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## LIDAR AND INS FUSION IN PERIODS OF GPS OUTAGES FOR MOBILE LASER SCANNING MAPPING SYSTEMS

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**Abstract.** Mobile laser scanning systems are becoming an increasingly popular means to obtain 3D coverage on a large scale. To perform the mapping, the exact position of the vehicle must be known throughout the trajectory. Exact position is achieved via integration of Global Positioning Systems (GPS) and Inertial Navigation Systems (INS). Yet, in urban environments, cases of complete or even partial GPS outages may occur leaving the navigation solution to rely only on the INS. The INS navigation solution degrades with time as the Inertial Measurement Unit (IMU) measurements contains noise, which permeates into the navigation equations. Degradation of the position determination leads to loss of data in such segments. To circumvent such drift and its effects, we propose fusing INS with lidar data by using building edges. This detection of edges is then translated into position data, which is used as an aiding to the INS. It thereby enables the determination of the vehicle position with a satisfactory level accuracy, sufficient to perform the laser-scanning based mapping in those outage periods.

[Conference Paper](#) (PDF, 508 KB)

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