

Mapping the Outermost Small Islands Utilizing Uav–Based Aerial Photography

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SUMMARY

This paper shows some experiences in mapping the outermost small islands near Indonesia boundary line that utilizing UAV (Unmanned Aerial Vehicle)-Based aerial photography. Some notes that should be emphasized are described, which are practical advantage and disadvantages in operation; automation in production; geometric accuracy, and potential for future applications. The UAV's aerial platform is made from the regular R/C-Aeromodeling that can carry point and shoot camera type for capturing aerial photo in certain formation with 85% overlap and 20% sidelap. The aerial platform has avionic system (ardupilot open source) that use for auto piloting during photo flight. Those instruments are keeping the aerial sub-system cost less than 2500US\$. The GPS Surveying with OEM UBLOX-GPS receiver is used for Ground Control Survey and record raw data tracking during photo-flight. More than 300 amount of aerial photos captured in each flight. Furthermore, the structure from motion algorithm is used for processing aerial photo to produce basic Orthophoto and Digital Surface Model (DSM). Then, both of Orthophoto image and DSM information are used for producing vector map and contour map. This technique can produce accuracy less than 2 times Ground Sampling Distance (GSD) for Horizontal position and 4 times GSD for DSM information. Aerial Photography with GSD number 15cm is enough produce map scale up to 1/2500. From those experiences can be founded that aerial photo that captured in the daylight afternoon is more advantages than in the morning, because in the clear shallow water near the beach, some underwater object can be seen. One of the challenges in working at the small islands with the UAV-based is the windy condition. In future, the UAV's system manufactures are increase and the tele-control range is more long distance also. This make UAV-based mapping can be operated in more big area coverage and more stable also.