INFORMATIONAL SYSTEM SPECIFIC TO REAL ESTATE CADASTRE AND URBAN DATA BANK IN THE CITY OF DEVA (HUNEDOARA COUNTY)

ASPECTE PRIVIND REALIZAREA UNUI SISTEM INFORMAȚIONAL GEOGRAFIC SPECIFIC CADASTRULUI IMOBILIAR EDILITAR ȘI BANCILOR DE DATE URBANE ÎN MUNICIPIUL DEVA, JUDEȚUL HUNEDOARA

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***Abstract**: In this paper, we overview some aspects concerning the development of an informational system specific to real estate cadastre and urban data bank in the city of Deva (Hunedoara County), regarding the real estate and urban network administration of a cadastre sector (sector 36 measuring 20,33 ha).*

***Rezumat:** In această lucrare ne-am propus să trecem în revistă aspecte privind realizarea unui sistem informațional specific cadastrului imobiliar-edilitar si băncilor de date urbane în Municipiul Deva, județ Hunedoara, privind gestiunea imobiliară si gestiunea rețelelor edilitare pentru un sector cadastral (sectorul 36 cu o suprafața de 20.44 ha).*

***Cuvinte cheie:** cadastru imobiliar edilitar, sector, drumuire, sistem stereografic;*
***Key words**: real estate urban cadastre, sector, road building, stereographic system*

INTRODUCTION:

The main operations in the achievement of the goals presented above were as follows: designing the works, achieving the survey network, collecting data from the field, processing data and developing the digital cadastre plan.

1. Designing the works. analysing the existing documentation

After analysing the documentation, we could see that the maps at 1:2000 scale with air-photography done in 1978 could be use s a support in the project development. The digital cadastre plan was done on the ground of indirect and direct measurements in the field. Dividing the city's territory into cadastre sectors was done taking into account the existing natural limits (streets, railways, rivers, etc.).

2. achieving the survey network

The road building networks was developed on the basic city's network, like in figure 1.

For the cadastre sector 36, they developed a road building network, in which we can determine, from any station point, all the fracture points, i.e.:

- Fracture points of the cadastre sector;
- Fracture points of the cadastre blocks;
- Plot limits and building corners;
- Characteristic points of urban network.

The rod network points were materialised through metal and wood posts for each survey description.

Automatic loading of the data collected from the field, plan metric and altimetry compensation, as well as the calculus of all the coordinates was done with the TOPOSYS

software. All the coordinates are in the Stereo 70 projection system and the reference point is the Black Sea.

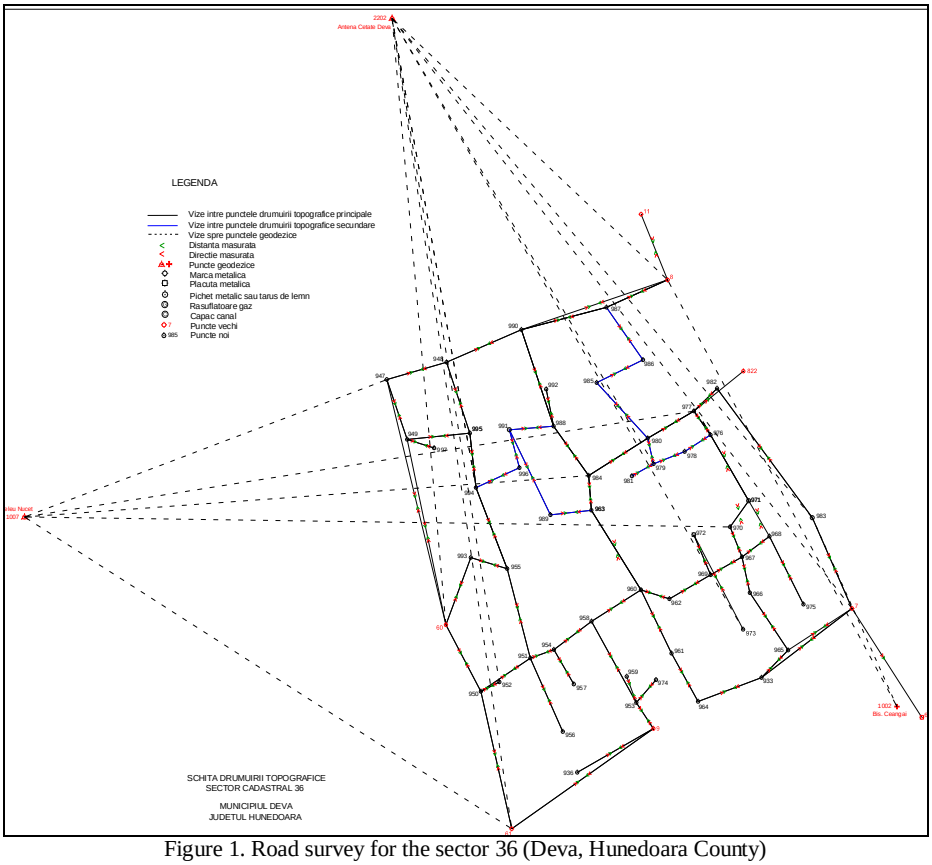

Figure 1. Road survey for the sector 36 (Deva, Hunedoara County)

Table 1

Coordinate inventory

Number of points	Name of the point	X [m]	Y [m]	Z [m]
1002	Biserica Ceangăi	487431.058	338147.375	-
1007	Releu Nucet	488085.383	334167.781	-
2202	Antena Cetate Deva	489815.130	336983.790	-

Table 2

Coordinate inventory of the old station points

Number of points	X [m]	Y [m]	Z [m]	Materialisation
6	487337.333	338230.503	194.233	Metal plate
7	487541.579	338094.463	192.354	Metal mark
8	487911.596	337877.555	189.989	Metal mark
9	487406.333	337860.835	194.060	Metal post
11	488101.006	337798.538	189.836	Metal mark
60	487523.190	337616.853	193.905	Metal post
61	487293.562	337694.238	196.127	Metal mark
822	487808.784	337966.675	190.425	Metal post

Table 3

Coordinate inventory of the new station points

Number of points	X [m]	Y [m]	Z [m]	Materialisation
947	487799.315	337547.386	192.686	Metal mark
948	487818.882	337617.559	191.236	Metal pole
949	487731.920	337571.311	192.866	Metal pole
950	487448.216	337658.007	194.419	Metal pole
951	487485.637	337716.148	193.491	Metal pole
952	487458.825	337679.695	194.102	Wooden pole
953	487435.558	337840.807	193.854	Metal pole
954	487495.199	337743.823	193.261	Metal pole
955	487586.321	337688.912	193.099	Metal pole
956	487402.923	337754.330	194.466	Nail
957	487456.358	337767.275	193.847	Nail
958	487527.082	337788.080	192.859	Metal pole
959	487463.373	337826.122	193.662	Metal pole
960	487562.456	337846.247	192.409	Metal pole
961	487491.027	337882.187	193.147	Metal pole
962	487552.407	337879.720	192.292	Metal pole
963	487652.098	337787.912	191.657	Metal pole
964	487436.820	337913.438	193.766	Metal pole
965	487494.624	338019.278	193.039	Metal pole
966	487559.307	337974.295	192.601	Metal pole
967	487599.580	337965.132	192.026	Metal pole
968	487622.761	337997.369	191.774	Metal pole
969	487579.394	337928.180	192.006	Metal pole
970	487633.390	337951.124	191.895	Metal pole
971	487662.839	337972.990	191.455	Gas aeration point
972	487624.616	337908.390	191.981	Metal plate
973	487514.761	337958.253	192.822	Nail
974	487461.280	337863.921	193.558	Nail
975	487546.314	338037.357	192.713	Nail
976	487737.012	337928.059	190.858	Metal pole
977	487763.819	337908.514	190.664	Metal pole
978	487718.229	337897.569	191.242	Wooden pole
979	487704.407	337861.052	191.122	Nail
980	487733.277	337854.192	190.867	Metal pole
981	487690.730	337835.614	191.570	Metal pole
982	487789.278	337935.740	190.409	Metal pole
983	487643.716	338047.809	191.739	Sewer cover
984	487691.161	337784.745	191.410	Metal pole
985	487795.861	337794.187	191.004	Nail
986	487821.547	337848.610	190.382	Nail
987	487880.622	337805.646	189.954	Metal pole
989	487646.988	337739.744	191.646	Metal pole
990	487855.440	337705.651	190.277	Metal pole
991	487742.757	337691.554	191.165	Gas aeration point
992	487788.476	337734.799	190.113	Nail
993	487598.880	337646.143	193.110	Metal pole
994	487677.690	337652.215	192.136	Metal pole
995	487739.008	337645.004	191.676	Metal pole
996	487700.033	337703.275	191.748	Metal pole

From different road portions we measured a few radial stations whose coordinates were calculated after block compensation of the road network, a few coordinates of the radiated points being mentioned as numbers in the following table.

Table 4

Coordinate inventory of the radial cadastre points

Number of points	X [m]	Y [m]	Z [m]	Code
3000	487346.176	337707.601	-	Building corner
3001	487336.875	337712.760	-	Building corner
3002	487359.662	337703.778	-	Building corner
3003	487319.254	337694.856	-	Building corner
3004	487317.250	337695.682	-	Building corner
3005	487317.951	337697.624	-	Building corner
3006	487322.798	337701.826	-	Building corner
3007	487320.896	337702.898	-	Building corner
3008	487321.928	337704.762	-	Building corner
3009	487341.182	337709.207	-	Building corner
3010	487333.859	337713.059	-	Building corner
3011	487336.311	337717.487	-	Building corner
3012	487336.482	337717.462	-	Building corner
3013	487338.305	337720.460	-	Building corner
3014	487351.749	337738.757	-	Building corner
3015	487350.017	337739.783	-	Building corner
3016	487349.859	337740.310	-	Building corner
3017	487352.536	337745.089	-	Building corner
3018	487353.160	337745.314	-	Building corner
3019	487358.317	337751.780	-	Building corner
3020	487359.569	337753.724	194.847	Sub-plot limit (kerbs, green areas)
3021	487351.818	337758.018	194.843	Sub-plot limit (kerbs, green areas)
3022	487350.715	337755.902	194.868	Sub-plot limit (kerbs, green areas)
3023	487345.131	337746.000	194.931	Sub-plot limit (kerbs, green areas)
3024	487349.440	337742.934	195.200	Sub-plot limit (kerbs, green areas)
3025	487349.702	337743.307	195.195	Scale
3026	487348.383	337741.156	195.119	Scale
3027	487348.671	337741.635	195.193	Sub-plot limit (kerbs, green areas)
3028	487344.433	337744.806	194.958	Sub-plot limit (kerbs, green areas)
3029	487343.620	337742.747	195.058	Sub-plot limit (kerbs, green areas)
3030	487344.031	337741.227	195.018	Sub-plot limit (kerbs, green areas)
3031	487350.444	337737.791	194.986	Scale
3032	487349.198	337735.643	194.923	Scale
3033	487343.417	337738.903	194.934	Sub-plot limit (kerbs, green areas)
3034	487342.225	337739.039	194.910	Sub-plot limit (kerbs, green areas)
3035	487340.972	337738.709	194.942	Sub-plot limit (kerbs, green areas)
3036	487340.376	337737.277	194.983	Sub-plot limit (kerbs, green areas)
3037	487347.110	337734.196	195.077	Sub-plot limit (kerbs, green areas)
3038	487347.407	337734.749	195.002	Sub-plot limit (kerbs, green areas)
3039	487347.898	337734.452	194.998	Scale
3040	487349.017	337733.953	194.988	Scale
3041	487345.172	337728.981	195.549	Scale
3042	487347.114	337732.468	194.990	Scale

3. Collecting data from the field

In the field we identified each plot, and within each plot we identified all the buildings still existing. All this was measured with a tape, while positioning each item to the plot limits determined by precision measurements. We also identified the owners or administrators and completed the Real Estate Chart forms.

4. Processing data and developing the digital cadastre plan

On the ground of both direct and indirect measurements in the field we developed the digital cadastre plan using the MAPSYS software. After developing the survey, we calculated the area of each plot in the cadastre sector and found out that their sum equals the area of the cadastre sector calculated analytically from the points collected in the field. For all the plots we edited the real estate chart; the data can be visualised in ACCESS, thus constituting together with the digital plan the cadastre data base. (figure 2). These data loaded in data base management software (SICAD–SD, MAPINFO or other compatible ones) constitute the data bank necessary for a modern exploitation of information.

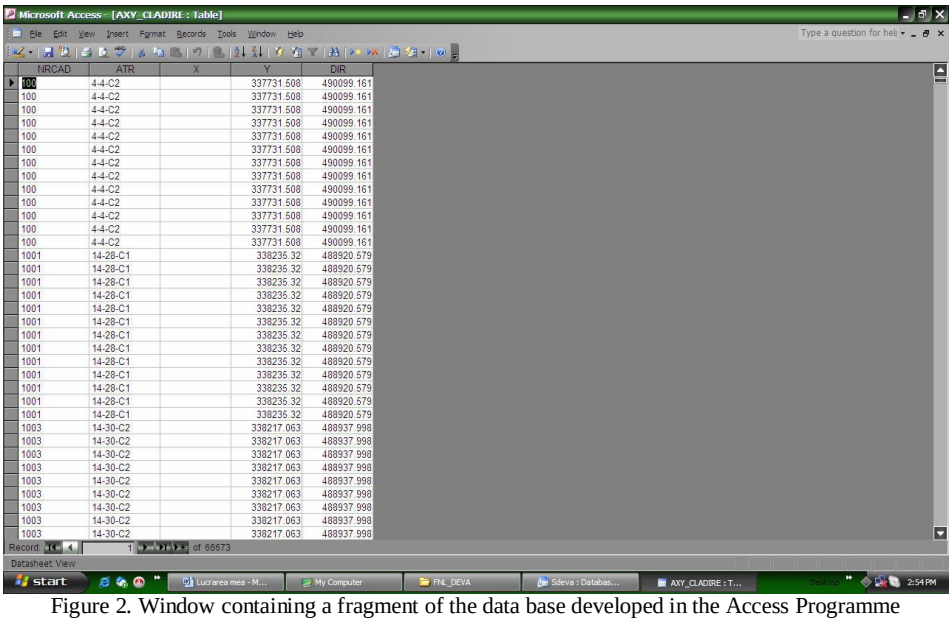

Figure 2. Window containing a fragment of the data base developed in the Access Programme

The cadastre plan for the sector in discussion was developed per **layers**, observing the following configuration:

Group I. Plot

- Layer " 1 " – limit plot (points and lines);
- Layer " 2 " – number of cadastral plot (texts)
- Layer " 3 " – number of the plot within the sector (texts);
- Layer " 4 " – postal number of the plot (texts);
- Layer " 5 " – name of the plot (texts);

Group II. Subplot

- Layer " 6" – subplots within the plot (points and lines);
- Layer " 7" – enclosures, other limits that do not close (points and lines);
- Layer " 8" – use category (texts);
- Layer " 9" – number of the plot within the sector (texts);
- Layer "10" – index of the subplot (internal number used in surveying);
- Layer "12" – survey number of the plot;
- Layer "13" – number of land chart of the plot;

Group III. Buildings

- Layer “16” – buildings (points and lines);
- Layer “17” – continuous linear signs in the buildings (terraces, balconies);
- Layer “18” – discontinuous linear signs in the buildings (gang, footbridge);
- Layer “19” – name of the building, inscriptions on the building (texts);
- Layer “20” – building mapping (texts);
- Layer “21” – body of the building (texts);
- Layer “22” – building identifier (internal number used in surveying);
- Layer “23” – staircases of the buildings (points and lines);
- Layer “24” – monuments, statues (point);
- Layer “30” – monument (lines)

Group III. Administrative limits

- Layer “31” – Block limit (lines, points)
- Layer “32” – Block number (text);
- Layer “33” – Limit of the cadastre sector (lines);
- Layer “34” – Number of the cadastre sector (text);
- Layer “35” – Limit of intravilaneous;
- Layer “36” – Name of intravilaneous;
- Layer “37” – Limit of extravilaneous;
- Layer “38” – Name of the extravilaneous;
- Layer “39” – Limit of Protected Area (historical, architectural, historical site);

Group IV. Objectives on the streets

- Layer “40” – Cadastre number of the street (text made up of **S** – cadastre number of the street and the order number of the street data base);
- Layer “41” – Limit of the street per fronts (points, lines);
- Layer “42” – Street separation limits (lines);
- Layer “43” – Names of the streets (texts);

Urban

- Layer “44” – Electric light pole (point);
- Layer “45” – Pole electric transformer (point);
- Layer “46” – Telephone pole (point);
- Layer “47” – Hydrant (point);
- Layer “48” – Well (point);
- Layer “49” – Sewage visitation chamber with leakage grid (point);
- Layer “50” – Unidentified visitation chamber (point);
- Layer “51” – Polygonation station (point);
- Layer “52” – Number of polygonation station (point);
- Layer “53” – Electric light wooden pole (point);
- Layer “54” – Electric light concrete pole (point);
- Layer “55” – Geodesic point (point);
- Layer “56” – Number of geodesic point (point);
- Layer “57” – Cover of sewage visiting chamber;
- Layer “58” – High-tension pole (point);
- Layer “59” – Sewage aeration chamber (point);
- Layer “60” - Bridges, foot bridges (point, line)

Group V. Objectives on the railway

- Layer “61” – railway (line);

- Layer “62” – inscription on the railway (text);
- Layer “63” – axis of the railway (line);
- Layer “64” – railway electric cable poles (point);
- Layer “67” – railway signing poles (point);
- Layer “69” – abandoned railway (line);
- Layer “70” – railway bridge (line);

Group VI. Objectives on water bodies

- Layer “71” – hydrographical contour (line);
- Layer “72” – hydrographical inscriptions (text);
- Layer “73” – water course (lines; symbols);
- Layer “74” – Water cadastre number (text made up of **A** – number of cadastre sector);

Group IV. Objectives on the streets (continuation)

- Layer “86” – water tub (point) ;
- Layer “87” – water tank, petrol, surface (point);
- Layer “88” – Tree (point);
- Layer “89” – Pipe (line);
- Layer “90” – Water pipe visitation chamber cover (point);
- Layer “91” – Subterranean electric network visitation chamber (point);
- Layer “92” - Basket (point);
- Layer “93” – Wayside crucifix (point);
- Layer “96” - Subterranean telephone network visitation chamber (point);
- Layer “99” – Gas iron cast box (point);
- Layer “89” – Gas pipe (line);
- Layer “101” – Boundary mark (point);
- Layer “102” - Subterranean gas network visitation chamber (point);
- Layer “103” – Gas network aeration cover (point);
- Layer “104” – Gas pump (point);
- Layer “113” – Central heating network visitation chamber (point);
- Layer “117” – Survey point, polygonation point, or soil-transmitted marked point (point);
- Layer “118” – Landmark inscription (text);

For all the plots we developed the **Real Estate Chart** according to the instructions of the M.L.P.A.T. Data in these charts can be accessed with ACCESS, which constitute together with the digital plan, the cadastre data base. These data can be loaded in a data base management software (e.g. SICAD/SD, MAPSYS ~ figure 3 or others) thus making up the data base necessary to exploit information in a modern way.

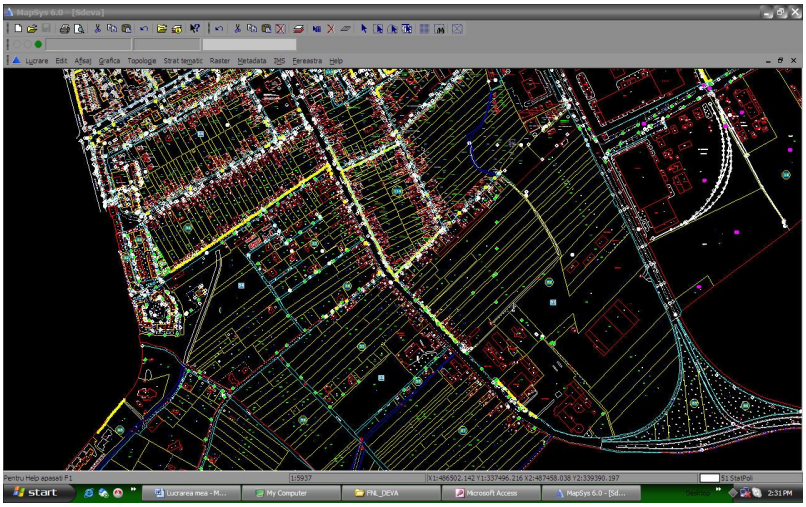

Figure 3. Digital cadastre plan developed with the MapSys Programme

CONCLUSION

Final scope of this paper is realization of digital cadastral map of one sector of Deva City, who is a base for an urban cadastral information system.

Figure 4. Digital cadastre plan of sector 36

BIBLIOGRAPHY

1. Methodology regards execution of works of introduction of real estate cadastre in urban area, Bucureşti, 1997.