Height Determination by GPS – Accuracy with Respect to Different Geoid Models in Sweden

Dr. Stig-Göran MÅRTENSSON, Sweden

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ABSTRACT

In this paper different gravimetric geoid models have been evaluated: on a regional bases utilising the Swedish GPS reference network SWEPOS; and locally, in a specific research area utilising the results from a GPS campaign conducted in the area.

The research area is situated in central Sweden having a size of approximately 100x300 km. In the area GPS measurements (with average baseline length of 13 km) have been conducted at well established benchmarks with known orthometric heights.

To find out if a geometric geoid model, based on the GPS measurements, would be a better height corrector surface for the research area than the gravimetric geoid models, such a model has been computed with geostatistical methods, i.e. universal kriging. The model has been experimentally evaluated utilising a Swedish GPS campaign called RIX95.

It was found, when the geometric geoid model is used, that the absolute accuracy of GPS levelling is ±14 mm and the relative accuracy ±10 mm (on a 10 km long baseline). It is concluded that the geometric geoid model is the best height corrector surface for the research area among the studied models.

CONTACT

Dr. Stig-Göran Mårtensson
Division of Geomatics
University of Gävle
SE-801 76 Gävle
SWEDEN
Tel. + 46 26 648 797
Fax + 46 26 648 828
E-mail: sgm@hig.se
Web site: www.hig.se