Volume XL-3/W1

Int. Arch. Photogramm. Remote Sens. Spatial Inf. Sci., XL-3/W1, 131-136, 2014
www.int-arch-photogramm-remote-sens-spatial-inf-sci.net/XL-3-W1/131/2014/
doi:10.5194/isprsarchives-XL-3-W1-131-2014
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ACCURACY ANALYSIS FOR AUTOMATIC ORIENTATION OF A TUMBLING OBLIQUE VIEWING SENSOR SYSTEM

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Keywords: Photogrammetry, Remote Sensing, Aerial Imaging, UAVs, Oblique Camera System, Sensor Orientation, Direct Georeferencing, MACS

Abstract. Dynamic camera systems with moving parts are difficult to handle in photogrammetric workflow, because it is not ensured that the dynamics are constant over the recording period. Minimum changes of the camera ' s orientation greatly influence the projection of oblique images. In this publication these effects – originating from the kinematic chain of a dynamic camera system – are analysed and validated. A member of the Modular Airborne Camera System family – MACS-TumbleCam – consisting of a vertical viewing and a tumbling oblique camera was used for this investigation. Focus is on dynamic geometric modeling and the stability of the kinematic chain. To validate the experimental findings, the determined parameters are applied to the exterior orientation of an actual aerial image acquisition campaign using MACS-TumbleCam. The quality of the parameters is sufficient for direct georeferencing of oblique image data from the orientation information of a synchronously captured vertical image dataset. Relative accuracy for the oblique data set ranges from 1.5 pixels when using all images of the image block to 0.3 pixels when using only adjacent images.

Conference Paper (PDF, 844 KB)

Citation: Stebner, K. and Wieden, A.: ACCURACY ANALYSIS FOR AUTOMATIC ORIENTATION OF A TUMBLING OBLIQUE VIEWING SENSOR SYSTEM, Int. Arch. Photogramm. Remote Sens. Spatial Inf. Sci., XL-3/W1, 131-136, doi:10.5194/isprsarchives-XL-3-W1-131-2014, 2014.

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