EFFICIENT USE OF MODERN TECHNOLOGIES FOR CADASTRAL WORKS

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Abstract: *Technical utility networks are networks serving housing, social cultural assemblies, institutions , businesses etc. industrial and technical networks in urban areas : utility networks can be installed both on surface and underground. Cadastre edilitary networks- the urban cadastre fund that deals with systematic inventory and tracking of underground and surface facilities in urban built-up area of settlements, both in technical and in terms of quality as well as maintenance and actualization. The objectives of cadaster edilitary networks is aimed at establishing procedures, methods, techniques and means to ensure and define from the technical, economic point of view and legal scope, content and products: General survey in settlements, Cadastre municipal networks, Information systems of the territory which are based on cadastral data about edilitary networks.*

Key words: *land register, measurements, cadastre, agricultural cadastre*

INTRODUCTION

This present research study has the purpose to obtain the accreditation O.C.P.I for topography measurements for the project "Extension and modernization of the water and sewer network in Timis Region, Sânnicolau Mare city". The work was made using the client's documentation as a basis, and the documents for environment accreditation – the documentation made by the architect, whose data is fully responsible for. He is also responsible for the correctness of other technical data provided for the environment impact. The main target of this project is the modernization of the water and sewer network along the roads of the inside city "Sânnicolau Mare".

MATERIAL AND METHODS

Sânnicolau Mare City is the westernmost city of Romania and Timis region. It is the third city after Timişoara and Lugoj.

Figure 1. Access to Sânnicolau Mare City

The city is situated along the European E70 road (the old DN6), more exactly 620 km distance from Bucharest. 64 km distance from Timişoara City and 14 km distance from Boarder of Romania – Cenad- Kizombor. As the traffic jam opened up through Vama Cenad, the road E70 is crossing streets such as Gării, Timişorii, Horia Damşescu. In the future, projects will expand the E70 to surround the city through the south.

The density of the geodesic points is in general in between 1 and 60km, but not all the network points are part of the same category. They are grouped in five "orders", among whoom there are 3 (I,II and III) are called "superior orders" and the last two (IV and V) are called "inferior orders".

Each of these "orders" is grouping points which are situated at the same distance each one from another, such as:

- first type network are formed by points with distance between app. 20-60 km;
- second type network are formed by points with distance between app. 10-20 km
- third type are formed by points with distance between app. 3-10 km
- the inferior types of network such as IV and V are formed by points with distance between 1-2 km, such as 500-1000 m

Main types of local triangles network:

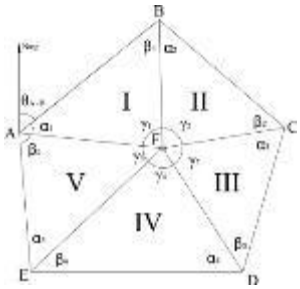

Figure 2. Central point polygon – with normal and short basis

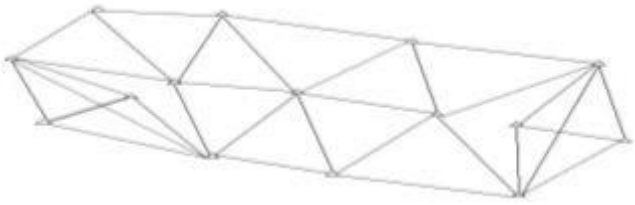

Figure 3. Polygon chain with one central point

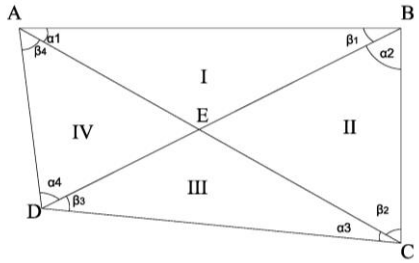

Figure 4. Quadrilateral with diagonals with normal basis and short basis

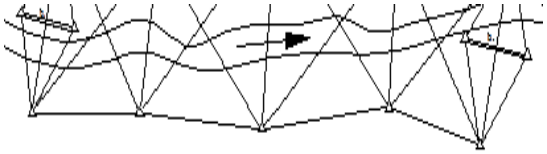

Figure 5. Quadrilateral chain

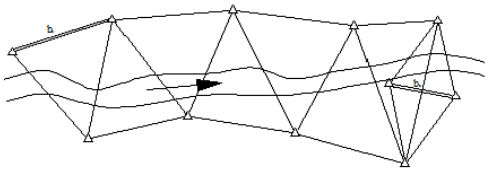

Figure 6. Traingles chain

RESULTS AND DISCUSSIONS

The following steps were taken into consideration while making the project:

- Field recognition
- Filed measurement
- Holding network and lifting up network
- Office works

Scouting the land

Recognition of land was executed after a topographic plan that contains objectives that must be pursued, and following this procedure data and information is obtained on:

• delimitation of the area of work;

• identification of the old network of support in the area (a thickening of the network design is done);

• boundary delimitation of the existing land sector in general cadastre.

Field measurements

Field measurements were performed with GPS RTK Rover model Hi-Target V30.

Figure 7. GPS RTK Rover model Hi-Target V30.

V30 GNSS receiver specifications:
Number of channels: 220

The signals following satellites - GPS simultaneously L1 C / A, L2 is L2 C, L5 - Glonass simultaneously L1 C / A L1 P, L2 C / A (Glonass M) L 2 P - SBAS simultaneously L1 C / A L5 - Giove-A: simultaneously L1 BOC, E5A, E5B, E5AltBOC1 - Giove-B: simultaneously L1 CBOC, E5A, E5B, E5AltBOC1 - Galileo: Upgrade

The networking and network support lifting

Support network was carried out according to the project to ensure the required density points for the networking lift.

The measurements were made with the GPS receiver.

Topographical points was achieved in RTK mode - Real Time Kinematic using real-time differential corrections from ROMPOS specialized service.

In field book the following data is mentioned:

• no. of points, 1970 • stereographic coordinates (X, Y, Z)
• geocentric Cartesian coordinates (X, Y, Z)
• ellipsoidal: Latitude (B), longitude (L)
• point code,
• the accuracy of determining horizontal (CEP)
• the type of solution (FIXED, INT)
• no. of visible satellites (SATS)
• occupancy point precision (PDOP, HDOP, VDOP)
• date and time measurements.

Processing and clearing measurements were made with Toposys program, version 7.0.

CONCLUSIONS

For my work I considered that GPS method the best indicated for its accuracy and speed for lifting of all details is the method in real time kinematic (RTK). For future work on modernization of water and sewage from different locations, I am proposing that in addition to using GPS technology, to also use technology based on RADAR because with RADAR we can use two working modes:

a) reflexive mode of determination is achieved by transmitting and receiving radio wave signals reflected by the device. Depending on the frequency of the reflected signal can determine the nature pipe or cable, and the pendulum swings left and right around the maximum frequency can be set and the depth at which it is located;

b) the inductive determination requires two units: the transmitter that binds to metal pipes in a manhole and the receiver which is moved along the ground.

The two units granted they are on the same frequency, can determine the exact position of the pipeline

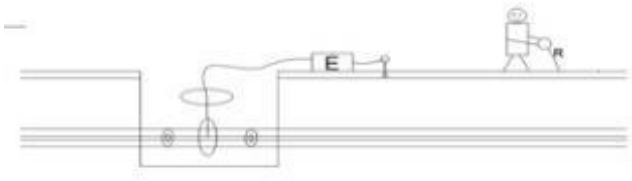

Figure 8. Schematic representation of RADAR

The radar image is independent of sunlight and is not affected by clouds or rain, except storms. In addition to operating a system of antennas, radar allows the resolution to be independent of aircraft altitude.

Radar images may offer different advantages for aerial photographs and topographic maps available for different types of Romanian urban projects, in the context of EU policies.

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