

# USE OF THE STONEX S9 PLUS GPS RECEIVER FOR THE PREPARATION OF CADASTRE DOCUMENTATION FOR THE REGISTRATION IN THE LAND BOOK OF A PROPERTY

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## ABSTRACT

*The purpose of the paper is to present a model for preparing topo-cadastral documentation for registration in the Land Book of a property, using modern equipment, methods and measurement systems. The respective building is located in Călărași commune, Sărata village, Dreptății street, number 3, Dolj county, being composed of construction yards and arable land, a residential building and two household annexes. In order to prepare the technical documentation necessary for registration in the land book of the building, a topographic survey was performed in the Stereographic 1970 projection system and the 1975 BLACK SEA reference system, using a Stonex S9 PLUS GPS receiver.*

## INTRODUCTION

The Cadastre and the Real Estate Register form a unitary and obligatory system of technical, economic and legal register, of national importance, of all the buildings on the entire territory of the country. (Boș N., 2003)

The purpose of this system is:

- a) determination of technical, economic and legal information regarding real estate
- b) ensuring the publicity of real estate rights, personal rights, legal acts and facts, as well as any other legal relations, through the real estate register
- c) providing data to the public state institutions, necessary for the taxation system and the real estate market
- d) contribution to ensuring the security of real estate transactions and to facilitating the mortgage loan

The cadastre identifies, measures, describes and registers the real estate in the cadastral documents and their representation on maps and cadastral plans.

The real estate register contains the description of the real estate and the inscriptions referring to the real building rights, to the personal rights, to the acts, facts or to the legal relations related to the real estate. (Miluț M. et al., 2018)

## MATERIAL AND METHOD

The performance of such work involves both fieldwork and office work for the calculation and processing of data recorded from measurements, from topographic surveys using modern measuring devices, methods and systems.

The objective of the planimetric survey is to determine exactly the points that delimit the area under study, after which the area owned by the owner will be calculated, comparing with the area in the property deeds and the sketch issued by the mayor's office within the radius of which the real estate in question is located.

For the elaboration of the topographic-cadastral documentation in order to register the building in the real estate register, the GPS measurements were performed with 1 GPS receiver, of the Stonex S9 PLUS type, from the double frequency geodetic precision class by

the real time kinematic-RTK method. The contour points and field details were raised with the reference station – NEAREST 3.1, RTK records, 3 epochs/point, Fixed solution, and field measurements were recorded with a GNSS system for the contour points of the site and the land details.

## RESULTS AND DISCUSSIONS

The realization of the work consisted in performing the following operations:

- documentation operations;
- field operations;
- office operations;

The documentation operations consist of studying the documents provided by the owner. The property deeds being:

- the title deed based on which the land was registered in the real estate register, the owner obtaining the right over the construction by reconstitution based on law 18/1991;
- the registration of the construction was made on the basis of the fiscal attestation certificate, in which were described: the year, the surface, the height regime;
- street naming and numbering certificate.

At the same time, in order to carry out the works, it is necessary to obtain information from the National Agency for Cadastre and Land Registration. Obtaining information is done in the following stages:

- the application for ON-LINE information is filled in/registered by the National Agency for Cadastre and Land Registration authorized personnel within the Association. The application receives a final number, after saving it in the e-Terra application. After the transmission of the application, the settlement term is calculated from the moment of saving the application and not from the date of presenting the original documents;
- the transmission of the application and the documents attached to the application to the National Agency for Cadastre and Land Registration. The applications must be accompanied by the following documents: online registration note; dxf file or approximate coordinates of the building in question, or of the studied area.

The data provided by National Agency for Cadastre and Land Registration provide information on the status of previously executed documentation in the project area.

After obtaining the information from National Agency for Cadastre and Land Registration and taking over the location information from the beneficiary, the land recognition stage will be carried out together with the owner and establishing the boundaries of the areas to be measured and how to perform the measurements (figure 1).



**Figure 1 – The location of the area of interest**

The total surface of the land from the documents is: 2426 sqm, with two categories of use: construction yards and arable land (table 1 and 2).

**Table 1**

**Land data**

Number	Use category	Surface (sqm)	Observations
1	A	618	Fenced land with wire mesh fence, wooden fence, concrete fence, access to metal gates and conventional boundary.
2	CC	1100	
3	A	708	

**Table 2**

**Construction data**

Construction name	Destination	Built area (sqm)	Observations
C1	CL	76	Residential house built in 1951, height regime P. Developed built area developed = 76sqm.
C2	CA	77	Outbuilding built in 1953, height regime P. Developed built area developed = 77sqm.
C3	CA	49	Outbuilding built in 1998, height regime P. Developed built area = 49 sqm.

All the contour points detailing the building were established in the presence of the owner and neighbours.

The topographic survey was performed in Stereographic 70 projection system and BLACK SEA 1975 reference system.

The data taken from the field were downloaded at the office, more precisely the field book in rv5 form and in CVS form.

The field book contains:

- Name of the points
- Name of the coordinates of the points
- X, Y coordinates
- Solutions in which the point was determined (Fixed, Float)
- Number of satellites
- The height of the appliance

The coordinate inventory of all points was extracted (Table 3).

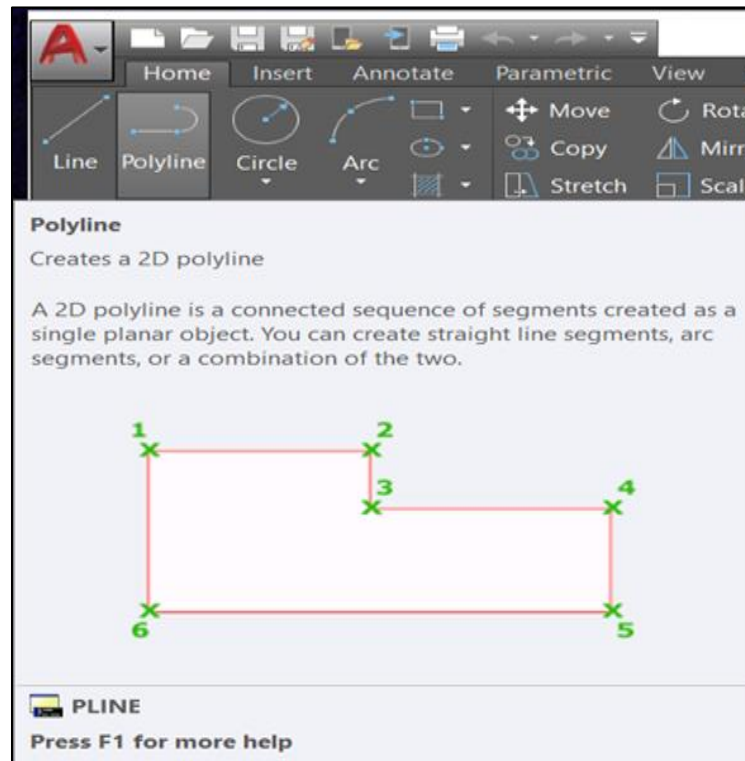
These are introduced, with the help of the TopoLT application, in the AutoCad 2019 programme, in order to draw up the location plan and the delimitation of real estate.

**Table 3**

**Coordinate inventory**

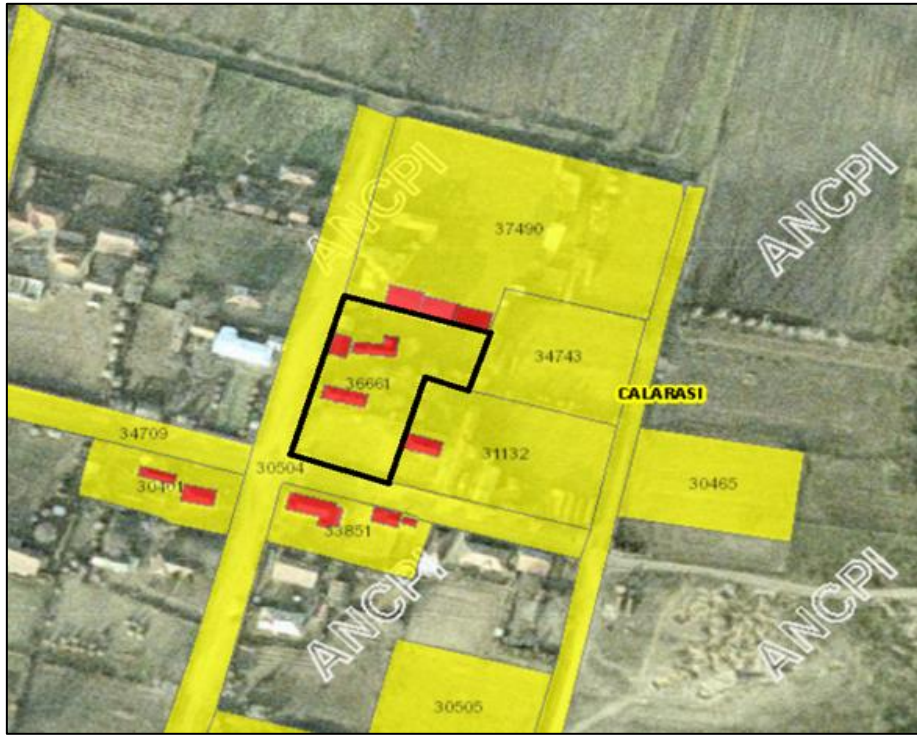
Point no.	X [m]	Y[m]	Point no.	X[m]	Y[m]
1	253521.454	422787.820	25	253499.507	422810.504
2	253516.814	422786.371	26	253486.166	422812.732
3	253487.099	422777.472	30	253502.840	422801.499
4	253485.199	422778.190	31	253504.229	422793.824
5	253478.055	422799.941	32	253504.924	422791.018
7	253475.518	422809.190	33	253506.348	422786.939
8	253502.522	422781.732	34	253511.216	422788.081
9	253504.387	422782.490	35	253543.665	422794.369
10	253522.918	422789.256	36	253539.957	422807.673
11	253521.076	422795.310	37	253484.370	422812.165
12	253523.029	422797.054	38	253496.479	422815.990
13	253521.444	422811.869	39	253526.556	422825.292
14	253528.797	422812.718	40	253535.492	422792.066
15	253529.394	422808.062	41	253530.953	422790.787
17	253527.109	422798.051	42	253503.706	422782.277
18	253528.526	422797.620	43	253505.314	422791.109
19	253530.441	422791.713	44	253504.618	422793.915
20	253530.443	422842.837	45	253507.588	422802.708
22	253509.402	422835.506	46	253526.230	422807.590
23	253513.997	422821.523	113	253533.440	422831.058

In order to obtain the land surface limits, the points were joined according to the field sketch, successively with the polyline command (figure 2).



**Figure 2 – The polyline command**

The next step is to place the buildings next to the real estate of interest. The perimeters were downloaded from the eTerra work programme in the form of dwg, then brought into coordinates (figure 3).



**Figure 3 – The eTerra work programme**

After verifying the data provided by National Agency for Cadastre and Land Registration Dolj as well as the eTerra 3 database, we found the following:

- the neighbouring building to the east IE 31132, falls within the tolerances imposed by the regulation on the highlighting in the graphic base of the single limit.
- the neighbouring building to the east IE 34743, falls within the tolerances imposed by the regulation regarding the highlighting in the graphic base of the single limit.
- The neighbouring building to the south and west IE 30504, falls within the tolerances imposed by the regulation on the highlighting in the graphic base of the single limit.

In order to draw up the topographic plan, other important information was added:

- Elements of altimetry;
- Planimetry elements;
- The title;
- The scale;
- The legend;
- Geographical north

Based on the absolute coordinates, the situation plan was drawn up at a scale of 1: 500 (figure 5).

From the absolute coordinates of the points, on each body the surface of the real estate was determined, and by summing them a total surface of 2426sqm was obtained.

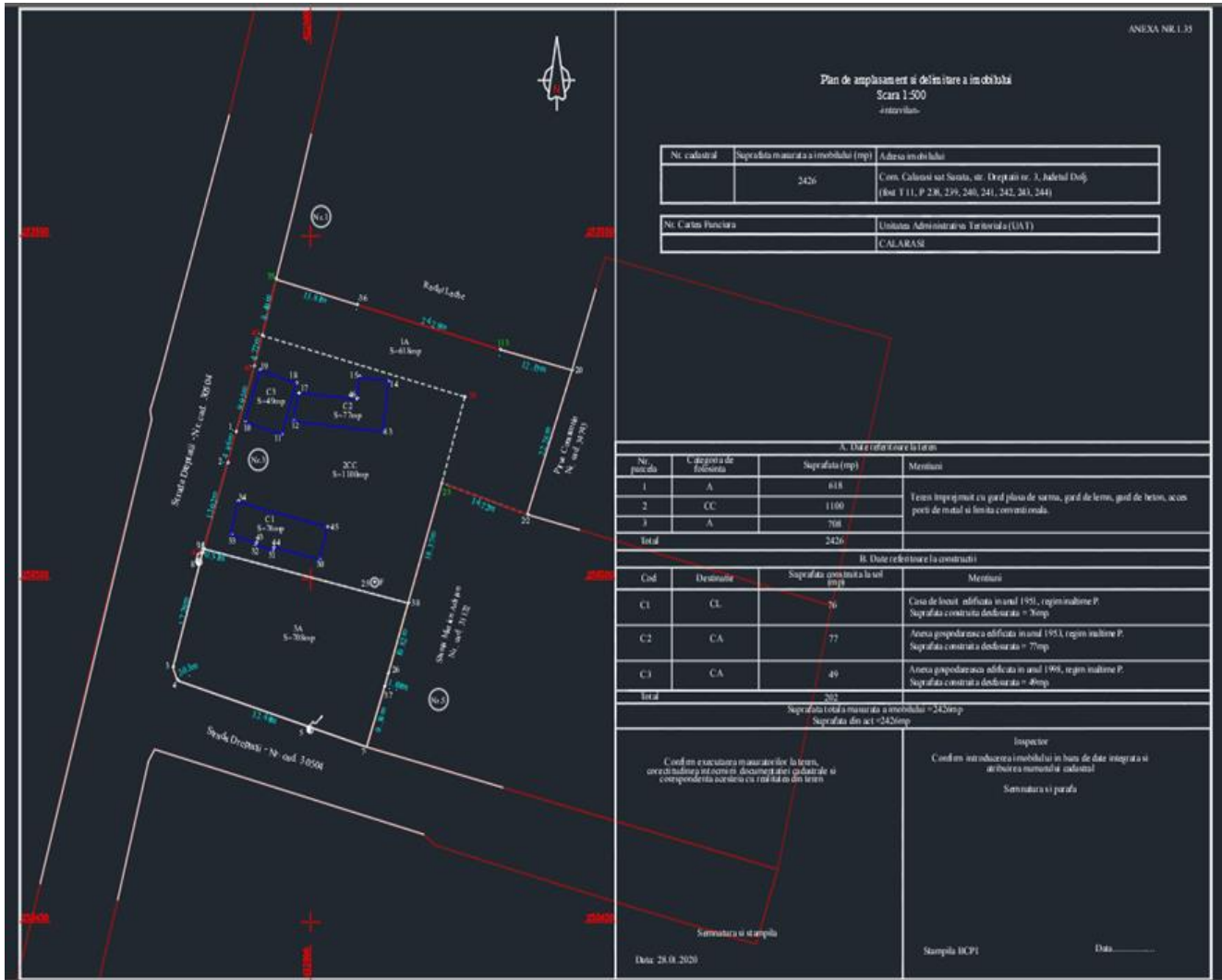


Figure 5 – The final form of the topographic plan

## CONCLUSIONS

1. The purpose of this work was the elaboration of the topographic-cadastral documentation in order to register in the real estate register of the real estate located in Călărași commune, Sărata village, Dreptății street, number 3, Dolj county.
2. In order to prepare the documentation necessary for the first registration in the real estate register, a topographic survey was performed in the Stereographic 1970 Projection System and the BLACK SEA 1975 Reference System.
3. Topographic measurements were performed with the Stonex S9 Plus GNSS device using the Real Time Kinematic method, which is a method with an accuracy of 1-2 cm.
4. After determining the absolute coordinates of the points, they were reported on a plan, after which they were joined according to the sketches on the field, obtaining the situation plan of the field, which is the result of planimetric surveys. This was done at a scale of 1:500.
5. From the absolute coordinates of the points, on each body the surface of the building was determined, and by summing them a total surface of 2426 sqm was obtained.

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