

The New ISO Standard for a Field-Testing Procedure of Terrestrial Laser Scanners and its Practical Performance

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SUMMARY

This contribution presents the new ISO standard 17123-9 "Optics and optical instruments - Field procedures for testing geodetic and surveying instruments - Part 9: Terrestrial laser scanners" and discusses its practical impact and its performance. The ISO 17123 provides not only field procedures for determining and evaluating the precision (repeatability) of terrestrial laser scanners (TLS) and their ancillary equipment when used in building, civil engineering and surveying measurements. It is also a tool for defining an uncertainty budget, which allows for the summation of all uncertainty components, whether they are random or systematic, to a representative measure of accuracy, i.e. the combined standard uncertainty. Primarily, these tests are intended to be field verifications of the suitability of a particular instrument for the immediate task at hand, and to satisfy the requirements of other standards. They are not proposed as tests for acceptance or performance evaluations that are more comprehensive in nature.

Within the contribution not only the testing procedure itself will be shown, also its practical performance is discussed in detail. This starts with a sensitivity analysis of simulated typical instrumental error sources based on state of the art calibration models for TLS. The discussion is made based on the configuration of the test field and the magnitude of the simulated error sources. The results show, that the new standard is very sensitive to single introduced typical errors of the instrument.

Furthermore, a practical test is carried out, where real calibration errors were introduced in the TLS software by a manufacturer. It is then shown, that the testing procedure allows detecting this error sources within real measurements very well. Finally, an overview of the performance and practical impact of the new testing procedure for TLS is given.

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