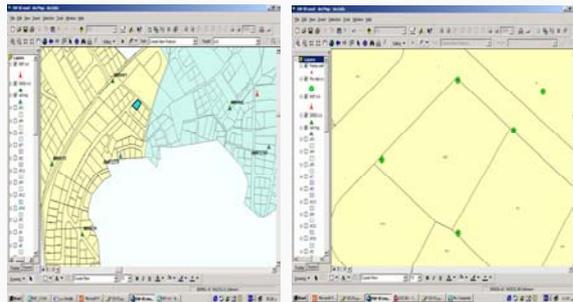
- ✓ The difference was bigger than expected, and was beyond the graphical accuracy.
- ✓ Edge matching process started in 1997 and the mathematical model was elaborated and implemented.



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Edgematching (Seamless JDCDB)

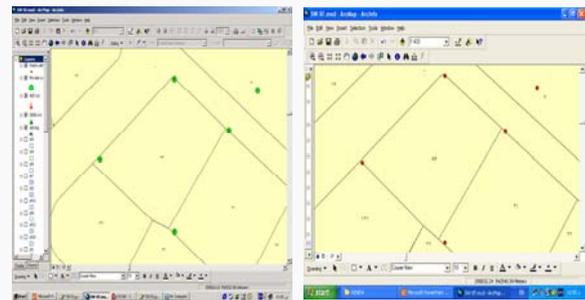
- ✓ Certain technical procedures that conserve of the geometrics shape without contradictions with legal aspects.



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Edgematching (Seamless JDCDB)

- ✓ Shape discrepancies between neighbored parcels / maps were verified in the field.



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DATA INTEGRATION

Renewing of cadastre.

- ✓ The high price of lands.
- ✓ The expectations of owners to get reliable results.
- ✓ The conflicts between owners.
- ✓ low accuracy of the digital cadastral maps.
 - ➔ Improving the cadastral information and making it available in an easy and friendly form.
 - ➔ Partial resurveying concept.
- ✓ This concept (boundary reestablishment) needs to be accepted and cleared to all stakeholders and especially the licensed surveyors as main executors.

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DATA INTEGRATION

Administrative act

- ❖ Red lines.
- ❖ Black lines.
- ❖ Shifting problem :- green area is considered aggression area.

- ➔ agreement
- ➔ litigation



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DLS Parcel Data Model

Modeling = intelligent use of CIS

Non-spatial object



person (owner?)
National ID
last name
first name
date of birth
association to real estate

spatial objects

boundary point
unique identifier
monument: Iron Pig
number: 99999

parcel
DLS_KEY
Number: 04655
area: 1700m²

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DLS Parcel Data Model

Building plan of an object

Village :- 0001
Block :- 033
Sector :- 016

DLS_Key 000103301604655

status {

behavior {

attributes

metadata

associations (relation)

methods (operation)

topology rules

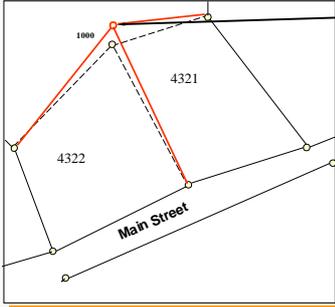
parcel number	04655
area 1700 m ²
Line type	10
Line type	11
data versioning	

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DLS Parcel Data Model

Advantage of using objects

Point object changes (Data versioning)



Boundary point
monument: stone
point number : 1000
Accuracy: 8-15cm

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CONCLUSION/COMMENTS

1. It was necessary to have software capable of presenting all residuals as vectors on the screen.
2. Distortions of mechanical movement in scanning process affected the results in large magnitude.
3. Very bad status of some cadastral analogue sheets took more time during scanning and vectorization (10 times more than usual).
4. Having parcel data model would be much better if it preceded the conversion project.
5. Tangible results helps to change strong resistance happened at the beginning.

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**Thank you very much for
your Attention**

I'm ready for any Questions

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