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REALIZATION OF THE TOPO-CADASTRAL WORKS NECESSARY FOR THE REGISTRATION OF A CADASTRAL SECTOR, BELONGING TO CĂTINA COMMUNE, CLUJ COUNTY IN SYSTEMATIC CADASTRE

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ABSTRACT

The study presents the analysis of the documentation for the registration of a cadastral sector in the systematic cadastre, the method approached at national level in order to determine the land areas and their registration in the Land Register.

GNSS Global Positioning Technology has been used in this work, using a Trimble R8 GPS receiver and measurements made by linking to the National GNSS Station Network. For the elaboration of the cadastral plan were analysed the documents provided by the owners and the City Hall of Catina village. It is found that there are 27 buildings that have not been previously registered in the Land Register. The necessary measurements have been made and the property limits are positioned according to the documentation.

It is found that the process used is an efficient one because of the shorter production times, in correlation with the complexity of the surface. Also, overlaps between neighbours have been eliminated.

INTRODUCTION

The theme of the project consists in measuring by systematic cadastre, aiming to update the information from the sporadic cadastre by registering in the Integrated Cadastre and Land Book System the buildings located in the chosen cadastral sector, belonging to Cătina commune, Cluj county.Cătina commune, Cluj county.

MATERIAL AND METHOD

The Global Positioning System (GPS) is a space satellite-based navigation system that provides information about place and time, regardless of weather conditions, anywhere on or near the globe where there is an unobstructed field of view at four or more satellites. The system provides important capabilities to military, commercial and civilian users around the world.

A network with permanent terminals and a prefabricated concrete terminal,

Feno terminal (Fig. 1), was used to make the measurements. They have a simple clamping and mounting mechanism that is operated by beating and no other materials are needed to anchor the terminal to the ground, such as concrete.Material and method. The measurements were performed with two Trimble R8 (Fig. 2) receivers, one used as a base and the other as a Rover.

The processing of measurements in the GPS network is specific, automatic, based on special programs and in stages. Finally, the spatial coordinates x, y, z of the observed points must be obtained, in the projection system adopted by us, respectively “stereographic 70” for the

plane coordinates and “Black Sea 1975” for the elevations.

Figure 1. Feno terminal

Figure 2. Trimble R8 Receiver

The most well-known GNSS systems that work in parallel are the NAVSTAR GPS system and the GLONASS system with small differences between them in the operating principles and the technology used. The Romanian position determination system which ensures precise positioning in the ETRS89 reference system (Fig. 3). It is based on satellite navigation systems, including GPS, Glonass and Galileo and on the national network of permanent GNSS stations.

Software used in the processing of measurements were: Trimble Business Center, TransDatRo, AutoCAD, TopoLT, CADGen.

Figure 3. National Network of GNSS Stations

RESULTS AND DISCUSSIONS

The stages of the systematic registration works that were carried out at the level of the cadastral sector under study are the following:

The public information campaign at local level to inform the citizens about the beginning of the systematic cadastre works in the cadastral sector studied in Cătina commune, Cluj county took place during the months 02.01.2018-12.02.2019 by displaying 100 posters at the headquarters of the City Hall of Cătina Commune, at the School in the commune, at the Post Office, announcements were also made at the 4 existing Churches in the commune and 130 leaflets were distributed. The citizens were informed about the way of carrying out the systematic registration works, about the rights and duties incumbent on them in order to facilitate the introduction of the systematic cadastre. The purchaser's representatives verified and took over informational materials, according to the Minutes 11367 / 02.01.2018. 130 leaflets were distributed and 100 posters were displayed to inform the owners of an estimated 30 buildings. The representatives of the purchaser also organized for this purpose, meetings with the citizens, at the cultural homes, according to the minutes no. 10779 / 10.02.2019, 10985 / 11.02.2019, 10332 / 12.02.2019.

On March 20, 2019, field verifications were carried out together with the citizens, taking measurements with a Trimble R8 GPS receiver at each building, measurements in which the citizens from the cadastral sector and two representatives from Cătina City Hall participated, a number of 590 points was taken over.

A Feno type terminal (point 10) was installed, the accuracy of which was determined on the basis of a series of measurements at different times, thus increasing the accuracy of determining the terminal; In order to perform the measurements with the GPS technology of global positioning, the Feno terminal was connected to the permanent GNSS stations (BAIA, IGEO, DEVA, OROS), thus determining the coordinates of point 10, in this sense achieving an accuracy that falls within the tolerances for the type work performed. Next, the measurements performed in the analyzed area were performed by connecting to the base located on the Feno terminal (Figure 4).

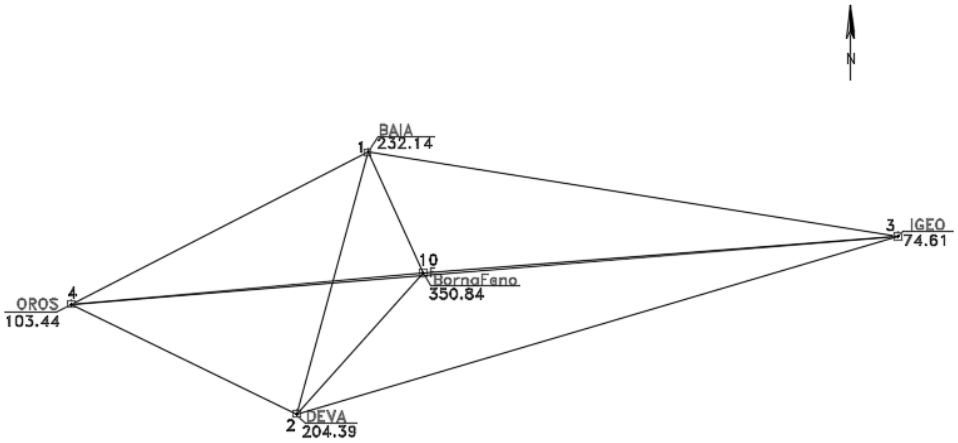

Figure 4. The network with permanent stations

The working point was set up within the City Hall of Cătina Commune, where citizens were taken weekly, on Wednesdays and Thursdays, respectively. The identification of the building boundaries was made in the presence of the owners and a representative of Cătina City Hall. The limits were set by mutual agreement by the owners of the neighboring buildings, and for those who did not show the limits were set by the representative of the mayor's office together with the neighbors present;

The buildings whose owners did not show up, nor was it possible to identify them together with the neighbors or the representatives of the City Hall, it was proposed to register them on ATU Cătina, according to the norms and technical specifications in force. The biggest problem in the identification process was the lack of the plot plan, or any obvious plot. Also, following the analysis of most of the possession reports, it was not possible to clearly identify the buildings in order to reconstruct a plot plan, most of the possession minutes being rectangular drawings, without dimensions or scale, only the surface and neighborhoods being mentioned. , which most of the times did not correspond to the real cardinal points respectively to the identifications of the present owners;

The identity documents of the present holders were collected, following that the mayor's office will take care of the collection of the documents of the other holders and the data sheets were completed with the preliminary information. The cadastral sector 14 was identified with an area of 315016 sqm, respectively approximately 3 ha and includes 27 buildings; the data related to this sector were taken from OCPI and the town hall of Cătina (ATU limit, urban limit, previous works, orthophotoplan);

The office work was followed by the analysis of documents and measurements and their processing (Table 1, Table 2); the data sheets were filled in with the rest of the information about owners and real estate, which were subsequently signed by them; the technical documents of the systematic cadastre were drawn up: the cadastral register of the buildings, the alphabetical description of the holders and the cadastral plan (scale 1: 5,000) on A3 format. Also, the Plan for Framing in the area (scale 1: 5,000) and the plan with the GNSS Permanent Station Network (scale: 1: 2,000,000) were made; the .cgxml files were prepared for each building.

The Technical Memorandum was made in which the data regarding the measurements of this cadastral sector are mentioned; the processing report of the permanent stations was downloaded, which shows the processing precision, the distances between the stations, the differences in elevations between the stations; the technical documents of the systematic cadastre related to their publication were prepared.

Table 1

Geographic coordinates taken from GPS

Stations	X	Y	Z
10	N46°50'48,46546"	E24°07'47,39285"	389,687
BAIA	N47°39'06,42447"	E23°33'27,75920"	271,026
DEVA	N45°52'42,29432"	E22°54'48,71911"	246,729
IGEO	N47°01'49,31201"	E28°50'36,64107"	105,858
OROS	N46°33'18,80170"	E20°40'16,84375"	146,024

Table 2

Geographic coordinates transformed into geodetic coordinates

Stations	X	Y	Z
10	433,639,919	594,473,914	350,842
BAIA	391,643,835	684,591,962	232,148
DEVA	338,072,858	488,601,275	204,399
IGEO	792,062,205	621,602,532	74,617
OROS	168,210,218	570,735,838	103,442

The measured area is outside the built-up area, so the measured points are numbered starting with the figure 100. 224 points were measured on the contour of the analyzed area. The sector under study has an area of 315016 sqm and the perimeter is 3561 m.

The surface calculation was performed in the Autocad program, using the TopoLT application, being generated the table with the contour points of the studied surface.

Table 3

Measurement processing report

Remarks		Type	H. Accuracy (m)	V. Accuracy (m)	Geodetic Az.	Ellipsoidal distance (m)	Height (m)
From	to						
BAIA	DEVA	Fixed	0,010	0,024	194°15'02"	203185,321	-24,209
BAIA	OROS	Fixed	0,009	0,025	241°58'17"	250708,633	-124,81
BAIA	10	Fixed	0,011	0,025	153°57'55"	99423,467	118,770
BAIA	IGEO	Fixed	0,012	0,032	97°51'41"	405297,635	-164,85
DEVA	OROS	Fixed	0,008	0,023	294°18'29"	188647,379	-100,60
DEVA	10	Fixed	0,010	0,026	40°34'11"	142643,820	142,975
DEVA	IGEO	Fixed	0,013	0,036	72°09'52"	473099,833	-140,63
OROS	10	Fixed	0,010	0,031	81°45'26"	266458,563	243,575
IGEO	10	Fixed	0,011	0,034	268°28'12"	359439,315	283,723
OROS	IGEO	Fixed	0,015	0,042	82°11'19"	625884,728	-40,040

Table 3

Inventory of coordinates

Parcela (14) Arabil

Nr. Pct.	Coordonate pct.de contur		Lungimi laturi D(i,i+1)
	X [m]	Y [m]	
248	594380.698	434087.140	14.877
247	594372.061	434075.027	29.142
243	594351.445	434054.430	5.897
242	594347.432	434058.751	2.532
241	594345.206	434057.544	23.062
231	594327.832	434042.379	2.174
230	594326.070	434041.106	25.597
226	594304.403	434027.477	32.137
225	594276.887	434010.874	6.052
221	594271.433	434008.250	2.173
220	594269.519	434007.221	32.494
219	594240.884	433991.863	7.992
218	594234.321	433987.303	20.500
217	594217.615	433975.422	13.851
216	594206.325	433967.398	12.890
215	594196.349	433959.235	6.383
214	594192.113	433954.460	6.051
213	594188.552	433949.568	13.569
212	594182.715	433937.319	23.596
S(14)=315016.42mp P=3561.504m			

Stages of realization of the cadastral plan:
- the coordinates were entered after the transformation in the AutoCad program with the TopoLT application
- the plots and the contour of the cadastral sector were digitized
- the cadastral numbers related to each building were assigned
- the plan indicator was made where the specific data regarding the name of the plan, the scale used, the projection system used and the name of the author were written
- the North direction was positioned
- the grid was drawn at a distance of 250 m in reality and 5 cm on the plane.

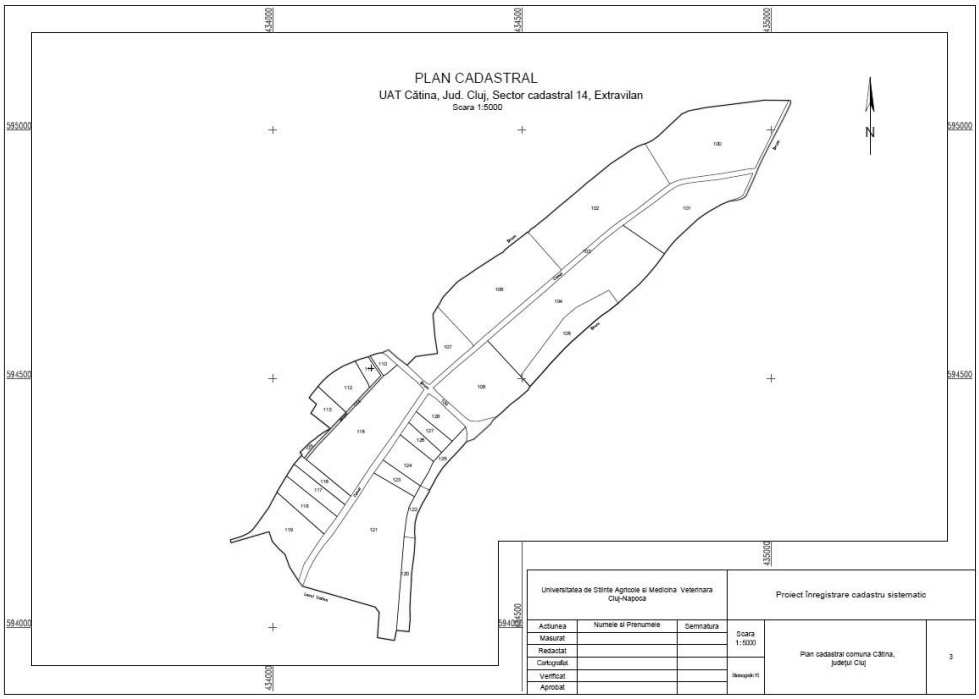

Figure. 5. Cadastral plan

CONCLUSIONS

Following the work, it is found that the method of registration in the Land Book through the Systematic Cadastre is an efficient solution and an alternative to the Sporadic Cadastre addressed at national level that facilitates field work, time and allows the determination of land areas in cadastral sectors. with better accuracy. At the level of Romania, the areas registered in the Land Book, represent a reduced percentage mainly in the rural area. Based on the Systematic Cadastre, it is desired to register in the national database for a good record in time of the evolution of the building, the analysis of plant crops and the collection of related taxes and duties. Also, farmers will no longer be able to benefit from financing on crops from APIA if the plots are not registered.

Based on this work, we notice that the surfaces of the buildings in the existing property titles do not correspond to the reality on the ground, in this sense based on the new measurements, the registration in the Land Book was made and the property limits were modified, according to the agreement of the owners. cadastral.

In the case of these buildings located outside the built-up area, which have been the subject of land laws, it is found that the area of the measurements is smaller than the area of the deed of ownership. The land difference remaining at the disposal of the local commission for establishing the property right over the lands and the property right will be provisionally registered in favor of the administrative-territorial unit.

When performing the measurements, in a first stage, a Feno terminal was mounted on which a base was placed whose coordinates were determined following a succession of measurements related to four GNSS stations in the National Network. In the next step, with the help of a Trimble R8 receiver, 590 characteristic points were measured on the basis of which the cadastral plan was drawn up.

The analyzed area falls outside the built-up area of the locality, and based on the analysis of documents and direct observations, the corresponding categories of use have been assigned, mostly being arable.

Based on the established limits, it is proposed to delimit the properties by wooden or metal poles in order to avoid the overlapping of the cultures.

It is found that there are buildings that do not have direct access to the road, in this sense, the right of easement was stipulated in the adjacent plots.

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