

Accepted Manuscript

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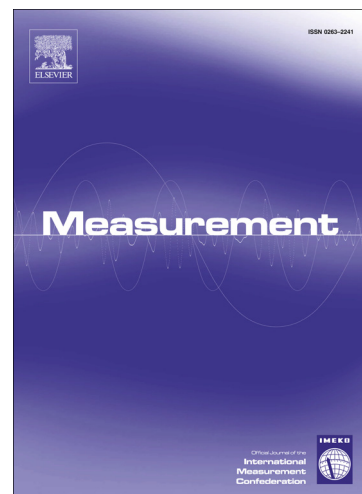
PII: S0263-2241(14)00184-5
DOI: <http://dx.doi.org/10.1016/j.measurement.2014.04.026>
Reference: MEASUR 2833

To appear in: *Measurement*

Received Date: 1 February 2013
Revised Date: 28 October 2013
Accepted Date: 23 April 2014

Please cite this article as: X. Wei, G. Zhang, Q. Fan, J. Jiang, J. Li, Star Sensor Calibration Based on Integrated Modelling with Intrinsic and Extrinsic Parameters, *Measurement* (2014), doi: <http://dx.doi.org/10.1016/j.measurement.2014.04.026>

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Star Sensor Calibration Based on Integrated Modelling with Intrinsic and Extrinsic Parameters

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Abstract: To guarantee high measurement accuracy, star sensors must be precisely calibrated prior to use. Existing star sensor calibration methods, such as the imaging model method with intrinsic parameters and the polynomial fitting method, exhibit disadvantages. Inspired by classic camera calibration theory, a novel star sensor calibration method based on integrated modelling with intrinsic and extrinsic parameters is proposed in this paper to overcome the inherent disadvantages. A complete, integrated imaging model for star sensors is established by using all intrinsic and extrinsic parameters. Calibration points' data are then acquired by using a two-axis rotary table and a star simulator. Finally, a two-step procedure is applied to calculate the parameters. Experimental results show that the proposed calibration method is capable of obtaining all the intrinsic and extrinsic parameters of the star sensor with high accuracy and efficiency and guarantees highly accurate attitude measurements.

Keywords: Star sensor; Calibration; Attitude measurement

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