Resolution 4 of the 27th CGPM (2022)

On the use and future development of UTC

The General Conference on Weights and Measures (CGPM), at its 27th meeting,

recalling that

- Coordinated Universal Time (UTC) is a time scale produced by the International Bureau of Weights and Measures (BIPM) with the same rate as International Atomic Time (TAI), but differing from TAI only by an integral number of seconds,
- the offset by an integral number of seconds is due to the agreement maintained between UTC and the time scale describing the angular rotation of the Earth (UT1),
- when the difference (UT1-UTC), as observed by the International Earth Rotation and Reference Systems Service (IERS), is predicted to approach 0.9 seconds, a leap second is applied according to the procedure described in Recommendation ITU-R TF.460-6 of the International Telecommunication Union Radiocommunication Sector (ITU-R),

further recalling that the CGPM at its 26th meeting (2018)

- stated that UTC is the only recommended time scale for international reference and the basis of civil time in most countries,
- recommended all relevant unions and organizations to work together to develop a common understanding on the realization and dissemination of reference time scales with a view to considering the present limitation on the maximum magnitude of UT1 - UTC to meet the needs of the current and future user communities,

welcoming the signature of a Memorandum of Understanding between the BIPM and the International Telecommunication Union (ITU), which ensures that they continue their joint work to improve global access to UTC,

noting that

- the accepted maximum value of the difference (UT1-UTC) has been under discussion for many years because the consequent introduction of leap seconds creates discontinuities that risk causing serious malfunctions in critical digital infrastructure including the Global Navigation Satellite Systems (GNSSs), telecommunications, and energy transmission systems,
- operators of digital networks and GNSSs have developed and applied different methods to introduce the leap second, which do not follow any agreed standards,
- the implementation of these different uncoordinated methods threatens the resilience of the synchronization capabilities that underpin critical national infrastructures,
- the use of these different methods leads to confusion that puts at risk the recognition of UTC as the unique reference time scale and also the role of National Metrology Institutes (and Designated Institutes) as sources of traceability to national and international metrological standards,
- recent observations on the rotation rate of the Earth indicate the possible need for the first negative leap second whose insertion has never been foreseen or tested,
- the Consultative Committee for Time and Frequency (CCTF) has conducted an extensive survey amongst metrological, scientific and technology institutions, and other stakeholders, and the feedback has confirmed the understanding that actions should be taken to address the discontinuities in UTC,

recognizing that the use of UTC as the unique reference time scale for all applications, including advanced digital networks and satellite systems, calls for its clear and unambiguous specification as a continuous time scale, with a well-understood traceability chain,

decides that the maximum value for the difference (UT1-UTC) will be increased in, or before, 2035,

requests that the CIPM consult with the ITU, and other organizations that may be impacted by this decision in order to

- propose a new maximum value for the difference (UT1-UTC) that will ensure the continuity of UTC for at least a century,
- prepare a plan to implement by, or before, 2035 the proposed new maximum value for the difference (UT1-UTC),
- propose a time period for the review by the CGPM of the new maximum value following its implementation, so that it can maintain control on the applicability and acceptability of the value implemented,

- draft a resolution including these proposals for agreement at the 28th meeting of the CGPM (2026),

encourages the BIPM to work with relevant organizations to identify the need for updates in the different services that disseminate the value of the difference (UT1-UTC) and to ensure the correct understanding and use of the new maximum value.

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The reader should note that the official version of this Resolution is the French text

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View

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