

## Consultative Committee for Thermometry (CCT)

### President Y Duan, Executive Secretary S Picard

<b>Meets every 2 or 3 years</b> <b>Last meeting in Oct 20 to Feb 21</b> <b>Members/Observers 25/3</b>	<b>Working groups:</b> Contact Thermometry (WG-CTh); Environment (WG-Env); Non-Contact Thermometry (WG-NCTh); Humidity (WG-Hu); Key Comparisons (WG-KC), CMCs (WG-CMC); Strategic Planning (WG-SP)		
<b>Comparison activity</b>	<b>Completed</b>	<b>In progress</b>	<b>Planned</b>
CCT KCs (& CC Supplementary)	16 (2)	8 (1)	0
RMO KCs (& SCs)	41 (18)	17 (10)	6 (5)
BIPM comparisons (all on-going)	0	0	0
CC Pilot studies	4	0	No Data
CMC	2936 CMCs in 46 service categories		
<p>The CCT Strategy has been aligned to the “CIPM Strategy 2030+”. Stakeholder needs were categorised within the identified priority areas. Additional stakeholder needs, particular to CCT, were also considered. In the light of these issues CCT considers the following to be its priorities from now to 2030+.</p> <ul style="list-style-type: none"><li>• The influence of the <b>redefinition of the kelvin (K)</b> and the associated <b>MeP-K-19</b> is increasingly being felt by stimulating long term research into primary thermometry approaches for temperature realisation and dissemination. Realisation and dissemination of thermodynamic temperature: a) at high temperatures <b>by indirect primary radiometry</b> through high temperature fixed points and b) at low temperatures <b>by Johnson Noise Thermometry</b> below ~5 K and <b>Gas Based thermometry approaches (acoustic gas thermometry, dielectric constant gas thermometry, refractive index gas thermometry)</b> &gt;5 K, will increasingly become common place as the decade advances, especially in the latter case for the calibration of CSPRTs.</li><li>• In the short-medium term, the ITS-90 (<b>International Temperature Scale</b>) will still be relevant and continue needing incremental improvements (e.g. to address the possible ban in the use of Hg). It is likely that at high and low temperatures ITS-90 will increasingly be supplanted by primary thermometry. In the medium-long term the PLTS-2000 (<b>Provisional Low Temperature Scale</b>) could be completely supplanted by primary thermometry.</li><li>• In the longer term, photonic thermometry, <i>in-situ</i> calibration and <i>in-situ</i> primary thermometry all have the potential to disrupt current approaches to temperature dissemination.</li><li>• A <b>key role of the CCT</b> will be to monitor this increasingly mixed situation regarding temperature dissemination (i.e. defined scales, primary thermometry and <i>in-situ</i> thermometry) and agree how to ensure on-going world-wide equivalence of temperature measurement.</li><li>• In the <b>long term, primary thermometry</b> regulated by the <b>MeP-K may meet temperature dissemination needs</b>. However, it is prudent to continue investigation into a range-restricted future scale (ITS-XX). Any decision to introduce ITS-XX would need to be carefully balanced against real stakeholder needs and cost of implementation.</li><li>• <b>Humidity and moisture</b> metrology is driven notably by environmental needs and climate observations, advanced production processes and future energy gases e.g. hydrogen. The WG is seeking to resolve the issues regarding ambiguous definitions of terms in this area and to repeat a KC.</li><li>• Key <b>Environmental observations</b> are inextricably linked to temperature and humidity measurements. Collaboration with WMO, GCOS, and IAPWS via a CCT WG ENV allows a reciprocal exchange of expertise and advice and will lead to ever increasing traceability of the measurement of these Essential Climate Variables. Work is on-going to improve the reliability of air temperature measurement (not just for climate).</li><li>• The TG for <b>Body Temperature Measurement</b> will work to improve the metrology of BTM in response to the plethora of inappropriate BTM for triage that was performed during the COVID-19 pandemic.</li><li>• Reliable determination of <b>Thermophysical quantities</b> are particularly valuable to support the energy and advanced manufacturing sectors. Comparisons of key TQ are being led by the TG to support CMCs.</li></ul>			
<b>Workload Trend &amp; Workload Management</b> <ul style="list-style-type: none"><li>• KC workload is managed carefully within CCT by WG KC. This ensures that only KC that are essential to underpin CMCs are performed.</li><li>• In the light of accelerated developments in thermometry practice, arising from the kelvin redefinition, a key CCT activity will be ensuring on-going world-wide equivalence to temperature measurement.</li><li>• CCT will continue to grow engagement with a broad range of stakeholders to ensure its work meets perceived future needs.</li><li>• Production of best practice guides relating to thermal measurements and other aspects of education/training will form a growing part of CCT’s activities in the coming decade.</li></ul>			
<b>BIPM – references to laboratory activity at the BIPM</b> <ul style="list-style-type: none"><li>• BIPM has no laboratory activity in thermometry.</li></ul>			