Functional and Accuracy Assessment of a Multisensorial Deformation Monitoring System Implemented for the Development Purposes of Warsaw Metro Line Ii

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SUMMARY

For many years, we have been observing an advanced investment process in Warsaw, including constructing the second metro line with its constant expansion. After the central section was completed, further works were undertaken to extend it to the northeast and west of the city. Such an advanced construction process requires utilizing many technological procedures, including both surface services and tunnel works. Therefore, there is a need to carry out a variety of geodetic labours, including activities related to the construction services, information and risk management or the assessment of the condition of engineering structures. Particularly noteworthy is the deformation and structural monitoring encompassing the continuous evaluation of geometric changes of civil structures and - in case the critical values are exceeded, generating warnings and alerts informing about possible hazards. The construction of the Warsaw Metro Line II requires extensive monitoring in many thematic areas - from land surveying geotechnics to physical values affecting the safety of the works carried out. In this case, one can talk about a multi-sensor monitoring system in which the data obtained from various sensors is analyzed in the context of their integration and a proper visualization in a specialized geoinformation environment. Such a multitask system operation requires constant functional and quality assessment, which has become the authors' motivation to undertake such studies in geodetic and geotechnical data. In addition, analyzing the accuracy and functionality of the deformation monitoring programme stands as a crucial element of building a comprehensive knowledge base of the monitored object.

What is more, the authors present the possibilities of a specially designed GIS platform along with its capabilities for data visualization and spatial analyses. The study outcomes may be applied in other similar civil projects. Finally, the benefits resulting from the fruitful cooperation between industry and science during the implementation of high-budget investments were emphasized.
