TOPOGRAPHIC SURVEYS FOR THE UPDATING OF SOIL IMPROVEMENT WORKS IN A TEACHING EXPERIMENTAL STATION

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Abstract: *For the purposes of this paper, the measurements were taken in the unincorporated area of Timisoara. Their aim is to make an inventory of the lands belonging to Banat University of Agricultural Science and Veterinary Medicine (USAMVB) Timisoara, Timiş County. The parcels included in the inventory belong to the Public Domain of the Romanian State and are managed by BUASVM Timisoara for the Teaching Experimental Station, in compliance with Government Decision 2066/2004, no 3001/2006. The following parcels are included: A347, A354/1, A359, A369, Cc372, A373/1, A375/5, A398, LL417/1, VN422, VN424, LL472, A519/1 and A521/1/1. The topographic survey perimeter is delimited by Berecsau in the north, Hpr 337, Timişoara-Arad National Road (DN) 355 in the east, the built-up area of BUASVMT in the south and Calea Torontalului-Cenad National Road (DN) 525 in the west. For the purposes of the present paper, the surveys were performed using Leica GPS 1200, a state-of-the-art device that uses SmartWorx v8.10 technology and a Bluetooth connection. 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. Data resulting from measurements are stored on a Compact Flash card. The data in the device is downloaded with the Compact Flash card that will be connected to a card reader and with the Leica Geo Office Combined software, which is easy to use both for downloading and loading data in the device. 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**:** *inventory of lands, topographic survey, World Geodetic System 1984, satellite positioning*

INTRODUCTION

The impressive results obtained in the past decades in geo-topo-photogrammetry equipment and instruments have led to constant changes and improvement of surveying methods. The technical characteristics of such instruments make them highly competitive due to their accuracy, effectiveness and easy and safe use. As a whole, they are extremely useful due to their economic efficiency.

At present, the electronic systems and instruments have entered our country with difficulty because of their high price, much higher than that of the classic instruments. Nevertheless, they are gaining ground and, given their special technical and economic performance, their use on a wider scale is just a matter of time. The classic instruments and methods will still be applied in parallel for some time, in private design practices concerned with small-scale works, but larger institutions and companies involved in large-scale activities cannot ignore cutting-edge technology.

The achievements of the field can be grouped around two categories:

- the GPS system, which establishes the spatial position (x, y, z) of certain points within a projection, based on observations and recordings of artificial satellites and automatic data processing;

- total or "intelligent" stations as geo-topographic instruments with an additional competitive electronic feature. This ensures the high-precision measurement of all geometric elements necessary for usual activities, their automatic recording, as well as finding on-the-spot solutions to specific survey and plotting problems arising in the field.

MATERIAL AND METHODS

For the purpose of this paper, the survey works took place on the premises of the Agricultural University of Timişoara, with GPS equipment – the Leica 1200 system that uses Leica Geosystem GPS technology and consists of the Leica RX1210 controller and the Leica ATX1210 antenna. The rover solution is ideal for topographic measurements and plotting, as in this way only one person is needed to perform a topographic survey in the field.

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

Dual frequency receivers measure phase and code on both L1 and L2. As the phase difference measurements are very accurate, very high-precision positioning can be obtained.

The reference receiver sends its phase and code measurements to the mobile receiver. The latter uses these measurements and its own phase and code measurements and calculates the position relative to the reference receiver.

The GPS1200 receiver exports the data thus obtained directly, but for this paper the data were downloaded with the ***Leica Geo Office Combined*** software.

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.

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

RESULTS AND DISCUSSIONS

The topographic survey data were downloaded from the device (table 3.a) with the Leica Geo Office Combined software, and the WGS84 ellipsoid coordinates of the measured perimeter (table 3.b) were obtained.

The transcalculation of coordinates from the ETRS'89 reference system in the '70 Stereographic system was performed with the ***TransDat 4.01*** software produced by NACLR.

Based on distortion grids, ***TransDatRO*** software (figures 1 and 2) ensures the transformation of coordinates from the European ETRS89 reference system to the national Krasovski 1942 (S42) reference systems with 1970 stereographic projection (for Romania's whole territory), the Hayford 1910 with 1930 stereographic projection (for Bucharest) and the Black Sea 1975 normal altitude system.

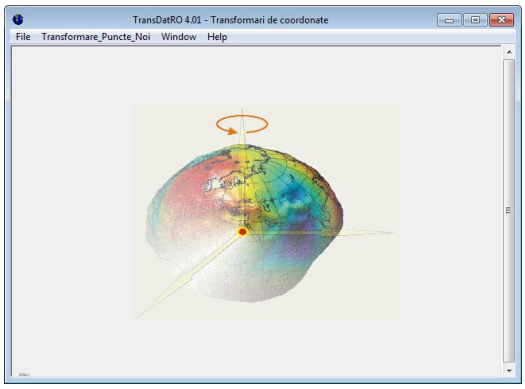

Fig. 1 TransDatRO 4.01 programme

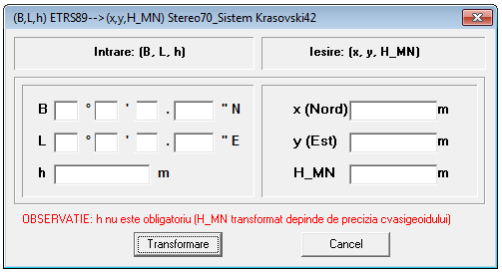

Fig. 2 Transformation of coordinates

The transformation parameters that connect the ETRS89 reference and coordinate system (ellipsoid GRS80) with the national S-42 reference system (ellipsoid Krasovski 1940) are the following:

Helmert parameters transformation from the ETRS89 reference and coordinate system and the national S-42 reference system

Parameter	**Value**	**UM**
Tx Translation	-2.3283	m
Ty Translation	147.0416	m
Tz Translation	92.0802	m
Sc. dm=(m-1)*1e+6	-5.68907711	ppm
Rx Rotation	-0.30924979	"
Ry Rotation	0.32482188	"
Rz Rotation	0.49730012	"

The ellipsoid coordinates that can be transformed with the software are those obtained through the connection to the class A national geodetic network (NGN). The stationing of the triangulation points is no longer necessary. Thus the accuracy of the transformation of the new points depends largely on the current number and position of points with common coordinates on the national territory.

For this paper, the transformation occurs from ETRS89 to 1970 Stereographic. In this way the coordinates will be obtained in the 1970 Stereographic Projection for all the points (table 3.c). Now we shall enter the coordinates in AutoCad and develop the plan that is necessary to prepare the documentation.

The topographic perimeter is delimited by Berecsau in the north, Hpr 337, Timisoara-Arad National Road (DN) 355 in the east, the built-up area of BUASVMT in the south and Calea Torontalului-Cenad National Road (DN) 525 in the west (table 4).

The parcels included in the inventory belong to the Public Domain of the Romanian State and are managed by USAMVB Timisoara for the Teaching Experimental Station, in compliance with Government Decision 2066/2004, no 3001/2006 and includes the following

parcels: A347, A354/1, A359, A369, Cc372, A373/1, A375/5, A398, LL417/1, VN422, VN424, LL472, A519/1 and A521/1/1 (figure 1).

Table 3

Transformation of obtained coordinates after measurements taken in the field

Pt. ID	3.a. GEOCENTRIC CARTESIAN COORDINATES				3.b. ELLIPSOID COORDINATES			3.c. 1970 STEREOGRAPHIC COORDINATES		
	Xc	Xc	Yc	Zc	B[m]	L[m]	He[m]	X(m)	Y(m)	Z(m)
100	4153733,898	41537338979	1611976,007	4548727,329	45° 47' 06.76926" N	21° 12' 36.63524" E	133,589	205545,277	483161,493	90,205
101	4153721,762	41537217621	1611984,616	4548734,975	45° 47' 07.13227" N	21° 12' 37.21006" E	133,351	205558,215	483172,102	89,967
102	4153703,641	41537036413	1611996,912	4548747,160	45° 47' 07.69639" N	21° 12' 38.04422" E	133,407	205577,045	483188,649	90,023
103	4153684,263	41536842628	1612010,363	4548760,078	45° 47' 08.29457" N	21° 12' 38.94932" E	133,461	205597,456	483206,173	90,077
104	4153665,236	41536652362	1612024,081	4548772,698	45° 47' 08.87614" N	21° 12' 39.86005" E	133,598	205617,965	483223,179	90,214
105	4153646,309	41536463091	1612037,227	4548785,551	45° 47' 09.46565" N	21° 12' 40.74441" E	133,823	205637,915	483240,458	90,439
106	4153627,349	41536273492	1612051,278	4548798,024	45° 47' 10.03967" N	21° 12' 41.66841" E	133,982	205658,699	483257,218	90,599
107	4153608,207	41536082073	1612064,269	4548810,954	45° 47' 10.63686" N	21° 12' 42.54973" E	134,084	205678,595	483274,736	90,701
108	4153589,142	41535891419	1612077,508	4548823,727	45° 47' 11.22674" N	21° 12' 43.44045" E	134,184	205698,683	483292,020	90,802
109	4153569,715	41535697149	1612090,987	4548836,754	45° 47' 11.82820" N	21° 12' 44.34758" E	134,293	205719,142	483309,644	90,911
110	4153550,254	41535502536	1612104,262	4548849,654	45° 47' 12.42921" N	21° 12' 45.24652" E	134,237	205739,424	483327,263	90,855
111	4153531,295	41535312954	1612116,936	4548862,050	45° 47' 13.01301" N	21° 12' 46.11108" E	133,995	205758,938	483344,385	90,613
112	4153512,662	41535126618	1612129,208	4548874,625	45° 47' 13.59722" N	21° 12' 46.95284" E	133,992	205777,961	483361,544	90,610
113	4153495,123	41534951229	1612141,106	4548886,719	45° 47' 14.14999" N	21° 12' 47.76015" E	134,261	205796,194	483377,769	90,880
114	4153477,026	41534770258	1612153,637	4548898,859	45° 47' 14.71057" N	21° 12' 48.60411" E	134,359	205815,229	483394,197	90,978
115	4153459,262	41534592615	1612166,131	4548910,816	45° 47' 15.26013" N	21° 12' 49.44093" E	134,535	205834,095	483410,293	91,154
116	4153441,928	41534419280	1612178,206	4548922,519	45° 47' 15.79813" N	21° 12' 50.25244" E	134,701	205852,396	483426,057	91,321
117	4153423,913	41534239132	1612191,048	4548934,392	45° 47' 16.34828" N	21° 12' 51.10846" E	134,741	205871,677	483442,151	91,360
118	4153405,342	41534053424	1612204,192	4548946,500	45° 47' 16.91324" N	21° 12' 51.98688" E	134,664	205891,462	483458,679	91,284
119	4153387,391	41533873913	1612217,415	4548958,058	45° 47' 17.45168" N	21° 12' 52.85828" E	134,615	205911,056	483474,397	91,236
120	4153370,209	41533702094	1612228,852	4548969,581	45° 47' 17.98772" N	21° 12' 53.63973" E	134,592	205928,706	483490,132	91,212
121	4153368,339	41533683394	1612229,668	4548970,749	45° 47' 18.04770" N	21° 12' 53.70630" E	134,419	205930,231	483491,914	91,040
122	4153372,859	41533728585	1612249,273	4548959,960	45° 47' 17.54154" N	21° 12' 54.47670" E	134,571	205946,116	483475,510	91,191
123	4153392,361	41533923608	1612236,562	4548946,811	45° 47' 16.92928" N	21° 12' 53.60139" E	134,616	205926,329	483457,520	91,236
124	4153409,710	41534097103	1612224,128	4548935,384	45° 47' 16.40017" N	21° 12' 52.77411" E	134,566	205907,700	483442,045	91,186
125	4153427,192	41534271917	1612211,933	4548923,679	45° 47' 15.85994" N	21° 12' 51.95493" E	134,464	205889,229	483426,219	91,083
126	4153444,013	41534440128	1612200,207	4548912,631	45° 47' 15.34487" N	21° 12' 51.16705" E	134,520	205871,471	483411,138	91,140
127	4153461,586	41534615859	1612188,183	4548900,713	45° 47' 14.79640" N	21° 12' 50.35371" E	134,368	205853,115	483395,052	90,987
128	4153479,153	41534791534	1612175,862	4548888,975	45° 47' 14.25459" N	21° 12' 49.52766" E	134,266	205834,494	483379,184	90,884
129	4153497,388	41534973883	1612163,241	4548876,457	45° 47' 13.68326" N	21° 12' 48.67750" E	133,963	205815,308	483362,431	90,582
130	4153515,188	41535151878	1612150,962	4548864,332	45° 47' 13.12735" N	21° 12' 47.84938" E	133,745	205796,622	483346,131	90,364
131	4153533,546	41535335464	1612138,204	4548852,069	45° 47'	21° 12'	133,671	205777,270	483329,516	90,289

					12.56024" N 45° 47'	46.99123" E 21° 12'				
132	4153551,744	41535517435	1612125,553	4548840,127	12.00297" N 45° 47'	46.14041" E 21° 12'	133,749	205758,091	483313,197	90,367
133	4153570,495	41535704954	1612112,628	4548827,760	11.42639" N 45° 47'	45.26851" E 21° 12'	133,815	205738,429	483296,305	90,432
134	4153589,170	41535891696	1612099,661	4548815,446	10.85304" N 45° 47'	44.39607" E 21° 12'	133,857	205718,760	483279,512	90,474
135	4153608,320	41536083200	1612086,116	4548802,757	10.26577" N 45° 47'	43.49070" E 21° 12'	133,793	205698,359	483262,324	90,410
136	4153626,822	41536268221	1612072,685	4548790,397	09.69902" N 45° 47'	42.60111" E 21° 12'	133,574	205678,329	483245,753	90,191
137	4153644,767	41536447671	1612059,659	4548778,614	09.15393" N 45° 47'	41.73839" E 21° 12'	133,508	205658,911	483229,823	90,125
138	4153662,669	41536626693	1612045,896	4548767,209	08.62449" N 45° 47'	40.84453" E 21° 12'	133,499	205638,843	483214,407	90,115
139	4153680,248	41536802481	1612032,942	4548755,506	08.08855" N 45° 47'	39.99102" E 21° 12'	133,271	205619,637	483198,749	89,887
140	4153698,469	41536984689	1612020,001	4548743,226	07.52556" N 45° 47'	39.12731" E 21° 12'	133,050	205600,171	483182,268	89,666
141	4153715,995	41537159954	1612007,587	4548731,768	06.99172" N 45° 47'	38.29801" E 21° 12'	133,099	205581,490	483166,650	89,715
142	4153732,839	41537328387	1611995,322	4548720,716	06.48060" N 45° 47'	37.48659" E 21° 12'	133,034	205563,228	483151,715	89,649
143	4153738,777	41537387769	1611991,657	4548717,002	06.29898" N 45° 47'	37.22897" E 21° 12'	133,308	205557,401	483146,377	89,923
144	4153744,323	41537443231	1612010,793	4548704,976	05.74661" N 45° 47'	37.96193" E 21° 12'	133,122	205572,411	483128,585	89,737
145	4153728,125	41537281252	1612023,808	4548714,941	06.21293" N 45° 47'	38.79491" E 21° 12'	133,018	205591,072	483142,116	89,633
146	4153711,298	41537112976	1612037,194	4548725,426	06.70148" N 45° 47'	39.65447" E 21° 12'	132,970	205610,340	483156,306	89,585
147	4153695,875	41536958751	1612048,313	4548735,764	07.17536" N 45° 47'	40.39267" E 21° 12'	133,159	205626,967	483170,167	89,774
148	4153679,686	41536796860	1612059,986	4548746,644	07.67342" N 45° 47'	41.16758" E 21° 12'	133,377	205644,422	483184,737	89,993
149	4153663,584	41536635842	1612071,064	4548757,503	08.17408" N 45° 47'	41.91539" E 21° 12'	133,487	205661,295	483199,414	90,103
150	4153648,498	41536484980	1612082,383	4548767,420	08.62949" N 45° 47'	42.65660" E 21° 12'	133,644	205677,959	483212,703	90,260
151	4153631,864	41536318637	1612094,457	4548778,221	09.13203" N 45° 47'	43.45633" E 21° 12'	133,618	205695,956	483227,385	90,235
152	4153615,356	41536153556	1612104,560	4548789,739	09.66456" N 45° 47'	44.16887" E 21° 12'	133,690	205712,115	483243,082	90,307
153	4153598,828	41535988281	1612115,505	4548800,942	10.18335" N 45° 47'	44.91807" E 21° 12'	133,737	205729,044	483258,318	90,354
154	4153582,076	41535820762	1612127,422	4548811,769	10.69032" N 45° 47'	45.71298" E 21° 12'	133,614	205746,943	483273,142	90,231
155	4153565,869	41535658690	1612139,302	4548822,140	11.17552" N 45° 47'	46.49720" E 21° 12'	133,509	205764,579	483287,306	90,126
156	4153549,215	41535492148	1612150,114	4548833,478	11.70120" N 45° 47'	47.24277" E 21° 12'	133,537	205781,440	483302,758	90,154
157	4153533,161	41535331610	1612161,305	4548844,318	12.19946" N 45° 47'	47.99470" E 21° 12'	133,694	205798,399	483317,358	90,312
158	4153517,406	41535174061	1612171,493	4548855,119	12.69879" N 45° 47'	48.69831" E 21° 12'	133,764	205814,315	483332,040	90,382
159	4153501,237	41535012370	1612182,537	4548866,307	13.20863" N 45° 47'	49.44583" E 21° 12'	134,059	205831,195	483347,002	90,677
160	4153485,167	41534851674	1612193,199	4548877,509	13.71986" N 45° 47'	50.17515" E 21° 12'	134,332	205847,684	483362,025	90,950
161	4153469,137	41534691366	1612204,223	4548888,275	14.21732" N 45° 47'	50.91949" E 21° 12'	134,409	205864,477	483376,608	91,027
162	4153453,721	41534537208	1612214,919	4548898,789	14.69856" N 45° 47'	51.63935" E 21° 12'	134,622	205880,718	483390,716	91,241
163	4153438,054	41534380539	1612226,241	4548909,001	15.17314" N 45° 47'	52.39047" E 21° 12'	134,614	205897,623	483404,586	91,233
164	4153423,229	41534232290	1612236,565	4548918,901	15.63085" N 45° 47'	53.08438" E 21° 12'	134,678	205913,269	483417,995	91,297
165	4153407,576	41534075761	1612247,484	4548929,053	16.10718" N 45° 47'	53.81786" E 21° 12'	134,535	205929,797	483431,938	91,154
166	4153391,959	41533919592	1612257,841	4548939,359	16.59091" N 45° 47'	54.52650" E 21° 12'	134,384	205945,799	483446,134	91,003
167	4153376,907	41533769071	1612267,487	4548949,434	17.06316" N 45° 47'	55.19498" E 21° 12'	134,254	205960,917	483460,017	90,873
168	4153381,013	41533810127	1612285,878	4548939,055	16.58540" N 45° 47'	55.91993" E 21° 12'	134,124	205975,863	483444,536	90,744
169	4153397,660	41533976596	1612274,650	4548928,022	16.07027" N 45° 47'	55.15645" E 21° 12'	134,204	205958,632	483429,428	90,824
170	4153414,266	41534142661	1612263,608	4548917,027	15.55532" N 45° 47'	54.40166" E 21° 12'	134,332	205941,588	483414,316	90,951
171	4153430,810	41534308100	1612252,342	4548906,376	15.05136" N	53.63829" E	134,610	205924,375	483399,551	91,229

172	4153446,384	41534463839	1612241,984	4548895,849	45° 47' 14.56358" N	21° 12' 52.93034" E	134,575	205908,382	483385,229	91,193
173	4153462,503	41534625030	1612231,078	4548885,087	45° 47' 14.06329" N	21° 12' 52.18962" E	134,588	205891,663	483370,555	91,206
174	4153477,756	41534777556	1612221,059	4548874,465	45° 47' 13.57745" N	21° 12' 51.50174" E	134,362	205876,106	483356,273	90,980
175	4153493,670	41534936699	1612210,225	4548863,846	45° 47' 13.08422" N	21° 12' 50.76756" E	134,362	205859,538	483341,810	90,980
176	4153509,290	41535092903	1612199,650	4548852,966	45° 47' 12.58928" N	21° 12' 50.04946" E	134,050	205843,315	483327,277	90,668
177	4153525,165	41535251650	1612188,956	4548842,010	45° 47' 12.08811" N	21° 12' 49.32201" E	133,819	205826,881	483312,563	90,437
178	4153540,382	41535403821	1612178,158	4548831,851	45° 47' 11.62003" N	21° 12' 48.60107" E	133,705	205810,636	483298,862	90,322
179	4153555,676	41535556761	1612166,954	4548821,608	45° 47' 11.15181" N	21° 12' 47.86135" E	133,478	205793,986	483285,176	90,096
180	4153571,492	41535714920	1612155,873	4548811,030	45° 47' 10.66371" N	21° 12' 47.11816" E	133,383	205777,231	483270,881	90,000
181	4153587,112	41535871121	1612144,647	4548800,827	45° 47' 10.18951" N	21° 12' 46.37204" E	133,391	205760,433	483257,018	90,008
182	4153603,141	41536031408	1612133,277	4548790,436	45° 47' 09.70345" N	21° 12' 45.61282" E	133,495	205743,335	483242,802	90,112
183	4153619,176	41536191758	1612122,135	4548779,970	45° 47' 09.21364" N	21° 12' 44.86337" E	133,607	205726,443	483228,460	90,223
184	4153635,420	41536354198	1612110,527	4548769,292	45° 47' 08.71841" N	21° 12' 44.09029" E	133,584	205709,032	483213,976	90,200
185	4153651,795	41536517951	1612099,123	4548758,433	45° 47' 08.21456" N	21° 12' 43.32383" E	133,570	205691,752	483199,219	90,186
186	4153668,199	41536681988	1612087,720	4548747,360	45° 47' 07.70523" N	21° 12' 42.55696" E	133,420	205674,454	483184,293	90,036
187	4153683,969	41536839694	1612076,110	4548736,996	45° 47' 07.22737" N	21° 12' 41.79175" E	133,315	205657,239	483170,337	89,931
188	4153700,039	41537000393	1612064,688	4548726,176	45° 47' 06.73115" N	21° 12' 41.02962" E	133,126	205640,063	483155,811	89,741
189	4153715,586	41537155862	1612053,362	4548715,878	45° 47' 06.25723" N	21° 12' 40.28040" E	132,994	205623,198	483141,959	89,609
190	4153731,835	41537318352	1612042,690	4548705,150	45° 47' 05.75291" N	21° 12' 39.54767" E	133,176	205606,644	483127,153	89,791
191	4153750,039	41537500389	1612029,613	4548693,265	45° 47' 05.20034" N	21° 12' 38.67840" E	133,193	205587,073	483110,999	89,807

Table 4

Inventory of parcels of the Experimental Teaching Station
HG 2066/2004 no 3001/2006

No	Cadastral no	Area (m^2)	Neighbours				Locality
			N	E	S	V	
1	A347	606843	HPr337	DE350	DE356	DN344	Timisoara
2	A354/1	821007	HPr337	HCN357	HCN354	DE350	Timisoara
3	A359	258264	DE356/1	HCN357	HCN670	DE361	Timisoara
4	A369	237322	HCN670	HCN357	HCN376	DE370	Timisoara
5	CC372	5070	A373/1	A373/1	A373/1	A373/1	Timisoara
6	A373/1	135897	HCN670	DE370	HCN376	HCN374	Timisoara
7	A373/5	22664	HCN373/4	DE370	HCN376	HCN374	Timisoara
8	A398	96990	HCN376	HCN399	DE541	CC377-396	Timisoara
9	LL417/1	7781	A63/1	-	DE746	DE423	Timisoara
10	VN422	54078	-	DE423	DE476	F421	Timisoara
11	VN424	27863	LL417/1	-	DE476	DE423	Timisoara
12	LL472	38006	DE476	-	-	DE473	Timisoara
13	LL474	43088	DE473	-	F475	DE476	Timisoara
14	A519/1	180025	DE514	HCN399	Incorporated area	DE520/1	Timisoara
15	A521/1/1	267959	DE514	DE520/1	HCN526	HCN521/1/2	Timisoara

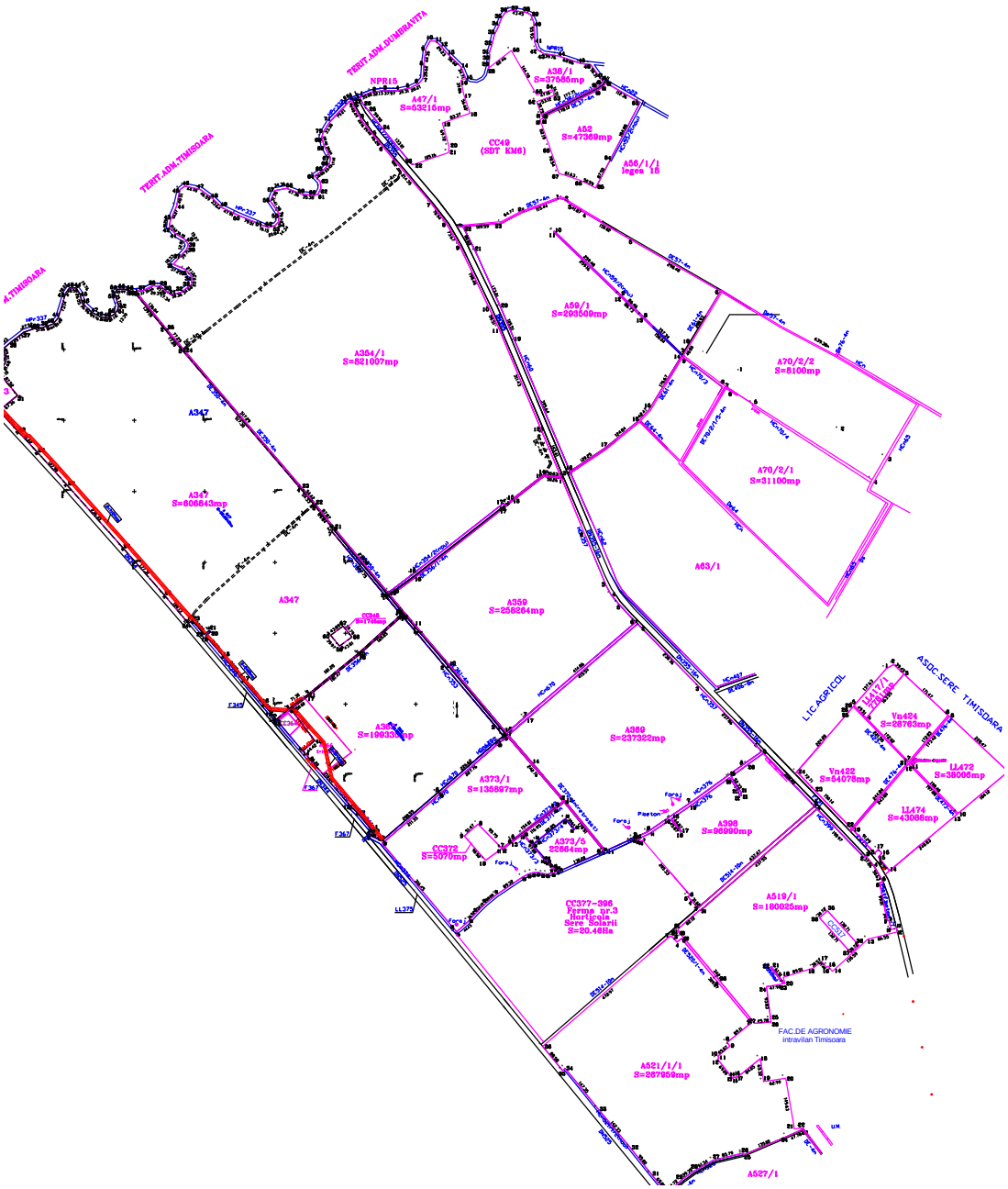

Fig. 1. Site plan for parcels A347, A354/1, A359, A369, CC37, A373/1, A373/5, A398, L417/1, VN422, L472, A519/1, A521/1/1, according to Government Decision 2066/2004 no 3001/2006, Timişoara, Timiş County

CONCLUSIONS

For the purposes of this paper, the measurements were taken in the unincorporated area of Timisoara. Their aim was to make an inventory of the lands belonging to Banat University of Agricultural Science and Veterinary Medicine (USAMVB) Timişoara, Timiş County.

The parcels included in the inventory belong to the Public Domain of the Romanian Government and are managed by BUASVM Timisoara for the Teaching Experimental Station, in compliance with Government Decision 2066/2004, no 3001/2006. The inventory includes the following parcels: A347, A354/1, A359, A369, Cc372, A373/1, A375/5, A398, LL417/1, VN422, VN424, LL472, A519/1 and A521/1/1

The topographic perimeter is delimited by Berecsau in the north, Hpr 337, Timisoara-Arad National Road (DN) 355 in the east, the built-up area of BUASVMT in the south and Calea Torontalului-Cenad National Road (DN) 525 in the west

The topographic surveys were performed with the GPS Leica 1200 equipment. The data were downloaded from the Compact Flash card and processed with the Leica Survey Office Combined software. The obtained ellipsoid coordinates were transformed with the TransDat 4.0 software, in order to obtain 1970 stereographic coordinates that were entered in an AutoCad file to prepare the site plan.

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