

## **GPS-Derived Height Changes in Diurnal and Sub-Diurnal Timescales**

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### **A b s t r a c t**

This paper describes the research concerning precise short-time GPS solutions conducted in the Centre of Applied Geomatics, Military University of Technology, Warsaw, Poland. The data from ASG-EUPOS (Polish Active Geodetic Network) was processed using Bernese 5.0 software and EPN (EUREF Permanent Network) standards and models. In this study, the adapted 3-hour observation window is shifted every hour for obtaining hourly geocentric coordinates in ITRF2005 reference frame. The adjusted network consisted of over 130 stations from Poland and the neighbouring countries, the period covered observations collected from June 2008 through June 2010. These two years of observations allowed for examining short-period oscillations which were found to be closely related to the tidal (dynamic) frequencies. The analysis of the residua from the IERS2003 tidal model was performed using the least squares method with the Eterna software. It confirmed the existence of significant (several millimetres) oscillations in the frequencies corresponding to S1, K1 and K2. The paper describes the idea of data processing and analysis, presents the results of vertical (the Up component) oscillations in main tidal frequency bands, and also includes discussion of possible explanation of the existence of short-period oscillations in the GPS precise solutions and the possibility of propagation of short-period oscillations into long-period spurious changes in the daily (standard) GPS solutions.

**Key words:** GPS, short-periodic signals, least squares estimation, ASG-EUPOS.