

A Long-Term and Long Baseline Multi-Constellation GNSS All In View Test - Using CGGTTS 2.E Files

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The GPS P3 all in view [1] (AV) is the most popular method for inter-national-lab time comparison, occupy more than 60% UTC time links. As the use of Galileo satellite system is getting popular and already demonstrates excellent performance, in this paper, we combined the GPS P3 and Galileo E3 CGGTTS files for AV time transfer to make the results more representative and redundant. We calculated the GPS-Galileo time offset [2] (GAGP) from several intercontinental GNSS sites rinex observations and found they were basically consistent within ns, that's we could combine the GPS and Galileo system time as the common reference to implement the typical AV time transfer. We calculated one year (MJD 59945-60309) GNSS AV time comparison results between PTB, TL, USNO, and OP, the results showed the short term stability of GNSS E3+P3 AV was a slightly more stable than Galileo E3 AV but better than GPS P3 AV, and all were consistent in long term.

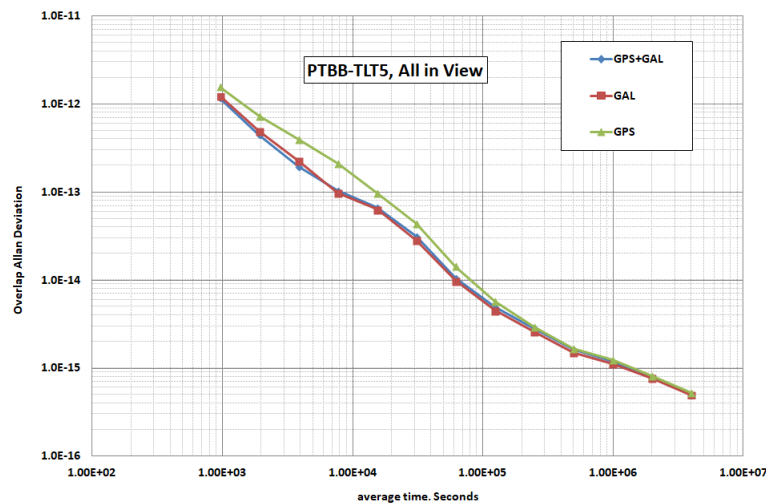


Fig. 1: The overlap Allan Deviation of PTBB-TLT5, by GNSS P3+E3 (blue dots), GAL E3 (red dots:), and GPS P3 (green dots).

References:

- [1] Z. Jiang and G. Petit, "Time transfer with GPS satellites all in view", *ATF2004: 18–19 Oct. 2004*. Beijing
- [2] G. Signorile, I. Sesia, T. T. Thai, P. Defraigne and P. Tavella, "Galileo and GNSS time offsets," *2018 European Frequency and Time Forum (EFTF)*, Turin, Italy, 2018, pp. 276-280, doi: 10.1109/EFTF.2018.8409048.
- [3] P. Defraigne and K. Verhasselt, "Multi-GNSS time transfer with CGGTTS-V2E," *2018 European Frequency and Time Forum (EFTF)*, Turin, Italy, 2018, pp. 270-275, doi: 10.1109/EFTF.2018.8409047.