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Calibration of Airborne Laser Scanners

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In this paper we are going to explain the calibration of an Airborne Laser Scanners (ALS). An ALS measures spot heights on the surface of the Earth for the purposes of deriving a Digital Terrain Model (DTM). To achieve consistent accuracy however, careful attention must be paid to the calibration of the system and the relationship of the components. Physical restrictions prevent the direct measurement of angular misalignment between the navigation and scanning components of an ALS, thus calibration parameters must be derived from the data. The primary goal of this thesis is to develop and implement a new calibration method for airborne laser scanners. The new method will address shortcomings in current manual methods by eliminating a need for ground control points, providing a rigorous stochastic model, modeling additional sources of error and improving the speed of a calibration. Using the presented methods, a calibration solution was calculated without ground control, with an elevation accuracy of 10cm.