CADASTRAL GIS

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***Abstract**: What are the benefits of implementing a Geographic Information System in the Cadastral workflow in Romania? Almost all local authorized surveyors and firms are somehow involved in Cadastre, doing their jobs with different levels of technology. What we introduce here is a Cadastral software and technology that offers benefits for all the factors activating in the Land Registration process, by organizing cadastral information starting from an Administrative Territorial level to parcel level (and not vice versa) using a GIS approach, that makes it easier to organize data and spot out missing information and material errors in documents and map data.*

***Keywords:** Cadastre, Land Registry, GIS,*

1. Introduction

Authorized surveyors and firms are often caught between Local authorities, Land owners, Prefecture and National Agency of Cadastre and Land Registry (NACL) in the land registration process, mostly because of the deep discrepancy between legal requirements and the real state of Cadastre and legal land owners information, (most of them deceased) making this process mostly a data recovery and reconstruction project that can take years to comply with NACL requirements.

What would be the surveyors' and Local Administration's tools that could help the effectiveness of this work? We think one of these tools is using a Cadastral GIS that allows a general approach and the possibility to mosaic in both known and unknown cadastral information into an existing Administrative territory map. The georeferenced database is build seamlessly during the data input process using MapSys 10 GIS, MapSys Internet Map Server and Attrib/CG database applications, developed by Geotop. Data redundancy can be avoided by using a unique person and Land Registry database, and all other data referring to owner and ownership can be linked to the current state of geographical identification: Administrative Territory, Locality, District or Parcel.

As land surveying results and alphanumeric data input advances, validated ownership information can be assigned to parcels, thus unclear or inaccurate data can be much easier outlined. We must not forget reality shows that old Land Registry information is not updated and recent ownership titles are at uneven completion levels, made with different technologies and accuracy, mostly depending on the current Local Administrations and political factors in charge since 1991.

By using MapSys and the mentioned database applications, identification, area balance and validation can be done as soon as field boundaries and parcel plans are created and area information is typed in from legal documents. By using MapSys Internet Map Server, verified map data and attributes can be securely accessed by land owners using a simple internet browser. Completed and topologically verified land unit data can be easily exported to NACL specification compatible digital and analog outputs.

2. Additions

General flowchart

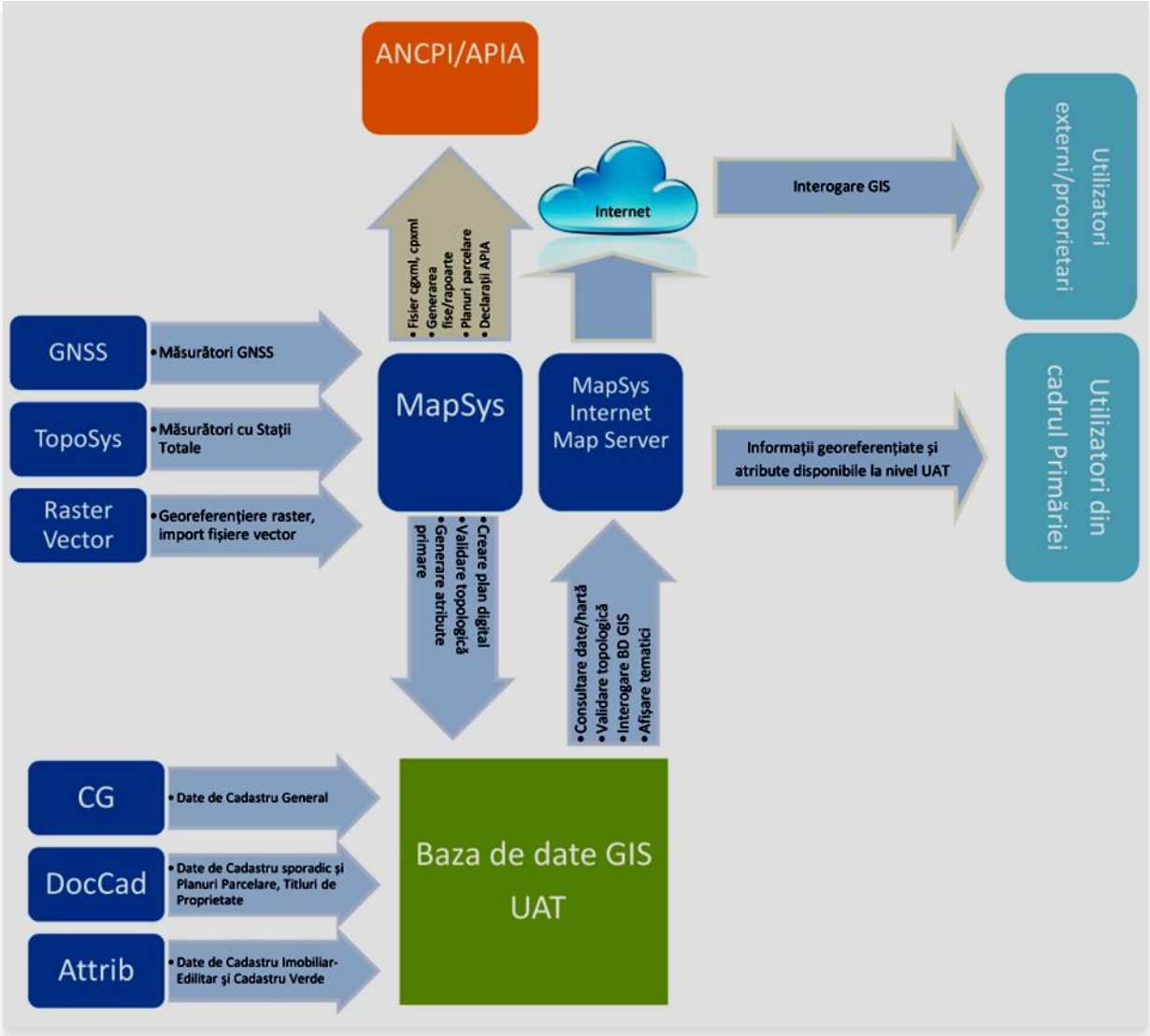

Fig. 1. Cadastral GIS technology developed by Geotop

Short description of the main software components:

MapSys 10 GIS

The new MapSys 10 combines advanced cadastre-specific functionality with processing power, providing solutions in many areas of activity, backed up by efficient GIS database creation tools. GIS professionals who use MapSys to generate geo-referenced spatial data can create GIS databases validated at all levels in a quick and structured manner. This approach is supported by its graphical, topological, analysis and representation features. By using these advanced features, data administration efficiency increases with the volume and complexity of data. MapSys can be used by geo-professionals to directly generate or edit topologically validated data that can be used in MapSys IMS or other GIS software.

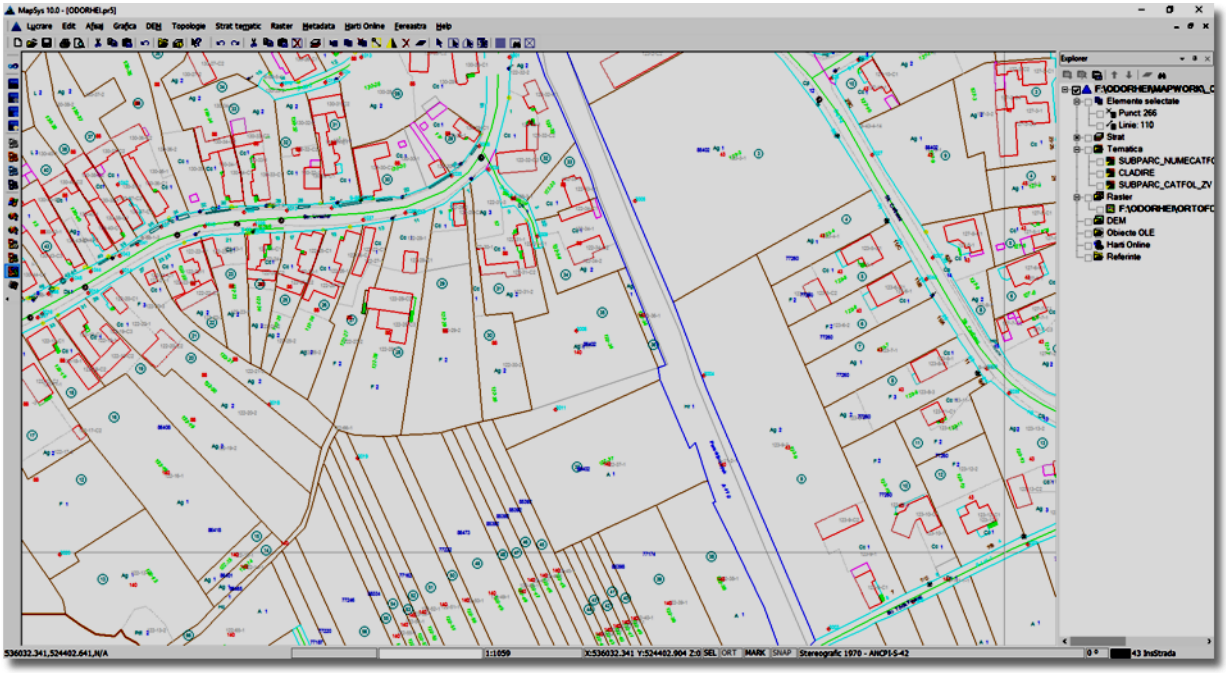

Fig. 2. Typical MapSys window

Main functions offered by MapSys are:

- Import/Export of vector, raster and attribute data using a wide range of formats
- Standard xml-based NACL outputs (Cp, cpxml, cgxml)
- Advanced, Cadastre specific editing and creation tools
- Efficient Topology build-up and analysis
- External plug-in application interface and live attribute transfer
- Various Thematic representation methods based on object attributes
- DTM generation and related functions
- Raster editing, geo-referencing and vectorization automation tools
- Plotting complex layouts and batch printing functionality
- Metadata tools
- MSCI interface for even more automation

GIS databases built with the above mentioned special features offered by MapSys can be synchronized with other similar software or with external applications like the ones below.

CG/DocCad/Attrib

In accordance with local regulations, specific attribute databases and outputs must be provided along with documentation for Cadastral Registration or City planning depending on the specific project type: Individual parcel/building ownership, Parcel plan, General Cadastre, Urban cadastral Information System. These requirements can be easily fulfilled by CG, DocCad and Attrib database applications, integrating relational database structure for all mentioned subcategories and bi-directional active links to map data stored in MapSys. Relevant object attributes like Area, Perimeter, ID's, neighbor objects are automatically

transferred from MapSys geo-database to the application job database where the user inputs or selects attribute data, reducing this way the error sources or data loss in typing or imports.

MapSys Internet Map Server

In order to provide reliable and complete GIS content to the end-user, an easy to access, simple and functional user interface is needed. MapSys IMS increases the geo-database content value through a user-friendly interface with familiar functionality, enabling a fast and direct access to ready-to-use validated GIS data.

MapSys IMS content and functionality is based on existing MapSys jobs and related geo-databases, consisting of:

- Digital map browsing
- Layer, Thematic representations and Legends settings
- Online overlay web maps (Google, Bing, Open Street Maps WMS sources etc.)
- Basic queries (coordinates, distances, area)
- Object queries
- Custom queries
- Profile selection
- Reports
- Plotting

MapSys IMS content and functionality can follow the validation level of Cadastral work, enabling instant use of validated geo-data.

Specific IMS functionality and content can be configured by the Administrator accordingly to specific user profiles: Administration, Public Utilities, Owners, Public etc.

3. Conclusions

Using a GIS solution in Cadastre by Local Administration, Utilities, Land owners and Surveying companies have some uncontested advantages:

- No data redundancy
- Instant georeferencing of alphanumeric data during the build-up process
- Easier identification and validation of survey-based and legal information
- Communities are provided with an Information System that can be permanently updated with new data according to Land ownership and configuration changes
- Local decisions and developments are made based on an updated map background
- Other local Information Systems like Tax or Agriculture Registry and can be linked in with ease, offering an updated GIS background
- Fast and clear Land ownership build-up is generated that is not dependent on NALC, APIA, etc. but provides information for them when needed
- GIS data can be kept and run on the Local Administration's servers or at the data provider's servers with multi-level access possibilities

4. References

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