

The Time Service Performance Evaluation of GNSS

LI Wei, XU Yongliang*, YUAN Haibo+

National Time Service Center/ Key Lab of Time-frequency Standard of
the Chinese Academy of Sciences, Xi'an Shaanxi China

* National Time Service Center/ Key Laboratory of Precision Navigation
and Timing Technology, Xi'an Shaanxi China

+ National Time Service Center/ Key Lab of Time-frequency Standard of
the Chinese Academy of Sciences, Xi'an Shaanxi China

Email: kim_weili@ntsc.ac.cn

Abstract: Time service is the most important function of GNSS, the time difference of UTC and GNSST is needed to broadcast in the GNSS navigation message to make the user get the coordinated universal time (UTC) through receiving the satellite navigation signal. But because of the lag of the UTC, usually the content broadcasted by GNSS is not the time difference of UTC and GNSST, but the time difference of national standard time, UTC(k) and GNSST. Many users trace to the UTC(k) according to the traceability model parameters broadcasted by GNSS, this is ok for the users in country area, but with the development of multi-mode navigation technology, it is necessary to using the UTC as a unified time reference for the user in different regions and countries with GNSS compatibility and interoperability, so the performance of user getting UTC through GNSS is needed to evaluated. From the perspective of the user, a testing and evaluation method of GNSS time service performance is put forward in this paper. Using the UTC (NTSC) as the user's local time, through the GPS, GLONASS and Beidou multimode receiver signal, the time difference of UTC (NTSC) and UTC(k) broadcasted by GNSS is got, to amend the UTC (k) to UTC with the Circular T issued by BIPM, the complete time service is obtained. In order to evaluate the time service performance, the time difference of UTC(NTSC) and UTC is obtained with Circular T as a reference to be compared and analyzed with the time service results of GPS, GLONASS and Beidou, the results show that the GPS time service deviation is controlled within $\pm 15\text{ns}$, and the error is small, the performance is higher than Beidou and GLONASS.

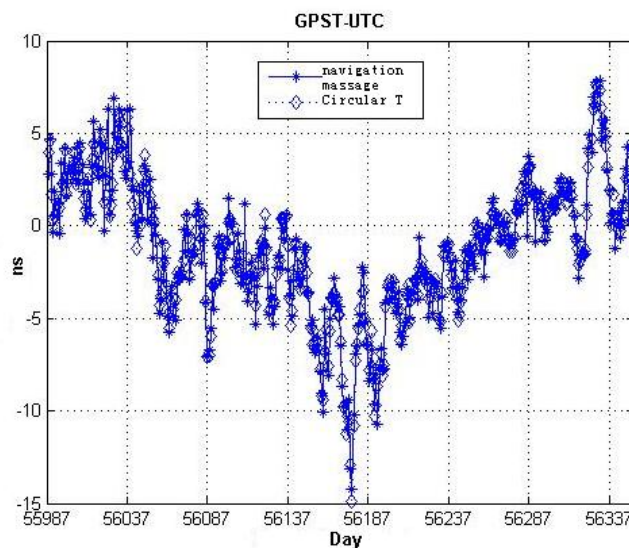


Fig. 1: GPST-UTC