Analysis and Comparison of a GPS/Beidou GNSS Signal Performance

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SUMMARY

The University of Nottingham Ningbo China (UNNC) has full access to the Beidou system, QZSS, GLONASS, Galileo and GPS on its campus. Currently UNNC has a number of GNSS receivers that can access the multi-GNSS constellation, these being a ComNav triple frequency GPS/BDS/GLONASS system, Unicore UR240-CORS-II and UR240-RTK GPS/BDS receivers, Javad SIGMA and TIUMPH-VS multi GNSS receivers, Leica GR25, GR10, GS10 GPS/GLONASS receivers, Septentrio AsteRx2eL multi-GNSS receivers, as well as U-Blox NEO-7P GPS receivers. In addition to this, UNNC owns a Spirent GSS8000 GPS, GLONASS, Galileo and BeiDou hardware simulator. Currently, it is typical to observe 30 or more GNSS satellites at any time at UNNC, allowing the campus to be an excellent test bed for such work. This paper brings together some initial results, processed with in-house software, to illustrate the performance of the BDS solution, compared to the GPS solution, and a combined BDS/GPS solution. These tests include the results of zero baseline tests using 24 hours of GPS/BDS data. The results illustrate that the GPS solution has RMS values of 1.22mm, 1.03mm and 3.7mm in Northings, Eastings and Height components respectively, GPS has RMS values of 0.81mm, 0.67mm and 1.94mm in Northings, Eastings and Height components respectively, and a combined GPS/BDS solution has RMS values of 0.69mm, 0.62mm and 1.71mm in Northings, Eastings and Height components respectively.