Time and Frequency

The Consultative Committee for Time and Frequency (CCTF)

On the use and future development of UTC – Draft Resolution D (2022)

UTC is supported by:

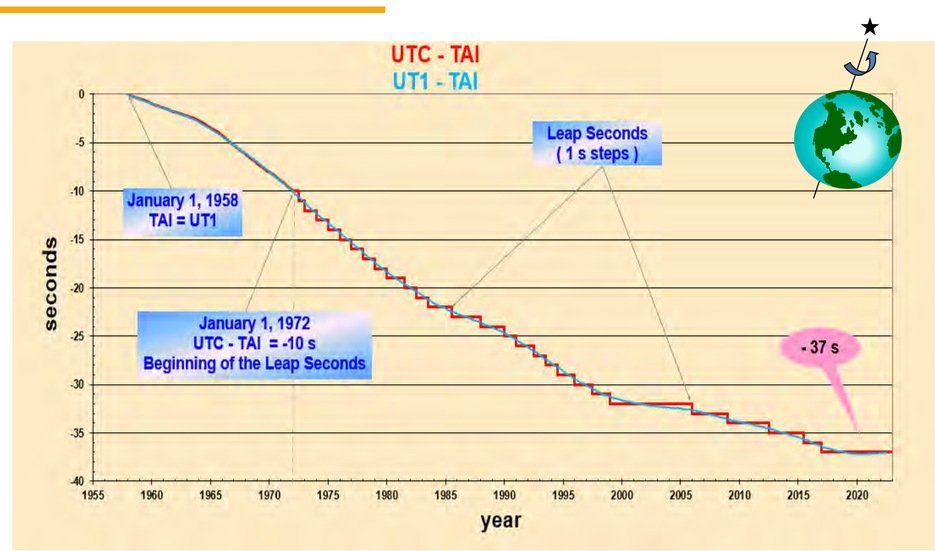
- the work of the BIPM and the 85 time laboratories providing data and realizing real-time traceability;
- the International Earth Rotation and Reference Systems Service (IERS), which publishes the difference versus the Earth rotation angle UT1-UTC;
- the work of the International Telecommunication Union - Radiocommunication Sector (ITU-R) that ensures it is correctly transmitted.

Users underpinning critical infrastructures need a **continuous** and unique timescale. Increasingly UTC is not being used by:

- most of the GNSSs;
- The “digital network giants” (for example GAFA and Alibaba);
- the most widely used Internet time synchronization protocols as NTP and PTP.

Google smear is now being proposed as an international standard.

GPS system time, which is continuous and easily accessible, is already considered as a time and frequency reference in international standards.



UTC is in agreement with the (irregular) rotation of the Earth UT1 (currently within 1 second)

UTC must be modernized to meet the needs of advanced timing and synchronization applications

Proposed way forward:

- Extend the tolerance for |UT1-UTC|.
- Consult with the ITU, IERS, IAU, and relevant organizations to propose a new maximum value for the difference (UT1-UTC) that ensures the continuity of UTC for at least a century.
- Periodically review of the new maximum value taking into account new discoveries and better understandings of the Earth rotation.

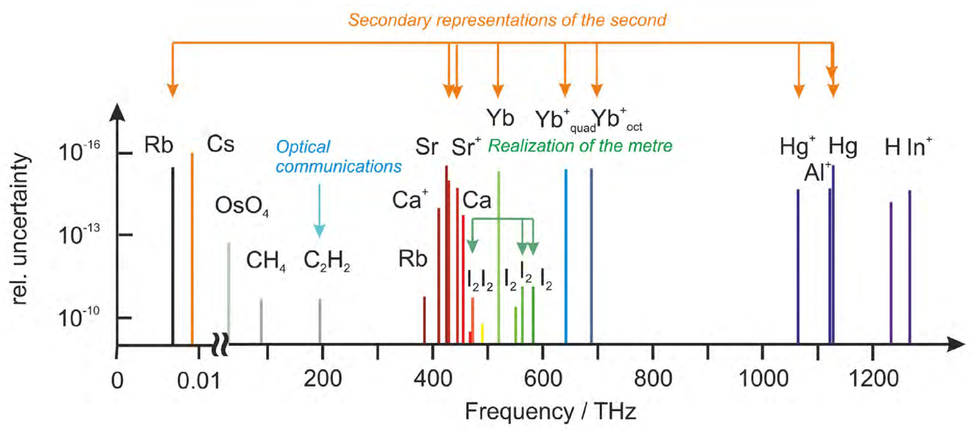
On the future redefinition of the second – Draft Resolution E (2022)

13th meeting of the CGPM (1967)

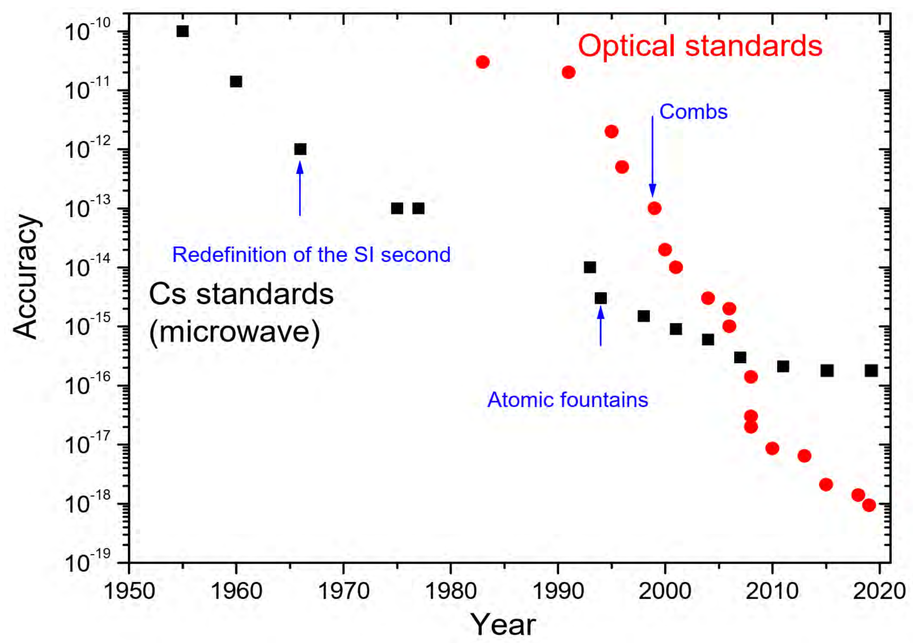
Resolution 1

The second is the duration of 9 192 631 770 periods of the radiation corresponding to the transition between the two hyperfine levels of the ground state of the caesium 133 atom.

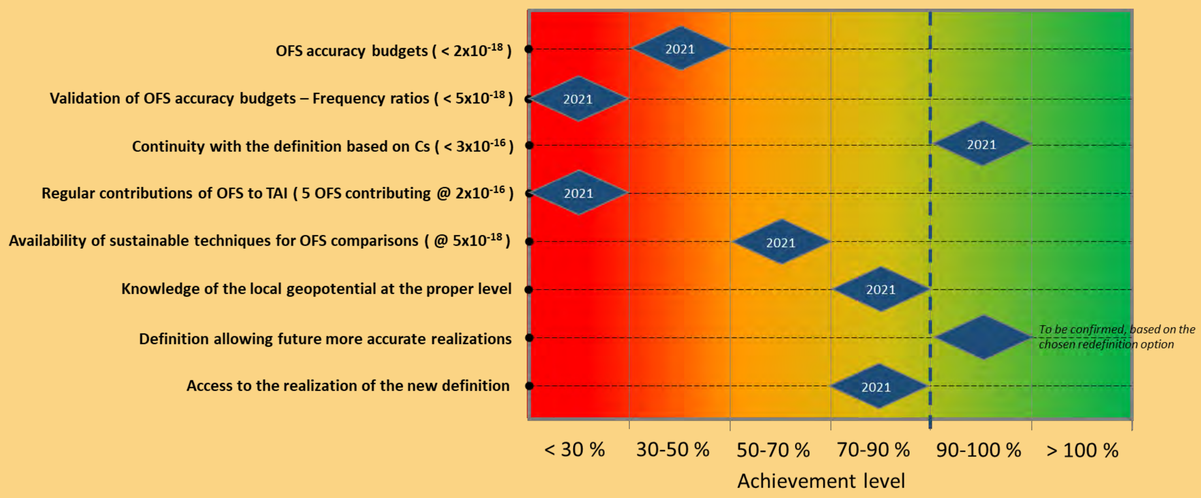
Secondary representations of the second



recommended by the CCTF/CCL



Mandatory criteria for redefinition



Clock comparison

- At the 10^{-18} accuracy level
  - Only fibre links
  - Presently limited to (sub)continental links
  - Earth-space optical links in progress
- At the 10^{-17} accuracy level
  - GNSS IPPP, TWSTFT CP, ACES MWL, …