

ROMPOS APPLICATION IN CADASTRE DOMAIN

APLICAȚII ROMPOS IN CADASTRU

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Abstract: This paper presents aspects concerning the new developments in the field of precise positioning based on GNSS technology with application in cadastre. It is introduced the ROMPOS system developed by National Agency for Cadastre and Land Registration (NACLRL) – Department of Geodesy and Cartography. ROMPOS postprocessing service it is realized especially for geodetic network modernization and very precise positioning (cm...mm) level. NACLRL launched real time services (DGPS/RTK) and are mainly dedicated for cadastre applications. Official regulations for GNSS RTK positioning are new introduced.

Rezumat: Lucrarea prezintă aspecte privind noi dezvoltări în domeniul poziționării precise bazate pe tehnologia GNSS cu aplicație în cadastru. În România este introdus sistemul ROMPOS dezvoltat de Agenția Națională de Cadastru- Departamentul de Geodezie și Cartografie. Serviciul de postprocesare ROMPOS este realizat în special pentru modernizarea rețelelor geodezice și pentru un nivel de poziționare foarte precis.(cm...mm). Agenția de Cadastru a lansat servicii în timp real (DGPS/RTK) și sunt aplicații strict dedicate aplicațiilor cadastrale. Reglementările oficiale pentru poziționarea GNSS RTK sunt nou introduse în sistem.

Keywords: ROMPOS, cadastre, GNSS, permanent station, RTK, Virtual Reference Station

Cuvinte cheie: ROMPOS, cadastru, GNSS, stație permanentă, RTK, Stație de Referință Virtuală

INTRODUCTION

Actual normative cadre

The National Agency of Cadastre and Land Registration (NACLRL), in accordance with HG 1210/2004, in essence of attribution have to coordinate and supervised execution of cadastre work, cartography, topography, geodesy, photogrammetry and teledetection of whole country. Making this projects involve execution, completion, modernization and keeping in utilization stage of national geodetic network system in collaboration with National Minister of Defence.

In cadre of NACLRL, Geodesy and Cartography Direction thought Geodesy Services and Cartography Offices are organized structures which they occupied with achievement of attribution to coordinate the coherent activities about geodesy, cartography, topography, photogrammetry and teledetection.

Across the laws, decisions or orders by government which establish the general cadre of work at the NACLRL and for this domain of activity, for warning, execution and reception of achievement categories of works, NACLRL had elaborated in the course of years a series of normative acts which contains the order of Minister who is coordinated the NACLRL activities or some orders of ANCPD Director.

Realization cadastre quality work involves assuring of a one infrastructure represented by the National Geodesic Network (NGN). NGN is the base of all works of determination to an position in one reference system and coordinates very good settled. By normative acts speaking issued by NACLRL for support geodesic and surveying works for cadastre it could be mentioned:

- Order nr. 534/2001 regard the approve of technical norms for introduction of general cadastre;
- Order nr 634/2006 for approval of statutes looking the subject matter and the way to organize of cadastral documentation for essential book.
- Decision nr 1/2008 - who is give by director of Direction of Geodesy and Cartography from NACL, concerning realization of measuring GNSS.
- Order nr 535/2001 which is looking to approve the statutes by checking the works of specialization in cadastre, geodesy, and cartography, works makes by physical or judicial person.
- Order nr 536/2001 regards of approving of statues looking the reception of geodesy, cartography, cadastre, fotogrammetry and teledetection
- Order nr 539/2001 for approve of cadastral works, geodesy, cartography, fotogrammetry and teledetection.
- Order nr 128/2007 regard approval of according to the tariff for activities developed by National Agency of Cadastre and Real Publicity and his unities dependent.

In the next paragraphs, in the light of normative acts mentioned upper and especially in Order 534/2001, order 634/2006 and decision nr./2008 will be discussed the principal condition to realize works to determinate coordinates of some points of interesting for recent cadastral works, using the ROMPOS system, in special the ROMPOS- RTK service of positioning in real time.

MATERIAL AND METHODS

Cadastral works and ROMPOS

In the cadre of cadastral works, possible applications of ROMPOS system dedicated to executive workers who posed GNSS technology are:

- Realization of rising network;
- Determination of coordinated points who defined real limits;
- Rising details for diverse categories cadastral works (forestry, municipal, waters etc.)

Realization of raising network

Geodesics networks definite by 534/2001 Ord. are classified in geodesics network: for support, for stretch and for rising. They are made congruent hierarchical principles from the superior one to the inferior one.

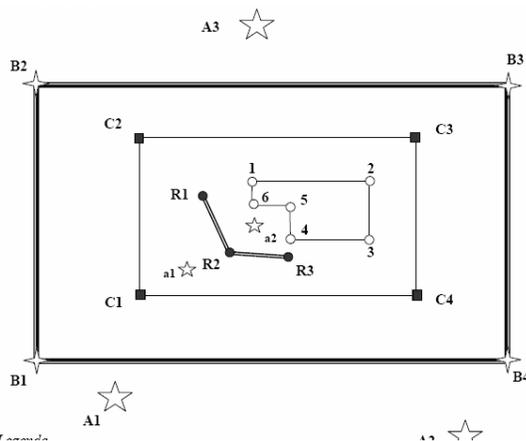


Figure 1: Script regard of GNSS geodesic network from work zone

Legend:

- A~reference stations (real) – A Class (70-100 km)
- A~reference stations (virtual) (hundred of meters)
- B~ dense landmark – B Class (cca.40 km)
- C~dense landmark – C Class (cca. 10 km)
- R~points of rising network (hundred of meters...1 kilometer)
- 1,2,3,4,5,6 – Points of details (tenth...hundreds of meters)

On the base of ROMPOS services, it is possible to determinate coordinate of rising network points using the ROMPOS – GEO – the service of static positional post processing. The users of these services can take over dates collected by GNSS stations and they could frame network system of rising in the Coordinated References System (CRS) ETRS'89. Once with the satellite dates, on the registration interval wanted (enough 5s, 10s 15s, 30s) are communicated the coordinate of these stations. Dates file (observation and dates of navigation) could be send on internet or magnetic support (CD, DVD). It planning the possibility to download from internet dates by login users and paid at the end of every month. Dates could be take it and pay it at the NGF (National Geodesy Foundation) and at the Cadastral Offices and Real Publicity (CORP). The request of these dates it makes in base of one paper of request by GNSS (dissociable on the NACL and ROMPOS sites). NACL offer satellites registration on the interval of 1s.

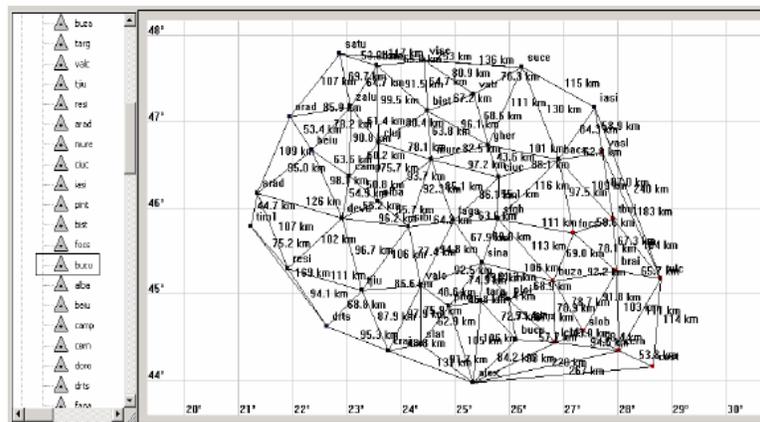


Figure 2: The GNSS Network Permanent included in ROMPOS with approximate distance between stations (48 stations)

Rising network composed by minim 2 points materialized in ground, it going to be positioned with GNSS receptors and they will collect in a static / quickly-static observation with a duration who depends by distance between station/ stations or/and point/points requested (have coordinates in SRC ETRS89), by numbers of frequency of receptors and by geometrical configuration satellites from the moment of making observations. The precisions (internal) for determination (3D) of coordinates can reach easily values under 5 cm specifically of this kind of network. In fig 2 are presented the GNSS networks make it by NACL until in present (A, B, C classes). An executant of rising network and rising of details, owner of GNSS technology, he will must:

- to realize rising network by measuring static/quickly- static; he will make connection to the GNSS network and hierarchical superior from zone (A ,B, C). To connect at

In reception works case by NACL, the executives of these types of work will surrender the elements précised in 15a and 15b annex an order 634/2006 and of nr.1/2008 decision, including the measuring files collected in the terrain. One example of this measuring file downloaded from GPS receiver which have worked in a ROMPOS-RTK (VRS) way and than transcalculate in a Stereo'70 projection plan with a TransDat Soft and they are presented in annex.

The points of network rise will have a description and a coordinate set in SRCETRS89 and in national SRC (STEREO'70). At the OCPR level will going to realize data base witch will include these elements. In this way, rising points of network will be used in the future for adjacent areas or for next checking or just for expert's report, possible with classical measuring instruments (optical).

Area of ROMPOS services application in cadastre could include in our country, like in the other countries, the possibility to determinate one of day drawing or underground drawing (in combination with a sonic detector system) of deferent's urbanite network (water pipe, gas, telephone and electrical network etc.), delimitation of perimeters of one interest zone (intravilan/extravilan, territorial- administrative unities etc.)

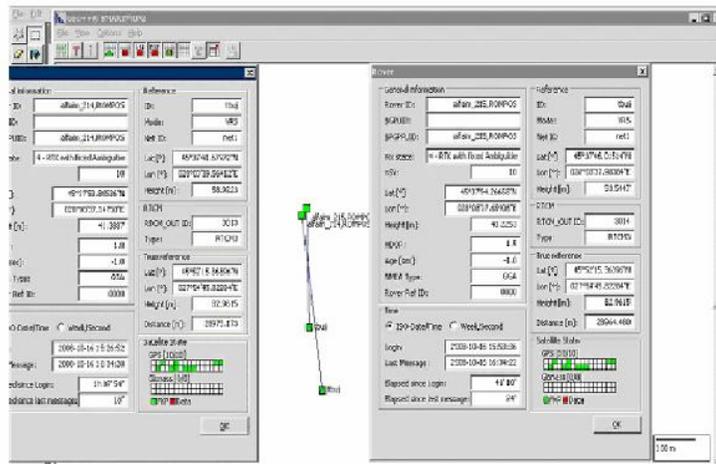


Figure 4: Information about detailed position points and virtual stations

RESULTS AND DISCUSSIONS

Advantages of using ROMPOS in cadastre

The services requisites by NACL through ROMPOS system, present a series of advantages in cadastral domain applications, comparative with classical measuring techniques:

- missing of visibility need between determinate points;
- time shorting of measuring by services in real time used (RTK);
- homogeny determination by connecting at European References System ETR89 and unitary transcalcul in the projection plan;
- utilization needs of a modern technology, independent practically by whether conditions;
- productivity rising and cost reduction (after an initial big investment in GNSS technology);
- services availability (24 hours for real time)

CONCLUSIONS

In the actual context of global technology development, modernization of geodesical network has suffered a big jump spectacular by ROMPOS system execution. This system will stay at the based geodesic national network of the country, allowing geodesic integration in the European one and global one.

NACLD had put a great effort in the last 4 years, in the final time it could be achievement this system to position at global navigation on satellites. In the NACLD cadre it was established National ROMPOS Center of Services, with administrative national network by permanent GNSS station (RN-SGP), composed by almost 50 stations, with an perspectives to get at 70 stations in 2009, even more.

By effort maintained of all involved persons in this project, ROMPOS have give in use a very large area of applications and users. Using in the real time of ROMPOS (DGPS/RTK) services is for free.

In this moment target application of ROMPOS system are from geodesic, surveying, cartographical, fotogrammetry and cadastral domain.

In the second part of the paper work was presented aspects of ROMPOS utilization (in special RTK services) in the cadastral domain. These aspects have been presented in the light of regalements in vigor of NACLD to get a better mean from ROMPOS users. Was given an example about an way of measuring and concrete dates results from special testes by CNS cadre (Geodesic Services).

Also it could be getting an idea that the ROMPOS could stay in present at the base of every positional determination in real time with a centimeter or even millimeter precision presented a multiple series of advantages in comparatively with measurable classical technologies.

NACLD will militate for development and ROMPOS modernization in the future with agreement of actual tendencies in the domain.

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