Utilization of the Raw Intensity Return from Laser Scanner Measurements to Assist in Control and Validation Targets

Abstract

Two-dimensional circular planar targets are commonly used as control and validation for Terrestrial Laser Scanning projects. Target acquisition occurs through high volume geometric measurements on the target that help to fit a true model of the target, thus allowing for computation of the controlling center of said target; being a form of image matching commonly used in photogrammetric/remote sensing applications. In many situations, dense geometric measurements of the circular target are not possible due to time or location constraints. This study tests the feasibility of utilizing the raw intensity return from a given measurement, to act as a 3rd dimensional element to help identify the controlling center of a circular planar target with minimal measurements. A Leica P20 Scanner is used to conduct the experiments utilizing two 0.152m diameter circular targets with varied radial intensity gradients at multiple distances and angles of incidences. Through proper modeling of the target's radial gradient, identifying the controlling center occurred with high precision and accuracy very comparable to traditional standard targets used conventionally.

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