FEASIBILITY STUDY OF VBS-RTK GPS SUPPORTED AERIAL TRIANGULATION FOR UAV IMAGES USING CONTROL ENTITY AS CONTROL POINTS

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ABSTRACT: Recently, UAV (Unmanned Aerial Vehicle) can be used in civil purpose such as mapping and disaster monitoring. UAV can collect high resolution images and fly under the cloud for mapping demands. VBS-RTK GPS (Virtual Base Station-Real Time Kinematic GPS) technique can be used to support bundle adjustment aerial triangulation of UAV images to reduce the demands of GCPs (ground control points). The offset between projection center and GPS antenna is solved by introducing the drift parameter for each strip. Additionally, self-calibration bundle block adjustment can be employed in aerial triangulation to overcome the imperfect calibration of non-metric camera. However, GCPs are still necessary to perform VBS-RTK GPS supported aerial triangulation for the precise position and orientation of UAV images. In Taiwan, there are lots of historic aerial photogrammetric projects for large scale cartographic mapping. If GCPs, called as control entities, can be obtained from these projects, it can reduce the costs for surveying GCPs and can improve the efficiency of aerial triangulation for UAV images. Therefore, this study will investigate the feasibility of GPS supported self-calibration bundle adjustment for UAV images by using control entity as GCPs. Meanwhile, the appropriate configuration of control entity for VBS-RTK GPS supported self-calibration bundle adjustment for UAV images will be proposed in this study.

KEY WORDS: UAV, aerial triangulation, VBS-RTK GPS, self-calibration, GPS camera offset, control entity;