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DIGITAL ZENITH CAMERA'S RESULTS AND ITS USE IN DFHRS V.4.3 SOFTWARE FOR QUASI-GEOID DETERMINATION (0054)

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Design of digital zenith camera in Institute of Geodesy and Geoinformatics of the University of Latvia commenced in 2010. During these years the prototype of digital zenith camera has been developed. Now, after tests of a prototype, improvements of design and manufacturing of the second version, it has reached operational status. This paper describes the construction of digital zenith camera, features of its control software. The results of vertical deflections' measurements are discussed. At the moment measurements are done in Riga region and are used in DFHRS v.4.3 software in order to check and improve local quasi-geoid model. It's a new method of quasi-geoid model determination and has not been used in Latvia before.

DFHRS (Digital Finite element Height reference surface (HRS)) v4.3. software has been developed by Karlsruhe university, Institute of Applied Research. It is based on parametric modeling of the HRS as a continuous polynomial surface. The access to the parametric HRS model is enabled by DFHRS_DB data-bases and access-software, which allow direct conversion of GNSS-heights h into physical normal heights H . DFHBF_DB stores polynomial p parameters.

DFHBF v4.3 includes all types of geometrical input data: both ellipsoidal and normal/orthometric heights, geoid/quasi-geoid heights, vertical deflections, derived from Earth Gravitational Model (EGM 2008) or grids, and observed vertical deflection measurements, as well as gravity data derived from EGM2008.

Analysis of impact of vertical deflection's measurements on local quasi-geoid model determination for Riga region is presented.

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Key words: digital zenith camera, DFHRS, EGM2008, quasi-geoid determination

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REFERENCES:

- [1] Jäger R, Kaminskis J, Strauhmanis J and Younis G 2012, "Determination of quasi-geoid as height component of the geodetic infrastructure for GNSS positioning services in the Baltic States Latvian", J. of Physics and Technical Sciences 3 5–15.
- [2] www.dfhbf.de , accessed January 2017.
- [3] International Center for Global Gravity field models, <http://icgem.gfz-potsdam.de/ICGEM/> , accessed January 2017.