

RECOMMENDATION

On the use of existing time scales to generate GNSS inter-system information

The Consultative Committee for Time and Frequency (CCTF)

realizing that

- Multi-GNSS is more and more used in the scientific and industrial world for time synchronization and syntonization,
- Multi-GNSS users need to consider the variable time offset between the individual system times, also called inter-system bias,
- In situations of good visibility, the inter-system biases can be determined from the GNSS measurements, while in other situations a broadcast value may be needed,

considering that

- The inter-system bias can be obtained by the user from the broadcast information of the offset of each GNSStime versus a unique reference,
- The International Committee on GNSS (ICG) of the United Nations recently discussed methods to identify a common time scale to be used as reference for GNSStime offsets,
- Each GNSS broadcasts a prediction of (UTC-GNSStime), but with the UTC term based on different UTC(k) time scales,
- These UTC(k) time scales are regularly compared to UTC in the BIPM Circular T, and are kept in strict agreement with UTC within some nanoseconds,
- Multi-GNSS receivers can determine the inter-system biases from the predictions of (UTC-GNSStime) using the UTC term as common reference,
- Recent studies have confirmed that with the current differences between the UTC terms in the broadcast predictions of (UTC – GNSS time), the error on the inter-system bias when the UTC term is used as common reference has no significant impact on positioning and timing in situations where mass-market receivers cannot determine the inter-system bias from the measurements,

noting that

- The CIPM decided (Decision CIPM/108-41) to support the International GNSS service (IGS) and the International GNSS Committee (ICG) in exploring the capacity of GNSS providers to ensure multi-GNSS interoperability, based on Coordinated Universal Time (UTC), with the final goal of avoiding the proliferation of international reference time scales,
- Resolution 2 of the 26th CGPM (2018) states that UTC is the only recommended time scale for international reference,

recommends that

- GNSS providers and multi-GNSS stakeholders consider the benefit of using the predictions of (UTC-GNSStime) as reference for computing the inter-system biases, which avoids the need to create an ad-hoc common reference time scale,
- GNSS providers continue their efforts to improve the prediction of (UTC-GNSStime) with the help of time laboratories,

and further recommends that

- Multi-GNSS receiver manufacturers explore the possibility to obtain the GNSS inter-system biases from these predictions of (UTC-GNSStime),
- The International Committee on GNSS of United Nations supports this recommendation.