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INVESTIGATIONS ON A COMBINED RGB / TIME-OF-FLIGHT APPROACH FOR CLOSE RANGE APPLICATIONS

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Abstract. 3D surface and scene reconstruction for close range applications mainly rely on high resolution and accurate system devices and powerful algorithms. Camera systems based on the time-of-flight principle allow for real-time 3D distance measurements. Unfortunately these devices are limited in resolution and accuracy. But applying calibration models and combining with high-resolution image data offers a promising approach in order to form a multisensor system for close range applications. This article will present investigations on such a multisensor system. Different options on data fusion processing of distance information and high-resolution color information in order to generate dense 2 1/2 D and 3D point clouds will be presented. The multisensor system is calibrated with respect to its interior and exterior orientation. The time-of-flight distance information is optimized extracting best information of different data captures with a set of integration times following the principle of high dynamic range imaging. The high-resolution RGB image information is projected into object space and intersected with the object surface from the time-of-flight camera. First results of this solution on dense monoplotting and its verification will be presented.

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