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Dedicated to the 150th Anniversary and
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Riga Polytechnical Institute / RTU Alumni

DIGEST

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What Height System is used in Latvia?

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Keywords **– GNSS, geodesy. Height systems.**

I. Introduction

Within the *EUPOS®* network the LatPos and EUPOS®-Riga RTK base station networks are designed in Latvia since year 2006. Time series of GNSS station results of both the EUPOS®-Riga and LatPos networks have been developed at the Institute of Geodesy and Geoinformation (GGI) using Bernese v.5.0 software. The base stations were selected among the EPN and IGS stations in surroundings of Latvia. The results of time series are analysed.

II. Identification Of Vertical Displacements

However, the behaviour of the RTK base station network approves to have similar stability comparing with EPN/IGS station network. Besides the RTK application for land surveying the possibilities to use RTK methods for the verification and validation of the height values of geodetic levelling benchmarks established historically long time ago have been studied. The differential GNSS and RTK methods appear very useful to identify the vertical displacement of landscape by means of inspection of the deformation of levelling networks. Preliminary results of the deformation of Riga levelling network have been discovered [2].

III. Sinex Solutions. GNSS Station Observation Time Series

Eight base stations were selected from a set of stations {BOR1, JOEN, JOZE, MDVJ, METS, POLV, PULK, RIGA, TORA, VAAS, VISO, VLNS} for the coordinate determination of EUPOS®-Riga and LatPos network base stations. Above mentioned international stations are placed up to 700 km far from Riga. Their coordinates monitored in International GNSS Network and European Permanent network. Consequently, the resulted coordinates of Latvian stations are highly reliable. The time series of computed daily coordinates of Latvian stations are designed as coordinate time series. Results are analysed. Coordinate velocity vectors are calculated for the period of 2.5 years.

Within the initiative of EUPOS the weekly SINEX solution (introduced to EUPOS Combination Centre) calculations have been performed by GGI for both LatPos and EUPOS®-Riga network stations. EPN Analysis Centre Guidelines (Final IGS satellite orbits, Ocean-loading corrections, 10° elevation cut off angle, Niell mapping function) were taken into account. Bernese GPS Software V5.0 was used in solutions for 1486-1616 GPS weeks. The calculated results are used for the studies of the environment of Latvia in order to identify the vertical displacements where also the gravity field could be influenced.

The results are quite a different when comparing them with conclusions of Latvian leveling network adjustment [3]. However, the doubts on reliability of time series disappear when the results of time series and the map of tectonic faults in Latvia are compared [4].

In conclusion the hypothetical question aroused – what height system currently is used in Latvia? Is it really the Baltic Height system 77? Will be correct the conversion to EVRS using current input data?

IV. Acknowledgment

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