MECHANICAL CALIBRATION AND ALIGNMENT OF AN AERIAL PHOTOGRAMMETRIC FILM SCANNER BASED ON A 2D ARRAY CAMERA

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Abstract

Mechanical calibration and alignment are fundamental steps in the development of any new aerial photogrammetric scanner. One aim of a film scanner in the digital era is to digitise the accumulated historic archives of images belonging to photogrammetric institutes. The present analysis is centred on a scanner with a translating 2D array camera. Two phases of equal importance can be outlined: the first phase is the alignment of all the mechanical parts inside the scanner, and the second is mechanical calibration, when the systematic effects in the camera positioning are measured and compensated. Among the design requirements of this scanner was to avoid the need for geometrical modification of the scanned images: they should be acquired in the correct position and not require a posteriori correction with a software routine. The proposed solutions lead to a final result of a metrologically satisfactory scanner with a geometric uncertainty of 2 lm or less throughout the frame (250mm·250 mm), a value definitely smaller than the pixel size (10 lm/pixel).

Keywords: aerial photography, calibration, camera, measurement, metrology, photogrammetric film scanner