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SIM-MWG3 THERMOMETRY

Regional Impact and International Alignment: Highlights from SIM

2025-2026

Carolina Herrera Ruiz (Chair)

Andrea Peruzzi (Vice Chair)

May 2026





AGENDA

- **Activities carried out during the last year**
- **Regional achievements**
- **Ongoing comparisons**
- **Confirmation of Participation in Upcoming CCT-K4 Comparison**
- **CMCs review process – Opportunities for Improvement and Lessons Learned**
- **Future activities**



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Activities carried out during the last year

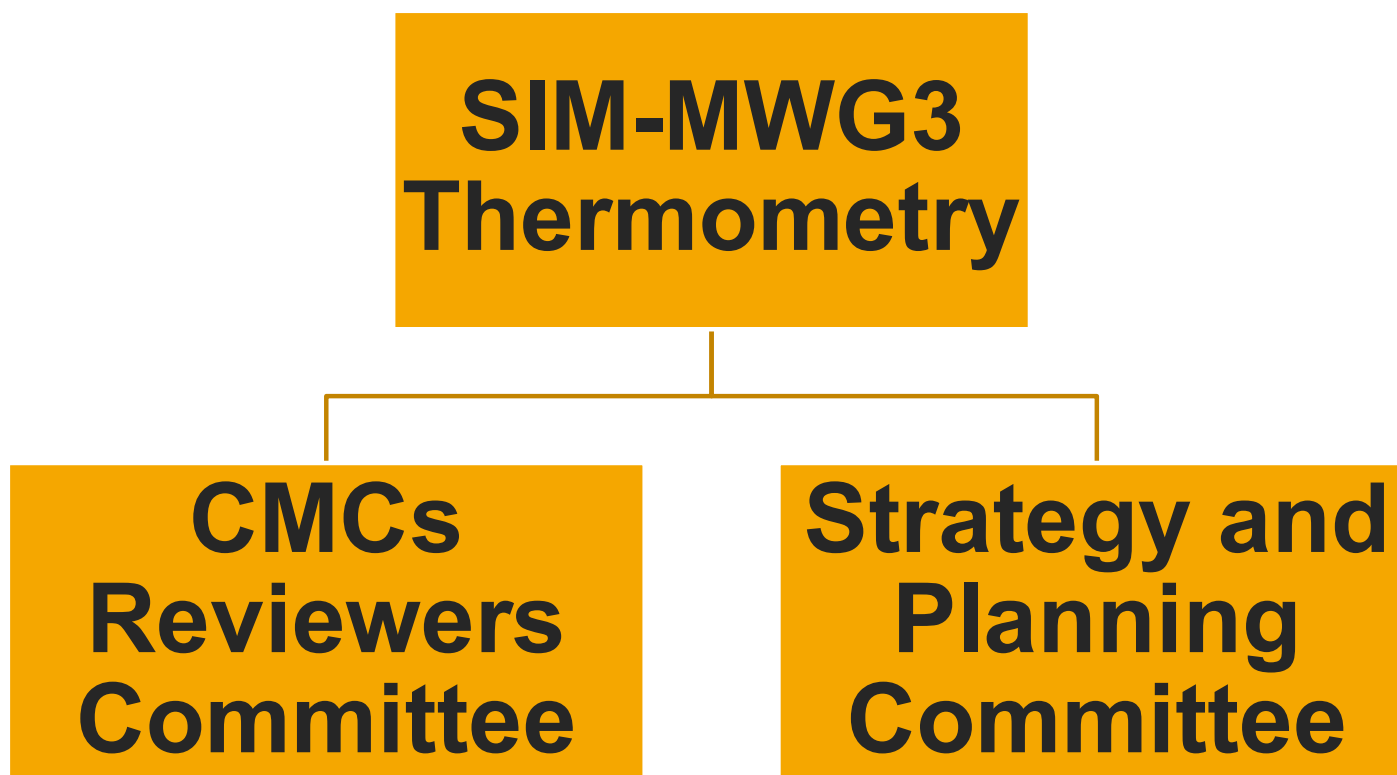
2026-05-22

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Activities carried out during the last year





Activities carried out during the last year

- **SIM-MWG3 CMCs Reviewers Committee: 12 experts (3 per technical area)**

**Fixed point cells and
SPRTs at fixed points
experts**

**Industrial thermometers (PRTs,
Thermocouples, thermistors,
liquid-in-glass) experts**

**Radiation
thermometry
experts**

**Hygrometry
experts**

**Total inter-RMO
CMCs reviewed:
79**

JCRB review statistics for the last twelve months

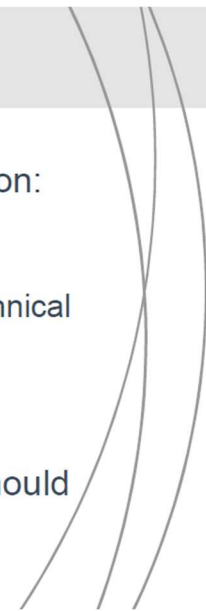


Activities carried out during the last year

➤ SIM-MWG 3 Strategy and Planning Committee: 9 experts

Terms of reference

- To advise the MWG3 Chair on the strategy and plans of the MWG3 on:
 - Key and Supplementary Comparisons
 - Capacity Building and Knowledge Transfer (CBKT) activities such as technical workshops and training
 - MWG3 meetings
- Intended to be the reservoir of future MWG3 Chairs (future chairs should be selected among the most active and committed members of this working group)





Activities carried out during the last year

➤ SIM-MWG 3 Strategy and Planning Committee

➤ Advised the chair on prioritizing the planned comparisons:

- **KC on dew/frost points -30 °C to 65 °C**
- KC on SPRTs at Hg to Zn
- KC on SPRTs at Al and Ag
- KC on radiation thermometry

➤ Supported the chair in streamlining:

- Organization of the workshops at LACOMET (10-11 November 2025)
- CMC review process



Activities carried out during the last year

June 26, 2025 SIM-MWG3: ITS-90 coefficient calculation software validation NIST Virtual Workshop

- Pre-work activities performed and reported by 13 NMIs
- **Anonymized results reporting** to ensure confidentiality during the online analysis conducted by NIST experts.
- Discussion on uncertainty analysis of SPRTs calibrated in fixed-point cells according to the ITS-90.
- **Triple Point Water Cell realization – pre-recorded demonstration.**
- 45 SIM participants joined online.

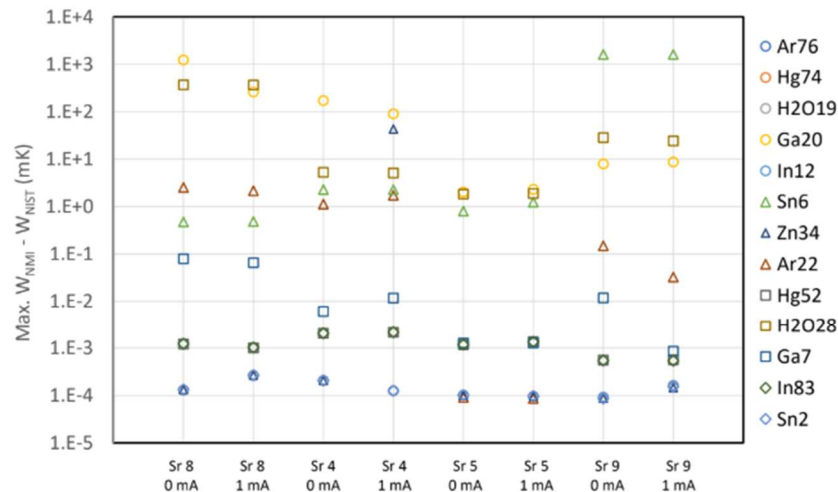


Activities carried out during the last year

June 26, 2025 SIM-MWG3: ITS-90 coefficient calculation software validation NIST Virtual Workshop

- Pre-work activities performed
- Anonymized results re-analysis conducted by NIST
- Discussion on uncertainty according to the ITS-90
- Triple Point Water Cell
- 45 SIM participants joined

Deviation from NIST



This plot only shows the maximum deviation within each subrange. The values shown are not at the same temperatures for each NMI.

Is the deviation within uncertainties?

Possible sources of deviations:

- Calculation errors
- Wrong functions
- Corrections
- Rounding differences



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- Discussion on uncertainty according to the ITS-90
- Triple Point Water Cell
- 45 participants joined

We gratefully acknowledge the contributions of:

- **NIST experts Ph.D. Klaus Quelhas and Ph.D. Richmond Wang;**
- **Ph.D. Howard Yoon, NIST Temperature & Humidity Group Leader, for his support;**
- **Ph.D. María Eugenia Nadal, NIST Sensor Science Division Chief, for her support;**
- **All contributors who made this possible.**



Activities carried out during the last year

SIM-MWG3 Temperature & Humidity Workshop November 10–11, 2025

- Hybrid format, enabling both onsite and virtual attendance.
- Venue: LACOMET
- Featured seven oral presentations delivered by regional experts who are also CCT members.
- More than 200 participants joined online during the first day
- Strengthened collaboration in temperature and humidity metrology across the Americas.

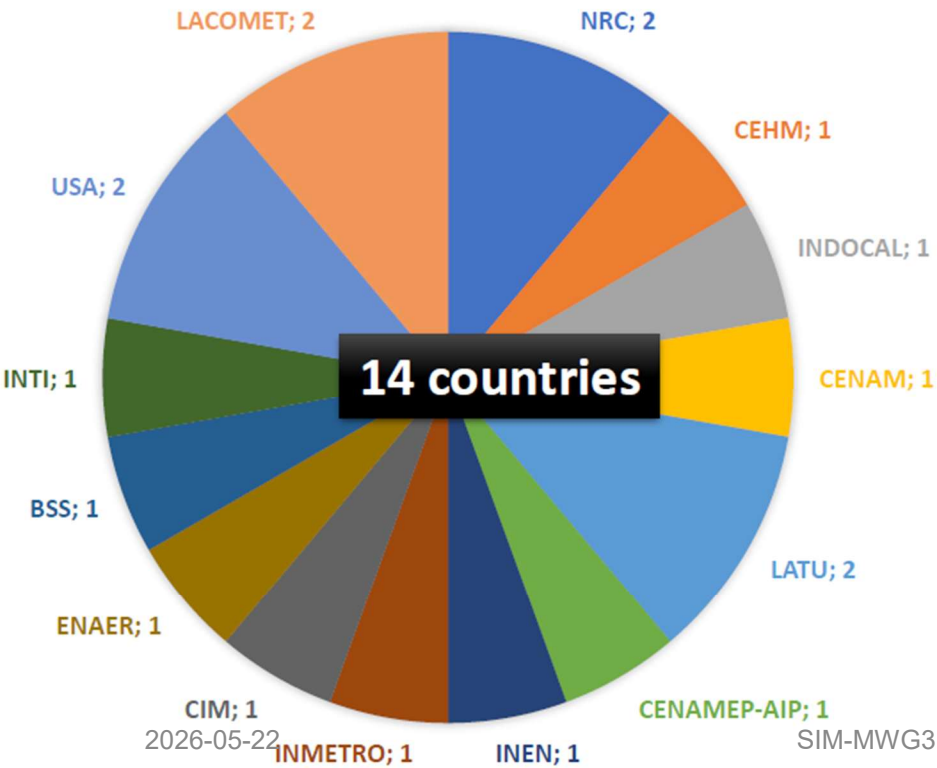


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Activities carried out during the last year

SIM-MWG3 Temperature & Humidity Workshop November



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We gratefully acknowledge the contributions of:

- **NIST experts Ph.D. Christopher Meyer and Ph.D. Klaus Quelhas;**
- **NRC experts Ph.D. Andrea Peruzzi and Ph.D. Sergey Dedyulin;**
- **LACOMET expert MII. Luis Chaves Santacruz;**
- **LACOMET Director and SIM for their support and funding;**
- **And all contributors who made this possible.**



Activities carried out during the last year

➤ Meetings in 2025

- SIM-MWG3 Virtual Meeting – May 2025
- SIM-MWG3 Hybrid Meeting – November 2025

➤ Other meetings in 2025

- 3 CMCs reviewers Committee virtual meetings
- +3 Intercomparison planning virtual meetings (Dew/frost point temperature intercomparison)
- 1 Strategy and planning Committee virtual meeting
- +5 SIM-MWG3 leadership coordination and planning virtual meetings



Activities carried out this year

➤ Meetings in 2026

❖ Planning meetings for the upcoming intercomparisons:

- Dew/Frost Point Temperature
- (+4) SPRTs in fixed point cells

❖ At least two planning meetings have already been held for the upcoming SIM-MWG3 Non-contact Thermometry Workshop 2026:

- **One virtual meeting** held through the Strategy and Planning Committee, focused on the overall planning of the workshop.
- **A second meeting**, independently organized, addressed the change of venue and dates due to major circumstances.

❖ SIM-MWG3 will convene at least one scheduled virtual/hybrid meeting in 2026.



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Regional achievements

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Regional achievements

18 APRIL 2025

Humidity - SIM

[The first CMC in humidity](#) measurements for **Bolivia** has recently been published in the KCDB via SIM, in the field of Thermometry.

11 JUNE 2025

Humidity - SIM

[2 new CMCs](#) in humidity measurements have recently been published in the KCDB for the **United States** via SIM, in the field of Thermometry.

21 JULY 2025

Humidity - SIM

[The first CMC](#) in humidity measurements for **Uruguay** has been published in the KCDB via SIM, in the field of Thermometry.

15 SEPTEMBER 2025

Temperature - SIM

[1 new CMC](#) in temperature measurements has been published in the KCDB for **Brazil** via SIM, in the field of Thermometry. SIM-MWG3 THERMOMETRY 2025-2026



Regional achievements

25 MARCH 2026

Temperature - SIM

5 first CMCs in temperature measurements have been published in the KCDB for **Ecuador** via SIM in the field of Thermometry.

31 MARCH 2026

Temperature - SIM

1 revised CMC in temperature measurements has been published in the KCDB for **Colombia** via SIM, in the field of Thermometry.

17 APRIL 2026

Humidity - SIM

The first CMC in humidity measurements has been published in the KCDB for **Ecuador** via SIM in the field of Thermometry.



Regional achievements

Hanging CMCs management

- Thanks to the support of the SIM-MWG3 CMCs Reviewers Committee, the dedication of CMC writers, and the commitment of all involved NMIs, as of today only one hanging CMC remains for our region in the KCDB.



Regional achievements

Hanging CMCs management

- In May 2025, one of SIM's hanging Relative Humidity CMCs lead to the identification of a potential improvement to the Relative Humidity CMC Review Protocol.
- In October 2025 (Reims), during the CCT-WG-KC, it was noted that the technical discussion on subsection 3.b (criteria for declaring Relative Humidity CMCs through intralaboratory-evaluation-based methods, section 3.2) would be escalated to the CCT-WG-HU.
- As the next CCT-WG-HU meeting was scheduled for last Tuesday, we are still awaiting their feedback on the final decision.
- **The outcome could positively impact not only one, but potentially several NMIs.**



Regional achievements

- The unsatisfactory results observed in the CCT-K9 comparison have been diligently addressed by the NMIs through various actions, including:
 - ❖ Technical studies that have yielded satisfactory outcomes.
 - ❖ Training processes for newly incorporated staff.
 - ❖ At least one additional intercomparison is currently in progress.



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Ongoing comparisons

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Ongoing comparisons

SIM.T-K9.4

Thermometry

REALIZATION OF THE ITS-90 OF THE TRIPLE POINT OF ARGON 2024

Standard Platinum Resistance Thermometers
Protocol complete
Key Comparison

Draft A is
currently
under review.



Ongoing comparisons

SIM.T-S13

Thermometry

CALIBRATION OF PRT IN -80 °C TO 420 °C AND TYPE S THERMOCOUPLE IN 0 °C TO 1050 °C.

2025 - 2026

Industrial thermometry
PRT (Platinum Resistance Thermometers)
Protocol complete
Supplementary Comparison

Measurements
in progress.



Ongoing comparisons

SIM.T-K6

Thermometry

COMPARISON OF DEW AND FROST POINT TEMPERATURES
2026 - 2027

Humidity
Planned
Key Comparison

SIM.T-K8

Thermometry

COMPARISON OF DEW POINT TEMPERATURES
2026 - 2027

Humidity
Planned
Key Comparison

Feedback on the protocols was received from the CCT-WG-KC. The pilot laboratory, NIST, has completed the requested changes and implemented the improvements.



Ongoing comparisons

CCT-K9.3

INFORMATION & CONTACT

PARTICIPANTS

Metrology area, Sub-field	Thermometry, Standard Platinum Resistance Thermometers
Description	Realizations of the ITS-90 from 83.805 8 K to 1 234.93 K
Time of measurements	2023 - 2024
Status	Report in progress, draft B



Ongoing comparisons

CCT-K4.2

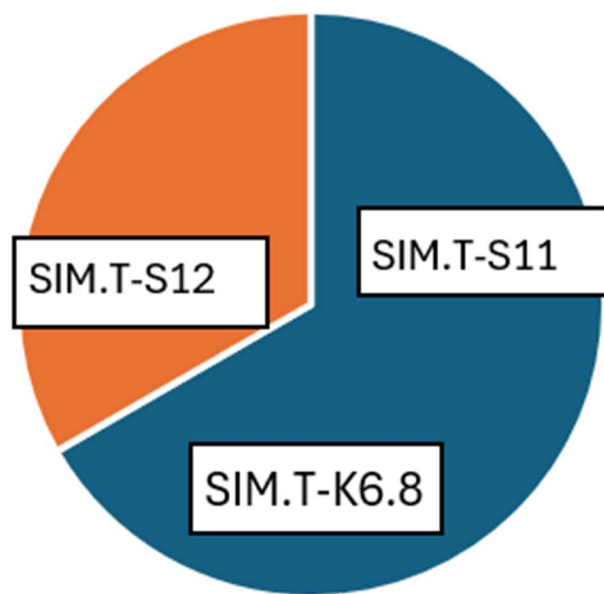
INFORMATION & CONTACT

PARTICIPANTS

Metrology area, Sub-field	Thermometry, Fixed Point Cells
Description	Realizations of the ITS-90 at Aluminium and Silver freezing-point temperatures
Time of measurements	2023 - 2024
Status	Measurements completed



Comparisons older than 5 years



- The pilot laboratory is currently working on the report.
- Currently under consideration by the CCT-WG-KC



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Confirmation of Participation in Upcoming CCT-K4 Comparison

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Confirmation of Participation in Upcoming CCT-K4 Comparison

CCT Members:

- INMETRO
- NRC
- NIST

Non-CCT Members potentially interested in participating:

- INM (Colombia)
- BNSI (Barbados National Standards Institution)



CMCs review process – Opportunities for Improvement and Lessons Learned



CMCs review process – Opportunities for Improvement and Lessons Learned

- A dedicated CMCs Reviewers Committee has proven to be a successful initiative.
- Effective and timely communication is essential: prompt reviewer assignments and follow-up emails at least 15 days before the review deadline have shown excellent results.



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Future activities

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Future activities

➤ SIM-MWG 3 Strategy and Planning Committee

Future activities

➤ Facilitate:

- Organization of the workshop/training on thermal imaging cameras
- Design of next KC (SPRTs at Hg to Zn)
- Next Annual Meeting (2026)

➤ 2026 CIPM MRA Summer School



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THANK YOU

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