

## Minutes of: Meeting of the CCT Working Group on Strategic Planning

Online meeting

Tuesday 26 January 12:00 – 14:00 UTC

Attendees: Graham Machin (NPL, Rapporteur), Yuning Duan (President CCT, NIM Vice Director), Zeeshan Ahmed (NIST, from 13:00 UTC), Miltiadis Anagnostou (EMI), Stephanie Bell (NPL), Jovan Bojkovski (MIRS/UL-FE/LMK), Dolores del Campo (CEM), Efrim Ejigu (NMISA), Jean-Rémy Filtz (LNE), Christof Gaiser (PTB), Andrea Merlone (INRIM), Andrea Peruzzi (NRC), Anatoly Pokhodun (VNIIM), Andrew Todd (NRC), Rod White (MSL, retired), Inseok Yang (KRISS), Howard Yoon (NIST), Susanne Picard (Executive Secretary CCT, BIPM)

### 1. Welcome, approval of agenda

YD welcomed the participants. The agenda for the meeting was approved, noting that the successor to key comparison CCT-K6 will be discussed at agenda point 3.

### 2. Approval of *Rapporteur*

Graham Machin (NPL) was proposed by YD as *Rapporteur*. This was approved by the WG.

### 3. Recent urgent issues of the WGs and TGs

#### 3a) Successor KC of CCT-K6

SB gave the background regarding the initiation of a successor for CCT-K6 (dew point temperature) highlighting the need of formal approval by CCT to begin. The details of comparison to be decided with planning starting after CCT approval. Proposed range is the same as before with capability below -50 °C being covered by a supplementary regional comparison. The aim is to improve the uncertainty, speed and effectiveness of delivery of the comparison. This will be done through having better travelling instruments than the original K6 and less narrowly spaced measurements compared to K6. The latter will require the appropriate CMC review protocol to be revised. Phasing will be decided by the participants but the aim is to have completed the measurements of current comparisons (CCT-K8, EURAMET.T-K8) before beginning those for the successor K6. Final participants (number and institute) need to be agreed and a pilot needs to be identified.

Decision 01: WG-SP supports a successor KC of CCT-K6.

Action 01: Chair of CCT WG-Hum to bring to CCT (5) a proposal for planning and initiation of successor of CCT-K6 for discussion and approval.

3b) WG and TG chairs were asked if there were any issues to report since their reports. The response was: WG CMC no, WG CT no, WG Environment no (except see item 6), WG NCT no, WG KC no, TG ET new ToR may be developed (see item 5), GoTh no – progress to be reported at CCT (5), TQ no – progress to be reported at CCT (5).

### 4. On TG-GoTh

RW gave an update on the current status of the work of the TG. Two guides have been completed and are on CCT web pages. Three guides are in progress: two guides on thermocouples (one led by RW, the other by Frank Elder, PTB) and another on industrial platinum resistance thermometry (led by Jon Pearce, NPL).

There are some outstanding guides needed; radiation thermometry (responsibility of WG-NCTh) and calibration media (furnaces, heat-pipes, calibration baths, cryostats). Also, some work is needed on an existing guide regarding additional material about sealed metal fixed point cells.

RW proposed to continue his role until the 3 guides currently in train are complete, after that he envisages his role will cease. Currently no successor has been found.

A solution was proposed by YD and SP which was to spin-out relevant activity to the WGs and then create a TG, with an identified person responsible for leading the draft production, when a particular guide is needed. GM pointed out that the important coordination work of the TG chair would be missing from that role and proposed asking Jon Pearce of NPL if he would be prepared to take on that role.

Action 02: GM to ask John Pearce (NPL) if he would be willing to coordinate TG-GoTh

#### 5. On TG-CTh-ET

ZA reported to the CCT plenary that the TG has achieved its set goals. However, the field is rapidly evolving so he proposed continuing the TG with revised ToR, to, as a minimum, scan and report to CCT on future photonic, quantum and other novel optical (fibre) based temperature measurement technologies. A review paper based on the findings of the TG will also be prepared.

Decision 02: TG-CTh-ET continue its activities with revised ToR to be approved at CCT (5)

Action: 03: ZA to let SP have the revised ToR prior to CCT (5)

#### 6. Update on the CCT WGs and TGs and chairs

The structure of WG and TG was discussed and reconfirmed. All the current CCT WG and TG indicated their willingness to continue in their current roles (except the chair of CCT TG-GoTh See item 4 above). The President thanked the chairs for their work and looked forward to working with them in the coming year.

Decision 03: Current CCT WG, TG structure deemed currently fit for purpose and will remain in place at least until next CCT

#### 7. Update on the CCT WG and TG ToR

The WG, TG chairs were asked to confirm their ToR or propose revised versions. Apart from WG-NCTh, WG-Environment (to propose new TG) and TG-CTh-ET all others remained unchanged.

AM proposed that a TG in WG Environment on air temperature measurement be established, with some external contributors, ToR could include fixing the definition of air temperature, providing guides on calibrating thermometers in air and some formal interaction with TG on emerging technologies. Every NMI who measures air temperature for close temperature control precision metrology and meteorology will have an interest in the work of this TG. WG-SP encouraged WG Environment to establish a TG on air temperature measurement.

Regarding TG-CTh-ET Emerging Technologies JR-F proposed its scope should be widened to include fibre-optic temperature sensors there was general agreement in the WG that this should occur.

Action 04: CCT-WG-NCTh chair to present revised ToR at CCT (5) for discussion and approval

Action 05: TG-CTh-ET chair to send revised ToR to SP by 27 January

Action 06: TG-CTh-ET chair to present revised ToR at CCT (5) for discussion and approval

Action 07: WG Environment chair to send proposed TG ToR to SP by 27 January

Action 08: WG Environment chair to present TG ToR at CCT (5) for discussion and approval

Decision 04: The TG-CTh-ET ToR should include fibre-optic temperature sensors

Action 09: ZA and JR-F to discuss and agree how to incorporate fibre-optic bases sensors in the TG-CTh-ET ToR

## 8. Draft Recommendations to the CIPM

A draft recommendation “Requirement for new determinations of thermodynamic temperature above 400 K” was introduced by chair of WG-CT. The aim of the recommendation is to stimulate various primary thermometry approaches in that temperature region to develop better  $T-T_{90}$  data.

There was significant discussion about the wording; especially the last clause “that member states stimulate appropriate levels of research to ensure the ITS-90 remains fit for purpose for all significant users”. Some members of the WG (AP, HY) considered this too vague and that it did not fit with the intent of the recommendation. A separate recommendation on research into ITS-90 was proposed but, after some discussion, this was felt to be too backward looking. Others felt that the recommendation was on the right lines (JR-F) but maybe needed some rewording or restructuring, as the intent of this part of the recommendation (as GM and DDC explained) was that the ITS-90 needs to remain fit for purpose whilst primary thermometry matures and comes on stream.

The original intention of the recommendation was to stimulate primary thermometry above 400 K to get good estimates for  $T-T_{90}$  for the interested user. This remains but it is also clear that it should support ITS-90 “evolution” to ensure it remains fit-for-purpose.

Decision 05: Redraft recommendation to take into account concerns expressed at WG SP

Action 10: CG, GM to redraft recommendation in line with decision 06 of WP SP and involve Patrick Rourke (NRC) in agreeing wording

Action 11: CG to provide agreed revised text of recommendation to SP and YD before CCT (5)

#### 9. Second revision of the CCT Strategic Planning

The President explained that the Strategic Plan for the CCT was in need of updating. GM was invited and accepted to responsibility of leading the development of the new revision.

Input will be sought from CCT WG SP, WGs, TGs and it will be aligned with CIPM Strategy.

It is likely that the CIPM may create a transversal committee for climate/health etc in the future, but it may be too late to impact the CCT Strategy – however both DDC and YD are on the WG so can provide relevant input into CCT Strategy as it develops.

Decision 06: CCT Strategic Plan to be revised to encompass time 2021-2031

Action 12: SP to send all CCT SP group members the CIPM strategy

Action 13: GM to lead this activity for CCT to develop next version of CCT Strategic Plan in first half of 2021

#### 10. Next CCT meeting

SP explained that the situation regarding Covid-19 rendered a face-to-face meeting unlikely in the near future until after the health situation improved, so more frequent on-line meetings are planned. These could be on an approximately annual basis, until we can realistically return to having face-to-face meetings.

Decision 07: CCT to hold approximately annual meetings by electronic means until face-to-face meetings become possible

YD informed the WG-SP that the CGPM will meet in 2022 so it would be prudent to have a short CCT meeting some months before around the end of 2021.

It was noted that only about half submitted CCT members gave an updated activity report. There was a suggestion that these reports be mandatory but very concise (A4) following a set template. No decision was agreed on how to progress improved member reporting.

Action 14: SP to propose some dates for shortened CCT to meet end of this year with 1 or 2 follow on sessions early in 2022

#### 11. Any other business

AP mentioned that the issue regarding sealed metal fixed point cells still needed to be concluded. CG explained there was a process agreed to do this in WG CTh.

#### 12. Close of the meeting

YD thanked the participants for their contributions. The meeting closed 14:15 UTC.

Annex 1: Summary of actions and decisions of CCT WG SP

Decision 01: WG-SP supports a successor KC of CCT-K6.

Decision 02: TG-CTh-ET continue its activities with revised ToR to be approved at CCT (5)

Decision 03: Current CCT WG, TG structure deemed currently fit for purpose and will remain in place at least until next CCT (except for TG-GoTh)

Decision 04: The TG-CTh-ET ToR should include fibre-optic temperature sensors

Decision 05: Redraft recommendation to take into account concerns expressed at WG-SP

Decision 06: CCT Strategic Plan to be revised to encompass time 2021-2031

Decision 07: Support the CCT to hold approximately annual meetings by electronic means until face-to-face meetings become possible

Action 01: Chair of CCT WG-Hu to bring to CCT (5) a proposal for planning and initiation of successor of CCT-K6 for discussion and approval.

Action 02: GM to ask John Pearce (NPL) if he would be willing to coordinate TG-GoTh / Completed

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Action 11: CG to provide agreed revised text of recommendation to SP and YD before CCT (5)

Action 12: SP to send all CCT SP group members the CIPM strategy

Action 13: GM to lead revision of CCT Strategic Plan first half of 2021

Action 14: SP to propose some dates for shortened CCT to meet end of this year with 1 or 2 follow on sessions early in 2022

Annex 2: Agreed agenda of meeting

Agenda

**Meeting of the CCT Working Group on Strategic Planning**

Online meeting

Tuesday 26 January 12:00 – 14:00 UTC

1. Welcome, approval of agenda
2. Approval of *Rapporteur*
3. Recent urgent issues of the WGs and TGs  
(TG-GoTh and TG-ThQ full report given at CCT Session 5)
4. On TG-GoTh
5. On TG-CTh-ET
6. Update on the CCT WGs and TGs and chairs
7. Update on the CCT WG and TG ToR
8. Draft Recommendations to the CIPM
9. Second revision of the CCT Strategic Planning
10. Next CCT meeting
11. Any other business
12. Close of the meeting