TOPOGRAPHIC LIFTING OF THE PROPOSED AREA OF INTEREST FOR THE MODERNIZATION OF THE NETWORK OF LOCAL ROADS-DC70A AND STREETS

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Abstract: *The topographic elevation represents a set of field and office works necessary for the realization of a topographic plan. Depending on their content, the topographic elevations can be: planimetric elevations when determining only the position in the plane of the points of the topographic surface, leveling elevations when determining only the vertical position of the points, the combined elevation, when determining both the position in the plane, as well as the vertical position of the points. Topographic survey may be necessary to obtain the building permit, demolition permit, PUG, PUD, PUZ; design of electricity, gas, water and sewerage networks; conclusion of rental, leasing, concession contracts; identifying the real owners of the land on which certain investments are to be executed; obtaining a notice of removal from the agricultural circuit; obtaining the decision to award the postal number. The present work was carried out in Santamaria-Orlea commune, Hunedoara county and aims at the topographic elevation of a sewerage network carried out in the commune as well as in the villages belonging to it. This measurement was made using a Hi Target V30 GPS system, which is the perfect combination of the quality of the materials used in its manufacture and the applied technology. Hi-Target V30 receiver for GNSS RTK measurements is a system that receives signals from multiple satellite constellations, designed to work with the network of ROMPOS reference stations. For the production of the receiver special materials were used, due to the fact that the Hi-Target V30 repeater is extremely resistant to the most difficult weather conditions, it can withstand even under water. The working mode with the V30 receiver can be: rover, base or static. All the working methods as well as the control over the GSM module, the internal radio or the external radio are made from the controller that comes with the Hi-Survey software with which you can modify the working mode. After the completion of the field measurements, the office work was completed, where the machine was unloaded and the measurements were completed to complete the work. In order to carry out the work, I used the AutoCAD (computer aided design) program, which is a CAD program used in the design of two-dimensional (2D), less three-dimensional (3D) construction plans, developed and marketed by the American company Autodesk. The measurements were processed in files specific to the "native" system, which are those of type dwg as well as those of dxf (Drawing eXchange Format), extremely widespread.*

Keywords: GNSS North Smartk, ROMPOS, Ro_VRS_GG, Trimble 5603, DR200+

INTRODUCTION

The ROMPOS position-determination system consists of The Center For Processing and Control of data from the GNSS Permanent stations (CPC), which is based on a Leica Spider software package and The National Permanent GNSS Station Network (NGSP) consisting of permanent GNSS stations located at the level of each county in Romania (BOTTON, S. ET ALL., 1997; LUCĂU, C. ET ALL., 2000).

ROMPOS services are used to perform field measurements and to verify specific works in The national Land and Land Book Program (PNCCF), in the context of specialist

work carried out by persons authorized by ANICC/OCPI, as well as in other works where positioning services are required.

ROMPOS system taken over by The National Cartographic map center is currently carried out using a specialized software, allowing data access and use from 98 permanent stations of which 73 in OCPI heritage, one in the administration of The Geodesy Faculty of Technical University of Construction Bucharest (UCB) and 24 in the property of neighboring countries with which the NCPI has concluded cooperation agreements.

During the period 2015-2018 ROMPOS system due to the lack of specialist technical assistance has suffered a number of systematic bottlenecks that have limited some of its functionalities requiring a complete overhaul of the system to prevent these functional bottlenecks, what we suppose requires a complete re-installation of all ROMPOS system software components.

ROMPOS system uses Leica GNSS Spider software package produced by Leica Geosystems AG. The Leica GNSS Spider program package consists of the following modules: - Site Server - which manages communications with permanent stations, allows their settings, where appropriate;Network Server – which processes the entire network and allows the creation of network products (I-Max, Virtual ReferenceStation – VRS, FKP - FlächenKorrekturParameter, MAC - Master-Auxiliary Concept); SpiderQC – quality Control – which is used to analyze GNSS data quality; SBC – Spider Business Center – which allows the administration of the system users' database and the definition of specific product packages; Spider Web – used for the provision of web services (SMULEAC, A. ET ALL.,2012, 2017).

MATERIAL AND METHODS

The measurements were carried out in the village of Petros in Baru Mare village, Hunedoara with GPS equipment from Leica GS18 T (figure 1). In the field 2 support points were determined, these points were determined using the North Smartk receiver, using the RTK method using the correction of the ROMPOS system.

Fig. 1 GPS Leica GS18T

In this work, using the 100 point, a polygon was created as a station point. From a geometric point of view, polygon definition measurements are taken in simple polygon paths or in polygon paths, it consists of several pulled things. They are almost exclusively signed with lead wires. The topographical marks (CRISTECU N., URSEA V., 1980) are intended for suspending the wire and since the signals are temporary, the marking must always ensure that the wire is suspended in the same position, materializing without vertical deviations at the topographical point (DRAGOMIR P., 1992; LEU N.I. ET ALL., 2002; NEAMȚU M., ULEA E. ET ALL.,

1982). Temporary reference marks are used on secondary roads for the current lifting of mining work or as intermediate points in the main frame on the connecting routes between the groups of hard points. The permanent markers are used to show the strong-point groups of the special destination points, the most common being: The armed-line (plug), the metal-fin, the moving-head mark and the terminal.

The data supplied by the national ROMPOS system was used via The Ro_VRS_3.1_GG station. The topo raise of the points was achieved in RTK – Real time Kinematic mode by using differential corrections from the specialist ROMPOS service in real time. Measurements were made with the GPS receiver only, each detail on the location and delimitation plane being recorded during the measurement. The coordinates of the contour points have been determined twice at different time intervals, averaging the readings a single value is given in the coordinate inventory and the average of the two readings.

RESULTS AND DISCUSSIONS

The following steps were taken to complete the measurements:

In the first stage, the details to be measured and the route to be traveled were identified in the field, where two support points S100 and S200 were determined.

The points were determined using the GNSS receiver North Smartk, using the RTK method using correction from ROMPOS system, with reference station: Ro_VRS_3.1_GG (SMULEAC, A. ET ALL., 2012, 2016).

To check the coordinates, 3 determinations have been made for each point at 30-minute intervals, each time with a new re-initializing of the receiver.

No errors in establishing the points have been detected following the checks

The points have been materialized in the field with the stretcher. The final Coordinates of the points are:

- 100 : X=442807.373, Y=357094.574, Z=483.728m
- 200 : X=442832.326, Y=442832.326, Z=483.728m

The points were also checked with the 5603 Trimble station, DR 200+

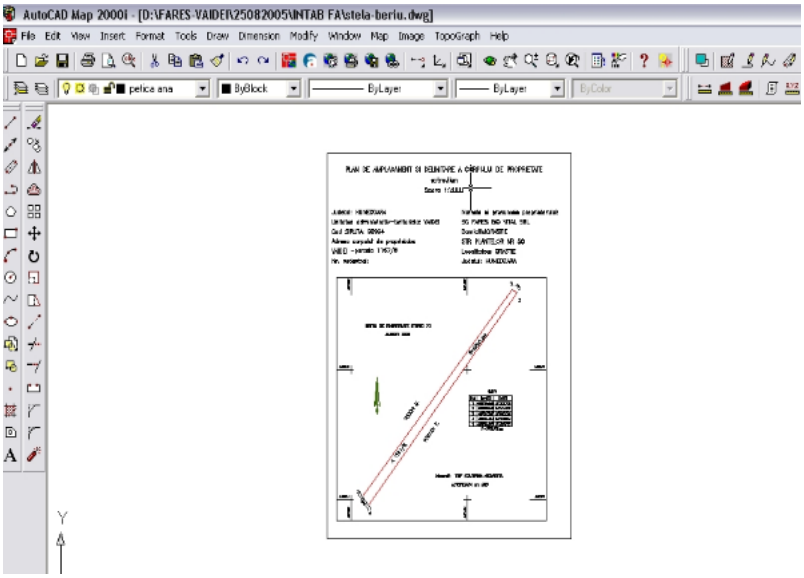

Fig 2. Topographic study

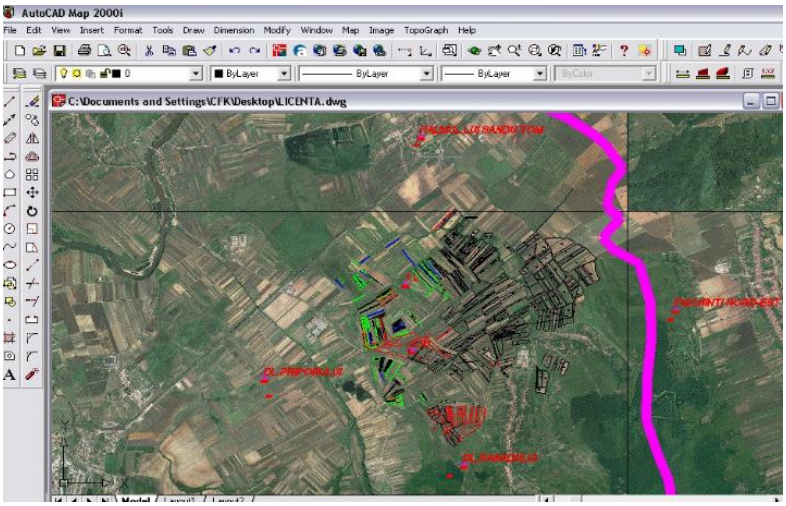

Fig 3. Framing plan in Petros road area

In the second stage, the field phase using 100 as a scoring point, a polygonation has been achieved by determining the following polygon points (table 1).

Table 1

The points obtained in the 1970 Stereographic coordinate system

Pt. No.	X	Y	Z	Pt. No.	X	Y	Z
S100	442807.373	357094.574	483.728	S770	442929.3949	357608.8962	487.874
S200	442832.326	442832.326	483.728	S760	442966.8943	357662.2276	487.874
S300	442922.497	357330.605	483.728	S750	443012.3406	357714.8476	487.874
S400	442980.364	357467.792	483.728	S740	443094.9576	357750.8863	487.874

S500	443035.9781	357580.4978	483.728	S730	443143.3859	357775.7866	487.874
S600	443149.6744	357660.4583	483.728	S720	443174.7986	357787.8275	487.874
S700	443200.735	357730.0516	483.728	S710	443182.8227	357767.7559	487.874
S800	443240.2281	357760.9163	483.728	S721	443197.6926	357785.9564	487.874
S900	443460.754	357960.6316	483.728	S722	443293.6261	357854.884	487.874
S1000	443486.8544	357988.871	483.728	S723	443318.7357	357894.6958	487.874
S1100	443627.889	358018.7304	483.728	S724	443311.9264	357912.7086	487.874
S1200	443703.5465	358099.2937	483.728	S920	443415.3938	357998.5598	487.874
S1300	443779.3616	358185.9489	483.728	S930	443454.7166	358030.2415	487.874
S1400	443809.8175	358207.4593	483.728	S940	443462.1064	358046.8145	487.874
S1500	443879.9042	358245.6945	483.728	S950	443562.562	358125.4603	487.874
S1600	443983.2346	358271.1916	483.728	S951	443518.6041	358183.0878	487.874
S1700	444067.3111	358378.4371	483.728	S952	443584.3881	358142.7439	487.874
S1800	444091.8547	358391.1145	483.728	S960	443639.2746	358160.9124	487.874
S1900	444218.2699	358399.15	483.728	S970	443732.0607	358198.5533	487.874
S2000	444288.8244	358381.9907	483.728	S1410	443767.9025	358255.0608	487.874
S2100	444368.8212	358428.95	483.728	S1420	443776.9087	358325.7041	487.874
S2200	444589.3787	358579.7356	483.728	S1830	444050.3382	358490.501	487.874
S2300	444867.5991	358686.032	483.728	S1820	444059.9142	358426.9435	487.874
S790	442857.8333	357737.6425	487.874	S1810	444081.2043	358405.6284	487.874

A total of 5021 points have been measured. The accessible Points were determined with the telescopic prism-to-prism milestone of 2.00 m height, the inaccessible points being determined by Direct Reflex technology directly on the surface of the measured object. The points determined with this technology have an accurate positetric only (X and Y) and not a non-leveled position.

The office stage is the last and most important stage of the work.

Data downloaded from the total station has been processed to draw up the status plan (Board No.1, A0 scale 1:2000 format). Route length (Plate No. 2, A size, scale 1: 5000) 5.6 km

CONCLUSION

In conclusion, we can say that using the Leica GS 18 T GPS is very practical and easy to use. For the topographic survey (ȘMULEAC, L. ET ALL., 2016, 3, 2017) of the area of interest proposed for the modernization of the network of roads of local interest-DC70A and streets in the locality of Petros-Valea Streiului, Baru commune, Hunedoara county, the following field measurements were made.

a) the values obtained from the GPS measurements, by RTK method.

b) b) the values obtained from the GPS measurements by the dyna

From a technical point of view the work ensures the specifications required by specifications and the technical norms in force the results obtained after the verification highlight the good quality of the GPS determinations.

The information recorded in the field is easy to process (ȘMULEAC, A. ET ALL., 2015) and can be transmitted directly to a GIS (Geographic Information System), a system that will find wide use in road management by entering all data in computerized databases, which will facilitate access to information.

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