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MANAGEMENT OF SYSTEMATIC REGISTRATION IN ZĂVOI COMMUNE, CARAȘ – SEVERIN COUNTY

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Abstract: *The registration of land in the unique cadastre system in Romania started in 2015 within the National Cadastre and Land Book Program. The registration is made at the level of a territorial administrative unit or at the level of one or more cadastral sectors. The way of working and the stages of systematic records are regulated by well-established laws and procedures. Knowing them by all landowners is an important step for the proper conduct of the process because by applying them may occur changes in the situation of real estate. During this work, a systematic recording of the lands in Zăvoi commune, Caraș-Severin county was performed. The study case was done for sector no. 80 which includes an area with a surface of 112329 sqm, and the total number of lands is 85. For this purpose, topographic measurements were performed using specific topography tools, namely: Pegasus Backpack equipment, Wingtra ONE drone scanning and TS06 total station. The coordinates of the control points were determined with the help of the GPS satellite positioning system providing a fast control of the static measurements. Following the measurements, the geometries of the lands were made, which will be an integral part of the cadastral plans. In order to correctly identify the owners and the land books, all the information provided by the competent institutions was used, as well as those collected directly from the lands owners. All this information led to the creation of cgxml files using software specialized in systematic recording, namely: Mapsys GIS application and CG 3.5 application, softwares that offer control over both geometry topologies and information that will be an integral part of the new land books. The purpose of this paper is to show how to organize and manage a systematic recording project by applying new technologies, both in terms of measurements and in terms of software used in accordance with the old records in land plans and books.*

Key words**:** *systematic recording, topographic measurements, Mapsys, cgxml files, cadastral plans*

INTRODUCTION

The process of cadastral and real estate publicity in Romania has gone through several stages over time, from the Austro-Hungarian model applied in the areas of Banat, Transylvania and Bucovina, to the modern cadastre implemented successively after 1996 through several methods and stages (Grecea C. and Herban I.S., 2008).

The systematic recording of real estate in the single system in Romania began in 2015 through the National Agency for Cadastre and Land Registration financed both from the own funds of the National Agency for Cadastre and Land Registration ("ANCPI"), and through non-reimbursable external funds (through the European Union). The process of systematic recording (Grecea et all. 2013) is regulated by a series of laws and procedures well established by law, especially Law 7/1996, all aimed at collecting and updating technical information (areas, categories of use, locations), but also legacy (by identifying the last owners and how to acquire them).

The unique cadastre system (Erghelegiu, 2013), will have as finality a complete and uniform system of cadastre and real estate publicity. The major benefit of systematic real estate recording work is the exact determination of the location of all real estate, thus eliminating the uncertainty of overlapping or misplaced locations (Șmuleac et all. 2019).

Systematic recording (Grigore, 2015), is performed at the level of each administrative territorial unit, divided into cadastral sectors or at the level of a cadastral sector. The cadastral sectors are delimited by fixed time limits, natural or artificial (waters, roads, railways etc.).

Presently according to the data transmitted by the National Cadastre and Real Estate Publicity Agency, out of the total of 3181 ATUs in Romania, until 31.03.2022, systematic registration works were completed in 133 ATUs, as well as in sectors cadastral, with a total area of 3,612,514.71 ha. At this time there are ongoing systematic registration works in 1991 ATUs, with an estimated area of 4,865,213.02 ha (Herbei et all. 2013; Șmuleac L. et all. 2014).

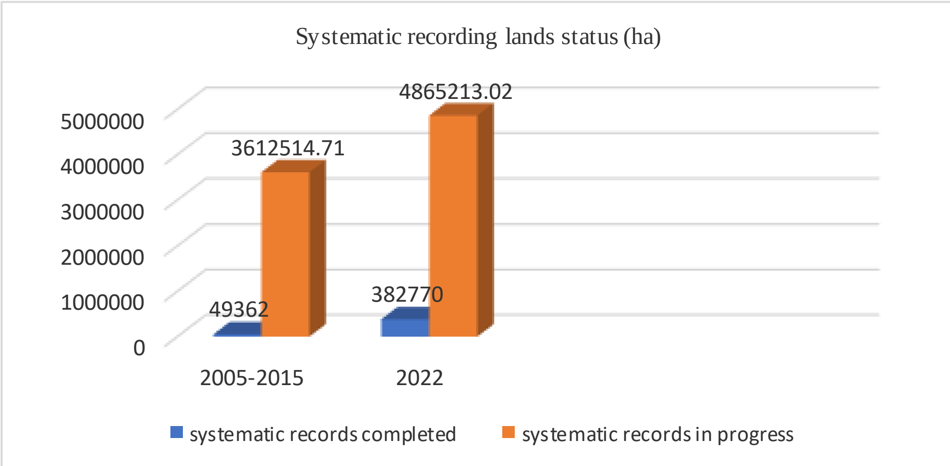

Fig. 1. The status of systematic recordinds land according to the number of hectares

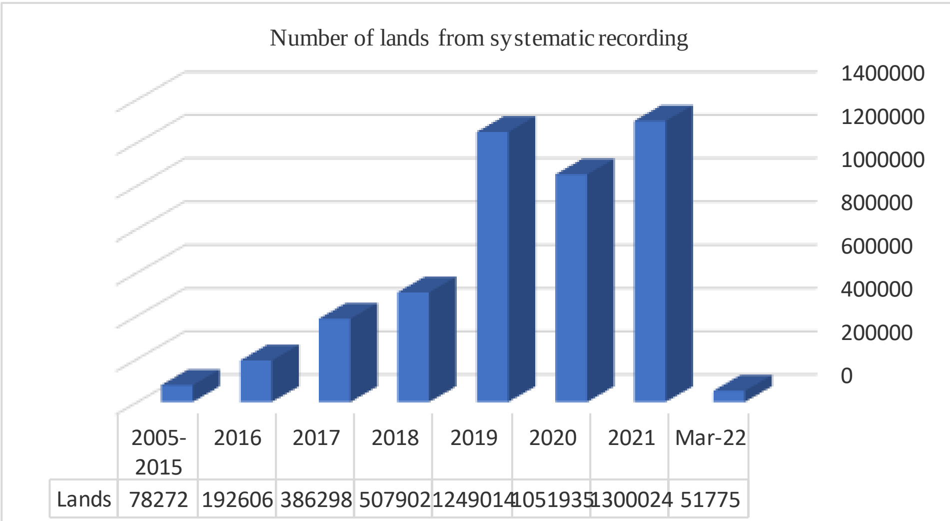

Fig. 2. Number of lands from systematic recording

The large data differences are due to the modern systematic recording process which involves an automation of data collection and manipulation both technically and strategically (Pasolea et all. 2017; Smuleac et all. 2014).

In this paper, through the study case conducted in Zăvoi commune in Caraş-Severin county, sector no 80, is presented the way of systematic recording of lands in terms of correlating the old cadastral records and land book within updated measurements.

MATERIAL AND METHODS

A first stage in the process of systematic recording of lands is represented by topographic measurements. In this case, in the commune of Zăvoi the topographic surveys were carried out by combined methods, using both modern and standard technology.

LiDAR-Mobile Mapping technology (Miță et all. 2020) using the Leica Pegasus Backpack system was used to measure the contours of the neighborhoods and the topographic details in the field. The Leica Pegasus Backpack (Figure 3) can be used even in areas where the GNSS signal is missing.

Fig. 3. Leica Pegasus Backpack

It is a sensor platform with an extremely ergonomic design. Combining the 5 cameras, the Leica Pegasus Backpack offers a fully 360-degree view. After processing the scans and the determined control points, a cloud of points will be created from which the tracked data will be extracted.

The second method used in topographic surveying is the use of aerial photogrammetric flights. These were made with the Wingtra ONE drone (Figure 5). It is equipped with a Sony RX1RII 4 MP 35 mm camera that is able to cover between 100 and 2500 hectares, depending on the altitude of the flight, in about 45 minutes. The Wingtra ONE drone can reach a maximum altitude of 3000 m, being an unmanned aircraft.

Fig. 4. Wingtra ONE drone

The use of this technology allows to obtain orthophotoplanes with a very high degree of detail, the pixel having a size of 2 to 10 cm. This way you can easily see details that are not accessible in the classic way of making measurements (Casian et all. 2019).

Fig. 5. An orthophotoplan made with Wingtra ONE drone in Zăvoi commune, Voislova locality, Caraș-Severin county

The coordinates of the control points were determined with the help of the GPS satellite positioning system providing a fast control of the static measurements (Șmuleac et all. 2020).

Following all the measurements performed, the geometries of the final lands were made on the basis of which the cadastral plans will be created (POPESCU G. et all. 2016).

The second stage in the systematic recording of real estate is the collection of documents both from the legal owners and from the institutions involved. Following the request to the Office of Cadastre and Real Estate Publicity Caraș-Severin, data were provided on the cadastral sector plan, plans and old maps at the scales 1: 50000, 1: 2880 and 1: 2000, cadastral registers, nomenclature, but also copies of existing land books. As such, the purpose of systematic recording is to update all information in existing land books, or to create new land books where they do not exist.

The handling of the collected data and their organization is done, as the case may be, using software specialized in systematic recording. The topological accuracy of geometries and the transformation of information into GIS databases can be done through Mapsys 10 software.

Mapsys 10 is a software optimized for creating distributed maps and plans regardless of the source of the data: processed field observations, manual / automatic vectorization, graphical creation. It has many geometric functions, verification, corrections, incremental creation, transformation / georeferencing and data collection. Communication with other CAD or GIS systems is provided by the GDAL (Geospatial Data Abstraction Library) Interface which allows the transfer of GIS vector data using the most popular data formats (Șmuleac et all. 2020; Păunescu et all. 2020).

Through topological functions, the primary GIS database is validated and created in a single command, in standard relational database formats (RDBMS), continuing the references for the vector elements. Created databases can be easily supplemented with new categories of information or can be linked to other external databases depending on the needs and complexity of the project.

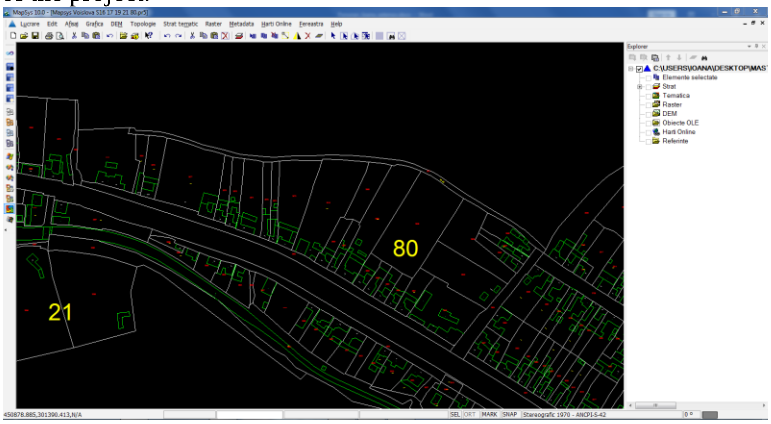

Fig. 6. Creating the topology in Mapsys 10

The databases thus created can be accessed simultaneously by several users. One of the software used for data processing is the CG 3.5 application. Graphic real estate information can be imported from DXG, SHP or MapSys papers. The CG 3.5 application is mainly developed for the systematic registration of real estate in the general cadastre. The information collected from the owners in the previous stage can be successfully processed in order to update the information in the associated land books (Șmuleac et all. 2019; Herbei et all. 2018).

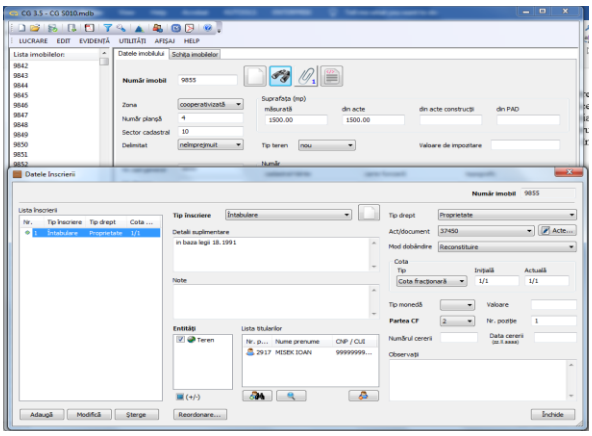

Fig. 7. Creating recordings in the CG 3.5 application

RESULTS AND DISCUSSIONS

It can be deduced that the systematic recording of real estate is a complex process, which involves both the processing of a large volume of data and the optimal use of modern technology.

The use of modern technology instead of the classic one leads to a significant improvement in the time and resources allocated to this stage, but also offers a considerable improvement in the quality of the data obtained.

Fig. 8. An orthophotoplan made with Wingtra ONE drone versus an orthophotoplan from the OCPI archive.

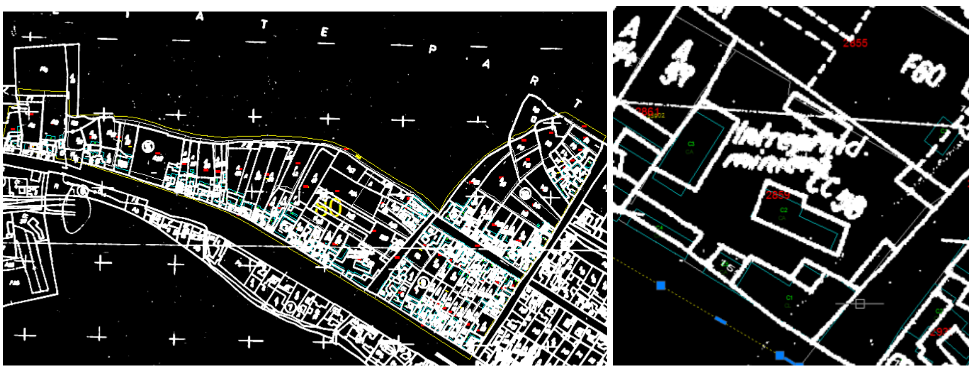

Fig. 9. Overlapping land geometries with cadastral plans at a scale of 1: 2000

After processing all the measurements, the exact geometries of the lands are established. In order to establish and identify the land books associated with them, the geometries of the lands overlap with the cadastral and topographic plans in order to identify the topographic numbers. The topographic numbers are then searched in the land books, thus identifying the land book number, but also the rightful owners of the lands.

Fig. 10. Overlapping land geometries with topographic plans at a scale of 1: 2880

Establishing the correct and exact locations of real estate and correlating it with old land books in order to identify the owners represents 40% of the workload in the case of systematic recording. Thus, at this stage it is imperative that the management of real estate recording and the use of modern technology be as optimal and as inexpensive as possible.

CONCLUSIONS

In the context of the development and European integration processes, the systematic recording of real estate is one of the most important pieces in the Romanian legal and economic system.

The integrated cadastre system will be a complete and uniform information system, composed both of technical coordinates at the level of all ATUs and of the legal information of the property rights.

In order to speed up the systematic recording process, it is absolutely imperative that the project management be efficient by applying the latest technologies, both in terms of measurements and in terms of the software used.

In the study case presented, the most important parts of a systematic recording project are highlighted, by first using and interpreting the data obtained during the project.

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