

EDM-GNSS distance comparison at the EURO5000 calibration baseline: preliminary results

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ABSTRACT

At the Pieniny Kippen Belt in Poland, the novel primary reference baseline EURO5000 is required as part of the European Research project GeoMetre to both validate refractivity-compensated EDM prototypes and investigate the metrological traceability of GNSS-based distances. Since the aimed uncertainty is 1 mm at 5 km ($k=2$), the design, construction, and validation must be carefully prepared to fulfil the high standards of the GeoMetre field campaigns which are planned to be carried out in May 2022. This contribution describes the main features of the EURO5000 and presents the results of the preliminary validation which includes a first comparison between the results obtained by using precise currently available EDMs as well as GNSS techniques following the standard GNSS geodetic processing algorithms, on the one hand, and the improved GNSS-Based Distance Meter (GBDM+) approach developed at UPV, on the other hand. The preliminary validation presented in this contribution also permits (1) to detect potential problems in the use of the baseline such as potential geodynamic problems, atmospheric refraction or multipath limitations, (2) to produce a set of reliable results, and (3) to pave the way for the final field comparisons between the novel EDMs and the GBDM+ approach. The result of this metrological experiment may significantly contribute to overcome the limitations of current high-precision deformation monitoring applications that require their scale to be consistent with the SI-metre within 0.1 ppm in several km.

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