


# **CCTF President's Report**

27th CGPM (2022)



Working together to  
promote and advance  
the global comparability  
of measurement

## Report by the President of the CCTF

Dr Noël Dimarcq, President of the Consultative Committee for Time and Frequency (*Comité consultatif du temps et des fréquences*, CCTF) presented the activities of the CCTF since the 26th meeting of the CGPM (2018).

### CCTF Executive summary

The Consultative Committee for Time and Frequency (CCTF) has mainly focused the last years activities on four “hot topics,” that will require decisions in the next years. These topics are:

1. the redefinition of the SI second based on an optical transition;
2. a revision of the leap-second procedure to realize a continuous UTC;
3. the requirements for supporting the traceability to UTC through GNSS measures; and
4. the establishment of a capacity building project based on shared resources with the NMIs, and with the sponsorship of the IEEE UFFC society, to transfer the technology allowing the realization of a local robust UTC(k) time scale, and a more widespread involvement in the generation and dissemination of UTC.

A *Metrologia* special Focus issue<sup>1</sup> is under preparation to address these topics. In addition two draft resolutions will be considered by the 27th meeting of the CGPM in November 2022, namely

- Draft resolution D: On the use and future development of UTC
- Draft resolution E: On the future redefinition of the second

### Scope of the CCTF

CCTF activities concern matters related to the definition and realization of the second, establishment and diffusion of International Atomic Time (TAI) and Coordinated Universal Time (UTC), and advice to the CIPM on matters related to time and time scales.

### Strategy

To support the development of frequency standards, time scales, and time and frequency transfer methods, to serve the need of the society.

### Activities and achievements since the last meeting of the CGPM

#### *Main activities and achievements*

To address the four hot topics, the CCTF has created dedicated task groups with more than 80 people working together with bimonthly meetings, dedicated workshops, presentations in fora, congresses, and online GIT forum discussions.

The following list reports the special task groups and their Chairs:

Task Force on Updating the Roadmap towards the redefinition of the SI second Roadmap and mandatory criteria	(N. Dimarcq, P. Tavella)
Request from user communities, NMIs and Liaisons	(M. Gertsvolf, NRC; G. Mileti, Uni Neuchatel)

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<sup>1</sup> <https://iopscience.iop.org/article/10.1088/1681-7575/ac98cb> and <https://iopscience.iop.org/article/10.1088/1681-7575/ac9da5>

Atomic frequency standards, and possible redefinition approaches	(S. Bize, SYRTE; E. Peik, PTB; C. Oates, NIST)
TF Dissemination and time scales	(D Calonico, INRIM; T. Ido NICT)
Leap seconds in UTC and building a consensus for a continuous timescale	(J. Levine, NIST; P. Tavella, BIPM)
Promoting the mutual benefit of UTC and GNSS, including	
Traceability to UTC from GNSS measurement	(P. Defraigne, ORB; A. Bauch, PTB)
Sharing Resources to Improve the International Timekeeping	(M. Gertsz NRC, Y. Hanado, NICT)

The CCTF has issued several recommendations on the different hot topics, some of which include recommendations to other organizations to which the CCTF activities and recommendations were presented.

1. Roadmap towards the redefinition of the second  
Two Recommendations approved by CCTF and Draft Resolution E to the CGPM
2. Leap seconds in UTC and building a consensus for a continuous timescale  
One Recommendation approved by CCTF and Draft Resolution D to the CGPM
3. Promotion of the mutual benefit of UTC and GNSS (including traceability of GNSS signals to UTC)  
Three Recommendations approved by the CCTF
4. Sharing of resources to improve international timekeeping  
Recommendation approved by the CCTF

In addition, three other Recommendations were approved by CCTF (optical frequency standards, Time transfer technology)

A *Metrologia* special focus issue is being prepared, which includes four papers:

1. CCTF strategy introduction
2. Roadmap towards the redefinition of the second
3. Towards a consensus on a continuous Coordinated Universal Time, <https://iopscience.iop.org/article/10.1088/1681-7575/ac9da5>
4. Achieving traceability to UTC through GNSS measurements, <https://iopscience.iop.org/article/10.1088/1681-7575/ac98cb>

A white paper on each hot topic will be published in early 2023, <https://www.bipm.org/en/committees/cc/cctf/publications>

### ***Challenges and difficulties***

The CCTF has worked in close cooperation with the liaison organizations and with all the CCTF members to build a consensus on the CGPM draft resolutions. This has required several meetings, online discussions, participation to international fora, and congresses.

## Outlook in the short and long term

Continue to follow activities, trigger and foster reflection, studies and collaborations on:

- Primary and secondary standards, with a connection to the CCL
- TF transfer techniques: GNSS, TWSTFT, advanced techniques such as optical fibres, ACES MWL, optical links in space
- Time scales: TAI, UTC, UTCr, UTC(k), algorithms
- CIPM MRA and Metrological traceability.

Continue to support transverse activities related to Hot Topics, detailed in the roadmaps described in Draft Resolutions D and E.

## CCTF Data

CCTF set up as the CCDS in 1956, renamed CCTF in 1997

President: N. Dimarcq Executive secretary: P. Tavella

Membership: 26 members, five liaisons, four observers

List of CCTF members and

observers: <https://www.bipm.org/en/committees/cc/cctf/members>

Meetings since the 26th CGPM

meeting: 28-29 October 2020, 11-12 March 2021, 29 June-1 July 2022

Full reports of the CCTF

meetings: <https://www.bipm.org/en/committees/cc/cctf/publications>

Nine CCTF Working Groups:

<https://www.bipm.org/en/committees/cc/cctf/>

- CCL-CCTF Frequency Standards (WGFS)
- CIPM MRA (WGMRA)
- Coordination of the Development of Advanced Time and Frequency Transfer Techniques (WGATFT)
- GNSS Time Transfer (WGGNSS)
- Primary and Secondary Frequency Standards (WGSPFS)
- Strategic Planning (WGSP)
- TAI (WGTAI)
- Time Scale Algorithms (WG-ALGO)
- Two-way Satellite Time and Frequency Transfer (WGTWSTFT)

CCTF Comparison activity	Completed	In progress	Planned
CCTF key comparisons	1, monthly	Ongoing (+1)	ongoing
(and supplementary comparison)			
BIPM comparisons	0	0	0
CC pilot studies	0	0	0
CMCs	776 CMCs in 19 service categories registered in the KCDB		