

Comparison of accuracy of TLS and SLAM technologies for 3D reconstruction of objects with different geometries

Aleksandra Szrek ^{*1}, Paulina Kujawa ¹, Kinga Romańczukiewicz ¹, Paweł Trybała ²,
Radosław Zimroz ¹

¹ *Faculty of Geoengineering, Mining and Geology, Wrocław University of Science and Technology, Na Grobli
15, 50-421 Wrocław*

² *3D Optical Metrology unit, Fondazione Bruno Kessler, via Sommarive 18, 38121 Trento*

*Corresponding author: aleksandra.szrek@pwr.edu.pl

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Current technologies have greatly simplified the 3D mapping process, but despite these advancements, there are still aspects that require further improvements. Efficient 3D data collection and reconstruction of objects with high accuracy remain a challenge for the scientific community. One of the most widely used methods is Terrestrial Laser Scanning (TLS). It provides data collection with high accuracy and precision, making it a preferred choice for many researchers and professionals. In comparison, mobile scanning technology, while less accurate, remains an effective alternative. Its portability and ability to capture data in real-time make it a practical option for a variety of scenarios where mobility and rapid data acquisition are the most important. This study aims to compare SLAM (Simultaneous Localization and Mapping) and TLS technologies in terms of accuracy evaluation and 3D reconstruction. Selected objects with varying geometries were utilized as examples for this evaluation. The analysis of distances measured between corresponding elements in the two point clouds uncovered a root mean square error (RMSE) of 5 cm. SLAM technology demonstrates its capability to effectively model objects that demand accuracy at the centimeter level.