

FUSION OF ALS POINT CLOUD DATA WITH HIGH PRECISION SURVEYING DATA

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ABSTRACT:

In today airborne laser scanning (ALS) extended areas are surveyed with a high point density and with decimeter elevation accuracy in a very short time. However, due to the finite sampling process the correct modeling of the surveyed earth surface is difficult, if break lines and special topographic features like railway tracks and high ways should be modeled. To improve the ALS derived models more and more additional surveying data are used which are measured by e.g. GNSS or tacheometers. These measurements have higher accuracy and are sampled in a way that they best describe the features to be modeled. For example break lines are described by splines derived from a tacheometric survey. As these supplement data are provided from independent sensors in their own coordinate system, all data sets to be fused has to be transformed so that the most accurate model can be computed. This means the algorithms must regard data property of the different data sets. In addition the most accurate and precise data set has to be used as reference. In this paper algorithms for the fusion of ALS data and additional surveying data obtained from tacheometric and DGNSS measurements are presented and discussed based on results of empirical computations on different data sets. The additional surveying data consists either of single point measurements or profiles. The presented algorithms are developed under the objective to use primarily existing functionalities of a commercial program.

TOPIC: Data fusion and data assimilation

ALTERNATIVE TOPIC: Lidar and laser scanning