



## Use of total station for precise astronomical positioning

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For investigations of geodynamic effects by geodetic methods the quantities related to both geometric and gravity space are of importance. Terrestrial data for determination of characteristics of the earth's gravity field, like geopotential differences from spirit levelling or derivatives of the disturbing gravity potential, are especially suitable for detailed studies but their determination is demanding and time consuming. Therefore, efficient and sufficiently precise observation techniques are always welcome. A mobile automated system for astronomical position determination has been developed by the team of the Department of Geodesy, Faculty of Civil Engineering, Brno University of Technology. The measuring system is based on a precise motor-driven total station Topcon GPT 9001A. This device is supplemented by special accessories for astronomical observations – CCD sensor, GPS receiver, video time inserter and a laptop. The measuring process is controlled by a special astronomical software developed by the author. This software assures a remote control of the total station during the observation as well as processing of observation data and evaluation of the results. The observation process is fully automatic and runs without any assistance which avoids personal errors and contributes to better stability of the results. The measuring system was given the name of MAAS – Mobile Automated Astronomical System – and, at present, it exists as a single specimen labelled as MAAS-1. The system was extensively tested in 2009 and 2010 and the results proved its feasibility for a rapid determination of astronomical coordinates. The 1-hour measurement in so called „standard operation mode“ provides the accuracy of vertical deflections components of 0.3 – 0.4 arcseconds so that during an 8-hour observation campaign the vertical deflections of up to 6 sites can be determined.