



## Report on Sistema Interamericano de Metrología (SIM) Activities in Thermometry and Humidity to the 27th meeting of the CCT

The Inter-American Metrology System (SIM) is the Regional Metrological Organization (RMO) that resulted from a broad agreement between 34 countries, which are Members of the Organization of American States. It was created to promote international and regional metrological cooperation among the American countries.

The SIM Organization has defined a strategic plan with its own mission, vision and values. SIM's mission is "To be a representative, transparent, competent, and worldwide-recognized regional metrology organization committed to ensuring uniformity of measurements while promoting cooperation among its members" by supporting all its member countries by improving their NMIs with respect to technical competence and quality infrastructure as an auxiliary tool. SIM has two general meetings each year to perform the SIM General Assembly. Simultaneously, the Quality System Task Force (QSTF) and the Technical Committee (TC) report their activities. The Technical Committee has several metrology working groups. SIM Metrology Working Group N<sup>o</sup>3 (MWG3) is the one related to Temperature, Humidity and thermo physical properties (heat conduction and spectral emissivity)

### Comparisons in progress:

SIM.T-K6.1	Realizations of local scales of dew/frost-point temperature of humid air , 2011 Key comparison in Thermometry, Humidity Temperature range: -25 °C to +20 °C Bilateral NIST/NRC Draft B circulated between the participants, revisions expected prior to submission to WG7 based on comments received on the K6.2 and K6.3 reports
SIM.T- K6.2	Realizations of local scales of dew/frost-point temperature of humid air, 2010 Key comparison in Thermometry, Humidity Temperature range: -20 °C to +20 °C Bilateral NIST/CENAM Report submitted to WG7, revision under review by WG7
SIM.T-K6.3	Realizations of local scales of dew/frost-point temperature of humid air, 2010 Key comparison in Thermometry, Humidity Temperature range: -30 °C to +20 °C Bilateral NIST/INMETRO Report submitted to WG7, revision in preparation
SIM.T-K9.1	Realizations of the ITS-90 from 273.16 K to 692.7 K, 2012 Key comparison in Thermometry, Standard Platinum Resistance Thermometers Fixed points of Ga (302.9146 K), Sn (505.078 K), and Zn (692.677 K) Report submitted to WG7, revision in preparation
SIM.T-S3	Comparison of platinum resistance thermometers, 2007 – 2008



	Supplementary comparison in Thermometry, Standard Platinum Resistance Thermometers Temperature range: -39 °C to 232 °C Report in progress, Draft B. WG7 comments sent to the participants Nov. 2012.
SIM.T-S4	SPRT calibration comparison at Hg, TPW, Ga, Sn and Zn ITS-90 fixed points, 2008 Supplementary comparison in Thermometry, Standard Platinum Resistance Thermometers Report submitted to WG7, revision in preparation

#### **Comparisons approved and published in the KCDB:**

SIM.T- K6.4	Comparison of humidity standards, 2010 – 2011 Key comparison in Thermometry, Humidity Temperature range: -20 °C to +60 °C Bilateral INMETRO/INTI Approved for equivalence
SIM.T- S1	Comparison of Type K thermocouples, 2004 Supplementary comparison in Thermometry, Thermocouples Temperature: 100 °C to 1100 °C Approved and published
SIM.T- S2	Comparison of platinum resistance thermometers, 2004 – 2005 Supplementary comparison in Thermometry, Standard Platinum Resistance Thermometers Temperature range: -40 °C to 250 °C Approved and published

#### **Comparison proposals marked as “planned” in the KCDB**

SIM.T- S5	Comparison of the calibration of 100 ohms platinum resistance thermometers, 2013 – 2014 Supplementary comparison in Thermometry, Standard Platinum Resistance Thermometers Planned. Protocol approved by WG7.
SIM.T-S6	Comparison of Type S thermocouples, 2012 – 2014. Supplementary Comparison. Measurand: emf, depending on temperature voltage Status: Report in progress, Draft A

#### **New CMCs**

Two SIM countries have new CMCs published in Appendix C of the BIPM KCDB:

Costa Rica [http://kcdb.bipm.org/appendixC/T/CR/T\\_CR.pdf](http://kcdb.bipm.org/appendixC/T/CR/T_CR.pdf) and;

Perú [http://kcdb.bipm.org/appendixC/T/PE/T\\_PE.pdf](http://kcdb.bipm.org/appendixC/T/PE/T_PE.pdf).



This has been a considerable effort of those countries to demonstrate their technical capabilities by participating in Supplementary and Key Comparisons and by being peer reviewed by other SIM countries.

### **New Members of BIPM**

Colombia became a signatory of CIPM MRA on 15 May 2013. This allows Colombia to declare CMCs in Thermometry and Humidity. CMCs of Colombia are under SIM Review.

### **Other SIM Activities**

#### NIST Guest Researcher Program

In 2012 NIST hosted two Guest Researchers from SIM:

Luis Chaves Santa Cruz (LACOMET, 1 year)

Verónica Ponticorbo Manfrino (LATU, 4 Months)

#### Thermometry Workshops at CENAM

A three week thermometry workshop, partly funded by SIM and PTB, was held at CENAM (México) from 26 August to 13 September 2013.

The purpose of the workshop was to train SIM MWG3 Members in:

- Radiation Thermometry from 26 August to 30 August;
- Platinum Resistance Thermometry from 2 September to 6 September;
- Relative Humidity in Gases, from 9 to 13 September.

Although not all SIM member countries were able to send delegates, it was a very important experience for the attendees and instructors. SIM MWG3 is planning to hold the workshop again in 2015.

#### SIM Metrology School at NIST (October 2014)

NIST hosted 53 students from 29 countries at the SIM Metrology School in Gaithersburg. This metrology school included many aspects of metrology (including temperature).

<http://www.nist.gov/pml/newsletter/sim-metrology-school-at-nist.cfm>.



There were lecturers from several countries (USA, Canada, Panamá, Chile, México, other ) of SIM.

### **Future Activities**

- A meeting of the SIM MWG3 is planned coincident with the *Simposio de Metrología 2014* (<https://www.cenam.mx/simposio/>) which is being held at CENAM in Querétaro, México. The focus will be on training to declare CMCs and plan comparisons.

SIM will continue its efforts to assist SIM MWG3 Members to:

- improve their knowledge of Temperature and Humidity Metrology;
- install new laboratories (CARIMET and CAMET mainly);
- develop new comparisons supporting the declaration of CMCs, especially in Humidity and Radiation Thermometry;
- declare CMCs;
- increase interaction among the member countries in the field of thermometry.