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THE DIRECT GEOREFERENCING APPLICATION AND PERFORMANCE ANALYSIS OF UAV HELICOPTER IN GCP-FREE AREA

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Abstract. There are many disasters happened because the weather changes extremely in these years. To facilitate applications such as environment detection or monitoring becomes very important. Therefore, the development of rapid low cost systems for collecting near real-time spatial information is very critical. Rapid spatial information collection has become an emerging trend for remote sensing and mapping applications. This study develops a Direct Georeferencing (DG) based Unmanned Aerial Vehicle (UAV) helicopter photogrammetric platform where an Inertial Navigation System (INS)/Global Navigation Satellite System (GNSS) integrated Positioning and Orientation System (POS) system is implemented to provide the DG capability of the platform. The performance verification indicates that the proposed platform can capture aerial images successfully. A flight test is performed to verify the positioning accuracy in DG mode without using Ground Control Points (GCP). The preliminary results illustrate that horizontal DG positioning accuracies in the x and y axes are around 5 meter with 100 meter flight height. The positioning accuracy in the z axis is less than 10 meter. Such accuracy is good for near real-time disaster relief. The DG ready function of proposed platform guarantees mapping and positioning capability even in GCP free environments, which is very important for rapid urgent response for disaster relief. Generally speaking, the data processing time for the DG module, including POS solution generalization, interpolation, Exterior Orientation Parameters (EOP) generation, and feature point measurements, is less than 1 hour.

[Conference paper](#) (PDF, 1237 KB)

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