



## **The integration of astro-geodetic data observed with ACSYS to the local geoid models Istanbul-Turkey**

Kerem Halicioglu (1), M.Tevfik Ozludemir (2), Rasim Deniz (2), Haluk Ozener (1), Muge Albayrak (2), Rasit Ulug (2), and Burak Basoglu (2)

(1) Bogazici University, Kandilli Observatory and Earthquake Research Institute, Geodesy, Istanbul, Turkey  
(kerem.halicioglu@boun.edu.tr), (2) Istanbul Technical University, Geomatics Engineering Department, Istanbul, Turkey

Astro-geodetic deflections of the vertical components provide accurate and valuable information of Earth's gravity field. Conventional methods require considerable effort and time whereas new methods, namely digital zenith camera systems (DZCS), have been designed to eliminate drawbacks of the conventional methods, such as observer dependent errors, long observation times, and to improve the observation accuracy. The observation principle is based on capturing star images near zenithal direction to determine astronomical coordinates of the station point with the integration of CCD, telescope, tiltmeters, and GNSS devices. In Turkey a new DZCS have been designed and tested on control network located in Istanbul, of which the geoid height differences were known with the accuracy of  $\pm 3.5$  cm. Astro-geodetic Camera System (ACSYS) was used to determine the deflections of the vertical components with an accuracy of  $\pm 0.1 - 0.3$  arc seconds, and results were compared with geoid height differences using astronomical levelling procedure. The results have also been compared with the ones calculated from global geopotential models. In this study the recent results of the first digital zenith camera system of Turkey are presented and the future studies are introduced such as the current developments of the system including hardware and software upgrades as well as the new observation strategy of the ACSYS. We also discuss the contribution and integration of the astro-geodetic deflections of the vertical components to the geoid determination studies in the light of information of current ongoing projects being operated in Turkey.