



## **Analysis of new position and height transformation models in Poland**

Ewa Andrasik (1) and Marcin Ryczywolski (1,2)

(1) Warsaw University of Technology, Poland (e.andrasik@gik.pw.edu.pl), (2) Head Office of Geodesy and Cartography, Poland (marcin.ryczywolski@gugik.gov.pl)

In January 2014 Head Office of Geodesy and Cartography, Polish authority for geodesy and cartography, has released transformation models for position and height. The appearance of the models is related to changes in legal acts concerning the introduction of new reference system and frames used in Poland. The transformation models link old reference frames PL-ETRF89-GRS80h (also called EUREF-89) and PL-KRON86-NH with new realizations PL-ETRF2000-GRS80h and PL-EVRS2007-NH. The reference frame for position is expressed in the same reference system ETRS89. In case of height system Poland is currently switching from Kronstadt normal height system to EVRS – European height system referred to the Normaal Amsterdams Peil. The transformation models are based on grids covering territory of Poland with node spacing of 0.01 of degree.

Model for transformation between previous and current ETRS89 realizations is based on the results of GNSS calibration campaign conducted between 2008 and 2011, covering over 500 points (permanent reference stations and 1st order ground control points) regularly distributed over interest area. Above transformation model has been analyzed in the context of differences to previous frames realizations and to the approach based on parameter transformation.

In the context of implementation of EVRF2007 the new local quasi-geoid model PL-geoid-2011 has been compared to the latest geopotential model, European quasi-geoid models EGG and local quasi-geoid models used so far. In addition the new model has been confronted with undulations based on the existing satellite levelling data, including the results of the fourth leveling campaign.