TOPOGRAPHICAL SURVEYS OF IDENTIFICATION FOR REGISTRATION IN THE LAND BOOK OF A FARM IN PECICA TOWN

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Abstract. *The present paper comprises a topographic work of lifting and identifying a plantation farm type consisting of company headquarters, stables, silos and concrete slabs for registration in the land book of Pecica town. The farm where the topographic works were executed is a farm specializing in raising and fattening buffaloes, milk production and the processing of it. It was set up in 2007 and the initial construction was built between 2007-2013. The farm is situated at the entrance to Pecica town, at a distance of 500 m from the living quarters, which complies with the existing laws on the layout of livestock farms. This project was realized by accessing European funds. Thus, a young buffalo population was reintroduced into the farm. These by grazing will contribute to the revitalization of the flora of the "Parcului Natural Lunca Mureșului". From the point of view of the modernization of the farm space, it was foreseen the construction of a stable with the latest modern equipment for animal housing during the winter, a technical room of type observatory, a veterinary cabinet with isolation space for diseased animals, a residential building, for employees. Also the farm will be equipped with a headquarters and research facility with the latest innovations in the field. For the farm there is pedestrian access, road access and parking for small cars and high capacity up to 20 tons. From the altimeter point of view the farm is protected from floods by a dam built on the shore of Mureș. The topographic elevations required to identify the farm were performed with a total station, Leica TCR 705, and the elevation procedures used consisted of radii and retro intersections from known co-ordinated points previously determined by other projects. From the point of view of the engineering topography the traces of the constructions were made by the method of the alignments and the polar coordinates. The same station was used for these operations Leica TCR 705. The data obtained by topographic surveys from the field were downloaded and processed using Leica Geo Office Tools and AutoCAD 2007. Thus, 11 plots of different use categories were identified.*

Keywords*: total station, topographic elevations, building identification*

INTRODUCTION

The cadaster realizes the identification, measurement, description and registration of the buildings (apartments, lands, houses) in the cadastral documents and their representation on maps and cadastral plans.(http://www.veritatopo.ro/intrebari.html)

The Land Book is a public registry in Romania, which contains the full and accurate legal records of the real estate property of the natural and legal persons from the same surrounding area.(http://www.veritatopo.ro/intrebari.html)

The land book proves the existence of the real right enlisted, for the benefit of the person who has acquired or constituted in good faith a real property right, as long as the contrary is not proved. Real estate publicity is performed throughout the country through a land register and it is intended to include in the land book the property right and other real rights that are transmitted, formed, changed or which, as the case may be, is extinguished and radiated, that as a result of legal acts and deeds relating to estate property. In addition, other legal relationships, personal rights, prohibitions, incapacities and court disputes in connection with the real estate are also included in the land register or, as the case may be, are also canceled.(https://ro.wikipedia.org/wiki/Cartea_Funciar%C4%83)

At present cadaster and registration cannot be done separately. Cadastral documentation is automatically entered in the Land Registry.

In accordance with Art. 19 and Art. 59 of the Law on Cadaster and Real Estate Advertising no. 7/1996, republished, the present regulation aims at establishing the procedures and modalities by which the cadastral documentation necessary for the registration of the legal acts and deeds in the land book is drawn up.(http://www.dreptonline.ro/legislatie/legea_cadastrului_publicitatii_imobiliare.php)

According to the current legislation, the documentation for registration in the land book is made in a unique file, and after the cadastral reception and the registration of the documents in the land book, the beneficiary is released the land registry conclusion, the land registry extract for information and the site plan delimitation of the real estate.(http://www.avocatura.com/ll878-regulament-pentru-inscrierea-in-cartea-funciara.html)

MATERIALS AND METHODS

The buffalo farm is located in Pecica UAT, outside an urban area, identified by no. cad. 311179. The building is vacant lot and partially fenced with a mesh fence.

The Complex of the Buffalo Farm and the Pecica City View Center includes the following (Fig.1)(https://ro.wikipedia.org/wiki/Pecica)

- A totem, a wall in which the contour of a buffalo is cut
- A veterinary office
- The caretaker's house
- Bicycle deposit (used for viewing the farm and the Natural Park of Mures Floodplain)
- Buffalo stable
- Grassy terrace - star-spot observation
- Visitor Center (Pecica Information Center)
- Surveillance tower-observation tower

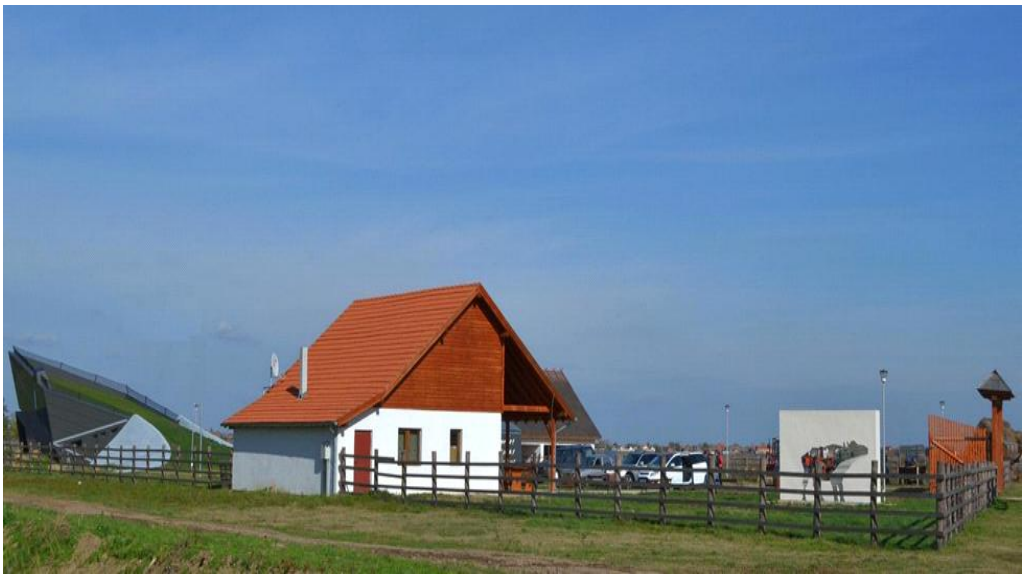

Fig.1. The buffalo farm in Pecica

Topographic measurements were performed using the RTK method with the Stonex S8 GPS receivers and the Leica TCR 705 total station.

The GPS Stonex S8Plus is the best-quality equipment, being one of the best in its class. Having implemented the Transdat program and operating with the ROMPOS national system can easily determine points in almost the whole country (where is GSM coverage). The SurvCE software makes the Stonex S8Plus a very easy tool to learn even by those who are not topographers of the profession. This tool is the perfect choice for those who want to start a business with minimal investments, but the quality equipment (fig.2) (http://www.survey-solutions.net/cumpara/gps-stonex-s8plus-27)

Total Station TC (R) 705 from Leica Geosystems is a high-quality machine designed for construction work. The advanced technology used makes it easier to measure. The appliance is ideal for simple building applications and layouts. Handling the device is easy and easy to learn in a short time. (Figure 3)(https://www.scribd.com/document/153374978/TCR-705)

Fig.2. GPS Stonex S8Plus

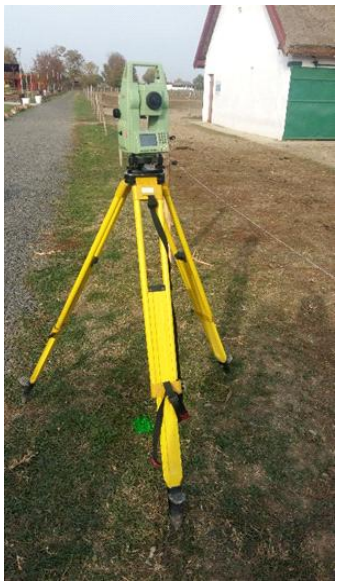

Fig.3. TC(R) Leica 705

Topographic elevation was performed using the RTK (real-time) method. It's a real-time OTF kinematic measurement method. The station has a radio link attached and retransmits the data it receives from the satellites. And the mobile has a radio link and receives the transmission from the fixed station. Mobile is also receiving data directly from satellites via its own GPS antenna. These two sets of data can be processed together by the mobile handset in order to solve the ambiguity and therefore a high accuracy relative to the fixed receiver will be obtained. Once the fixed receiver has been installed and transmitted data via the radio link, the mobile handset can be activated. When it tracks the satellites and receives data from the fixed, the initialization process can begin. This is similar to initialization made for a kinematic OTF measurement, the main difference being that it is run in real time.(https://www.ct.upt.ro/users/AlinaBala/Tehnologii_Geodezice_Spatiale.pdf)

RESULTS AND DISCUSSION

File processing has been done with specialized programs. Mapping topographic plans has been done digitally on the CAD platform. The analog format of the plans was written at 1: 500 scale.

The measurements were carried out with a density of approximately 100 measured points / ha, with an accuracy of plan metric determination of up to +/- 10 cm, falling within the tolerances imposed and accepted by the technical norms in force.

The measured area of the building subject to the technical reception is: 0.5 ha. (Fig.4.)

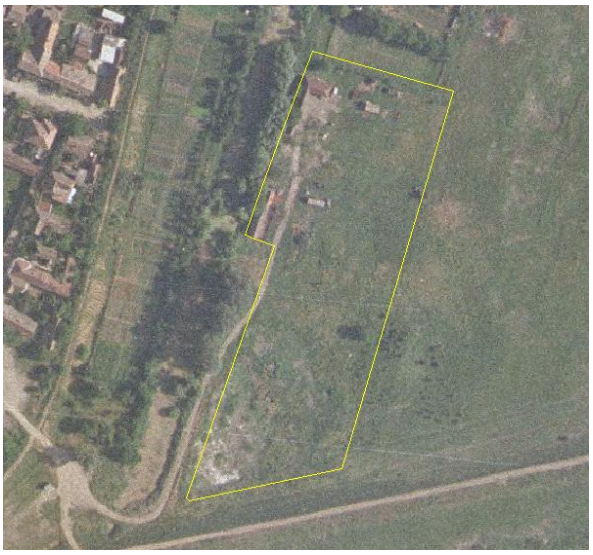

Fig.4. Outline of buffalo farm overlapped on orthophoto plan

The transfer and import of data from the electronic carnet was made with the software provided by Leica, namely "Leica GeoOffice Combined.

During the lifting was determined the outline of the farm along with the outline of the 9 plots. After processing the data we obtained the following data regarding the surface of the land:

Total area of buffalo farm - Plot (CF305862)

Point No.	Outline coordinate points		Side Length
	X(m)	Y(m)	
1	524941,330	196452,602	191,063
2	524757,974	196398,883	75,370
3	524742,181	196325,186	2,272
4	524743,920	196323,724	129,369
5	524866,166	196366,058	9,994
6	524869,517	196356,643	4,523
7	524871,206	196352,447	0,499
8	524871,392	196351,984	24,540
9	524894,526	196360,171	27,698
10	524920,525	196369,723	29,933
11	524948,650	196379,969	13,146
12	524961,001	196384,471	15,580
13	524956,679	196399,440	55,333
S(CF305862)=14422.99mp	P=579.321m		

Maps and topographical plans helped to better identify the area, and based on the topographic measurements made, it was possible to draw up the plans with all the elements collected on the ground and the proper checks were made by overlapping the orthophotoplanar outline and drawing up the plan situation (Fig.5)

With LeicaGeo Office Combined, all field data on the three spatial coordinates, X, Y, and Z respectively, were then imported, and later transposed into the plan.

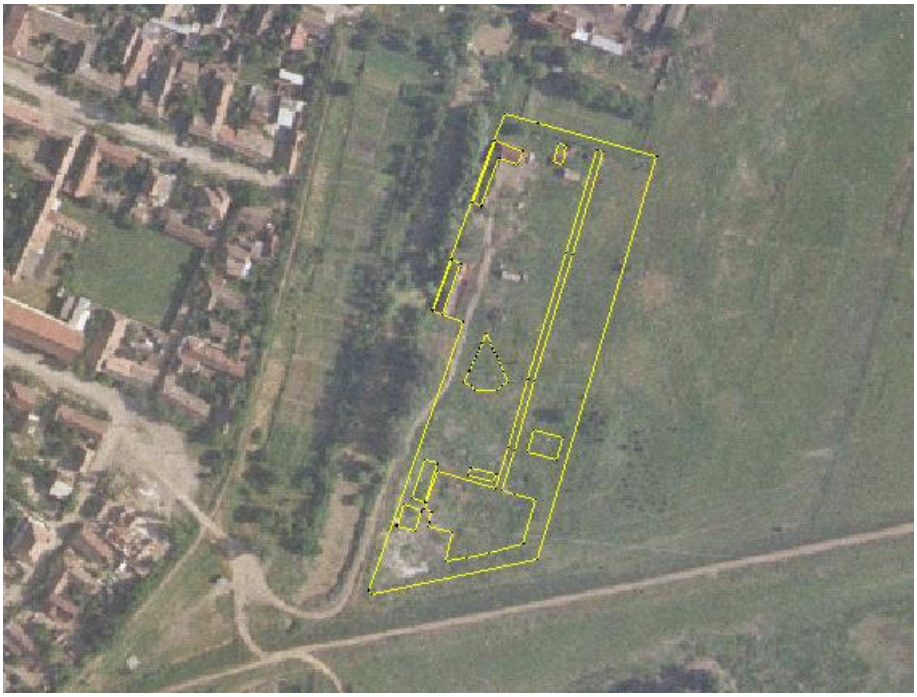

Fig.5. Situational plan overlapped on orthophotoplasm

CONCLUSION

The GPS system is the easiest and safest way for topographic surveys to be geodetic. Regardless of the method or process, relative or differential positioning is used, in which a fixed receptor is installed at a known point or more, and in the new points one or more mobile receivers moving at all projected points. With the use of GPS, the errors made by using the total TC (R) Leica 705 station were eliminated.

From the topographic point of view, RTK (real-time) method simplified the topographic issue ensuring the necessary precision of such works.

Carrying out digital plans through AutoCad demonstrates that they can be done with maximum accuracy and precision, allowing different field analyzes.

From the tourist point of view, the buffalo farm is a special objective combining nature with the observation center with all the modern facilities. It also provides a large number of jobs in Pecica.

The topographic elevation carried out is of great importance for the registration in the land registry of the buffalo farm in Pecica.

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