

Application of Airborne Laser Technology to 3D Cadastre

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SUMMARY

Growing demand for an efficient land use above and below the ground is motivating cadastre and land management systems to move from traditional 2D systems toward three-dimensional ones. A major concern in realizing the 3D cadastre vision is the development of efficient methods for the attachment of the third dimension to the existing 2D systems. In this regard airborne laser technology that offers direct acquisition of dense and accurate 3D data in the rapid turn-around time offers a very suitable mean to meet this objective. Finding ways to harnessing laser technology to nourish the other seems therefore only natural. The transformation of surface data into objects and shapes is, however, not as immediate and requires studying several aspects in more detail. Whereas developing methods to process LiDAR data is an active research field, little is reported about utilizing this technology for cadastral purposes. We identify three major aspects that should be studied in some detail. The first one is fundamental and concerns elements of accuracy, co-registration of the two datasets and required point density. The second one concerns recognizing objects and their shapes in relation to cadastre purposes, and the third one concerns the integration of the data with the existing databases. The paper presents a methodology and an algorithm for integrating airborne laser scanning data and existing 2D cadastral system. We demonstrate the integration over a residential area comprising several high rising buildings with varying shapes, open areas, etc. A special attention is paid to elements of accuracy and co-registration between the datasets a topic of great importance in terms of consistency. Results highlight the processes involved in realizing the idea of transforming laser data into cadastral information.