

Determination of the reference point of Metsähovi SLR telescope

Arttu Raja-Halli, Ulla Kallio, Jyri Näränen, Elmeri Riikonen

Finnish Geospatial Research Institute, National Land Survey, Espoo, Finland

Metsähovi Geodetic Research Station (MGRS) of the Finnish Geospatial Research Institute (FGI) is one of the core stations of the GGOS, housing all the major space geodetic techniques. FGI has been a part of a large EMPIR (European Metrology Research Programme) funded consortium GeoMetre in which we studied the best methods for measuring and determining reliable and accurate local ties between all the geodetic infrastructure on a geodetic station. To determine the intersection of the azimuth and elevation axis of the MGRS SLR telescope and tie it to the global reference frame, we used a robotic total station to measure accurate locations of two retroreflectors attached on the telescope's optical tube assembly. Measurements were done from two concrete pillars outside the observatory dome in various telescope azimuth and elevation positions. The coordinates of the measured retroreflector reference points were used as observations in the reference point estimation. The purpose of the measurements was to get the initial accurate reference point coordinates and to learn how the process could be automated in Metsähovi in the future. Unfortunately, we couldn't fully automate the process or use independent star observations during this measurement campaign as the SLR telescope was not yet fully operational. Here we present the results of three different approaches to the reference point calculation from the measurements: antenna model with axis, sphere fitting and circle fitting.

This project 18SIB01 GeoMetre has received funding from the EMPIR programme co-financed by the Participating States and from the European Union's Horizon 2020 research and innovation programme.