



**Agenda item 7.2**

**Report from the BIPM**

## Report from the BIPM to the 50<sup>th</sup> CIML

The **international bureau of weights and measures (BIPM)** is an intergovernmental organization established by the Metre Convention, through which Member States act together on matters related to measurement science and measurement standards. There are currently 55 Member States and a further 40 Associated States and Economies who participate in the activities of the BIPM. **The mission of the BIPM is to ensure and promote the global comparability of measurements, including the provision of the basis for a high-level coherent international system of units for:**

- Scientific discovery and innovation,
- Industrial manufacturing and international trade,
- Sustaining the quality of life and the global environment.

The unique role of the BIPM is based on its international and neutral character enabling it:

- To coordinate the realization and improvement of the world-wide measurement system to ensure that it delivers accurate and comparable measurement results.
- To undertake in its laboratories scientific and technical activities in support of this system that are more efficiently carried out on behalf of Member States.
- To promote the importance of metrology to science, industry and society, in particular through collaboration with other intergovernmental organizations and international bodies and in international fora.

The unique role of the BIPM enables it to achieve its mission by developing the technical and organizational infrastructure of the International System of units (SI) as the basis for the world-wide traceability of measurement results. This is achieved both through technical activities in its laboratories and through coordination activities.

### News and developments

We have welcomed two new Member States this year. The Republic of Lithuania, an Associate since 2001, acceded and became a full Member State on the 16<sup>th</sup> April 2015. The United Arab Emirates also became a Member State of the BIPM, acceding on the 27<sup>th</sup> April 2015. Unfortunately, having failed to pay subscription for three years, Sri Lanka was excluded as an Associate at the end of 2014, and the Dominican Republic, a Member State with whom the BIPM had concluded a rescheduling arrangement for the repayment of outstanding arrears, was also excluded at the end of 2014 due to its failure to maintain payments in accordance with that arrangement.

### The 25th CGPM was held in November 2014

Five Resolutions were adopted, addressing the revision of the International System of Units, the SI, the election of the CIPM, addressing the BIPM Pension Fund, the Dotation of the BIPM for the years 2016-2019, and the review of the CIPM MRA. The Resolutions are available on the BIPM website.

### Redefinition – the revision of the SI

Work towards redefinition continues new definitions of the kilogram, ampere, kelvin, and mole in terms of fixed numerical values of the Planck constant, elementary charge, Boltzmann constant, and Avogadro constant, respectively continues. The scientific results have converged such that the expectation remains that redefinition will occur at the General Conference (CGPM) in 2018. Work is advanced on the new *mise en pratiques*, that is the set of instructions that allows the definition to be realized in practice at the highest level.

The 9th edition of the SI brochure is being finalised in anticipation of redefinition and is either opened for consultation (for some chapters), or will shortly be (for the remainder).

### **CIPM Changes**

The 25<sup>th</sup> CGPM saw the introduction of a new process of election for CIPM Members. Members are now elected to a term that begins at the first CIPM meeting to take place no later than six months after the CGPM meeting at which they are elected, and ends at the beginning of the CIPM meeting that follows the next meeting of the CGPM. The elections resulted in seven Members who had not previously been on the CIPM. Full details are available on the BIPM website.

### **CIPM Mutual Recognition Arrangement (CIPM MRA) and the BIPM key comparison database (KCDB)**

The Mutual Recognition Arrangement of national measurement standards and of calibration and measurement certificates issued by National Metrology Institutes (CIPM MRA) The CIPM MRA has been signed by the representatives of 98 institutes – from 55 Member States, 40 Associates of the CGPM, and 4 international organizations – and covers a further 152 institutes designated by the signatory bodies. After some 15 years and following on from Resolution 5 adopted at the General Conference in 2014 the CIPM MRA is to undergo a review of its implementation and operation. Preparatory work is well advanced and a dedicated web page has been established. The NMI Directors meeting scheduled for 13 and 14 October 2015 is dedicated to the issue, and will establish the formal working group under the chairmanship of the CIPM President to conduct the review. The review is expected to take around one year.

### **BIPM workshops**

The BIPM hosted a two day Workshop on Global to Urban Scale Carbon Measurements on the 30 June and 1 July 2015. The aims of the workshop were to identify requirements for advanced measurements, standards, reference data, and instrument comparisons for carbon measurement and other related climate variables to enable a complete global monitoring system for greenhouse gases to be operational and useful for validated greenhouse gas flux and emission calculations and for the verification of emission inventories. Furthermore, approaches to be undertaken for the development of an international roadmap for standards, reference data, and instrument comparisons for global greenhouse gas measurements and other related climate variables and greenhouse gas emission inventories were explored. Abstracts and presentations are available on line. This workshop, and a JCGM workshop on the GUM also held in June, were landmark for the BIPM in that for the first time the main plenary sessions were webcast live. These webcasts are also available on the BIPM webpages.

### **Working with OIML/BIML**

Collaboration with OIML continues to be very good. The World Metrology Day joint initiative has become an excellent tool for raising awareness of metrology. The theme for 2015 is aligned with the UNESCO International Year of Light and Light based technologies, with the strapline 'Measurements and light'. Yet again we achieved record participation, with 36 countries organising events, and 24 versions of the poster produced by participating institutes, in addition to the formal English and French versions produced by the team. The theme for 2016 has been chosen ('Measurements in a dynamic world') and design work on the 2016 poster, overseen jointly by the two organisations, has begun in collaboration with VNIIMS in Russia. BIPM and OIML work alongside each other in a wide range of forums, including the quadripartite arrangement with ILAC and ISO, in the working groups of the JCGM, in the DCMAS Network where we are jointly looking to overhaul the dedicated website, and more recently within the ISO CASCO WG44 looking at the revision of ISO/IEC 17025. The two organisations also collaborate closely in terms of achieving the maximum impact in terms of raising the profile of metrology. When one or other organisation is unable to attend important meetings, the other organisation presents or speaks on their behalf. In the last year this approach has been used at, for example, the WTO TBT Committee, at a dedicated seminar for WTO trade negotiators on conformity assessment, at the ACP EU TBT meeting and at an awareness raising event in Kazakhstan. Following discussions with the OIML President and the BIML Director the OIML the BIPM will offer participants on the

new BIPM training courses developed under the BIPM Capacity Building and Knowledge Transfer Programme (see below) the opportunity to attend BIML for a day to hear first-hand how the key elements of the work of the international legal metrology community.

#### **BIPM capacity Building and Knowledge Transfer Programme**

It is recognised that all advanced nations already participate in the activities of the BIPM. Many Member States and Associates who have joined recently have emerging metrology systems, and that will be the case for all future potential participants. A proposal for a dedicated BIPM Visitor Programme aimed at helping those with emerging metrology systems engage effectively in the international system did not receive the consensus needed to increase the BIPM budget to fund the VP. However the ideas and principles were widely supported by many Member States. Consequently the Resolution addressing the BIPM funding was amended to encourage Member States, as well as international organizations, private organizations and foundations to support specific BIPM mission-related activities, particularly those that facilitate participation in the activities of the BIPM by those countries without well-developed metrology infrastructure. Building on the discussions at the CGPM the BIPM has since developed a Capacity Building and Knowledge Transfer Programme (BIPM CBKT). The activities are opened for support by voluntary contributions. The programme aims to enhance engagement from Member States and Associates with emerging metrology systems, and to aid wider sharing of the workload of operating the CIPM MRA. The programme offers a 'Menu' of possible activities allowing donors to focus their support on those they consider most worthwhile. Funding has already been secured (from NIST in the USA) to enable the BIPM to run two training courses (including financial support for the participant costs). The first is scheduled for late 2016 aimed at new and potential technical committee and working group chairs, and the second is scheduled for late 2017 and is aimed at those newly engaged in the CIPM MRA. Full details will be given at the OIML CEES Seminar.

#### **BIPM Work Programme 2016-2019**

The BIPM will begin a new four year Work Programme in January 2016. For the first time detailed resource per project information has been provided, along with clear deliverables. The development of this WP followed a more rigorous and formal consultation process than had been the case historically. As a consequence it was approved without changes at the CGPM. The WP is openly available on the BIPM website.

#### **BIPM changes**

Following the retirement of Dr. Claudine Thomas, the KCDB Coordinator role has been taken over by Dr. Susanne Picard. The Mass and Electricity Departments were merged in October 2015 to form a single Physical Metrology Department headed by Dr. Michael Stock.