

Comparison of Triple Frequency GNSS Carrier Phase and Pseudorange noise using various satellite constellations.

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Key words: GNSS/GPS

SUMMARY

The first Global Positioning System (GPS) satellite was launched in 1978, and today there are 4 Global Navigation Satellite Systems (GNSS), with a further 7 Space Based Augmentation Systems (SBAS) and Regional Navigation Satellite Systems (RNSS) transmitting data. Further to this, these systems consist of three basic types of satellite orbits, namely Mid Earth Orbiting (MEO), Geosynchronous Orbits (GEO) and (IGSO) Inclined Geosynchronous Orbits. It is now possible to see and take measurements up to almost 50 satellites at any instant.

This paper looks at the quality of the data from GPS, BeiDou, Galileo and QZSS, looking at the different satellite constellations used, as well as the different frequencies and also the historical satellite systems such as the various GPS blocks. The approaches used in this paper, are those also used for cycle slip detection. These are namely the range residual (code-carrier), Melbourne Equation, and the Ionospheric Residual. In this paper, however, the noise of these combinations are investigated and compared, illustrating the expected measurement precisions from the different types of satellites, and their comparisons.

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(9452)

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FIG Congress 2018

Embracing our smart world where the continents connect: enhancing the geospatial maturity of societies
Istanbul, Turkey, May 6–11, 2018