

ACHIEVING THE NETWORK SUPPORT BY USING GPS MEASUREMENTS IN ORDER TO BUILD AN INDUSTRIAL AREA IN THE BELIU LOCALITY, ARAD COUNTY

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Abstract

The paper aimed was to enhance Beliu village geodetic network in Arad County for the construction of an industrial area. Beliu village is located in western Romania in the north - west of Arad County between Black River and White River on Beliu valley, 20 km away from Sebis and 20 km from Ineu. In order to achieve the network support using the static method three Leica equipment 1200 dual frequencies L1/L2, each equipped with one Ax 1202 GG antenna. For determination, were used three fixed positioning references: Arad, Gurahonț and Beiuș. Overall route were placed three pairs of terminals in protected places, easily accessible by car, outside the private areas. For setting the new points has been carried out only one measurements session and the average stationary on a spot was one hour and twenty minutes. To get results as accurate as possible and provide more stability and confidence in solutions was used a specialized software to process GPS data provided by the Swiss company Leica, named Leica Geo Office Combined version 8.2., a program that allows downloading, storing, sorting, processing and compensation the network simultaneously. The three points determined by GPS, were transformed in STEREO - 70 coordinates through the TRANSDAT version 4.01. Coordinates (X, Y, Z) of the new points will underpin the design and execution works in an industrial area in the village Beliu, Arad County.

Keywords: dual frequency equipment, rovers

INTRODUCTION

In the idea to satisfies the requirements imposed by European and international standards through establishing a GPS network support, was chosen as the theme of this paper „Achieving the network support by GPS measurements for building an industrial area in the Beliu village, Arad County”, thereby laying out, the importance of introducing GPS technology in the measurement of networks support in our country [1].

MATERIAL AND METHODS

Qualified staff using dual frequency GPS systems performed the measurements. The method used was the „static method” with three dual-frequency Leica GPS equipment 1200 dual frequency L1/L2, each equipped with one antenna Ax 1202 GG, and three fixed positioning references.

Processing the GPS measurements was done using specialized software, LEICA GEO OFFICE COMBINED, a program that allowed data processing and network compensation simultaneously [2].

RESULTS AND DISCUSSIONS

Before terminals setting on the ground, was done a thorough recognition of the land. On the entire route has been set three pairs of terminals [3]. Terminals were placed in areas accessible by car and outside the areas of private property.

For the determination, there were used three fixed positioning references (Table 1.) and by measuring for each reference point three vectors (Figure 1.).

Table 1.

Inventory of known coordinates points Stereographic – 1970 projection system
Black sea 1975 reference system

No.	Location	Scale	X(m)	Y(m)	H(m)
1.	ARAD	A	525763.831	217967.384	124.980
2.	GURAHONȚ	A	533080.984	294961.363	208.749
3.	BEIUȘ	A	577811.367	297506.978	202.510

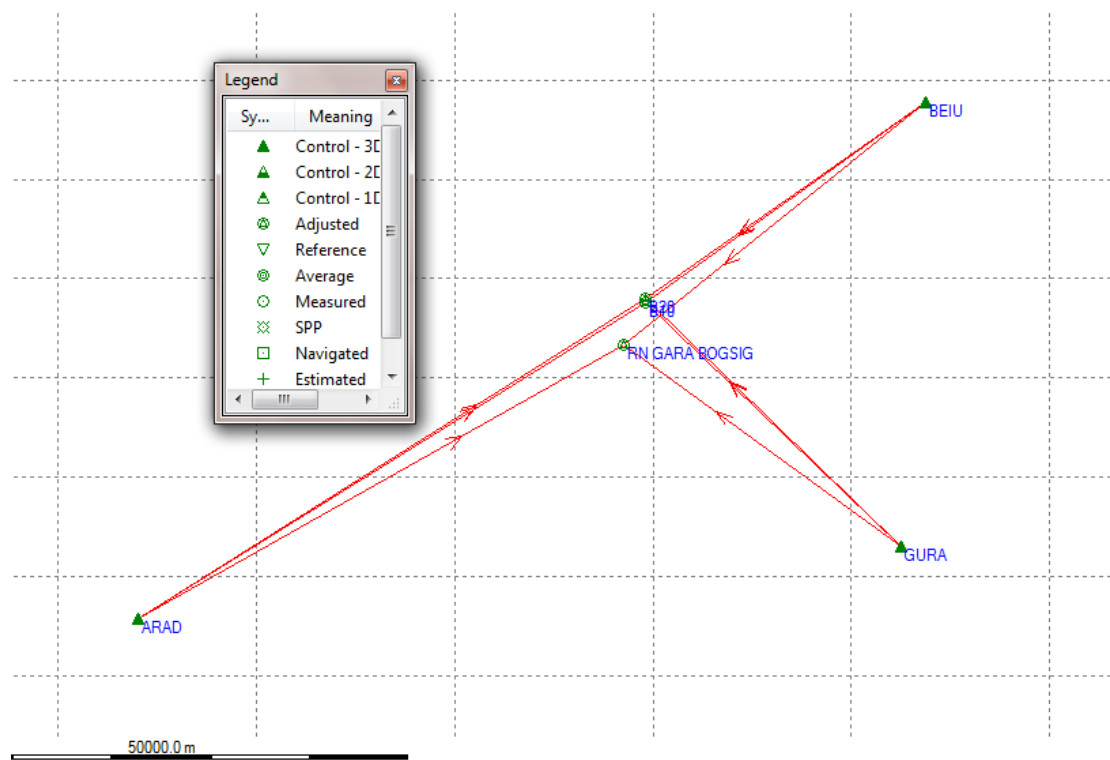


Figure 1. Network diagram

For all terminals, there was one session of measurements with three fixed reference points and three rovers on new points.

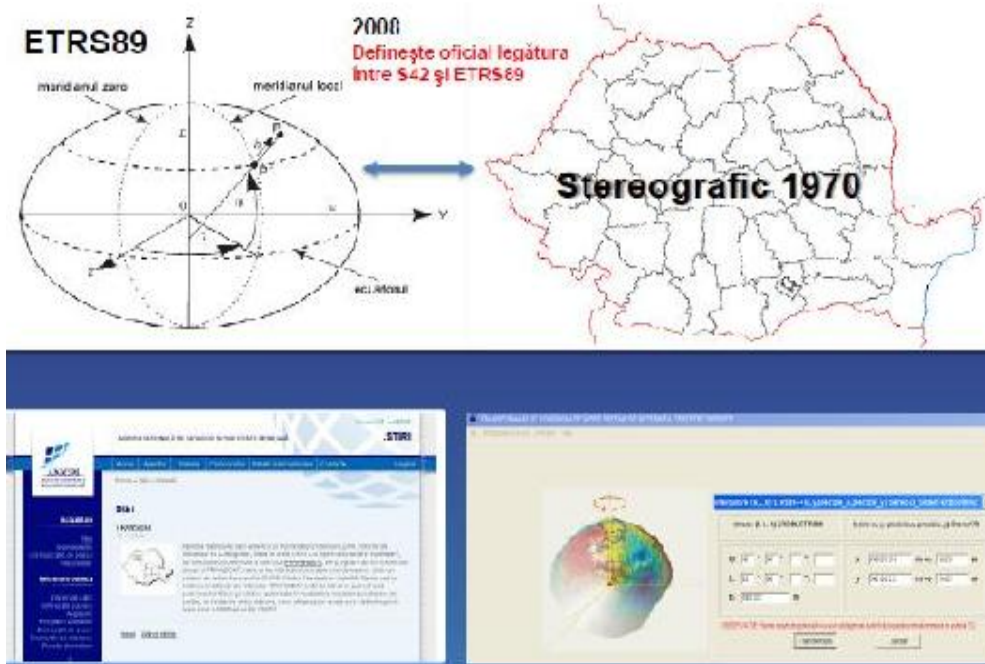


Figure 2. TransDAT Versiunea 4.01

To obtain results that are more accurate and provide more stability and confidence in solutions, specialized software to process the GPS data was used, provided by the Swiss company Leica, named Leica Geo Office Combined.

Points determined by GPS system were transformed in STEREO-70 coordinates through the program TRANSDAT, version.4.01.

For the network compensation was used a conditioned adjustment, keeping fixed the three-dimensional coordinates of permanent stations: Arad, Gurahonț and Beiuș.

Stereographic - 1970 coordinates of determined points are shown in (Table 2.).

Table 2.

Inventory of known coordinates points Stereographic – 1970 projection system
Black sea 1975 reference system

No.	Location	Scale	X(m)	Y(m)	H(m)
1	B10	C	557642.395	269162.889	119.854
2	B20	C	557974.934	269204.271	120.065
3	RN GARA BOGSIG	C	553287.060	267029.732	118.311

CONCLUSIONS

During the GPS measurements campaign to achieve the Beliu support network in Arad County, was once again confirmed the performance of GPS technology and its advantages compared to conventional surveying methods.

For this reason, we propose using of GPS specified points support in the design work and execution of an industrial area within the locality Beliu area.

Due to the advantages of GPS technology, we propose its use in the measurement and re-measurement of networks support in our country.

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