

Project Summary „PMD-Modeling“

For approximately 15 years now, range measuring Time-of-Flight (ToF) cameras are under active development. One of the first approaches, the Photonic Mixing Device (PMD), was presented and prototypically implemented at the University of Siegen by Prof. Dr. Rudolf Schwarte. The PMD concept was instrumental in establishing „pmd technologies gmbh“, which today is one of the world’s leading manufacturers of ToF-cameras. The very central idea of this knowledge-transfer project is the integrated processing and conceptual integration of the topics of sensor modeling, simulation, evaluation and algorithmics for ToF cameras, on the basis of the current development status in both, the Computer Graphics and Multimedia Systems Group, as well as the industrial partner „pmd technologies gmbh“.

The provides a twofold benefit: On the one hand the development of relevant research results of the last 10 years is advanced enough to be furnished for implementation in commercial products, with consideration

of real application conditions. On the other hand new solutions for hitherto neglected disruptive effects of ToF camera systems still need to be developed.

In this project practical issues are examined, which are also of great scientific interest. These issues are based on findings from basic groundwork in previous and current DFG-funded research projects, and include, on one side, issues of modeling, simulation and evaluation, the integrated consideration of which will afford a quantitative assessment of future sensors and algorithms on the level of chip geometry all the way up to specific measurement errors at the driver level. On the other side, research to very relevant, practical questions is taking place in the area of algorithms, such as with motion- and multiple-reflexion path artifacts. A reliable and above all efficient remedy of these effects will sustainably improve data quality and open up new potential uses for ToF cameras.

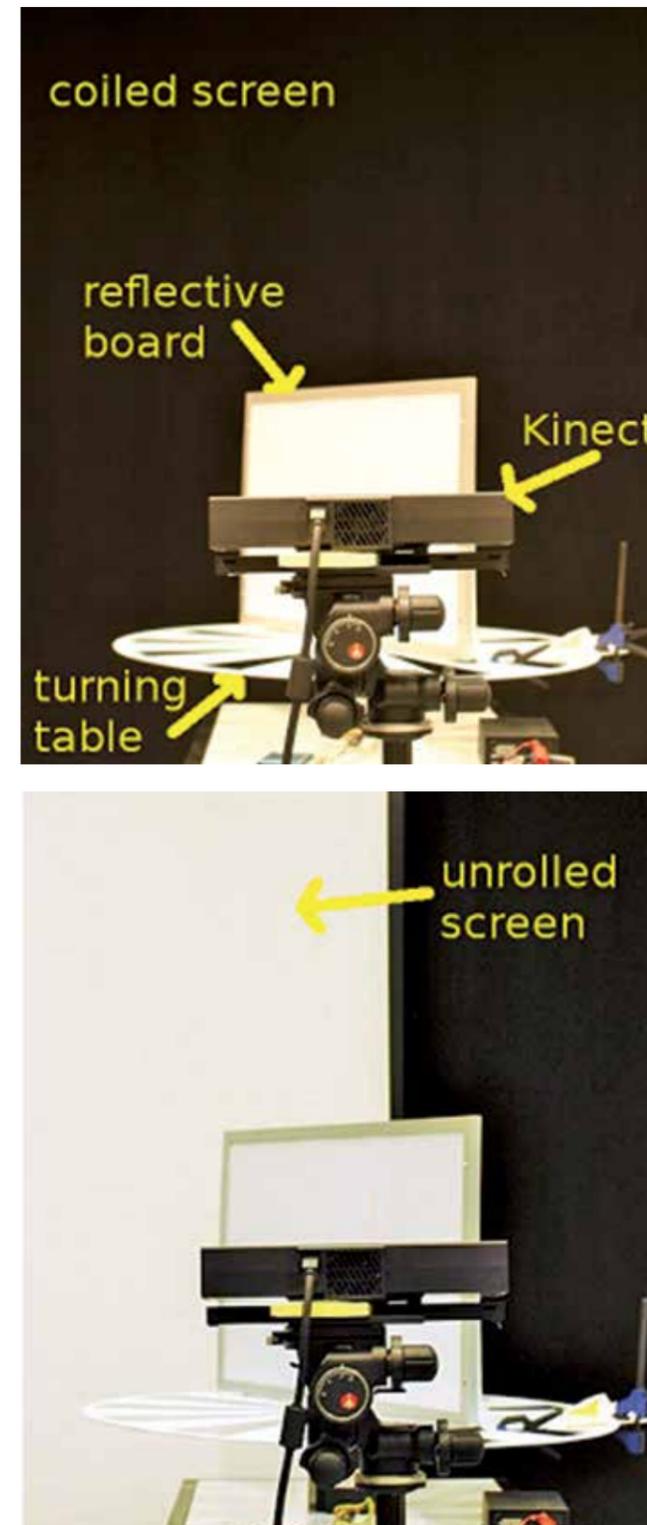


Fig1:
Setup for the multi-path evaluation. A reflective board is observed in front of a diffuse reflective screen, where the multi-path artifact occurs, and a reference measurement setup in front of a non-reflective black curtain.

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