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USING MODERN INFORMATIONAL TECHNIQUES FOR THE ELABORATION OF CADASTRAL DOCUMENTATION

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Abstract

This paper aims to highlight a number of facilities that an engineer in topography can use to automate the elaboration of cadastral documentations. Once the legislation in this field changed, new challenges appeared related to the fast and correct generation of all appendices which are part of any type of documentation. For the proper completion of appendices 13, 14 and 15 all opportunities offered by the Microsoft Excel and Microsoft Word. With regard to appendix 16, the AutoCAD and ArcMap programs were used, with full automation being achieved. VBA code sequences were developed to extras neighbouring parcels from the E-Terra platform and label the arcs with their names. These neighbouring parcels were also analysed in an individual manner with regards to area overlaps. Finally, the whole documentation was completed in an Excel registry, which was afterwards exported into the .pdf format. Testing of this method on 38 cases lead to an eight-fold increase in terms of time efficiency for the completion of cadastral documentations.

Key words*: ArcGIS, AutoCAD, automation, cadastral documentation.*

INTRODUCTION

This paper, although it has a pronounced applicative character, is still based on concrete data and presents a series of data about an easy method of completing a cadastral documentation. As it is already known, on 08.02.2023 Order no. 600 was published, which approved the Reglementation for receiving and notation of cadastral and real estate records. For most cadastral documentations, certain appendices with attribute data (no. 13, 14 and 15) and both graphical and attribute data (appendix 16) have to be completed.

In order to improve the efficiency of generating these appendices, various software packages have been developed which try to solve the most important issues regarding the graphical pieces (automatic calculation of parcel area, automatic dimensioning etc.) (Tereşneu and Vasilescu, 2013; Tereşneu et al., 2009, 2013). In this case we aim to highlight a method thru which the whole cadastral documentation is automatically completed. All these programs help in various steps and considerably improve the efficiency with which various appendices are created.

MATERIALS AND METHODS

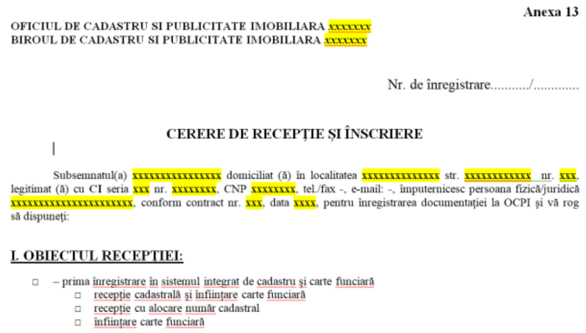
In order to accomplish the paper's aim, the following were used:

- One laptop Dell Latitude 5411 with a procesor Intel(R) Core(TM) i7-10850H CPU @ 2.70GHz 2.71 GHz; şi 16MB RAM;
- Microsoft Office (specifically the Excel and Word packages);
- AutoCAD Civil 3D software;
- ArcMap software
- The result of 38 land surveys, corresponding to 38 parcels.

With regards to research methods, we specify that GIS and other methods belonging to informatics were used in order to automate the whole process of creating a cadastral documentation

RESULTS AND DISCUSSIONS

The first step was the automation of appendices 13, 14 and 15 which involve attribute-type data. In order to fill out appendix no. 13 (Figure 1) we first intend to use Microsoft Excel in order to complete the personal data and the characteristics of the current documentation (Figure 2). Microsoft Excel is an extremely useful tabulation software, which can be used for data organization, carrying out mathematical operations, generating reports based on data or creating various graphs (Tamaş and Tereşneu, 2009; Tereşneu and Vasilescu, 2013).



Anexa 13

OFICIUL DE CADASTRU SI PUBLICITATE IMOBILIARA xxxxxxx
BIROUL DE CADASTRU SI PUBLICITATE IMOBILIARA xxxxxxx

Nr. de înregistrare........../............

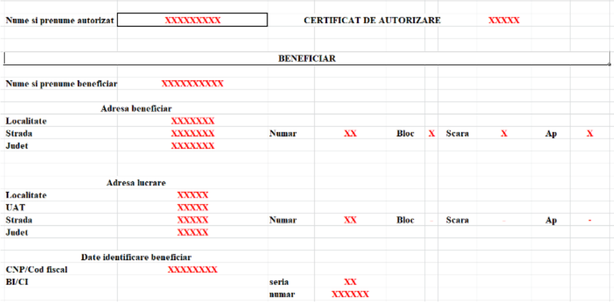
CERERE DE RECEPȚIE ȘI ÎNSCRIERE

Subsemnatul(a) xxxxxxxxxxxxxxxx domiciliat (ă) în localitatea xxxxxxxxxxxxxx str. xxxxxxxxxxxx nr. xxx, legitimat (ă) cu CI seria xxx nr. xxxxxxxx, CNP xxxxxxxx, tel./fax -, e-mail: -, împuternicesc persoana fizică/juridică xxxxxxxxxxxxxxxxxxxxxx, conform contract nr. xxx, data xxxx, pentru înregistrarea documentației la OCPI și vă rog să dispuneți:

I. OBIECTUL RECEPȚIEI:

- – prima înregistrare în sistemul integrat de cadastru și carte funciară
  - recepție cadastrală și înființare carte funciară
  - recepție cu alocare număr cadastral
  - înființare carte funciară

Figure 1. Appendix 13



Nume si prenume autorizat	XXXXXXXXX	CERTIFICAT DE AUTORIZARE		XXXXX					
BENEFICIAR									
Nume si prenume beneficiar	XXXXXXXXXX								
Adresa beneficiar									
Localitate	XXXXXXX								
Strada	XXXXXXX	Numar	XX	Bloc	X	Scara	X	Ap	X
Judet	XXXXXXX								
Adresa lucrare									
Localitate	XXXXX								
UAT	XXXXX								
Strada	XXXXX	Numar	XX	Bloc	-	Scara	-	Ap	-
Judet	XXXXX								
Date identificare beneficiar									
CNP/Cod fiscal	XXXXXXXX								
BI/CI		seria	XX						
		numar	XXXXXX						

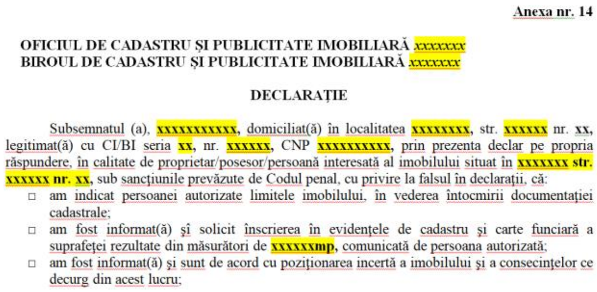
Figure 2. Excel worksheet for completion of general data

After all this data is filled out in the Excel worksheet an automation is carried out in order to add the data into the model specific to appendix no. 13.

Appendix 14 is completed in a somewhat similar manner (Figure 3). In this case the same general data (personal data and parcel address) are taken, to which the surface area and legal documents belonging to the land owner are added. This last type of data is input into the same Excel worksheet in reserved sections.

With regards to appendix 15 (Figure 4), this is the technical report of the documentation containing general information taken from the first sheet of the Excel registry but other kinds of data. This data is written in the Excel sheet in dedicated sections and will be input into the general document model of appendix 15.

Another highly efficient alternative for the automation of written appendices would be that by which Microsoft Word is used, with specific data being input into the general documents by way of links.



Anexa nr. 14

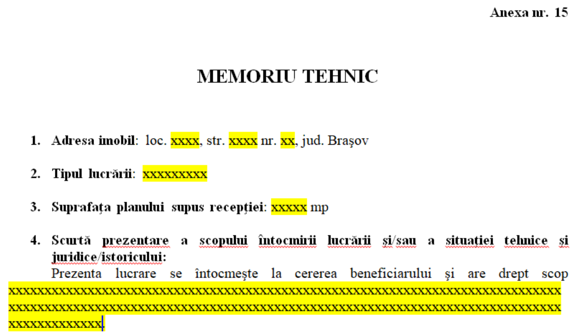
OFICIUL DE CADASTRU ȘI PUBLICITATE IMOBILIARĂ xxxxxxx
BIROUL DE CADASTRU ȘI PUBLICITATE IMOBILIARĂ xxxxxxx

DECLARAȚIE

Subsemnatul (a), xxxxxxxxxxx, domiciliat(ă) în localitatea xxxxxxxx, str. xxxxxx nr. xx, legitimat(ă) cu CI/BI seria xx, nr. xxxxxx, CNP xxxxxxxxxx, prin prezenta declar pe propria răspundere, în calitate de proprietar/posesor/persoană interesată al imobilului situat în **xxxxxxx str. xxxxxx nr. xx**, sub sancțiunile prevăzute de Codul penal, cu privire la falsul în declarații, că:

- am indicat persoanei autorizate limitele imobilului, în vederea întocmirii documentației cadastrale;
- am fost informat(ă) și solicit înscrierea în evidențele de cadastru și carte funciară a suprafeței rezultate din măsurători de **xxxxxxmp**, comunicată de persoana autorizată;
- am fost informat(ă) și sunt de acord cu poziționarea incertă a imobilului și a consecințelor ce decurg din acest lucru;

Figure 3. Appendix no. 14

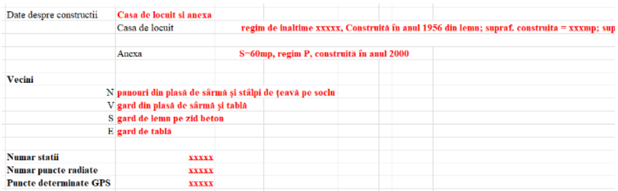


Anexa nr. 15

MEMORIU TEHNIC

1. **Adresa imobil**: loc. xxxx, str. xxxx nr. xx, jud. Braşov
2. **Tipul lucrării**: xxxxxxxxx
3. **Suprafața planului supus recepției**: xxxxx mp
4. **Scurtă prezentare a scopului întocmirii lucrării și/sau a situației tehnice și juridice/istoricului:**
   Prezenta lucrare se întocmeşte la cererea beneficiarului şi are drept scop xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx

Figure 4. Appendix no. 15



Date despre constructii	Casa de locuit si anexa		
	Casa de locuit		regim de inaltime xxxxx, Construită în anul 1956 din lemn; supraf. construita = xxxmp; sup
	Anexa		S=60mp, regim P, construită în anul 2000
Vecini			
N	panouri din plasă de sârmă și stâlpi de țeavă pe soclu		
V	gard din plasă de sârmă și tablă		
S	gard de lemn pe zid beton		
E	gard de tablă		
Numar statii	xxxxx		
Numar puncte radiate	xxxxx		
Puncte determinate GPS	xxxxx		

Figure 5. Necessary data for completion of appendix no. 15

Much more complex problems are present during the completion of appendix no. 16. In order to create this graphical piece, data from the field survey is imported into ArcMap (Figure 6) and the polyline representing the parcel boundary is created. This is then imported into E-Terra and the following operations are carried out:

Checking if any neighbours are registered into the integrated system of cadaster and real estate;

Checking of possible area overlaps with neighbouring parcels (Figure 7);

Modification of the polyline representing the

parcel boundary for which the cadastral documentation is created, by taking the coordinates of neighbouring parcels as long as these are inside the tolerance admitted by ANCPI for intra-urban/extraurban areas;
Automatic extraction of cadastral numbers for registered neighbouring land parcels.

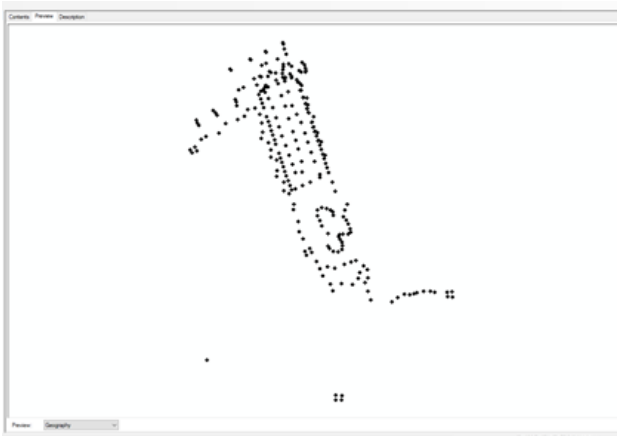


Figure 6. Importing points in ArcMap

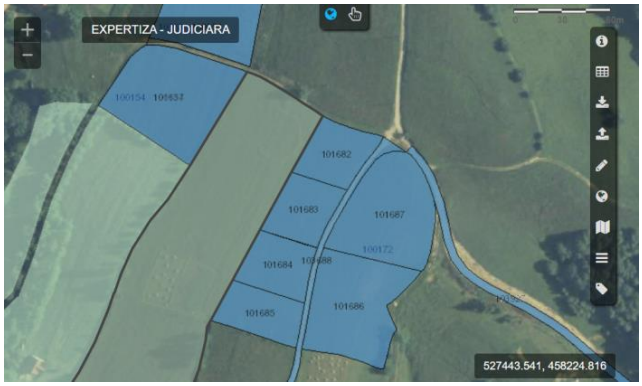


Figure 7. Checking for potential overlaps

All these operations are automatic and make use of the VBA facilities in ArcMap.
The next step is the creation of appendix 16. For this, a new page in A3 format is created in Excel and the general tables specific to this appendix (Figure 8) are inserted, which will then be automatically filled-in from data input into the first page. Then, the complete PAD will be extracted from ArcMap, also by using a VBA script (Figure 9).
The final step is the creation of another Excel page which contains the whole documentation, with appendices 13, 14, 15 and 16 arranged in order. Here a final check of the documentation is carried out and, if everything is in order, a .pdf file is generated for upload to the E-Terra platform. The only thing remaining to be manually input is the contract number and date in appendix 13 and certain specific mentions which are necessary for the technical report (appendix no. 15).

Nr. cadastral	Suprafața măsurată a imobilului (mp)	Adresa imobilului
xxxxxx	xxxxxx mp	Loc. Xxxxxx, str. Xxxxx

Nr. Cartea Funciară	Unitatea Administrativ Teritorială (UAT)
xxxxxx	xxxxxxx

A. Date referitoare la teren			
Nr. parcelă	Categorie de folosință	Suprafața (mp)	Mențiuni
1	xxxxx	xxxxxx	Teren neimprejmuit
Total		xxxxxx	-

B. Date referitoare la construcții			
Cod	Destinația	Suprafața construită la sol (mp)	Mențiuni
C1	XXXX	XXXX	Casa xxxxx, construita in anul xxxx; supraf. Desfasurata= xxx mp
Total			-

Suprafața totală măsurată a imobilului = xxxx mp

Suprafața din act = xxxx mp

Executant xxxxxxxxxx	Inspector
Autorizat ANCPI, categoriile B/C, seria BV, nr. 231	
Confirm executarea măsurătorilor la teren, corectitudinea întocmirii documentației cadastrale și corespondența acesteia cu realitatea din teren	Confirm introducerea imobilului in baza de date integrată și atribuirea numărului cadastral

Figure 8. Completion of appendix no. 16

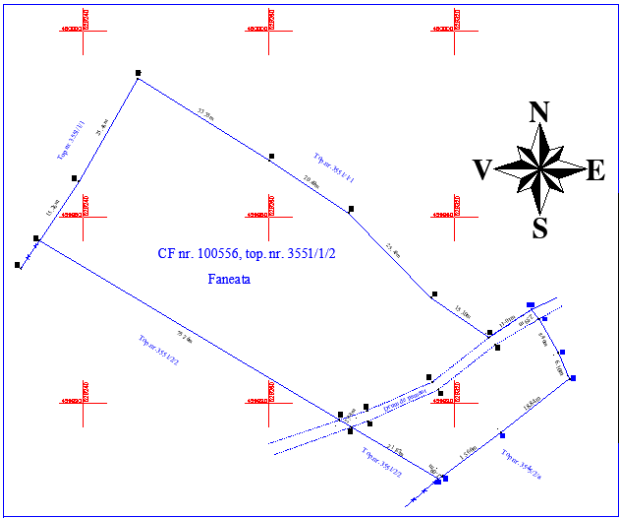


Figure 9. Graphical section of appendix no. 16

This method was tested on 38 cadastral documentation and a considerably improved efficiency was noticed, as the time necessary for the completion of a documentation was between 5 and 8 times lower

CONCLUSIONS

The very high speed with which everything taken place in everyday life implies that the methods for completion of a cadastral documentation must be improved. Steps towards this were and are still being taken, but these only

involve the graphical part of the documentation and just parts of it. In order to achieve maximum efficiency we recommend this method by which Microsoft Excel is used for completion of the written appendices (13, 14 and 15 in the cadastral documentation) and ArcMap is used for the automatic generation of appendix no. 16 (plan of delimitation). Finally, the whole documentation is assembled in a new Excel worksheet, from which a .pdf file is generated. Testing on 38 actual use cases has proven that this method is efficient and deserves to be utilised.

REFERENCES

Tamaş, Şt., Tereşneu, C.C., 2009. Elemente de informatică aplicată. Editura LuxLibris, Braşov.

Tereşneu, C.C., Tamaş, Şt., Vasilescu, M.M., Ionescu, M., Hanzu, M., Cîrstian D.G., 2009. Possibilities of automated solving of some representative surveying-related problems by means of AutoCAD and Scilab software. În "Pădurea şi dezvoltarea durabilă", Editura Universităţii Transilvania din Braşov, p. 503-510.

Tereşneu, C.C., Vasilescu, M.M., 2013: Possibilities to automatize the process of elaboration the cadastral documentation. In RevCAD 14/2013, p. 179-188.

Tereşneu, C.C., Cîrstian, D.G., Hanganu, H., Vlad-Drăghici, H.G., 2013: Using Geographical Information System for the Automatic Creation of Topographic Maps. În "Pădurea şi dezvoltarea durabilă", Editura Universităţii Transilvania din Braşov (p. 117-122).