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AUTOMATIC ORIENTATION OF LARGE BLOCKS OF OBLIQUE IMAGES

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Abstract. Nowadays, multi-camera platforms combining nadir and oblique cameras are experiencing a revival. Due to their advantages such as ease of interpretation, completeness through mitigation of occluding areas, as well as system accessibility, they have found their place in numerous civil applications. However, automatic post-processing of such imagery still remains a topic of research. Configuration of cameras poses a challenge on the traditional photogrammetric pipeline used in commercial software and manual measurements are inevitable. For large image blocks it is certainly an impediment. Within theoretical part of the work we review three common least square adjustment methods and recap on possible ways for a multi-camera system orientation. In the practical part we present an approach that successfully oriented a block of 550 images acquired with an imaging system composed of 5 cameras (Canon Eos 1D Mark III) with different focal lengths. Oblique cameras are rotated in the four looking directions (forward, backward, left and right) by 45° with respect to the nadir camera. The workflow relies only upon open-source software: a developed tool to analyse image connectivity and *Apero* to orient the image block. The benefits of the connectivity tool are twofold: in terms of computational time and success of Bundle Block Adjustment. It exploits the georeferenced information provided by the *Applanix* system in constraining feature point extraction to relevant images only, and guides the concatenation of images during the relative orientation. Ultimately an absolute transformation is performed resulting in mean re-projection residuals equal to 0.6 pix.

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