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FURTHER APPROACH TO THE GNSS LOCALIZATION ACCURACY ESTIMATION WITH RESPECT TO THE NAVIGATED OBJECT EARTH POSITION AND THE SEASON PERIOD ADVISEMENT

Abstract

When the static object or moving vehicle is navigated, the GNSS satellite constellation is considered as crucial condition for the best accuracy acquisition. Although an occurrence of various systematic errors is practicable, presently employed methods are sufficient enough for such kind of errors suppression. According to various algorithms implemented in the GNSS receiver's core as well as various supportive techniques as SBAS or LAAS consideration, presently employed receivers could distinguish which satellites shouldn't be regarded inside the navigation process. This allows the receiver to differentiate between features "Satellites-in-View" and "Satellites-in-Use". Via DOP values checking the elevation and power mask may be set to accept no satellites with strength below a certain threshold. The GNSS signal availability and reliability is in this case dependent on the receiver's signal tracking performance and its reacquisition time. The elevation angles between the receiver and the satellite provide information about signal distortion by multipath, by Atmospheric (Tropospheric) delays and by Line-of-sight blocking. Considering Tropospheric effect signal delays could be calculated from several models that as an input use average and seasonal variation data related to the receiver's position. In this paper the method for GNSS localization accuracy analysis with respect to the navigated object Earth Northing and Easting position will be evaluated. Various dynamic measurements in Slovakia, Germany and Austria were already taken. According to RMS and Satellites-in-use receiver's features analysis, the most appropriate cardinal direction for GNSS navigation of dynamic object among specific area of Mid-Europe will be shown. From the long-term meteorology observations made (1951 - 2010, 2009 - 2011) an error model applicable in the specific area of Slovakia will be investigated. Model will apply NMEA and SIRF standards.