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AIRBORNE LIDAR: A FULLY-AUTOMATED SELF-CALIBRATION PROCEDURE

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Abstract. Automated calibration of LIDAR systems has been an active field of research and development over the last years. Traditional calibration approaches rely on manual extraction of geometric features in the laser data and require time-intensive input of a trained operator. Recently, new methodologies evolved using automatic extraction of linear features and planar information to minimize systematic errors in LIDAR strips. This paper presents a new methodology of LIDAR calibration using automatically reconstructed planar features. The calibration approach presented herein integrates the physical sensor model and raw laser measurements and allows for refined calibration of internal system parameters. The new methodology is tested and compared with a traditional approach based on manual boresighting using a typical survey mission. Optech's software suite LMS, which is the first commercial implementation of this functionality, was used to process the data and to derive means of quality assessment. Different methods of reconstructing automatically extracted geometric features are presented and discussed in the context of their contribution to the calibration process. The final results are compared numerically and through graphic quality check.

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