NEWSLETTER

IMEKO Technical Committee 12

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Dear Colleagues,

welcome to the first appointment with the TC12 newsletter in 2012. As indicated earlier, we will keep on sending the newsletter to a list of approximately 2000 readers all over the world. This is a wide group of temperature, thermal measurements and humidity scientists, manufacturers, and users.

As usually, this issue brings you news on recent events interesting metrologists working in the fields of temperature and humidity metrology, including thermodynamics measurements, primary thermometry, hygrometry, etc.

Here we report on the results of the **European Metrology Research Programme - EMRP** 2011 where two projects dealing with temperature have been awarded for funding on the call on SI broader scope. This issue also contains news from the organizing committee of Tempmeko 2013 and other short communications.

As usual, we are open and ready to receive and publish news from all readers on topics of interest for the entire community.

Andrea Merlone

EMRP 2011 calls.

Congratulations are due to the coordinators of the two temperature metrology joint research projects, awarded for funding under the 2011 EMRP SI Broader Scope Call. Dolores del Campo (CEM) and Graham Machin (NPL) succeeded at gathering the appropriate consortia of NMIs and stakeholders, preparing the JRP protocols and convincing the reviewers about the need and importance of the proposals, during the review conference.

InK

Implementing the new kelvin

Implementing the new kelvin (InK) is the project coordinated by Graham Machin. The JRP will develop primary thermometry methods that both challenge and supplant the defined scales at high (>1000 °C) and low (<1 K) temperatures. This will result in a paradigm shift in the practice of thermometry. At these extremes thermodynamic temperature will be, for the first time (anticipating the new kelvin defined in terms of the Boltzmann constant) directly realized and disseminated, instead of one of the defined scales.

Between these temperature extremes new values of $T - T_{90}$ with the lowest uncertainties (≤1 mK) are required in the a) short term to provide ultra-reliable $T - T_{90}$ data for the MeP-K and b) longer term to develop the primary thermometry

techniques needed to progressively supplant defined scales in the next decade.

The user community will welcome the fact that this work will extend the life of ITS-90, through the mechanism of the MeP-K, and negate the need for a change in the temperature scale for a considerable length of time.

NOTED

Novel techniques for traceable temperature dissemination

Dolores Del Campo, from CEM coordinates this project, focused on the development of new advanced techniques for providing improved traceability to the kelvin to support its wider and simpler dissemination to the users.

The project objective will be attained by:

a) The development of new interpolation instruments and techniques and through implementing practical primary thermometers (which will be able to perform a calibration of Standard Platinum Resistance Thermometers (SPRT) directly to the new kelvin definition).

b) Solve current outstanding questions related to the ITS-90 temperature fixed points, to clarify the discrepancies in their realization facilitating a reduction of their uncertainty.

This JRP is a challenge in the field of fundamental thermometry: it will solve some of the pressing weaknesses of the ITS-90 (T_{90}) and will help make practical the link between the thermodynamic temperature T and the temperature defined by the ITS-90 T_{90}. This JRP offers solutions to the most pressing problems associated with high level practical temperature metrology, in the most widely used temperature range, from -218 ºC up to 1000 ºC. As temperature is one of the most frequently measured physical quantities in science and industry, (for example pharmaceutical, semiconductors, petrochemistry or food processing industries) the impact of this project will be transmitted to both communities.

All National Metrology Institutes (NMIs) will benefit from the results of this project because of its direct and significant contribution to the developing MeP-K. iIn particular this work will facilitate:

- an improvement of the present uncertainties in the realization of the ITS-90,
- new dissemination methods and instruments to ensure traceability to the kelvin.

The impact of this project will go directly to users in science and industry because of its improved practicality: e.g.:

- new robust high performance sensors,
- development of practical primary thermometers, simpler, faster (in operation) and cheaper,
- reduction of the uncertainties in the measurement of temperature leading, for instance, to improved process tolerances in which temperature is a critical factor,
- new more accurate and faster calibration methods for contact thermometry.

Temperature is a fundamental parameter measured on a daily basis across a very broad spectrum of human endeavor e.g. in industry, health, meteorology, science etc. Hence the pool of beneficiaries for those two project is very large.

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HiTeMs[1] Kick Off Meeting

The EMRP – IND01 kick-off meeting was held at NPL on 13 - 15 September 2011 for the EMRP HiTeMs project. A total of 30 participants from 16 different organisations attended the meeting. The project, which is co-ordinated by NPL, aims to develop a suite of novel thermometry techniques, both non-contact and contact thermometry, for improving high temperature measurement in industry. The meeting agreed how to implement the technical workpackages and how to generate the greatest impact including presenting at trade shows and publishing articles in industrial sector magazines (e.g. aerospace, nuclear, glass) as well as through scientific conferences. The next project meeting is 21-22 June 2012 at CEM, Spain.

[1]High temperature metrology for industrial applications

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TEMPMEKO 2013

The next TEMPMEKO 2013, *Symposium on Temperature and Thermal Measurements in Industry and Science* will be held in Madeira Island from 14th to 18th October 2013. It will be hosted by SPMet – Portuguese Metrology Society and RELACRE – Portuguese Network of Accredited Laboratories and the co-sponsoring of IPQ - Portuguese Institute of Quality, Madeira Autonomic Regional Government and Madeira University.

The event has the support of the Madeira Autonomic Regional Government and of IPQ, the Portuguese Institute for Quality.

The first call for papers of this Conference is expected to be issued in October 2012.

The organizational work is running smoothly and it is ongoing the contract with a five stars hotel with a Congress Centre, the *CS Congress Centre of Madeira Atlantic Resort & Sea Spa,* that proposes a very suitable infrastructure for large events with a good exhibition zone and last but not the least a beautiful location with several facilities as you can appreciate from the photos. Also in a walking distance there are several hotels with a different number of stars and convenient prices.

The CS Congress Centre of Madeira Atlantic Resort & Sea Spa is located in the south coast of the Madeira Island which benefits from an exclusive oceanfront position.

The five stars hotel has a contemporary style with elegant décor throughout and spacious modern rooms with balconies overlooking the ocean and beautifully landscaped nature gardens.The CS Congress Centre facilities include an Auditorium with 400 seats and several Conference Rooms.
Guided visits to the Island and excursions to most beautiful places will be available to accompanying persons.

Madeira, known as the Atlantic “pearl” is about one hour flight from Lisbon. It is a well known tourist destination with friendly people and a good infrastructure for events. The organizing committee intends to offer you a pleasant and memorable event.

Eduarda Filipe

News submission invitation

We invite all readers to submit relevant news. Welcome topics are: practical and thermodynamic thermometry; temperature scales and fixed points; temperature and humidity measurements, calibration and control devices, methods and data analysis; Boltzmann constant and new definition of the kelvin, medical and biological thermometry; temperature and humidity measurements for meteorology and climate studies; earth surface and atmosphere thermometry and hygrometry, temperature and humidity metrology applications.

Andrea Merlone