The Analysis of GPS Signal Short–term Loss Influence on the Accuracy of Mobile Laser Scanning Data

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Key words: mobile laser scanning; accuracy estimation; GPS signal loss

SUMMARY

The Analysis of GPS Signal Short-term Loss Influence on the Accuracy of Mobile Laser Scanning Data Maxim A. ALTYNTSEV, Roman A. POPOV Russian Federation Key words: mobile laser scanning, accuracy estimation, GPS signal loss SUMMARY The results of mobile laser scanning data accuracy obtained for the same area under various conditions are presented. For the purposes of investigations there was chosen in Novosibirsk Region a nonlinear road with a length of 1 km. Gage marks were painted by white color on both sides of asphalt pavement every 50 meters. Paint marking coordinates were measured by a total station. When the marks painted, scanning was done three times by the LYNX Mobile Mapper M1 system. The mobile scanning system was calibrated in advance. The first scanning was carried out in a forward direction, the second in a backward direction. Then the GPS antenna installed on the mobile laser scanning system was switched-off and the test road section was scanned for the third time. The GPS antenna's switching off was done in order to simulate a GPS signal loss which appears during moving through various tunnels. The main goal of analysis was to determine the GPS signal loss influences on the quality of obtained data. In case of GPS signal losses coordinates of a scanning system's motion trajectory are determined only by means of the inertial navigation system. The more GPS signal loss duration, the lower accuracy of obtained data. Furthermore, the final accuracy significantly depends on how such trajectory will be adjusted by POSPac MMS software. The adjustment method of mobile laser scanning data obtained by LYNX Mobile Mapper M1 and using POSPac MMS, DASHMap and TerraSolid software is described. The results of relative and absolute accuracy estimation of mobile laser scanning data adjustment are given.