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Analysis and correction of the dependency between laser scanner intensity values and range

R. Blaskow and D. Schneider
Technische Universität Dresden, Institute of Photogrammetry and Remote Sensing, Dresden, Germany

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Abstract. Intensity values, which are registered by a terrestrial laser scanner system (TLS) for each point of a 3D point cloud in addition to its coordinates, are affected by the characteristic of the measured object and the parameters of the environment. The backscattered electromagnetic signal is influenced in his strength by the reflectivity of the scanned object surface, the incidence angle, the distance between laser scanner and object and the atmospheric respectively system specific setting of the TLS-measurement. The entity of all influences on the signal can be summarized in the laser range equation of *Jelalian*[1]. For the investigations of this study the named influences where divided into two groups. Group 1 includes the surface specific influences. The second group contains all other influences. The correction of the intensity values from the effects of group 2 theoretically allows the determination of similar materials, using similar intensity values in laser scanner point clouds. In this paper the dependency between laser scanner intensity values and range are investigated on the basis of laser scanner data recorded with a Riegl LMS-Z420i. The results are compared with data from the phase-difference laser scanner Zoller+Fröhlich Imager 5006i.

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