

EVALUATION OF A LASER MOBILE MAPPING SYSTEM FOR MONITORING SANDY COASTS

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ABSTRACT:

The Dutch coast is characterized by sandy beaches flanked by dunes. As the coast is dynamic but also essential for the defence against flooding of the hinterland, it is monitored on a yearly basis by airborne laser scanning. It is also recognized that most erosion of the beach and first dune row takes place during storms. To assess the state of the coast directly after a storm with airborne laser scanning is expensive and difficult to organize. In this research it is evaluated if using a laser mobile mapping system (LMMS) mounted on a 4WD car could be a good alternative. For this purpose a test data set obtained by Geomaat using the StreetMapper LMMS system, containing three individual line scanners, is evaluated. The data set covers a stretch of beach of 6 km long and consists of about 50 million laser points. Both the quality of individual points and of a derived Digital Terrain model (DTM) are assessed. To obtain insight in the relative individual point quality, height differences between close-by points are considered. Except for arbitrary close-by points, also close-by points obtained from different scanners and from different drive-lines were analysed. It is shown that on a flat beach a precision of 3 mm is achieved and that almost no internal biases exist. Moreover a DTM with a grid size of 1 m was obtained using least squares including a quality description per grid cell incorporating both measurement precision (influenced by e.g. scan geometry) and terrain roughness. Although some problems remain with the low scanning height of 2 m., which causes measurement shadows behind low dunes, it is concluded that a LMMS enables the acquisition of a high quality DTM product suited for assessing most storm induced damage within two days.

TOPIC: Lidar and laser scanning

ALTERNATIVE TOPIC: Change detection and process modelling