

RECOMMENDATION CCTF-24-1

On the development of a common Lunar reference time scale and its traceability to UTC

The Consultative Committee for Time and Frequency (CCTF), at its 24th - Session 1 meeting in 2024,

Considering

- that national and international space agencies are launching projects aimed at establishing communication and navigation systems on or around the Moon, and the necessity for interoperability among them;
- the requirement for these communication and navigation systems to rely on a reference coordinate system and a reference time scale;
- that Resolution III “on the establishment of a coordinated lunar time standard by international agreement,” adopted in 2024, by the International Astronomical Union (IAU) XXXIIInd General Assembly, states that
 - o “considering that UTC has been a successful worldwide reference time scale for operational systems in the near-Earth environment;
 - o recommends the establishment of a lunar reference time scale by international agreement and that the relationships between the possible versions of a lunar reference time scale and other time scales, in particular a lunar coordinate time and UTC, are pursued in collaborative agreement among the relevant international organizations”.

Noting

- the creation in 2024 of a Working Group-L on Lunar PNT by the International Committee on GNSS (ICG) “to be coordinated, as needed, with other ICG Working Groups and with external international organizations, such as the BIPM, to support standardization of lunar time with traceability to UTC”;
- the work of the International Association of Geodesy (IAG) WG1.1.3 on Lunar Reference Frames;
- the studies at International Telecommunication Union – Radiocommunication (ITU-R) carried out by WP 7B, with contribution of WP 7A, on the allocation of frequency bands for future communication systems on the lunar surface and between lunar orbit and the lunar surface.

And further noting

- that the above International Organization have requested collaboration and support from the BIPM concerning the definition and realization of reference time scales.

Considering that the expertise of BIPM and CCTF in precision timekeeping can:

- help identify key issues in time scale realization, dissemination, synchronization, traceability to UTC and uncertainty evaluation;
- foster collaboration between metrology institutes and space agencies to develop shared reference standards that ensure interoperability and comparability of measurements.

Recalling

- that, in agreement with the CCTF WG on Strategic Planning, the BIPM has started the call for a task group involving NMI colleagues with relationship with space agencies involved in Moon projects.

Recommends that

- the CCTF Task Group on Lunar timing is confirmed with the goal of:
 - o pursuing an efficient coordination between UTC laboratories and NMIs of countries connected to Moon projects, and with the concerned International Organizations and space agencies;
 - o addressing metrological questions related to a Lunar time scale definition, its practical realization, its retrace and traceability to UTC;
 - o preparing for the 24th - Session 2 meeting of the CCTF in 2025, a draft resolution to be submitted to the 28th CGPM for approval.