



A Report on the Recent Advances at the Consultative Committee for Time and Frequency (CCTF): Updates on the Redefinition of the Second and Continuous UTC

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The Consultative Committee for Time and Frequency (CCTF) is devoting particular attention to some hot topics that may have an important impact on time and frequency metrology.

The first one concerns the redefinition of the second based on optical transitions that have proved to be 100 times more accurately realized than the current relation of the second based on the Cesium transition. The CCTF has fixed mandatory criteria that have to be fulfilled before redefinition and National Metrology Institutes are at work to realize the requested conditions. The most demanding activities concern the realization of optical frequency standards with an accuracy budget at the low 10^{-18} , the capacity to compare different frequency standards at that level of accuracy, and the contribution of frequency measurements to the steering of UTC. The goal is still to change the definition of the second in 2030, if all the mandatory and challenging criteria will be satisfied.

The change of UTC towards a continuous time scale without the current discontinuities due to the leap seconds is progressing by discussing with the different communities of stakeholders which would be the most acceptable solutions. After having discussed with industries involved in applications of synchronization, it seems that the best solution is to avoid any time or frequency steps at least for 100 years, envisaging a possible offset between UTC and the rotational angle of the Earth, UT1, at least to 100 second or even to 1 hour. The possible insertion of a future negative leap second, due to the change in velocity of the Earth rotation, is leading the community to evaluate the need to anticipate the new procedure application, that must be applied not later than 2035.

These advances will be reported in this paper to update the URSI community on the development of the CCTF activities.