

## Summary of doctoral dissertation

### Research on the methodology of surveying works applied to flood zones modeling

mgr inż. Paweł Kotlarz

The topics of this work are the subject of research of specialists in many fields, which include: geologists, hydrogeologists, land reclamation specialists, planners, computer scientists, automation specialists and lawyers. The author takes on the theme in practical terms in relation to the implementation of surveying tasks. The work is of research-cognitive character. It consists of three main parts: descriptive, analytical and research.

The issues of the development of surveying works methodology used for flood zones modeling was elaborated taking into account the three groups of factors: legal, technical and economic. In the legal aspect the basic legal regulations, which should include INSPIRE Directive, The Act of the Water Law and standards of surveying works were analyzed. The technical aspect considered the use of integrated techniques and methods of measuring using the latest generation of surveying instruments. An important element of the work is a combination of two measurement methods: classical and LIDAR airborne laser scanning. The economic aspect of measurement methodology for flood zones modeling was considered in terms of time necessary to perform the survey of situation and altitude along with the office processing of the results. The object of the research was the river Prądnik along 3 km of the course. It is located in the administrative borders of the following municipalities: Skąła, Wielka Wieś and Zielonki, in the northern part of the Małopolska Voivodship. The field conditions of the test object can be described as difficult to carry out direct surveyings works. Studies have shown that the optimum methodology of surveying works, applied to flood zones modeling, is to integrate both surveying techniques. On the basis of LIDAR data the Digital Terrain Model (DTM) can be made with appropriate accuracy and quickly. While the measurement of the bottom of the watercourse and engineering equipment associated with it should be supplemented, as needed, by the tacheometric survey. The degree of detail of supplementary survey should be clarified by environmental engineering specialists and specified in the project assumptions before the start of the field works.

**Keywords:** methodology of surveying works, tacheometry surveying, LIDAR, DTM, flood zones modeling

*Paweł Kotlarz*