

Towards Augmented Topographic Map: Integration of Digital Photograph Captured from MAV and UAV Platforms

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SUMMARY

Unmanned Aerial Vehicle (UAV) is a small unmanned aircraft that can be programmed to fly based on a flight instruction computerized that includes navigation software in the aircraft. The remotely piloted plane, embedded with camera for image capture communicates with the ground control system using radio and Global Positioning System (GPS). The UAV have been used in the military purposes, especially in intelligence reconnaissance and surveillance tasks. However, the rapid growth in mapping technology and the decrease of costs related to UAV technology has caused researchers in the field of applied geomatics and GIS to evaluate the capabilities of UAV to perform aerial mapping, as an alternative to commercial aircraft. In the framework of such activities, a UAV deployment exercise was organized in the Department of Survey and Mapping Malaysia (DSMM) mainly aimed at assessing the operational procedures to deploy UAV for large-scale topographic map revision task and the usability of the acquired data in feature-by-feature map updating. A test area was selected to capture images and automated image processing was carried out. Corrected images were then mosaicked and ortho-photographs generated and digitized to produce geospatial data for map updating. UAV was flown in the area where ortho-photographs were produced previously using normal manned aircraft. In the paper the technical features of the UAV platforms will be described, highlighting the main advantages/disadvantages of using UAV as compared to normal manned aircraft. Discussion and assessment will be made in term of the cost of operation, time required to carry out each step, highlighting potential hindrances and in view of the law and regulation basis. Different methodologies for the processing of the acquired data will be described and deliberated, evaluating the suitability for fast data capture and map updating. Map accuracy achieved is also analysed thus reviewing its suitability for accurate large scale topographic map revision. It is acknowledged that UAV with mapping system embedded can be utilised to produce orthophotographs up to the DSMM standard and is very appropriate for use in the process of map updating. It is envisaged that the UAV system contributed significantly to the rapid acquisition of

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imagery data to support map updating. Furthermore, the introduction of the UAV system would expedite the geospatial development program, including fast and systematic map updating procedure, in order to meet the demand of spatially-enabled government and society in Malaysia.

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