

Automatic Validation of the Surveyors' Regulations Criteria

A New Challenge in the Future Legal Digital Cadastre Implementation Task



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Motivation

- ▶ Toward a new modern **legal digital** method for defining the **geodetic dimension** of the **cadastral basic layer**, as an alternative for the existing measurement-based documenting method.
 - High accuracy coordinates for the boundary points of the cadastral parcel.
 - Via new surveying equipment that is based on the Active Permanent GNSS Network of the country.
 - Cadastral points' coordinates are designed to be the main proof in the court (instead of the wedge...)



Motivation

- ▶ The main three goals are:
 1. Converting the existed cadastral description layer from analogical to digital one.
 2. Legislation the digital cadastral coordinates database.
 3. Establish Legal digital Cadastral **stable** and “**eternal**” system.





Implementation Issues

- ▶ Achieving the above goals involve several problems which make the implementation of such an ideal system very difficult:
 - Geodetic aspects
 - Technical aspects
 - Structural aspects
 - Conceptual aspects
 - Juridical aspects
 - Financial aspects
 - Town planning aspects



Problem Definition

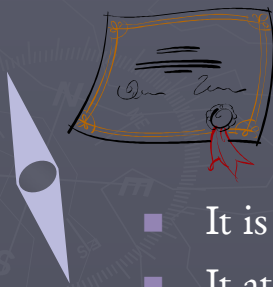
- ▶ This lecture is dealing with solving the problem of mission implementation essential for legislation the cadastral digital database :
 - Which appears when survey agency has to check “**each**” cadastral points’ coordinates before inserting them to the “**Digital Database**”.
 - Checking the coordinates **quality**: the accuracy and the reliability degrees.





Problem Definition

- ▶ Every boundary point must be treated similar to licensing process of national cadastral control points: GPS points etc...



Producing a licensed for every boundary point

- It is a geodetic and technical mission.
- It attends to solve Financial and Structural issues with far-reaching advantages.



Regulating an Automatic Validation Process

- ▶ The main legal tool that could be used by survey agency to set on the quality criteria is the “**Surveyors’ Regulations**”.
- ▶ Solving the problem, survey agency have to:
 - Set on appropriate criteria for desired accuracy level in relative to the Active Permanent GNSS Network- APN.
 - Validate “all” the cadastral measured points whereas they are meeting the regulations criteria.
- ▶ Manual validation → Needs for man power



Financial Obstacle



Regulating an Automatic Validation Process

- ▶ The logical alternative is: **Automatic validation of the regulations criteria:**
 1. Licensing of computational software.
 2. Web-base automatic computerized system for surveyors' regulations enforcement.
- ▶ This process involves several difficulties.
- ▶ The most significant are:
 - The complexity of the Regulations structure and formulation.
 - Inexistence of uniform secured measurements digital format.



Regulating an Automatic Validation Process

- ▶ Overcoming the first difficulty:
 - Needs for an **Object-Oriented Regulation Structure.**
 - For computerized algorithm for validation the measurements structure and the results...
- ▶ Overcoming the second difficulty:
 - Using existed data measurements file format belongs to survey equipment manufactories.
 - Especially the binary formatted because they are more secured.





Digital Measurement Field Book (DMFB)

- ▶ The second solution:
Web-base automatic computerized system for surveyors' regulations enforcement
 - Looks has significant advantages.
- ▶ Implementing such a promise web-base automatic system involves several requirements.
- ▶ One of them: Digital Measurement Field Book: **DMFB**
- ▶ By searching the web, looking for the suitable existed measurements' equipment file formats:



Digital Measurement Field Book (DMFB)

- ▶ Two main problems were found:
 1. Enormous number of file formats.
 2. No complete and perfect file format that includes post-processing GNSS vectors solution.
 - ▶ The best file format was: OBEN (O-File) vector format belongs to ex-Ashtech company.
 - ▶ It is binary → secure
 - ▶ Most of the existed post-processing software don't produce O-File, and if they produce it they don't do it perfectly.





Digital Measurement Field Book (DMFB)

► Thus:

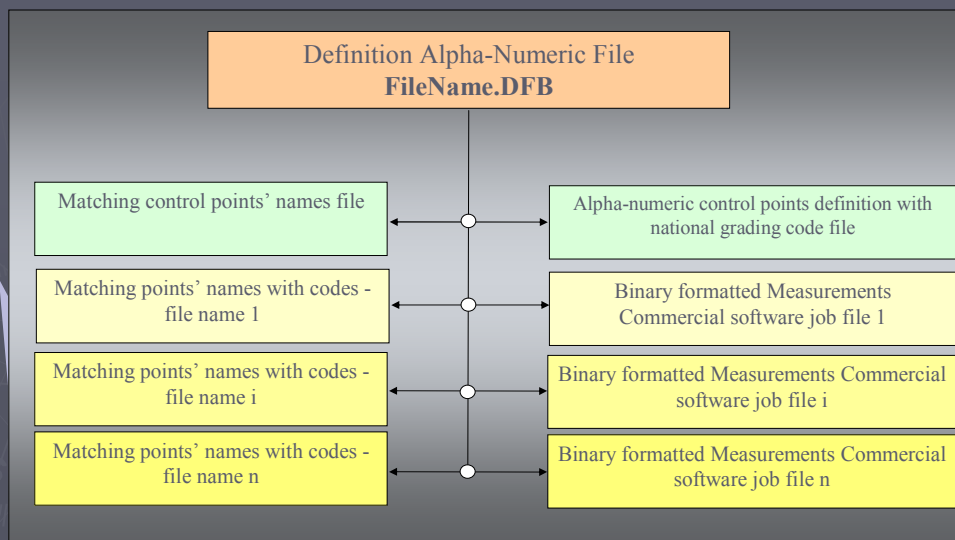
- **First problem:** DMFB must enable several measurements' data type formats.
- **Second Problem:** Using Rinex with O-files.

► For completing the data in the DMFB:

- The surveyor and the project details must be added.
- Data on the cadastral control points also must be added.
- Matching points' names: measured points names with final projects points names.

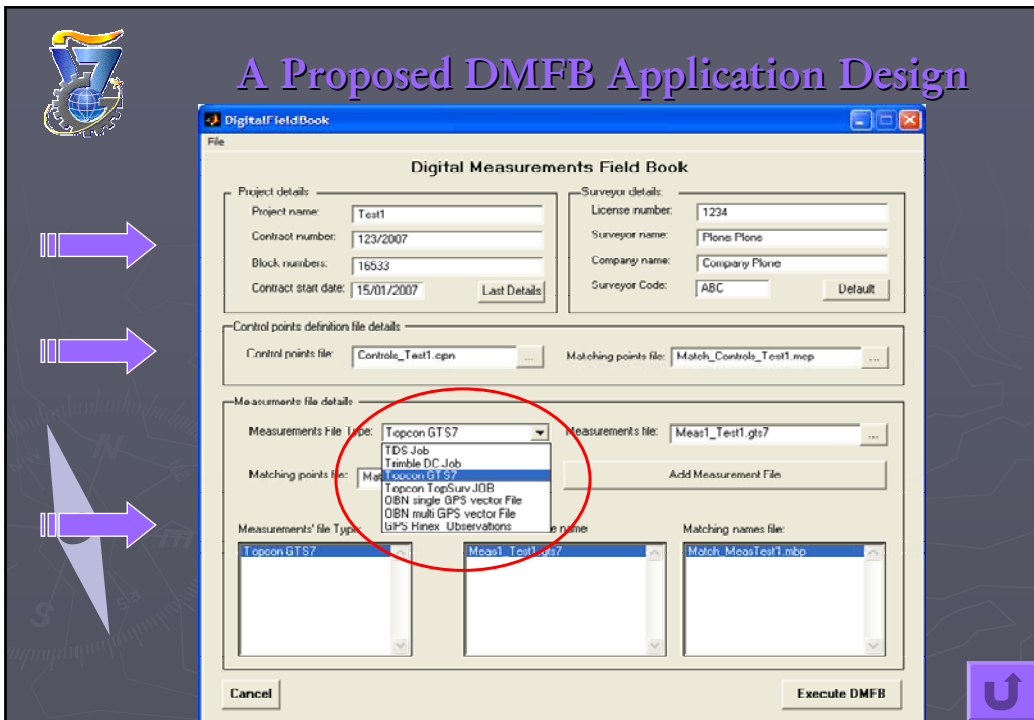


A Proposed DMFB Application Design





A Proposed DMFB Application Design



Summary and Conclusion

- ▶ An automatic validation process of the surveyors regulations criteria is becoming an obligatory especially in LDC era.
- ▶ The system advantages are vary, some of them:
 - An important step towards the legalization of the future cadastral database
 - Establishing a high, computed and homogenous component accuracy for every point in the future cadastral database



Summary and Conclusion

- Accelerating the cadastral point identity licensing process, and in return **accelerating the title registration process as a whole.**
- **Providing statistical analysis tools for the submitted data reports:**
 - Enabling a review of the accuracy strictness degree recommended by the surveying regulations.



Summary and Conclusion

- highlight specific problematic criteria or problematic methods or tools at use
- Raising the professional level of the licensed surveyor in the country.
- Reducing the need for executing field measurements aimed at examining the project measurements' compliance with the regulations
- The DMFB structure is just a proposal.
- Every surveying agency can adopt these concepts and a matching specialized design that would match its cadastral requirements.





Summary and Conclusion

- ▶ Although the use of the **DBMF** principle, toward an **automatic validation system of the surveyors' regulations criteria**, does not pretend to be the core of the main implementation issue, it stills considered an innovative approach to it .



Thank you about your kind listening and hoping to see you next year in **EILAT- ISRAEL**



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