TC Chair Annual Report 2021 - 2022

TC for Thermometry (T)
TC Chair: Dolores del Campo
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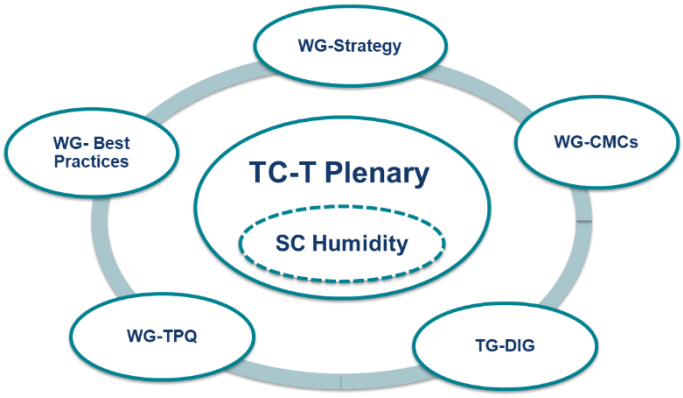
1. General Aspects

The TC-T is structured in one Sub-Committee for humidity and moisture (SC-H) and four very active working groups dealing with the TC general strategy (WG-Strategy), capacity building and knowledge transfer (WG- Best Practices), CMCs evaluation (WG-CMCs) and Thermophysical Quantities (WG-TQ). These groups develop and coordinate the most important activities of the TC between plenary meetings. The WG-Strategy appointed a new chair, Mohamed Sadli (LNE-CNAM, France), to replace Steffen Rudtsch, new TC-T chair from May 2022. The new chair was approved by the TC-T plenary.

During the 2021 meeting, and following the requirements of the coordinator of the EURAMET project 1448, the establishment of a new task group to collaborate with the activities of the project was agreed. The TG was set up in the autumn of 2021. Later on, the coordinator of the EURAMET project 1551 requested too some interaction with the TC-T in the topic of sensor network metrology, in consequence it was decided during the 2022 meeting to enlarge the scope of the TG to all digitalisation issues.
The TG-DIG is chaired by Åge Andreas Falnes Olsen (JV, Norway). The figure on the left summarises the current structure of the TC-T.



TC-T structure

Since the last report one on-line meeting took place from 25th to 29th April. This meeting was completely rearranged after the Ukraine war as it was planned a joint meeting with COOMET together with a training course on CMC submission and a technical workshop “Turning the MeP-K into reality”. Finally the training course and the technical workshop were cancelled and the TC-T meeting itself only treated urgent and routine issues.

TC-T online meeting

2. Projects

Currently there are 17 projects in progress, 1 ongoing. In this reporting period one project (1401) linked to the EURAMET.T-S6 comparison concluded because no participant intends to apply for CMC based on the high-temperature guarded hot-plate object of this intercomparison so there was no motivation to continue the project.

3. Comparisons

There are several running comparisons at CCT and regional levels that involve most of the TC-T members:

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- CCT.K8: Comparison of realisations of local scales of dew-point temperature of humid gas. The Draft A report has been issued and circulated within the participants in April 2022.
- EURAMET project 1352: Comparison of the realisations of the relative humidity (RH) in the range from 10%rh to 95%rh at temperatures from -40 °C to +1 °C. In order to continue with the comparison a new coordination has been discussed with CETIAT as candidate, due to the lack of resources of the previous one.
- EUROMET.T-K8 (project 717): Comparison in dew-point temperature (high range). Draft A was sent to the participants two years ago, but after the comments of the participants, the statistical analysis has been improved. It is expected that a new Draft A will be issued by the summer and the Draft B by the end of 2022.
- CCT.K10: Realization of the ITS-90 between 960 ºC and 3000 ºC. Due to the Ukraine war an interim Draft B is being issued without the VNIIM results.
- EURAMET.T-K9 (project 1318): ITS-90 SPRT Calibration from the Ar TP to the Zn FP. The measurements were finished long ago. An initial Draft A report, with undisclosed identifications of the participants, circulated by the end of January 2022. No major changes were requested and it is expected to circulate a new version with the names of the participants by mid May 2022.
- CCT-S3: Supplementary comparison on thermal diffusivity measurements of isotropic graphite using laser flash method. First version of Draft B submitted for review to the WG-KC of CCT in November 2020.
- EURAMET project 1524: Comparison on thermal diffusivity measurements of high conductive materials by the laser flash method. The protocol of the comparison is under preparation and it will be sent for CCT review to register the comparison in the KCDB: It is expected to start measurements by the beginning of 2023.

There are other comparisons that involve a lower number of participants (mostly bilateral): most of the coordinators have sent a progress report that can be consulted in the EURAMET web page.

4. CMCs

The CMCs are reviewed by the members of the WG-CMCs that is currently chaired by D. del Campo. The members are appointed by the TC-T plenary based on their different expertise. Currently there are 3 members (1 MIRS/UL-FE/LMK and 2 NPL) to review the CMCs for SPRTs and fixed points, 2 (PTB and RISE) to review the CMCs for industrial thermometers, 1 (CEM) to review the CMCs for thermocouples, 2 (PTB and LNE-CNAM) to review the CMCs in radiation thermometry and 2 (INRiM and MIRS/UL-FE/LMK) to review the CMCs in humidity.

In 2021 a batch of 26 CMCs from 9 EURAMET countries was reviewed. Only the 27 % of the CMCs were accepted in the initial review and in the second round only the 55 % supplied enough information to support the claim. This highlights an important problem of interpretation of the CCT review protocols and implies a significant waste of time for the reviewers and the submitters. In order to solve this problem a training course was planned together with the 2022 TC-T meeting that was cancelled as it has been commented in the initial paragraph. It is expected that this course will take place during the 2023 meeting at the latest.

In addition 7 CMCs from AFRIMETS and 8 from SIM were reviewed together with some APMP CMCs which were pending from previous years. Several problems have also been detected in the review of these CMCs regarding the traceability of some claims and also the participation in inter-comparisons. If possible it would be desirable that the CMCs training will be open to all RMOs as it was foreseen in the beginning.

5. Activities of the Subcommittees

The TC-T has only one sub-committee regarding Humidity and Moisture. The Sub-Committee Humidity (SC-H) is concerned with all issues of measurement of humidity and moisture, as well as with standards and references necessary for developing the metrology in the field.

The SC-H is coordinated by Domen Hudoklin (MIRS/UL-FE/LMK). The SC-H met on the 28th April 2020 where the different comparisons in which the SC-H is involved were discussed (see section 3) as well as the participation in research and EURAMET projects.

6. Participation in EMRP/ EMPIR/ European Partnership on Metrology

The TC-T participated in the first call of the European Partnership on Metrology research funding programme which had as main topic the European Green Deal. The community participated in many proposals, some of them agreed within the EMNs Energy Gases and Climate and Ocean Observation. In the previous TC-T meeting was discussed the lack of success of the proposals related to climate monitoring.

To facilitate the participation of the TC-T community in the 2022 Partnership call, orientation papers focused on the IEM and health topics were prepared. Both lead to the submission of several PRTs with a main thermometry focus. The initial list of SRTs includes as selected topics the two IEM proposals submitted by our community based on the orientation paper prepared, one related to primary thermometry and the other related to fiber optic thermometry. It also includes a third one related to primary spectrometric thermometry for gases. The proposal submitted for the health call was not successful. There has been another unsuccessful proposal related to the quality of hydrogen, proposed within the EMN Energy Gases, which counted with an important contribution of the humidity community.

7. Capacity Building: Activities of the last year and future needs

The TC-T is really engaged with all the capacity building activities organised by EURAMET and in fact it is one of the main objectives of the WG-BP, discussed within the Strategy Group and there is always a slot on the TC-T agenda for the Euramet CB Officer to give a presentation.

As commented in the previous paragraphs the training on CMCs to be held during the 2022 TC-T meeting was cancelled due to the Ukraine war. From outcomes of the CMC reviews performed in the last years an urgent need for a training on the CCT CMC review protocols and the submission of CMCs has become obvious. Ideally the training should take place during the 2023 TC-T meeting at the latest.

The dates for the 2nd Summer School on Thermometry hosted by MIRS/UL-FE/LMK has been agreed. It will take place from 11th to 15th September 2023.

8. Meetings

The 2022 meeting was on line from 25th to 29th April according to the following schedule:

- 25th April: meeting of the WG on Thermophysical Quantities
- 26th April: meetings of the TG on Digitalisation and WG on Best Practices
- 27th April: meetings of the WG on CMCs review and WG on Strategy
- 28th April: meetings of the SC-Humidity and joint meeting with the TC-T plenary.
- 29th April: meeting of the TC-T plenary.

It is expected that in 2023 it will be possible, finally, to have a face-to-face meeting hosted by SMU in Bratislava from 17th to 21st April.

9. Issues

The TC-T is improving the interaction with the recently created EMNs. A plan for maintaining interactions will be coordinated by the WG-Strategy and a set of presentations of the EMNs of interest for the TC-T were scheduled during the 2022 meetings.

During the WG on Strategy meeting, the new TC-T chair pointed out the need to perform a revision of the TC-T WGs membership and rules of procedure. He will work on a new proposal together with the new chair of the WG on Strategy that will be presented in the next TC-T meeting.

It is important to highlight that the contribution of the TC-T to international organisations in the field on climate and meteorology such as WMO, GCOS or GCW is increasing its relevance year by year. In particular the TC-T is playing an essential worldwide role in the research for air temperature measurements thanks to the outputs of the EURAMET project 1459 “Air Temperature Metrology” in which 25 NMIs and DIs are participating.

10. Strategic Planning

The TC-T Strategic Planning falls within the responsibility of the WG-S currently chaired by Steffen Rudtsch (PTB).

In 2022 two orientation papers for the IEM and health calls respectively were prepared in order to help the TC-T community with the formulation of proposals. The orientation paper for the IEM call was totally successful as the 2 PRTs proposed were selected in the initial lists of SRTs.

With respect to the roadmaps, the CCT Strategy plan has been published. In principle the idea was to start the update of the TC-T roadmaps based on this document, however the need for this update is still unclear so the TC-T chair will consult with the EURAMET General Secretary and the BoD if the TC-T roadmaps update is really necessary when the EMNs strategic agendas are under development and the CIPM CCT Strategy plan already published.

11. Outlook for 2022/2023

In 2022-2023 TC-T activities will include, apart from the routine activities like CMC review:

- Organisation of the face-to-face EURAMET TC-T meeting (17-21 April 2023).
- Organisation of the Training Course on CMCs.
- Organisation of the workshop on the new kelvin challenges and opportunities.
- Organisation of the 2nd Summer School on Thermometry (11-15 September 2023).