Metrological Assurance of Geodetic Measurements: From the Czech Geodetic Baseline Koštice to the Ukrainian - Yavoriv

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SUMMARY

Accurate and metrologically traceable measurements are the primary criterion for the quality of geodetic surveying activities, especially in geometric control of construction where compliance with prescribed tolerances is decisive. Although the theoretical and normative issues for geometric precision are already well established, harmonised with ISO practice and aligned across the European Union (EU) their incomplete adoption in practice has historically produced disputes between contracting parties. Therefore, strong emphasis is placed on meeting the Metrology Act and EU legislation, ensuring uniformity and accuracy of measurements and instruments. In the field of lengths, this creates a demand for high-precision geodetic baselines and corresponding measurement instruments.

Based on the many years of experience of the Czech Research Institute of Geodesy, Topography and Cartography (VUGTK, v.v.i.) in metrological assurance of geodetic measurements, the paper considers the possibility of a practical implementation of converting the unit of length from the Kostice geodetic baseline, which serves as the Czech state length standard since 2008, to the Yavoriv geodetic baseline in Ukraine.

The current state of knowledge in the field of the geodetic concept of converting the unit of length was verified through an international interlaboratory comparison carried out in 2018 by experts from the VUGTK at the Finnish base in Nummela, where the achievable accuracy of this traceability was confirmed. Further cooperation was also developed with the Lviv Polytechnic National University at the geodetic baseline in Yavoriv. Independent measurements on this base in Ukraine have already been initiated; however, practical implementation is currently limited by security restrictions and regulatory prohibitions arising from the ongoing armed conflict in

Ukraine.

Beyond its technical dimension, this initiative has strategic significance. For Ukraine, strengthening metrological traceability in geodetic surveying supports post-war reconstruction by ensuring the reliability of measurements used in infrastructure, industry, and urban development. It reduces risks of error, fosters trust in engineering processes, and enhances alignment with European and global measurement systems. In this way, the initiative contributes not only to scientific advancement, but also to sustainable reconstruction, long-term resilience, and, in particular, to the establishment of a seamless cross-border communication infrastructure.