新型简易三维数字化全貌测量系统

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摘　要：

设计了一种新型三维全貌测量系统，系统结构简单，仅由单传感器系统和方向性平面靶标组成。传感器基于数字光栅投影轮廓测量法实现，可以进行快速整视场三维数据采集。平面靶标不仅可以对传感器进行物相标定，还可以帮助求解位置转换参数，实现全局标定；在三维拼接环节，还可以用于确定重叠区域，有效缩减匹配点搜寻算法的时间。通过实验验证，该全貌测量系统不仅具有简单实用、成本低的特点，而且还具有较好的测量能力和效率。

关键词：三维数字化；全貌测量；方向性平面靶标；全局标定；重叠区域

Novel and Simple System for Whole-profile Metrology

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Abstract:

A novel whole-profile metrology system is designed with simple structure and low cost, only including one single vision sensor and one directional planar pattern. The sensor is realized based on digital fringe projection profilometry, which can capture the whole view data rapidly. The one pattern not only has the ability of calibrating sensor with coordinates measuring, but also helps to align the multi-position measuring data to one united coordinate system. In registration, the pattern is also applied to define overlap range, which improves searching efficiency of matching points. Experimental results have proved that the whole-profile measurement method is a simple and low-cost application, as well as has good accuracy and efficiency.

Keywords: 3D digitalization; whole-profile measurement; directional planar pattern; coordinate alignment; overlap definition

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