DOI: 10.29302/Pangeea 19.15

IMPLEMENTATION OF SYSTEMATIC CADASTRE IN SECTOR 60 OF THE VALEA LARGĂ COMMUNE, MUREŞ COUNTY, ROMANIA

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ABSTRACT: *The systematic registration of all the property in Romania is a priority of the Romanian Government as the implementation of the National Cadastre and Land Registration Programme is vital to our country's economic development. The registration of property into the integrated system of cadastre and land registration through simplified procedures of systematic registration, as well as the increase in the number of registered property are all objectives assumed by Romania, taking into account the constitutional principle of ownership guarantee.*

Keywords: *systematic cadastre; Valea Largă; identification; measurement; description; registration;*

1. Introduction

The commune of Valea Largă is located in the N-W part of Mureş County, at a distance of 20 km from the town of Luduş and of 70 km from the city of Târgu-Mureş. Sector 60 is located in the South-Western part of the commune (fig. 1,2).

Sector 60 has an irregular shape with a total of 62 registered properties and a total surface of 49.35 hectares.

The purpose of this work consists in the free registration of all the property in the integrated cadastre and land registration system based on the National Cadastre and

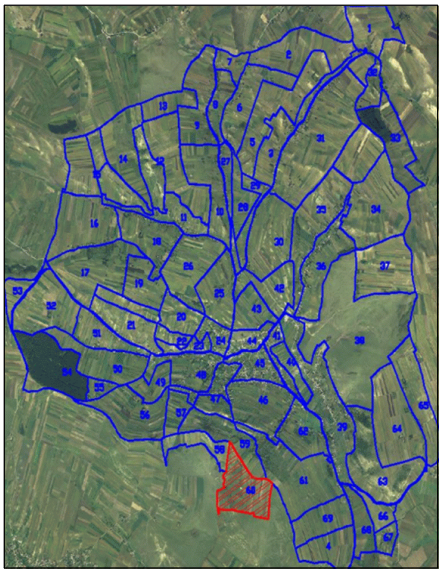

Fig. 1. Overview of the cadastral sectors of the Valea Largă commune

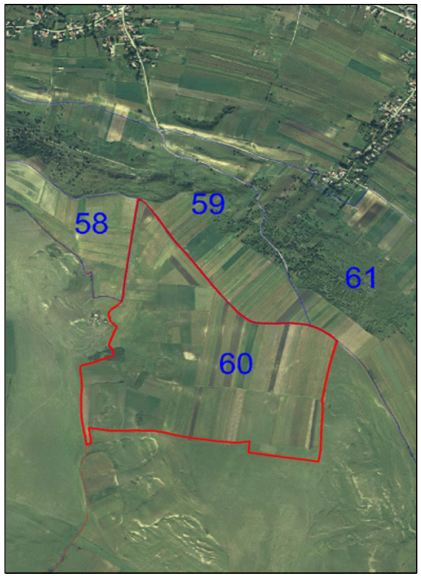

Fig. 2. Cadastral sector 60

Land Registration Programme[1]. The main beneficiaries of the direct results are the owners, possessors or other identified property holders.

The systematic cadastre works carried out are the following:

a) Identification, measurement, description and registration of buildings in the technical documents, their representation on cadastral plans and the storage of data on computer media;
b) Identification of the owners, possessors or other identified property holders, in order to be registered in the land book;
c) Public display of the results obtained after executing the systematic cadastral works, rectifying the errors reported by the owners and opening the new land books[2].

After the completion of the systematic cadastre works, the technical documents of cadastre are prepared.

The technical documents of the cadastral register are: the cadastral register of property (Annex no. 2), the alphabetical statement of the holders of the real property rights, of the owners and other possessors (Annex no. 3), the cadastral plan (Annex no. 7)[3].

2. Material and methods

In order to measure the boundaries of sector 60, GPS RTK Topcon Hyper II was used, which included a Topcon Receptor and a Topcon Hyper II Controller.

Topcon Link data processing software was used. This is a complete utility tool used for data import/export or conversion for the Topcon equipment[4]. Autocad 2016 was used for map design.

CADGen is a complex Romanian Systematic Cadastre app which enables a quick and correct generation of deliverables (technical documents) and of CGXML files directly from a CAD medium .

The main purpose of the application is the automation of the process of creating the deliverables provided in the technical specifications of the systematic cadastral works on cadastral sectors with a view to listing the buildings in the land book6.

CADGen enables the generation of reports (Cadastre Registers, Alphabetical Opis, Real Estate Datasheets) and of .cXML files, directly from the .dwg drawing for the cadastral sector 6[5].

2.1. Field measurements

The contour of the sector, the existing roads and other details encountered in the field were measured using the TopCon Hyper II GPS. A new job was created then the controller was connected to the receiver and a connection to the ROMPOS system was initiated. The Survey function was accessed, after which the point number was entered and the points were measured according to fig.3.

According to fig.4, field measurements started from point 1 and progressed to point 2, which is in the western part of the sector, measuring the road limits. From point 3, we moved southward and measured the western limits of the plots until point 4 was reached, which is on the border with Cluj County, respectively with LAU Tritenii Mari. From the southwest part of the respective sector,

[1] GD no. 294/2015 regarding the approval of the National Programme of Cadastre and Land Registration

[2] Order no.1427/2017 – regarding the approval of the Technical Specifications for systematic cadastre works according to cadatral sectors in view of land book registration

[3] Order no.1427/2017 – regarding the approval of the Technical Specifications for systematic cadastre works according to cadatral sectors in view of land book registration

[4] TopCon Link Guidelines

[5] https://www.topo.com.ro/aplicatii-topografie/cadgen

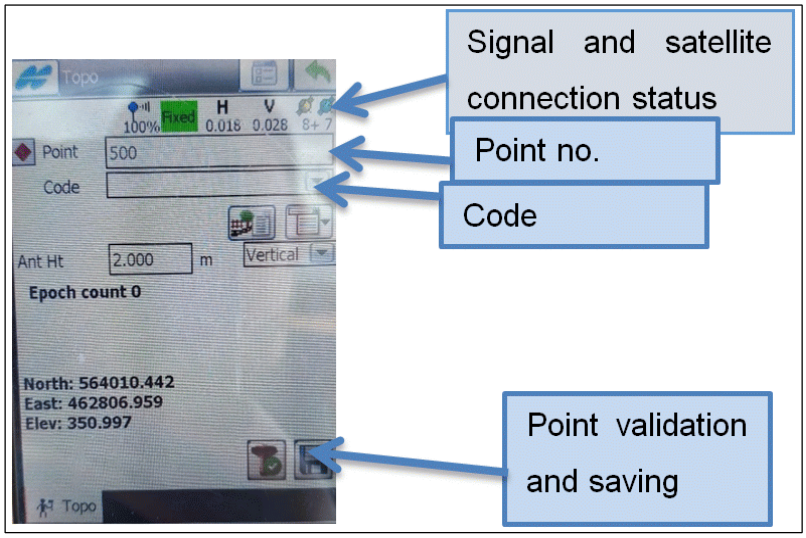

Fig. 3. Entering and measuring points

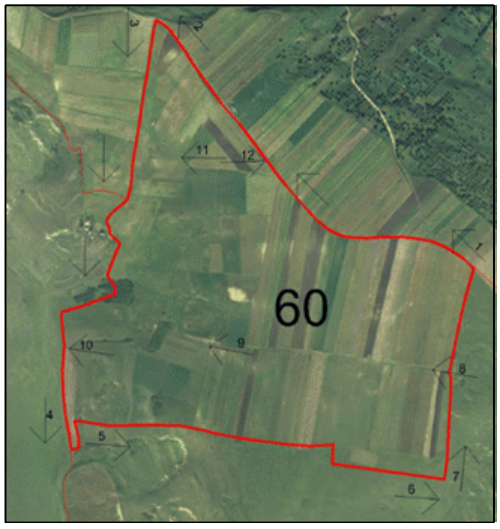

Fig. 4. Order of field measurements

point 5, we started eastward towards point 6, at the border between LAU Valea Largă and LAU Tăureni in Mure County. From point 7, we moved northward to point 8, which is about halfway between points 7 and 1, at the border with LAU Taureni. From point 8, we moved westward to point 9, where the road limit was measured, continuing from point 10 where the road limit was measured. Finally, we started measuring from point 12 westward to point 11 and finally between points 8 and 1 where the measurement started.

2.2. Downloading the measured data

In order to download the measurements made in the field, the GPS controller was connected to the computer using a micro-USB cable. The controller's memory was browsed through the JOBS folder,

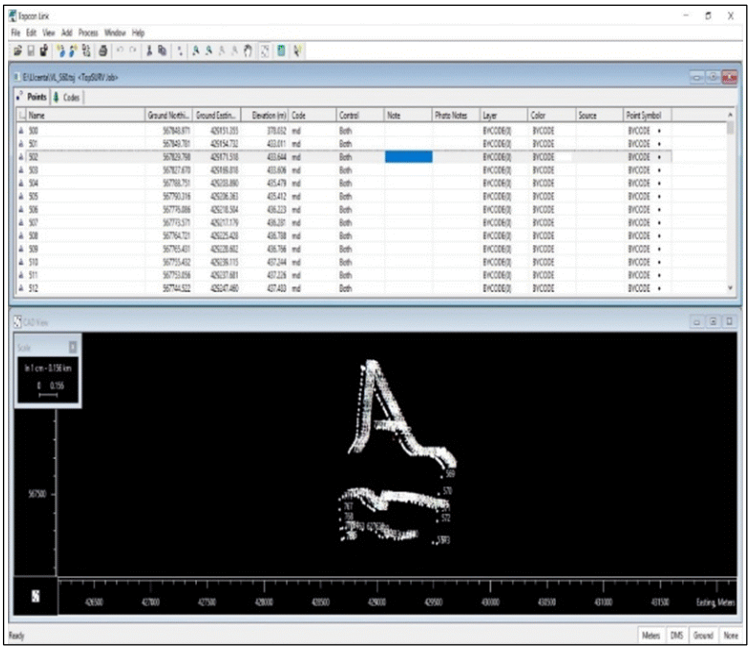

Fig. 5. Job imported to TopCon Link

subfolder VL_S60 (name of the job when the sector was measured) and the V_S60.tsj file was copied on to the computer.

With the help of Topcon Link, the file was opened according to fig.5 - Topcon Link imported job. Two windows were opened inside the software, the interface at the top containing the field book with all the measured points, with the coordinates in STEREO 70, the point code, along with other details of the points such as the layers of the points, the colour or the symbol that was assigned during the measurement.

The measured points are visible in the lower side of the window, within the coordinate system, each with their own point number. This is a basic CAD interface, where only the points can be viewed. It does not allow any change or editing of the points as AutoCAD would.

In order to be able to use the measurements made, the SAVE AS function of the software was used to save the field book in a .CSV format.

This newly created file displays the coordinates, the number of points in a more accessible way according to Table no.1.

After the CSV file was generated, the TopoLT extension was used to report points in Autocad.

From the TopoLT menu, by selecting the COORDINATE submenu and the REPORT POINTS function, a window was opened in which the data from the CSV file was entered, according to fig. 6. After the points were reported, the result are gone in fig. 7.

Table no. 1 – CSV File model

Point number	Coordinate N	Coordinate E	Elevation Z	Point name
500	567848.971	429151.355	378.032	md
501	567433.289	428905.551	378.062	md

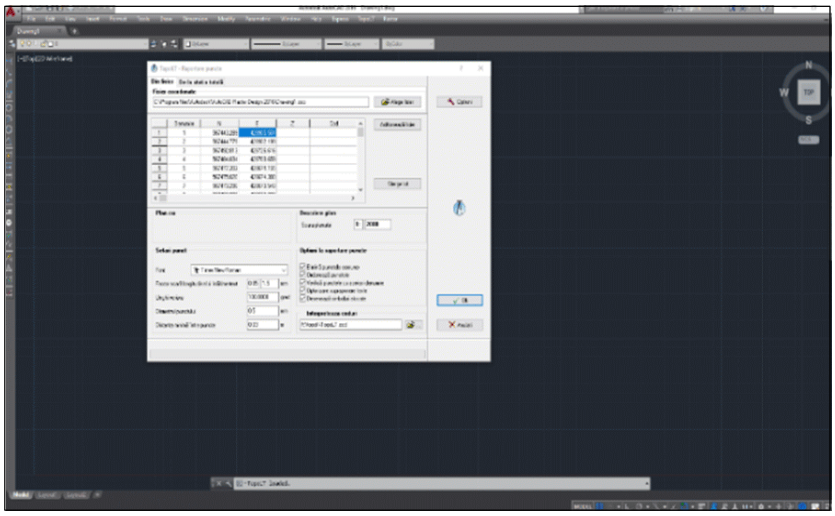

Fig. 6. TopoLT coordinate reporting

Fig.7. Autocad point reporting

2.3. Carrying out of the cadastral plan

Based on the measurements made in the field, imported into AutoCAD and with the support of the data received from the Town Hall, the cadastral sector plotting began.

The parcelling started with the delimitation and representation of the existing road from sector no. 60, according to fig. 8.

After completing the road construction, two large plots were obtained, one on the south side and the other on the north side of the road. In the eastern part of the sector, there is a property that continues from one plot to another and for this reason, this was chosen to be the first property parcelled out according to fig. 9.

Fig. 8. Existing road construction

Fig. 9. Creating the first parcel in the east side

Therefore, multiple detachment could be used afterwards in order to facilitate the parcelling.

After the representation of the first plot, the southern plot was chosen and with the help of the TopoLT software, more specifically with the help of the MULTIPLE DETACHMENT function, the surface of each property was inserted in the displayed window according to fig. 10.

After the data was entered in the TopoLT window and the list was validated, the entire plot was parcelled out on the basis of property titles (fig. 11). After plotting the north side, a total of 62 properties resulted from the plotting of cadastral sector 60 (fig.12). After parcelling, the coordinate inventory was created using the CREATE TABLE COORDINATE function of the TopoLT extension in AutoCAD.

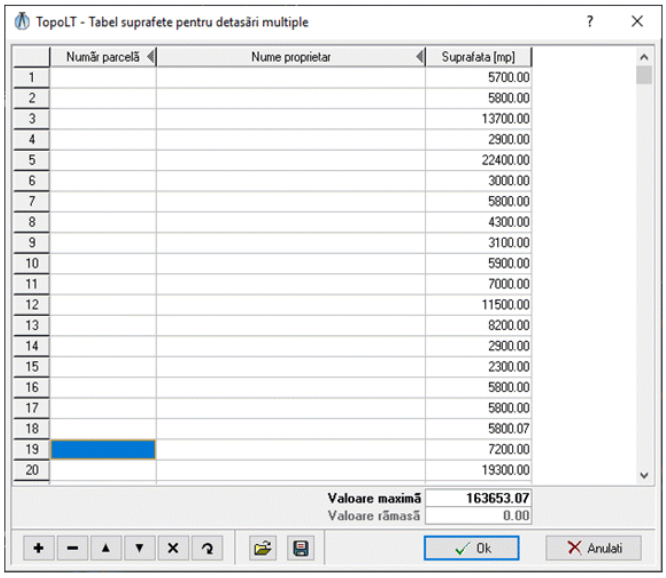

Fig. 10. Multiple detachment TopoLT

Fig.11. South side plotting

Fig. 12. Plotting of SECTOR 60

After completing the parcelling, the topology of the properties was checked by using the the QGIS software for possible overlaps between property or gaps between properties / sector. Then, the size of the surfaces was calculated.

CADGen was used for data completion in all the required documents. Thus, the data was input into the software and each requested document was generated based on these data.

3. Conclusions

Preparing all the documents in order to register the property in the land book

The documentation regarding the registration of the property in the land book was executed according to the requirements of the order of the general director of ANCPI no. 1427/2017, and these documents are: the data sheets according to annex no.4; cadastral register of property according to annex no.2; the alphabetical list of the holders according to annex no.3; the cadastral plan according to annex no. 7; cgxml files; technical memory; georeferenced cadastral plan.

To complete the data in each of the requested documents, CADGen was used. In this way, the data was entered into the software and subsequently, based on this data, each requested document was generated.

To start with, a new layer called LANDS was created where all the property resulting from the parcels was moved to. This is a requirement of the CADGen software. In order to enter the general data, the EDIT GENERAL DATA SECTOR function was used and the data was filled in according to fig.13.

After completing the graphic data and entering the real estate data, cgxml files were generated, using the Generate CGXML files function in the software, which generates one cgxml file for each building in the sector according to the data entered. The result was 62 cgxml files, after which the function Generate cadastre attachments was used to generate the data files, cadastral registers and the alphabetical list according to fig.14.

To create the georeferenced cadastral plan, a software was used that allows files to be printed from AutoCad in a .tiff format and then uploaded to the ETERRA3 platform: the cgxml files, the data files with the ownership documents and the geometry of the cadastral sector. After uploading and validating the online data, a CD was created

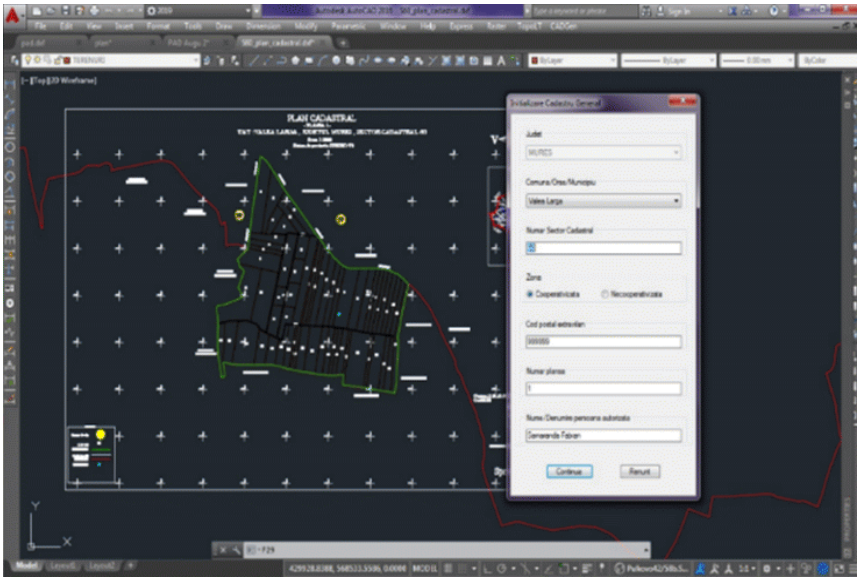

Fig.13. General data for the sector

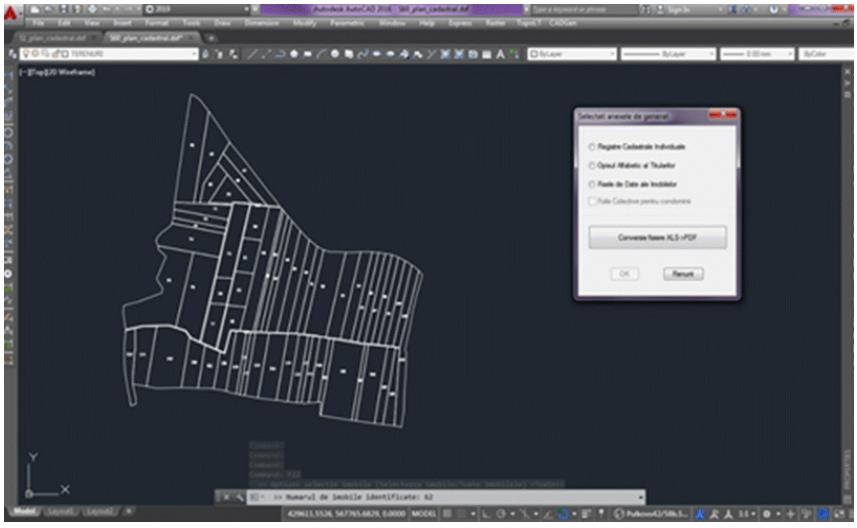

Fig.14. Annex generation

with: the alphabetical list according to annex no.1, the technical report according to annex no.2, the cadastral register according to annex no.3 which contained an extract from the register, the data sheets according to the annex no.4, cgxml files, cadastral plan according to annex no.5, the georeferenced plan, which was handed over to OCPI for verification.

Following the verifications, a notice was received mentioning that the cadastral sector was verified and declared admissible for submission in an analogue format.

After verifying the submitted analogue deliverable, OCPI Mure together with the Valea Largă Town Hall began the procedure for displaying the data for public information.

The period for displaying the data was 60 days, during which time, property holders could submit a request for rectification in the case of a mistake registered in the documents.

After 60 days of displaying the data of the cadastral sector 60 at the Town Hall, the final deliverable was prepared.

After validation and acceptance of the delivery, OCPI Mure prepared a report of final quantitative and qualitative acceptance of the work to be released to the land book.

References

[1] Velţan V., *Topographical and Cadastral Works Carried Out for Systematic Cadastre in Sector 60 of the Commune of Valea Largă, Mureş County* – Bachelor's Degree Thesis, "1 Decembrie 1918" University of Alba Iulia, B.Sc. Programme "Land Measurements and Cadastre" coordinated by Senior Lecturer Magdolna Eva Koncsag, Eng. D.

[2] *G.E.O no. 35/2015* – regarding the change of and addendum to the Cadastre and Land Registration Law no. 7/1996;

[3] *GD no. 294/2015* regarding the approval of the National Programme of Cadastre and Land Registration.;

[4]. *Order no.1427/2017* – regarding the approval of the Technical Specifications for systematic cadastre works according to cadastral sectors in view of land book registration;

[5]. TopCon Link guidelines.