

Modular PMD Simulator for Multistatic Camera Systems

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Abstract

In recent years the progress in high-speed technical 3D-Vision development aroused increasing interest in many industrial, automotive and safety-related applications. This paper presents a simulation approach for a 3D PMD camera with arbitrary resolution and consists of some major parts.

In the first part the software-based PMD sensor simulator developed by ZESS is described. This module of the simulator allows calculating the theoretical response of a PMD sensor for a given 3D absolute referenced scene, which is comparable to real PMD sensor data.

For accurate PMD simulations we need the information about the wave propagation of the transmitted signal. For this purpose the modular illumination pre-simulator has been developed and will be described in the second part of this paper.

The third part of the paper is concerned with the modeling and simulation of bistatic reference 3D data, which are indispensable for adaptive correction of bistatic deformation caused by different illuminator and sensor positions.

The results of the simulated scenario including an error analysis and the comparison with real PMD camera data are discussed.

Keywords: PMD, 3D, Simulation, Modeling, Multistatic

Presenting Author's biography

Valerij Peters received the Diploma degree in electrical engineering from the University of Siegen in 2002. He is currently scientific assistant in the Center of Sensor Systems (ZESS) at the University of Siegen. His current research interests include 3D Vision, mono- and bistatic signal theory and simulations, multi sensor data fusion, computer based 2D and 3D sensor simulations, Synthetic Aperture Radar (SAR) raw signal simulations.

