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Calibration of Terrestrial Laser Scanners

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Terrestrial Laser Scanners provide a three-dimensional sampled representation (i.e. point cloud) of the surfaces of objects. To achieve consistent accuracy, careful attention must be paid to the calibration of the system. The main interest was to investigate the systematic instrumental errors. The knowledge of these errors is rather limited due to the proprietary design of the scanners. Our approach was to first perform scanner self-calibration, assuming that the systematic instrumental errors were the same as those in the total station, and then to compare the distances, horizontal directions and vertical angles derived from the scanning with the true ones in order to reveal the possible presence of some non-modeled systematic trends. We have found a significant vertical scale error; and also investigated the target coordinate accuracy, stability of the range measurements over time (range drift) and angular accuracy and precision.