

The Mapping Accuracy of Low-Cost UAV- Based Laser Scanner System: a Case Study of Hokuyo UTM30lx Laser Scanner

Anh Thu Phan Thi (Vietnam) and Kazuyoshi Takahashi (Japan)

Key words: Laser scanning; Low cost technology; Positioning; Laser scanner, UAV, accuracy, low cost, positioning

SUMMARY

A cheap, compact, light-weight UAV-based laser scanner system was developed. The developed system, powered by Pin Lithium Polymer (LiPo), consists of a hex-rotor aircraft DJI S800 with the 3-axis gimbal (TAROT 5D) carrying the Hokuyo UTM30LX laser scanner, an ultra-small motion logger (Ninja Scan Light), GPS receiver and a single-board PC (Raspberry Pi). The test flights in Kumamoto prefecture had been performed in 2014. The point clouds were collected with the setting of a 100° of field of view and 0.25° of angular resolution at the height of about 7 meters from the ground surface. There were 9 markers arranged within the study area. Their coordinates were measured with total station and used as reference value for accessing the accuracy of generated 3D laser point clouds. The locations of markers were identified, and their observed coordinates were manually measured from the intensity image of observation data. By using magnetic data for determining flight direction and applying Helmert transformation with four ground control points, the developed system could achieve a mapping accuracy of 0.04 m in both horizontal and vertical direction. The results show the capability of generating a large-scale map with the low-cost UAV-based laser scanner system.

The Mapping Accuracy of Low-Cost UAV- Based Laser Scanner System: a Case Study of Hokuyo UTM30lx Laser Scanner (9871)

Anh Thu Phan Thi (Vietnam) and Kazuyoshi Takahashi (Japan)

FIG Working Week 2019

Geospatial information for a smarter life and environmental resilience

Hanoi, Vietnam, April 22–26, 2019