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Int. Arch. Photogramm. Remote Sens. Spatial Inf. Sci., XXXIX-B5, 15-19, 2012
www.int-arch-photogramm-remote-sens-spatial-inf-sci.net/XXXIX-B5/15/2012/
doi: 10.5194/isprsarchives-XXXIX-B5-15-2012

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IMPLEMENTATION OF ZOOM-DEPENDENT CAMERA CALIBRATION IN CLOSE-RANGE PHOTOGRAMMETRY

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Keywords: Zoom-dependent calibration, self-calibration, close-range photogrammetry, zoom lens, distortion variation

Abstract. The application of consumer-grade cameras for photogrammetric measurement has traditionally been subject to the requirement that imagery is recorded at fixed zoom and focus settings. The camera is then metrically calibrated, usually via self-calibration, for the lens setting employed. This requirement arises since camera parameters, and especially principal distance and lens distortion coefficients, vary significantly with zoom/focus setting. A recently developed process, titled zoom-dependent (Z-D) calibration, removes the necessity for the zoom setting to be fixed during the image capture process. Implementation of Z-D calibration requires that the camera be pre-calibrated at four or more focal settings within the zoom range, nominally at shortest and longest focal lengths, and at two mid-zoom settings. This requirement, coupled with issues of data management in carrying different focal settings for potentially every image within a bundle adjustment, has largely accounted for the reason that Z-D calibration has not previously been implemented within COTS software for close-range photogrammetry. The objective of this paper is to describe the practical implementation of Z-D calibration within software, along with its associated workflow, and to discuss issues that impact upon the accuracy, reliability and appropriateness of the technique. Experimental testing is used to highlight the merits and shortcomings of ZD calibration.

[Conference Paper](#) (PDF, 1404 KB)

Citation: Fraser, C. S., Cronk, S., and Stamatopoulos, C.: IMPLEMENTATION OF ZOOM-DEPENDENT CAMERA CALIBRATION IN CLOSE-RANGE PHOTOGRAMMETRY, Int. Arch. Photogramm. Remote Sens. Spatial Inf. Sci., XXXIX-B5, 15-19, doi: 10.5194/isprsarchives-XXXIX-B5-15-2012, 2012.

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