Accuracy Assessment of Geospatial Data obtained using an UAV-based System with Autonomous Flight Capability

Accuracy Assessment of Geospatial Data obtained using an UAV-based System with Autonomous Flight Capability

*岡本 淳之介[1]、島崎 彦人[1]
*Jun-nosuke Okamoto[1], Hiroto Shimazaki[1]

1.独立行政法人国立高等専門学校機構 木更津工業高等専門学校
1.National Institute of Technology, Kisarazu College

Unmanned Aerial Vehicle (UAV) has been increasingly becoming an important tool for collecting geospatial data in various industrial and research domains. Very high spatial-resolution imagery acquired from UAV has made the land surveying in small areas more flexible and cost-effective, as compared to conventional methods with a Total Station or a Terrestrial Laser Scanner. However, the UAV specifically designed for land surveying applications is still expensive and having exaggerated specifications and, this might be an obstacle to introduce UAV into educational institutions. To improve the educational opportunity of the UAV surveying method, reliable UAV equipment at reasonable cost are needed.
This study preliminary evaluated the positional accuracy and attribute accuracy of geospatial products derived from a set of digital imagery, which was obtained using a commercially-available inexpensive small UAV-based system. First, ground control points (GCPs) to be used for georeferencing geospatial products and reference points to be used for validation of positional accuracy were deployed over the entire study site, and their 3-dimensional coordinates were measured with static GNSS surveying method and radiation method with Total Station. Second, three types of geospatial products, i.e., (1) orhtomosaic image, (2) Digital Surface Model (DSM), and (3) landcover map, were generated using a set of imagery obtained by Ricoh GR mounted on Phantom 2 Vision +. Third, positional accuracy of orthomaic image and DSM was assessed based on the Root Mean Square Error (RMSE) between the Photo Identifiable Features (PIFs) on the geospatial products and the reference points. Fourth, attribute accuracy of landcover map was assessed based on Cohen's kappa coefficient. Preliminary results showed that the positional accuracy and attribute accuracy were both acceptable for educational purposes.

キーワード：Unmanned Aerial Vehicle、Geospatial Data、Accuracy Assessment
Keywords: Unmanned Aerial Vehicle, Geospatial Data, Accuracy Assessment

