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Application of a laser tracker for local-tie survey

Michael LÖSLER (1) and Rüdiger HAAS (2)

(1) On the leave from : Geodetic Institute of the University of Karlsruhe (TH), DE-76128 Karlsruhe, Germany, (2) Chalmers University of Technology, Radio and Space Science, Space Geodesy and Geodynamics, Sweden (rudiger.haas@chalmers.se)

Fundamental geodetic stations that host co-located equipment for different geodetic space techniques, e.g. Very Long Baseline Interferometry (VLBI) and Global Navigation Satellite Systems (GNSS), play a key role for the Global Geodetic Observing System (GGOS). A meaningful combination and integration of data acquired with the co-located techniques can only be achieved if the local-ties at these fundamental stations are know accurately. The local-ties are the coordinate differences between the reference points of the geodetic space techniques. The requirements for the reference points are that they are known with an accuracy of better than 1 mm and that the full covariance information is available. For the GGOS even a continuous terrestrial monitoring of the local-ties at an accuracy of 0.1 mm is desirable. We describe an innovative approach to perform a local-tie survey at a fundamental geodetic station. The work was performed in September 2008 at the Onsala Space Observatory and used a laser tracker as survey instrument. Both the reference point of the radio telescope used for geodetic VLBI and the local-tie between the latter and the reference point for GNSS measurements were determined. The application of the laser tracker allowed fast survey work and resulted in accurate coordinates with complete covariance information in a local true cartesian coordinate system.