FUSION OF MOBILE LASER SCANNING AND UAV DATA FOR CARTOGRAPHY PURPOSES

Vladimir A. Seredovich, Maxim A. Altyntsev
Siberian State University of Geosystems and Technologies, Russian Federation

KEYWORDS: mobile laser scanning, UAV, cartography, digital elevation model, horizontal and vertical object position

ABSTRACT

Both mobile laser scanning (MLS) and UAV aerial survey are new techniques in surveying. Data obtained are mainly used in cartography for large scale topographical mapping and for 3D modelling. Both MLS and UAV aerial survey used for cartography purposes have their own pos and cons. If we use UAV aerial survey, the topographic plans are created based on a digital surface model (DSM) in the form of a point cloud and an orthophoto plan. The point cloud is generated from pairs of non-metric UAV images. An orthophoto plan should be used for determining the horizontal object position, whereas a point cloud – for determination of the vertical object position. If we use MLS data, a point cloud is applied for determination of both horizontal and vertical object position. The horizontal accuracy of both techniques is usually sufficient for creating a topographic plan at any scale. In case of generating contours it is important to be sure that low points belong to the ground. Digital elevation model (DEM) is generated by means of low point extraction from the whole point cloud. In some cases UAV aerial survey can provide reliable position of ground, in other cases – only MLS. Depending on an area, it is necessary to choose any surveying technique which is more suitable. For built-up areas actually without vegetation and for areas having large slopes it is better to apply UAV aerial survey. For areas with dense vegetation layer MLS is more suitable because the laser beam can penetrate through the vegetation layer. Thus, it is more difficult task to generate contours with appropriate accuracy using data obtained both from UAV aerial survey and MLS. The better decision is fusion of point clouds from MLS and UAV data. Then advantages of both techniques can be combined. The method of MLS and UAV data fusion is described. The results of data fusion are presented for a highway in Novosibirsk Region.

CONTACTS

Prof. Vladimir A. Seredovich
ISPRS Working Group IV/2 Chair
SSUGT
10, Plakhotnogo Str.
Novosibirsk, 630108, Russian Federation
Phone: + 7 (383) 343 39 57
E-mail: v.seredovich@llst.ru

Maxim A. Altyntsev, Ph.D.
SSUGT
10, Plakhotnogo Str.
630108, Novosibirsk
Russian Federation
Tel. +7 9529152980
Email: mnbcv@mail.ru