TOPOGRAPHIC ELEVATIONS FOR THE REGISTRATION OF OWNERSHIP RIGHTS OF IMMOVABLE PROPERTIES IN DUMBRAVITA, BASED ON LAW OF EDUCATION 1/2011

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Abstract: *This paper was written at the request of the Banat University of Agricultural Sciences and Veterinary Medicine Timisoara, in order to pass these lands from the possession of the Public Domain of the Romanian State and the Administration of USAMBV Timisoara to the property of the Banat University of Agricultural Sciences and Veterinary Medicine Timisoara, based on Law of Education 1/2001. This paper aims at obtaining the permit from the National Agency for Cadastre and Land Registration (NACLR) Romania and new land registry numbers, following the drafting of the documentation of IMMOVABLE PROPERTY CADASTRAL DATA UPDATE for parcels bearing cadastral numbers A38/1, A47/1, A52, A70/2/1 and A70/2/2, located outside the locality of Dumbrăviţa, based on Law of Education 1/2001. Article 226, paragraph 2 of Law of Education 1/2001 specifies the rights universities have on their own heritage assets. Paragraph 4 of the same law entitles the universities to own movable and immovable property from the public and private domain of the state among their assets. Paragraph 6 stipulates that "according to a Government decision, assets can pass from the state's public domain to the state's private domain and to the property of state universities, on condition that relevant laws are complied with." In order to pass these lands from the property of the Romanian State to the property of USAMVB Timişoara, two topographic and cadastral surveys were conducted to update the immovable property data according to Order 634/2006. The code used to submit the surveys complies with the Order on tariff approval published in the Official Journal no 253/16.04.2009, which specifies code 2.6.2 for surveys submitted to Timiş County Office for Cadastre and Land Registration – for immovables whose area specified in papers coincides with the area resulted from measurements; for immovables whose measured surface is ± 2% different than the area in the papers, the code is 2.5.4. For code 2.6.2, NACLR charges 60 RON/immovable property, while for code 2.5.4 the tax is 120 RON/immovable property. The elevations in the present paper were done with Leica GPS 1200, a state-of-the-art device that uses SmartWorx v8.10 technology and a Bluetooth connection. After finishing the measurements, the data were unloaded with the Leica Geo Office Combined software. The WGS84 coordinates were transformed into 1970 stereographic coordinates using TransDat 4.0. The 1970 stereographic coordinates were transferred to AutoCad to draft this topographic work.*

Key words**:** *Public Domain of the Romanian State and the Administration of USAMBV Timisoara, immovable property cadastral data update, Law of Education 1/2001*

INTRODUCTION

The emergence of modern total stations is a great step ahead in terrestrial measurements owing to increased precision, work speed and efficiency. The apparition of the GPS technology has been a great step in the same direction. Most likely this is the last stage in the field, as what will follow will be only a reduction in price and receiver dimensions correlated with an increase in autonomy and accuracy. However, as far as the operating principle is concerned, my personal opinion is that no other radically different system will be developed.

The use of GPS equipment has the advantage that it does not require angular and distance measurements and the inconvenience of using total stations is also eliminated. At the

same time, it is worth mentioning that with the RTK (Real Time Kinematic) method it is possible to determine coordinates with an accuracy that is comparable to that of the total

stations and in a suitable period of time. One must also take into consideration the necessity to align Romania to the European and international standards by developing a GPS reference geodetic network of high-precision, whose points should be determined and included in the EUREF European GPS geodetic network.

This paper aims at obtaining the permit from the National Agency for Cadastre and Land Registration (NACLR) Romania and new land registry numbers for parcels bearing cadastral numbers A38/1, A47/1, A52, A70/2/1 and A70/2/2, located outside the locality of Dumbrăviţa, based on Law of Education 1/2001.

MATERIAL AND METHODS

The topographic elevations for this paper were performed with Leica GPS 1200, a very powerful device with many applications and functions that can satisfy the requirements of users worldwide.

GPS1200 can be used either as reference or rover for static or kinematic measurements (RTK); it can be used for topographic elevations, tracing, monitoring, and earthquake measurements. GPS1200 receivers are designed to operate under the roughest weather conditions. They are waterproof up to 1 m water depth, shock, vibration, rain, dust, sand and snowproof, able to operate at temperatures between -40°C and +65°C.

For this paper, the GPS measurements were taken with the RTK (Real Time Kinematic) method, using the TIM1_2.3 reference station in Timisoara.

The measurement engine of Leica GPS1200 is a SmartTrack type that acquires satellites within seconds; it is ideal for construction areas where other receivers cannot find a proper position.

The aerial used for this paper is of dual frequency GX1230 type, SmartTrack being designed to support GLONASS, GPS L15 signals, as well as the signals of the future European GPS network GALILEO. Leica GPS1200 uses QWERTY keyboard, with touch screen or non-touchscreen, as requested. The elevation can be viewed directly in the field as well as from the office. ZOOM and PAN functions are also available.

The collected data can be exported directly by the GPS1200 receiver, but for the present paper they were unloaded with the ***Leica Geo Office Combined*** programme.

The GPS reference system is **WGS 84** (World Geodetic System 1984) that, like the ITRF system, is defined by the coordinates of the determined terrestrial points.

The wider and wider use of satellite positioning systems and satellite global mapping systems for geodetic operations may cause serious practical difficulties if the results of these spatial techniques must be related to older maps or digital data. The main difficulty lies in changing data from geocentric datums to local datums that describe older data or viceversa.

The ***TransDatRO 4.01*** software application is a transformation procedure similar to other international procedures. It embeds a spatial data distortion model in order to maintain spatial data integrity and topology in each datum. As a result, points with larger distortions are not eliminated. On the contrary, they are tested and included in the transformation, in order to describe as realistically as possible the characteristics of each area containing new points awaiting transformation.

RESULTS AND DISCUSSIONS

This paper was performed at the request of the Banat University of Agricultural Sciences and Veterinary Medicine Timisoara (BUASVMT), in order to enter into the land register, according to Law of Education 1/2001, the land rights for the immovables with

cadastral numbers A38/1, A47/1, A52, A70/2/1, A70/2/2, located outside the locality of Dumbrăviţa. Currently, these immovables belong to the Public Domain of the Romanian Government and are managed by BUASVMT, for the Experimental Teaching Station.

The parcels are located outside the locality of Dumbrăviţa, at the west, bordering the unincorporated area of Timisoara (figure 1).

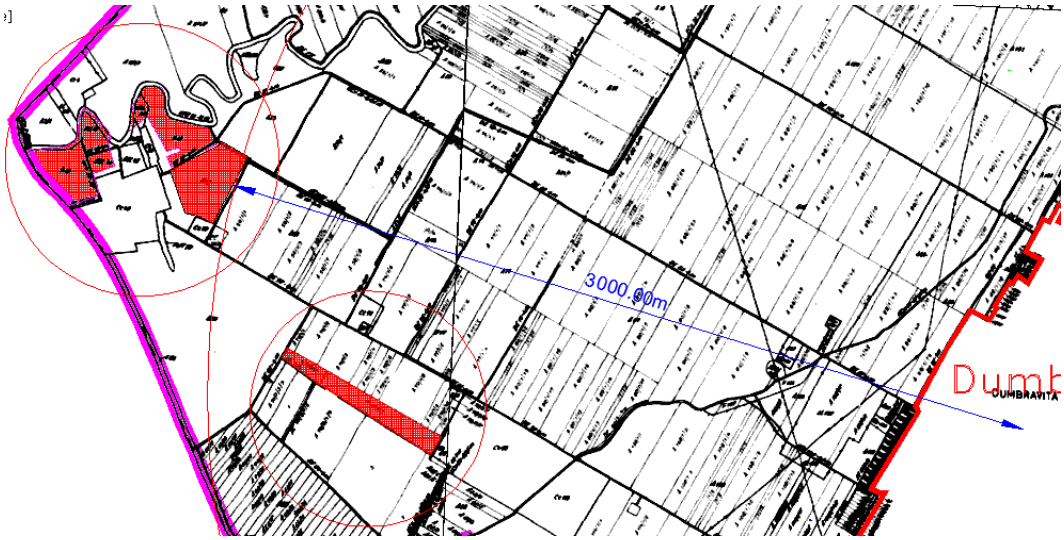

Fig. 1 Location of immovables outside Dumbrăviţa

FIELD WORK

When the immovables that were to be measured had been determined, a request was submitted to the Timiş County Agency for Cadastre and Land Registration, in order to obtain the coordinates of the border points of the immovables registered in the area. Having obtained the requested information and based on the 1:10000 scale development site plan, the 1:5000 scale parcel map and the details in the database, the immovables could be located in the field.

Immovable location was followed by the topographic surveys. First the device was configured, and then the reference station was chosen, so that measurements could be taken.

The reference station used for the purposes of this paper is described in table 1.

Table 1

Permanent GNSS station

GEOCENTRIC CARTESIAN COORDINATES				
Name of permanent station	Class	Xc	Yc	Zc
Timisoara (TIM1_2.3)	A	4153556.883	1613641.291	4548330.869
ELLIPSOID COORDINATES				
Name of permanent station	Class	B[m]	L[m]	He[m]
Timisoara (TIM1_2.3)	A	45°46'47.65271"N	21°13'51.46281"E	154.7278
1970 STEREOGRAPHIC COORDINATES				
Name of permanent station	Class	X(m)	Y(m)	Z(m)

UNLOADING THE GPS LEICA 1200 AND DATA PROCESSING

Information resulted from measurements is stored on a ***Compact Flash*** card type. It can be unloaded with this card, which is connected to a card reader, and a specialised Leica software called ***Leica Survey Office Combined***, which is easy to use both for unloading and uploading data.

A NEW PROJECT is created by pressing the ***Project*** icon. A ***New project*** box appears. Our project is called USAB DUMBRAVITA and uses the parameters for transforming the coordinates from the WGS84 system to the 1970 stereographic system.

When the new project has been created and named, the coordinates are chosen. We have other calculated Helmert parameters and in this case the transformation from the WGS84 system to the 1970 stereographic system takes place directly, with ***Leica Geo Office Combined***. It is not necessary to process the file with the ***TrasDatRO 4.01*** file to transform the coordinates. A click on OK will send the new project entitled DUMBRAVITA on the project list.

The next step is to import the data from the card in the device, using the ***Import Raw Data*** command. After that, the measurements file will be obtained from the GPS Leica 1200.

The **MEASUREMENT FILE** (given only partially) is shown below:

Fieldbook Report

03/25/2012 10:33:20

Job Information

Job name:	USAMVB TIMISOARA
Created:	03/25/2012 09:19:02
Time zone:	2h 00'
Coordinate system name:	PARAMETRI PE TIM
Application software:	LEICA Geo Office 6.0
Firmware version:	5.60
Codelist name:	SYSTEM1200
Average limit (Position):	0.0500 m
Average limit (Height):	0.0750 m

Coordinate System Information

Coordinate system name:	PARAMETRI PE TIM
Created:	03/23/2012 09:17:33

Transformation name:	PARAMETRI PE TM
Transformation type:	Classical 3D
Height mode:	Orthometric
Residuals:	No distribution
Local Ellipsoid:	Krassowski
Projection:	Romania Stereo 70
Geoid model:	-
CSCS model:	-

GPS Coordinates

Baseline	**Reference: TIM1_2.3**	**Rover: 0002**
WGS 84 Coordinates:		
Latitude:	45° 46’ 47.65271” N	45° 47' 06.18575" N
Longitude:	21° 13’ 51.46281” E	21° 12' 35.67366" E
Ellip. Hgt:	154,7278 m	133.6731 m

Quality:	Sd. Lat: 0.0080 m	Sd. Lon: 0.0062 m	Sd. Hgt: 0.0143 m
	Posn. Qlty: 0.0101 m	Sd. Slope: 0.0068 m	

Baseline	**Reference: TIM1_2.3**	**Rover: 0003**
WGS 84 Coordinates:		
Latitude:	45° 46’ 47.65271” N	45° 47' 05.61720" N
Longitude:	21° 13’ 51.46281” E	21° 12' 34.76061" E
Ellip. Hgt:	154,7278 m	133.5572 m

Quality:	Sd. Lat: 0.0055 m	Sd. Lon: 0.0043 m	Sd. Hgt: 0.0100 m
	Posn. Qlty: 0.0070 m	Sd. Slope: 0.0047 m	

Baseline	**Reference: TIM1_2.3**	**Rover: 0004**
WGS 84 Coordinates:		
Latitude:	45° 46’ 47.65271” N	45° 47' 05.02062" N
Longitude:	21° 13’ 51.46281” E	21° 12' 33.87791" E
Ellip. Hgt:	154,7278 m	133.5644 m

Quality:	Sd. Lat: 0.0054 m	Sd. Lon: 0.0042 m	Sd. Hgt: 0.0098 m
	Posn. Qlty: 0.0069 m	Sd. Slope: 0.0046 m	

Baseline	**Reference: TIM1_2.3**	**Rover: 0005**
WGS 84 Coordinates:		
Latitude:	45° 46’ 47.65271” N	45° 47' 04.43649" N
Longitude:	21° 13’ 51.46281” E	21° 12' 33.03878" E
Ellip. Hgt:	154,7278 m	133.5103 m

Quality:	Sd. Lat: 0.0045 m	Sd. Lon: 0.0034 m	Sd. Hgt: 0.0081 m
	Posn. Qlty: 0.0056 m	Sd. Slope: 0.0038 m	

Baseline	**Reference: TIM1_2.3**	**Rover: 0006**
WGS 84 Coordinates:		

Latitude:	45° 46’ 47.65271” N	45° 47' 03.79986" N
Longitude:	21° 13’ 51.46281” E	21° 12' 32.12154" E
Ellip. Hgt:	154,7278 m	133.5413 m

JOINING THE OBTAINED POINTS AND DRAFTING THE PLANE

Once the points are loaded in AutoCad, they are joined using the Polyline command. When the polyline is closed, the area of the polygon is calculated. The scale chosen for plane representation when drafting the technical documentation is 1:2000 (figure 2), so that all survey details are highlighted.

When the points are joined and processed, data are checked by placing the obtained information on the TM_Dumbrava_image.sid.xml orthophotomap shown in figure 3.

OFFICE WORK

The following is a presentation of the GenerareCP file, version 2.78.14.0, that will be attached to the cadastral documentation. In order to create this file, first the data of the immovable owners and the information in the land register will be entered (figure 4). Then the plot data and text data of the immovable are entered as follows:

- for the A38/1 immovable - figure 5; for the A47/1 immovable - figure 6; for the A52 immovable - figure 7; for the A70/2/1 immovable - figure 8; for the A70/2/2 immovable - figure 9.

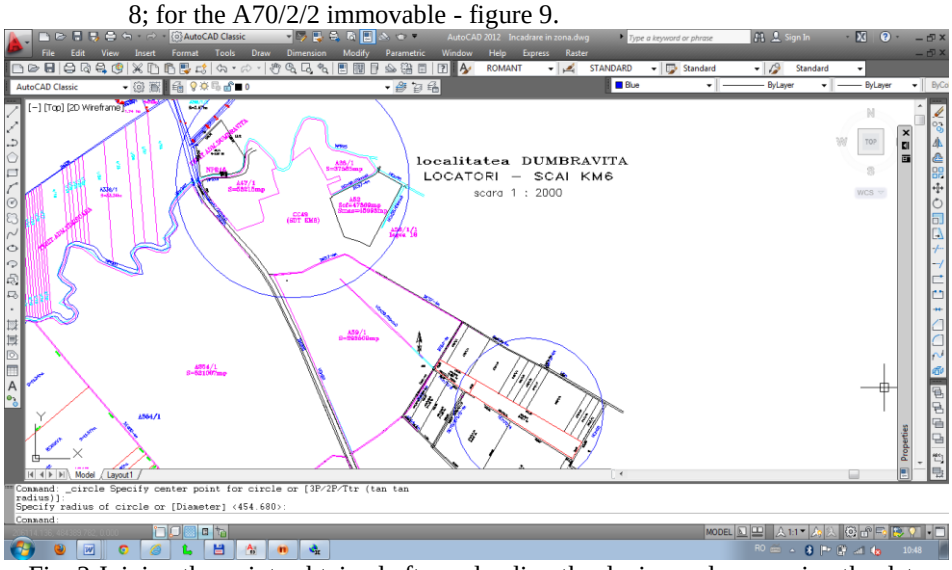

Fig. 2 Joining the points obtained after unloading the device and processing the data

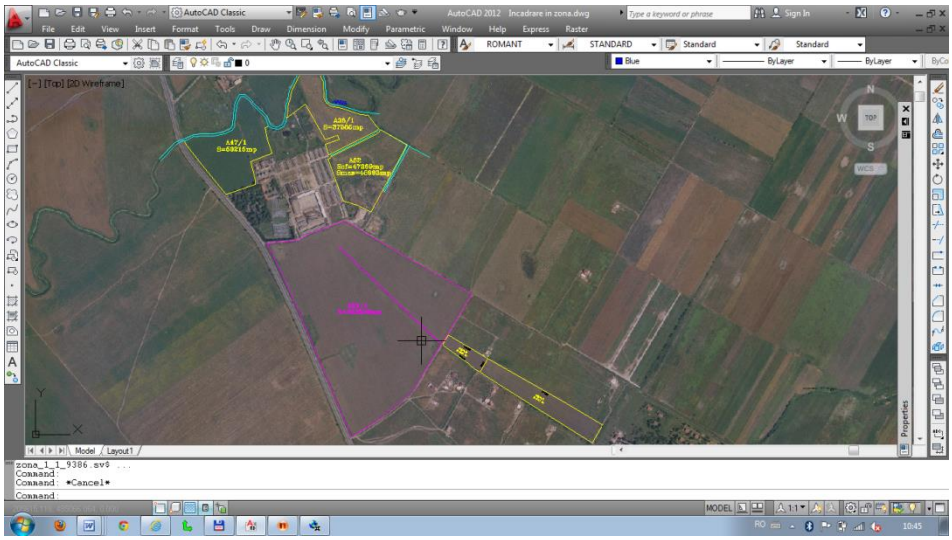

Fig. 3 Checking whether the data are correct by placing the obtained information on the TM_Timisoara_image.sid.xml orthophotomap

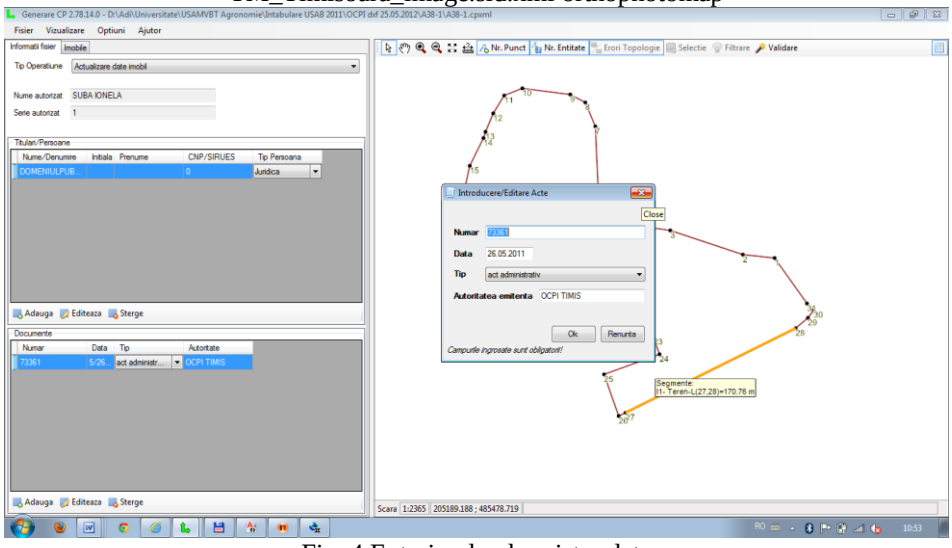

Fig. 4 Entering land register data

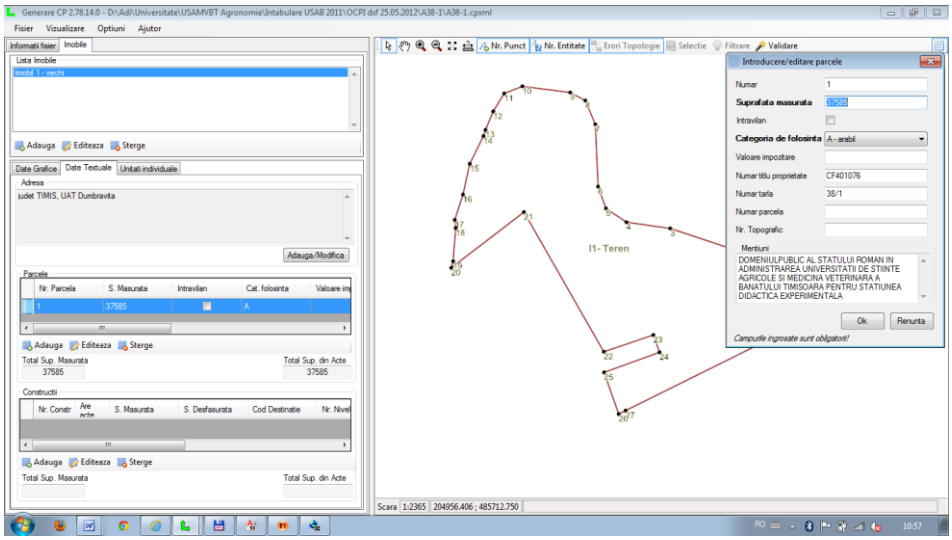

Fig. 5 Entering the field plot data
for the immovable with the A38/1 cadastral number in Dumbrăviţa

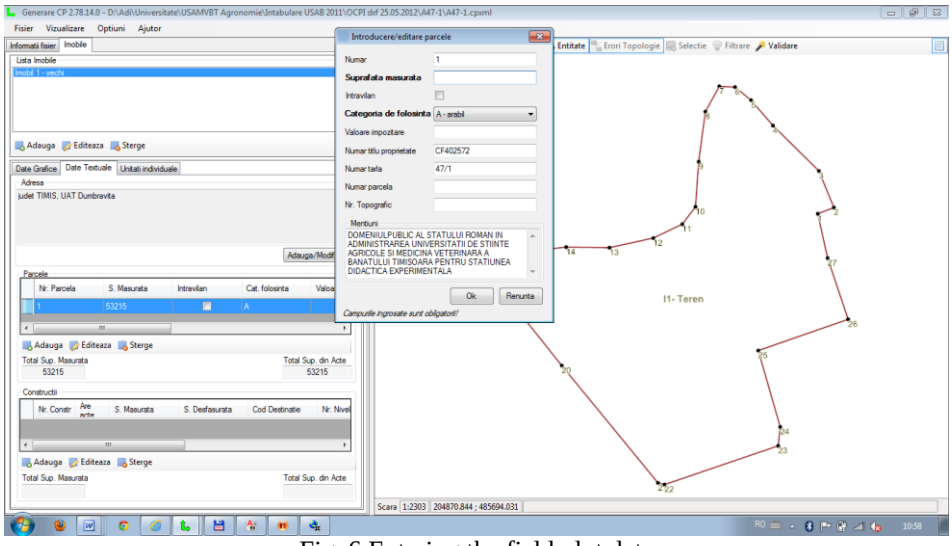

Fig. 6 Entering the field plot data
for the immovable with the A47/1 cadastral number in Dumbrăviţa

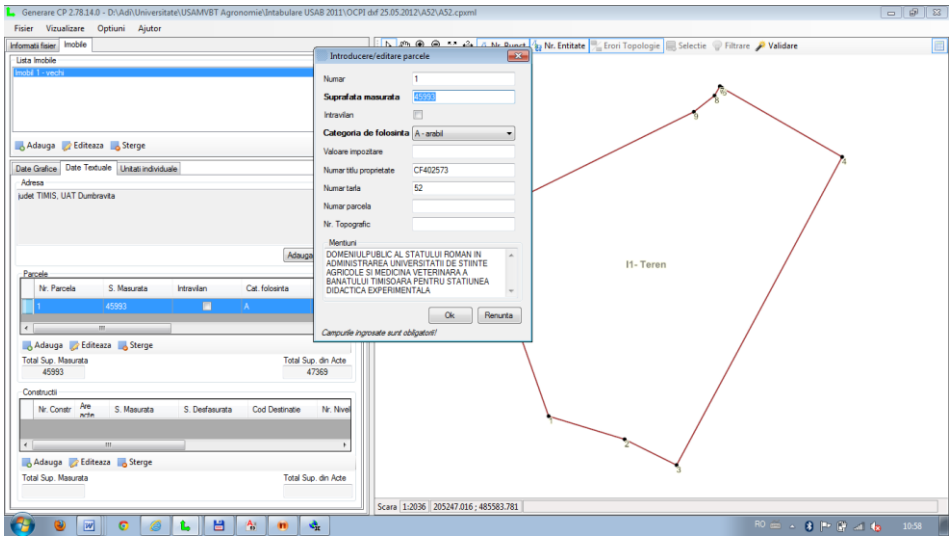

Fig. 7 Entering the field plot data
for the immovable with the A52 cadastral number in Dumbrăviţa

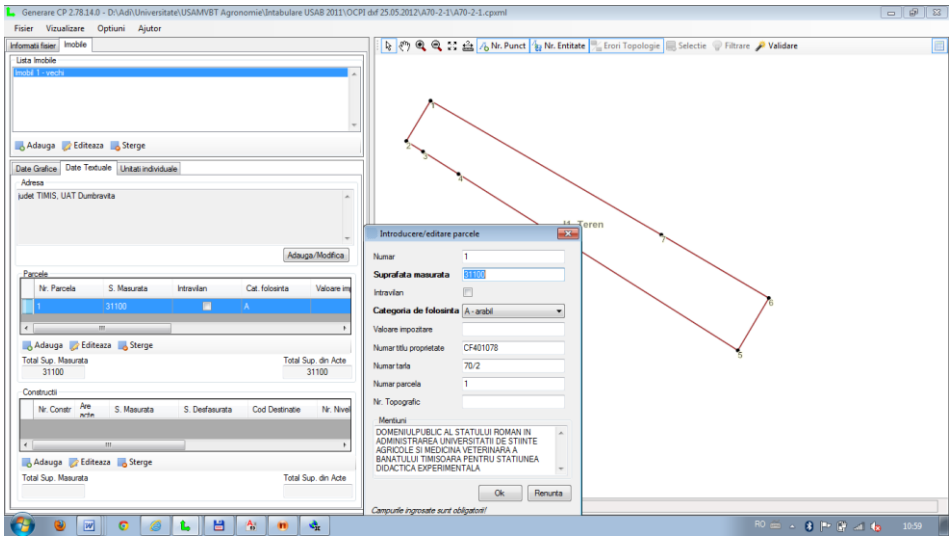

Fig. 8 Entering the field plot data
for the immovable with the A70/2/1 cadastral number in Dumbrăviţa

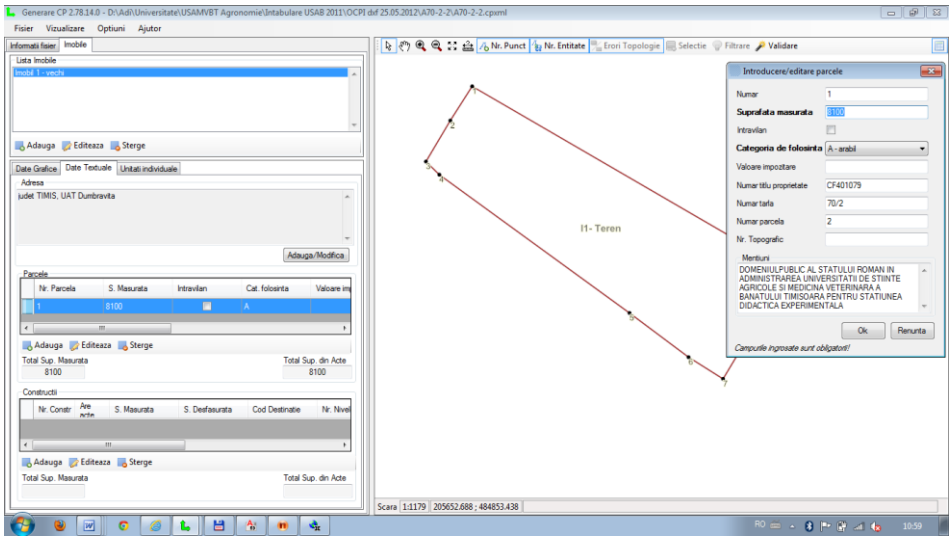

Fig. 9 Entering the field plot data
for the immovable with the A70/2/2 cadastral number in Dumbrăviţa

CONCLUSIONS

This paper was written at the request of the Banat University of Agricultural Sciences and Veterinary Medicine Timisoara, in order to pass these lands from the possession of the Public Domain of the Romanian State and the Administration of BUASVMT to the property of the BUASVMT, based on Law of Education 1/2001, published in the Official Journal no 18/January 10th 2011. At present, these immovables belong to the Public Domain of the

Romanian Government and are managed by BUASVMT, for the Experimental Teaching Station.

Article 226, paragraph 2 of Law of Education 1/2001 specifies the rights universities have on their own heritage assets. Paragraph 4 of the same law entitles the universities to own movable and immovable property from the public and private domain of the state among their assets. Paragraph 6 stipulates that "according to a Government decision, assets can pass from the state's public domain to the state's private domain and to the property of state universities, on condition that relevant laws are complied with."

In order to pass these lands from the property of the Romanian State to the property of BUASVM Timişoara, topographic and cadastral surveys were conducted to update the immovable property data according to Order 634/2006. This type of work is done in the same way as registering an immovable located outside a locality. The difference between the two documentations lies in the type of operation chosen when creating the Generare CP file which must be the latest version, namely 2.78.14.0. The "Tip Operaţiune" (Operation Type) option allows choosing from the list "Actualizare date imobil" (Immovable Data Update) and the code used for submitting the papers.

The code used to submit the surveys complies with the Order on tariff approval published in the Official Journal no 253/April 4th 2009, which specifies code 2.6.2 for surveys submitted to Timiş County Office of Cadastre and Land Registration – for immovables whose area specified in papers coincides with the area resulted from measurements; for immovables whose measured surface is ± 2% different than the area in the papers, the code is 2.5.4. The

surveys for the present paper were performed with Leica GPS 1200, a state-of-the-art device that uses SmartWorx v8.10 technology and a Bluetooth connection. The permanent GNSS station for survey works was the ROMPOS permanent station, namely TIM1_2.3.

After finishing the topographic surveys, the data in the device were unloaded and recorded on a memory card of the Compact Flash type, which is inserted in a card reader. The data were unloaded and processed with the Leica Geo Office Combined software. The coordinates were processed and transformed into 1970 stereographic coordinates using the TransDat 4.0 application created by NACLR and available at www.ancpi.ro.

The next step is to draft the data updating documentation in order to obtain the technical approval from Timiş County Office for Cadastre and Land Registration. Each documentation will be prepared in compliance with Order 634/2006, in three copies, each with a CD containing the Generare CP file as well as the 1970 stereographic coordinates system as .dxf file.

Once the documentation with the technical approval from the Timiş County Office for Cadastre and Land Registration is received in two copies, one copy is sent to be registered at the Ministry of Education, Research, Youth and Sport. Based on each copy of the documentation and the registration numbers received from the above-mentioned ministry, the Government will issue a Decision specifying that the immovables will pass to the property of the Banat University of Agricultural Sciences and Veterinary Medicine Timisoara.

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