



***University of Oradea – Faculty of Architecture and Construction
Technical University of Civil Engineering of Bucharest – Faculty of Geodesy***



***Differential corrections
provided by Rompos Romania
transmission via GPRS with the
help of the radio transmitter***

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INTRODUCTION

RTK - work speed and accuracy

- is based on time correction principle and applying it in real time to obtain the coordinates as precise and as fast as possible.
- requires the use of dual frequency receivers





TRANSMISSION OF DIFFERENTIAL CORRECTIONS

- Differential correction transmitted using radio waves:
 - using UHF band and sometimes VHF band with the data bit of 9600 bps
 - frequencies chosen depends on the restriction imposed by the governmental agencies - "the power" restriction





- Differential correction transmitted with the help of mobile Internet
- Possible due to the utilization of NTRIP protocol (Network Transport of RTCM via Internet Protocol).

There are three classes of objects that are communication between them:

- GPS station servers that assure differential correction;
- Users that want to have access to this differential correction;
- Transmitters that compute differential correction and they are transmitting the differential correction;

- Data transmitted with the help of the mobile Internet:
 - GPRS (General Packet Radio Service)
 - EDGE (Enhanced Data rates for GSM Evolution)
 - CDMA2000 (also known as IMT Multi-Carrier (IMT-MC))
 - UMTS (Universal Mobile Telecommunications System)



DATA TRANSMISSION USING A COMBINATION OF THESE 2 METHODS

- Problem of "coverage" of the mobile Internet made possible the the development of the system in which the two methods are "combined".

Combining the two methods is as follows:

- will seek an area relatively close to the work place where we have access to the Internet
- transmitting differential corrections via radio waves, in first case we will need:
 - the hardware, this part is composed of a laptop, modem GPRS
 - the software, specialized software to access the differential corrections and transform them into a format that can be passed down through radio waves.

- The use of this technique is possible only on dual frequency receivers.

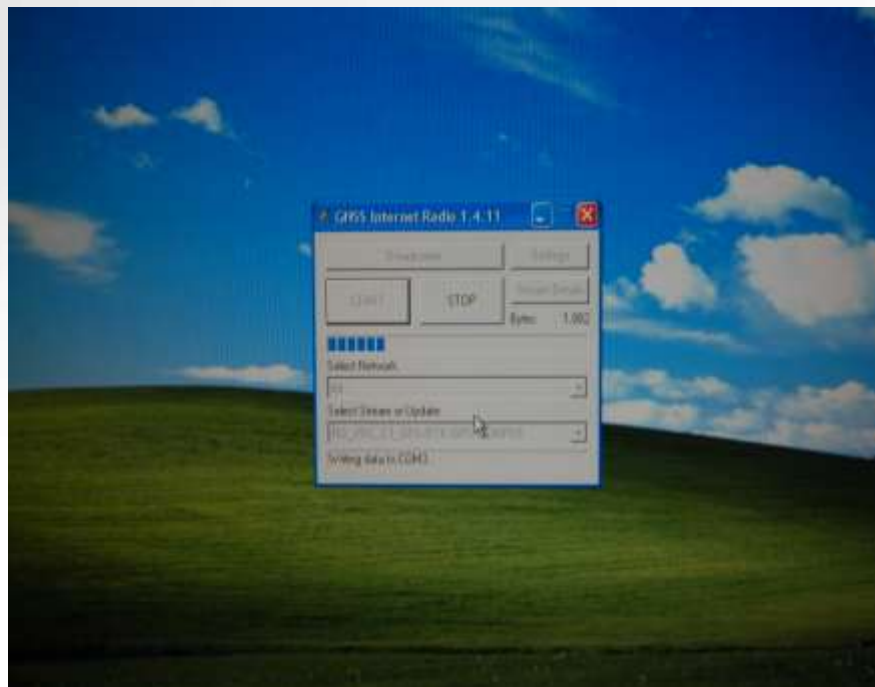




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Data conversion is possible by using specialized software – GNSS Internet Radio, developed by the Federal Agency for Cartography and Geodesy in Germany.



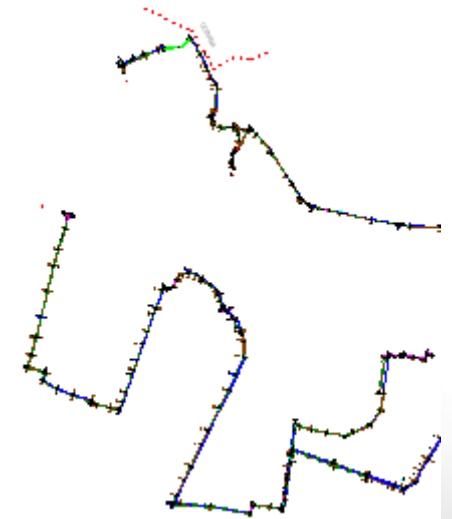


CASE STUDY – Measuring an earth road - Hamleu village, Satu Mare County

- In this work, we carried out topographical plans to modernize roads in Satu Mare County – Halmeu village.
- Measurements were made with a Trimble R6 dual frequency receiver. We also used a laptop, a radio transmitter (PLD 450) and a modem. On the laptop we had installed the GNSS Internet Radio.



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1. At the beginning, we had to examine the possibility of accessing the site from where we will receive differential corrections - ROMPOS Romania.
2. We have to go to the location of the area of interest and the receiver will determine a point - this point can be with the precision of a few meters. This position will be forwarded to the the program.
3. The coordinates will become the virtual point coordinates. At a distance of 1-2 km from the virtual point we will determine a new position which will be communicated in order to change the virtual point position.



Because of the complexity of the road networks and distances that were around 20 km we had to move in different positions with the entire system.



CONCLUSIONS

- **Technical aspect:** distance and coverage, transmission bandwidth, protocol, trust in the system. More precision offered by RTK method decreases in accuracy if the transmission of differential corrections has a low transfer rate.
- **Economic aspect:** communication costs consist of purchase price of the "senders".
- **Administrative aspects:** bands of radio frequencies may not be used free of restrictions imposed by government agencies.





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Thank you for your attention!



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