

Station calibration of the SWEPOS GNSS Network

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SUMMARY

While the performance of positioning services are improved to the benefit of the users, with uncertainties from densified Network-RTK networks for construction work approaching the sub-centimetre level also in the vertical, the error sources related to the permanent reference stations (CORS) may soon be limiting factors for further improvement of performance.

Station dependent effects are thus important and limiting factors in high accuracy GNSS positioning. Electrical coupling between the antenna and its near-field environment changes the characteristics of the antenna from what has been determined in e.g. absolute robot or chamber calibration.

Since the first initial tests back in 2008, Lantmäteriet together with Chalmers technical University and SP Technical research Institute of Sweden has carried out station calibration, in-situ calibration, of its network of permanent reference stations, SWEPOSTM. The station calibration intends to determine the electrical centre of the GNSS antenna, as well as the PCV (phase centre variations) when the antenna is installed at a SWEPOS station. One purpose of the calibration is to examine the site-dependent effects on the height determination in SWEREF 99 (the national reference frame). Another purpose is to establish PCV as a complement to absolute calibrations of the antenna-radome pair.

We will present both the methodology for observation procedure in the field and the method for the analysis, together with results of the station-dependent effects on heights as well as PCV from the analysis. Some strength and weakness of our method for GNSS station calibration will be discussed at the end.

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