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DETECTION OF GNSS SIGNALS PROPAGATION IN URBAN ENVIRONMENTS USING GNSS
MULTIPATH PROPAGATION MODEL**Abstract**

This paper deals with the problem of reflected GNSS (Global Navigation Satellite System) signals, which are responsible for distorting the information on the actual user position, and with a novel method on their mitigation and utilization. For decades, GNSSs have been serving well in all areas of human activity. Thanks to augmentation systems, their accuracy is sufficient under usual conditions of the applications. However, the problem arises when the position has to be determined in complex environments, such as narrow streets, mountain valleys etc., where the signal tends to be reflected, diffracted or even blocked from various obstacles, leading to un-modelled GNSS errors in position estimation. Therefore in order to detect and mitigate the impact of multipath, a new model of multipath signal propagation in a dynamic environment is proposed - using the ray-tracing algorithm, 3D building model, known positions of individual satellites acquired from the navigation message, and assumed position of the user. The model is established and validated using experimental, as well as real data. This is a very pressing problem especially for complex environments and situations where positioning with highest accuracy is required – i.e. in areas such as the navigation for the visually impaired or future navigation of unmanned vehicles.