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THE PERFORMANCE ANALYSIS OF A 3D MAP EMBEDDED INS/GPS FUSION ALGORITHM FOR SEAMLESS VEHICULAR NAVIGATION IN ELEVATED HIGHWAY ENVIRONMENTS

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Abstract. In this study, a 3D Map Matching (3D MM) algorithm is embedded to current INS/GPS fusion algorithm for enhancing the sustainability and accuracy of INS/GPS integration systems, especially the height component. In addition, this study propose an effective solutions to the limitation of current commercial vehicular navigation systems where they fail to distinguish whether the vehicle is moving on the elevated highway or the road under it because those systems don't have sufficient height resolution. To validate the performance of proposed 3D MM embedded INS/GPS integration algorithms, in the test area, two scenarios were considered, paths under the freeways and streets between tall buildings, where the GPS signal is obstacle or interfered easily. The test platform was mounted on the top of a land vehicle and also systems in the vehicle. The IMUs applied includes SPAN-LCI (0.1 deg/hr gyro bias) from NovAtel, which was used as the reference system, and two MEMS IMUs with different specifications for verifying the performance of proposed algorithm. The preliminary results indicate the proposed algorithms are able to improve the accuracy of positional components in GPS denied environments significantly with the use of INS/GPS integrated systems in SPP mode.

[Conference Paper](#) (PDF, 918 KB)

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