



Application of Bernese Software to Processing Precise Local Networks: ASG-EUPOS case study

P. Wielgosz and J. Paziewski

University of Warmia and Mazury in Olsztyn, Department Geodesy and Regional Planning, Olsztyn, Poland
(pawel.wielgosz@uwm.edu.pl, + 48 89 5234768)

ASG-EUPOS is a Polish part of multifunctional EUropean POSitioning System (EUPOS) that covers 16 Central European countries. EUPOS provides GPS correction data for real-time positioning and navigation as well as observation data for the post-processed positioning. ASG-EUPOS is an active reference network that provides a variety of services for geodesy, surveying and navigation. The separation between the reference stations is about 50-70 km; therefore, in the worst case scenario, the distance from the user receiver to the closest reference station should not exceed 40 km.

One of the most important services for geodesy and surveying is rapid-static (fast-static) positioning, assuring centimeter-level accuracy of the horizontal position when using short spans of GPS data. ASG-EUPOS provides fully automatic, www-based postprocessing service – POZGEO – that requires minimum of 15 minutes of dual-frequency pseudorange and carrier-phase GPS data. Another postprocessing service is POZGEOD-D, where user can download data from the reference stations and process them together with his own observations using any software of choice. It should be noted that ASG-EUPOS is considered first-order control network and provides the realization of ETRS'89 in Poland.

Bernese v.5.0 is a highly-regarded scientific software, primary designed and used for processing of regional and global satellite networks. It can estimate a number of parameters, e.g., station coordinates, tropospheric and ionospheric delays, orbital parameters, etc. However, in this paper, the Bernese software was applied to process short baselines up to 35 km using 15-minute long data sessions. This task required to develop and test a suitable processing strategy. This paper presents the results and analysis of several processing strategies applied to the processing of the user data. GPS data collected at the test sites were divided into 32 consecutive 15-minute long sessions. The most successful strategy was recommended and compared to the results obtained using the automatic POZGEO service that is based on a proprietary software. The results show that Bernese may be successfully applied to process precise local networks using relatively short observing sessions. It should be also noted that it is quite easy/convenient to employ Bernese in the automatic mode, what makes it a recommended tool for Internet-based automatic processing services.