

COMPUTATION OF THE IGS20 COORDINATES FOR ROMPOS NETWORK

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The development of GNSS reference networks at national and regional level has led to the need to integrate them into European and international networks. This involves the coordinate computation of GNSS antennas for the reference stations, both in ETRF and ITRF/IGS systems, ensuring a high precision and accuracy. This task can only be achieved by performing a rigorous data analysis using scientific software, designed for this purpose.

The presentation approach the coordinate computation of ROMPOS GNSS reference stations in IGS20 reference frame, according to the EPN Guidelines.

The Romanian Position Determination System – ROMPOS was officially launched in September 2008, having at that time a network of 48 GNSS reference stations as basic infrastructure. These were uniformly distributed throughout the national territory [5].

Over the years, the National Network of Permanent GNSS Stations has undergone a continuous process of modernization and expansion. Today it consists of 86 GNSS reference stations, covering the whole territory of Romania and, in addition, 20 more stations operated by neighbouring countries in the border area, namely Hungary, Ukraine, the Republic of Moldova and Bulgaria (countries with which cross - border GNSS data exchange agreements have been concluded). The Agreement with Serbia is being ratified also. The current configuration of the ROMPOS network is shown in the Figure 1.

The general purpose of reprocessing of the whole National GNSS Network in the IGS20 reference frame is to increase the quality of the physical coordinates of the GNSS antennas [3] and, on the other hand, to complete the process of integrating the National GNSS Network into the European EUREF-EPN network [4], by approving the documentation regarding reprocessing it in a scientific approach, according to their Guidelines [2].

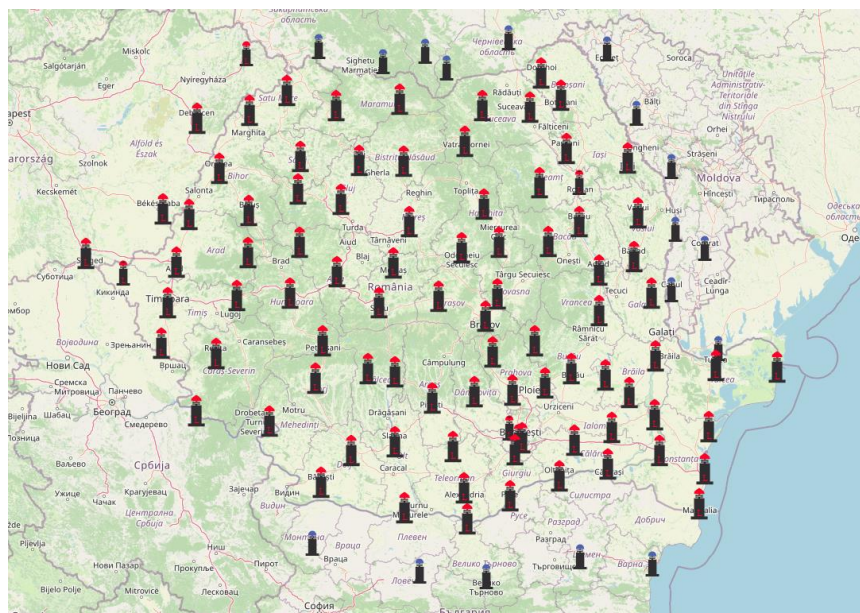


Fig. 1. Current ROMPOS network configuration [5]

It has to be mentioned that, for those who are new to the EPN processing Guidelines and new to the Bernese GNSS Software 5.4 version (BSW 5.4) [1], EPN has set up a so called benchmark campaign, in order to help ACs to make sure that the processing chain they set up is fine and in full agreement with the Guidelines. The involved data stems from 40 GNSS reference stations, covering most of the cases which can occur in the networks.

By processing the datasets related to the year 2023 - 7 days (GPS week 2293) with BSW V.5.4, running the specific programs were obtained the coordinates in IGS20 system, at the 2015.01.01 00:00:00 reference epoch, according to EPN Guidelines, which were briefly described in the current subsection. It has to be mentioned that, the data processing has been run both manually and automatic, using the BPE (Bernese Processing Engine), specifically the Process Control File RNX2SNX.PCF.

The correctness of the results and the software configuration were checked and confirmed by Analysis Coordinator of the EPN, based on the benchmark campaign. This allowed the transition to the next stage, namely that of testing the processing including data from the ROMPOS network, for a 15 days interval, between 19.07.2024 and 08.08.2024 (GPS days 207 - 221).

After the initial verification of the results by the EUREF Governing Board specialist, it were obtained very good values of mean repeatability, namely 0.85, 0.72, and 2.75 (NEU, respectively, in mm).

References

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