

A Simulation of Creation Digital Elevation Model for Inland Flood by UAV

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Abstract:

Some inland flood regarded by a climate change have occurred in Southeast Asia. Usually, an inland flood is generated at flat place. In order to carry out the simulation of the flow of the inland flood, highly precise DTM is needed. The purpose of this study is to generate highly precise DTM less than 10cm accuracy using the UAV. Accuracy of 10cm is required by the specialist in hydrology. As the first stage of this study, the geometric model of the UAV is created by some makers are installed in the ground with calibration of the camera. The UAV called Grass Hopper with 6 propellers was developed by Information and Science Techno-System Co.,Ltd in Japan.

The experiment was carried out as follows. Firstly, the distortion of the camera lens was corrected in the laboratory because commercially cameras were used in this experiment. 6 points makers as tie points and more over 10 points makers as validation points were installed, because the UAV cannot be detected the position and orientation of the loaded camera. As an example of an experiment, the geometry of the UAV shows that the camera base length was 2m, the UAV height was approximately 20m, and ground resolution was 4mm.

As the results, the accuracy of generating DTM was $X=3.8\text{cm}$, $Y=5.5\text{cm}$, $Z=-6.3\text{ cm}$ in average, $X=0.1\text{cm}$, $Y=1.0\text{cm}$, $Z=0.2\text{ cm}$ in Standard Division. This experiment showed that UAV has a capability to generate highly precise DTM less than 10cm accuracy.

Keyword: UAV, DTM, 3D Model, Photogrammetry

