



52nd CIML Meeting - Working Document

**Additional Meeting Document**

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**Agenda item 10.3: Updates by organizations in liaison**

**Report from the BIPM to the 52nd CIML meeting**

## REPORT FROM THE BIPM TO THE 52nd CIML MEETING

Cartagena de Indias, Colombia

10-12 October 2017

### Background

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 58 Member States and a further 41 Associate States and Economies who participate in the activities of the BIPM.

The **vision** of the BIPM is to be universally recognized as the world focus for the international system of measurement.

The **mission** of the BIPM is to work with the NMIs of its Member States, the RMOs and strategic partners world-wide and to use its international and impartial status to promote and advance the global comparability of measurements for:

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

The **objectives** of the BIPM are:

- To represent the world-wide measurement community aiming to maximize its uptake and impact.
- To be a centre for scientific and technical collaboration between Member States providing capabilities for international measurement comparisons on a shared-cost basis.
- To be the coordinator of the world-wide measurement system ensuring it gives comparable and internationally-accepted measurement results.

Fulfilling the mission and objectives of the BIPM is underpinned by its work in:

- capacity building, which aims to achieve a global balance between the metrology capabilities in Member States;
- knowledge transfer, which ensures that our work has the greatest impact.

### UPDATE ON RECENT PROGRESS:

#### Review of the CIPM Mutual Recognition Arrangement (CIPM MRA)

The Mutual Recognition Arrangement of national measurement standards and of calibration and measurement certificates issued by National Metrology Institutes (CIPM MRA) continues to expand, with the NMIs from three additional states; Iran, United Arab Emirates and Qatar, signing in the twelve month period.

The CIPM MRA has now been signed by the representatives of 102 institutes – from 57 Member States, 41 Associates of the CGPM, and 4 international organizations – and covers a further 155 institutes designated by the signatory bodies. After some 15 years and following on from Resolution 5 adopted at the General Conference in 2014 the review of the CIPM MRA is well advanced. Significant analysis and consultation has been undertaken and two preparatory workshops have been held. *The Recommendations from the Working Group on the Implementation and Operation of the CIPM MRA* have been published on the dedicated CIPM MRA Review [webpage](#) and the community is now taking the recommendations forward.

## The Key Comparison Database (KCDB)

The KCDB is the essential vehicle for the delivery of information underpinning the operation of the CIPM MRA. At the end of February 2017, the KCDB included a total of 24 974 Calibration and Measurement Capabilities (CMCs) - 18 693 in Physics plus 6 281 in Chemistry.

Over the last six months 34 countries have published CMCs. (A detailed breakdown is given at the end of this report).

As part of the recommendations of the review of the MRA, the KCDB software platform will be renewed, the specification has been developed and the contract is expected to run until late 2018.

## BIPM Workshop: The Quantum Revolution in Metrology

The objective of the workshop is to promote scientific exchange amongst the NMIs and with leading researchers on the applications of quantum-based technologies to metrology. The workshop will be held at the BIPM on 28-29 September 2017. The representatives of several NMIs, such as NIST, PTB, LNE, etc. will deliver lectures at this workshop.

## The BIPM Capacity Building and Knowledge Transfer Programme

It is recognised that all advanced nations already participate in the activities of the BIPM. However, many Member States and Associates that have joined recently are working to bring their metrology systems to maturity, and that will be the case for all future potential participants. Building on the discussions at the 2014 CGPM the BIPM has since developed a Capacity Building and Knowledge Transfer Programme (BIPM CBKT). The activities are open 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. Support has already been secured and some first project has been formulated, funded, and indeed completed.

Courses advertised have been heavily oversubscribed. So far around 93 participants from 35 countries participated in various training courses. There is a dedicated webpage at the BIPM website that lists the following individual projects <http://www.bipm.org/en/cbkt/>:

The BIPM and the Italian Physical Society ran a **joint Metrology School "Metrology: from physics fundamentals to quality of life" in Varenna (Italy)**, during the summer of 2016. The BIPM teamed up with METAS (Switzerland) and supported three students, allowing them to combine attendance at the Metrology School with a short placement at METAS to pursue a specific metrology topic of interest.

In a second project, supported by NIST (USA), an **11 day training course "Leaders of Tomorrow"** held in November 2016, enabled 18 new and potential technical committee and working group chairs to increase the knowledge and confidence around the effective operation of the CIPM MRA. **This course included lecturers from OIML/BIML.**

Furthermore, **the 2016 "BIPM-GULFMET TC Workshop"** has been successfully completed 21-23 November 2016 in Dubai, United Arab Emirates. The course was designed to provide GULFMET Technical Committee members with the skills, knowledge and tools to help them participate in the mechanisms of the CIPM MRA. The Workshop provided participants with an understanding of the CIPM MRA requirements relating to comparisons, CMCs and Quality Systems, and their use in the CMC review, approval and publication process.

The BIPM hosted a **4 day course "TC Leadership"** as a joint initiative with the EURAMET on 07-10 February 2017. The course content was designed for experienced eighteen TC members within twelve EURAMET member countries who have already been involved in the CIPM MRA and its processes. It provided participants with: an understanding of the importance of metrology in the global quality

infrastructure; aspects of mechanisms of the CIPM MRA; specific requirements of various metrology areas on comparisons; and representation of CMCs and regional requirements of EURAMET on the operation of the CIPM MRA.

A second NIST sponsored an **11 day course "Sound beginning in the CIPM MRA"** scheduled for November 2017 at the BIPM, is aimed at technical staff (those responsible for metrology service development and/or quality systems) from NMIs that have signed the CIPM MRA but not yet submitted CMCs (or are early in the process). **This course will include lecturers from OIML/BIML.**

The further events planned for late 2017 are:

The **EURAMET - BIPM Training** (7-8 November 2017, Madrid, Spain) is focused on the processes related to evaluation of quality systems and peer-review of the NMI/DI technical capabilities within the framework of the CIPM MRA.

The **APMP-DEC "Leadership training"** (4-8 December 2017, Thailand) is designed to provide new or future leaders of APMP-DEC NMIs, including new TC Chairs and Chair-elect depending on availability of places and who have shown potential for leadership, with the skills, knowledge and tools to help them participate in the mechanisms of the CIPM MRA.

The BIPM CBKT also encompasses laboratory activity on ongoing basis:

The **2016-2018 "Metrology for Safe Food and Feed in Developing Economies" project** is up and running. This project is designed to allow NMIs to work together to strengthen mycotoxin metrology infrastructure; provide knowledge transfer to scientists developing capabilities in this area, including periods as visiting scientists at the BIPM; and enable NMIs to provide mycotoxin calibrant and matrix reference materials and proficiency test materials to support mycotoxin testing laboratories within their countries. As of today, there are 8 participants from 7 countries so far have participated in this initiative.

A second laboratory based BIPM CBKT activity is focusing on **Metrology for clean air** - capabilities in gas metrology. 5 participants from 5 countries so far have benefitted from this initiative.

The further such projects are:

**2017–2018 "Support for GULFMET key comparison of Zener voltage standards" project** is designed to support GULFMET (Gulf Association for Metrology) in the organization of one of their first key comparisons, GULFMET.EM.BIPM-K11, a comparison of Zener voltage standards, coordinated by the Standards and Calibration Laboratory (SCL) of Hong Kong, China. Two countries from GULFMET region are participating in this comparison.

The BIPM and the National Metrology Institute of Turkey (TÜBİTAK UME) are running a joint training initiative entitled: **2018 & 2019 "BIPM - TÜBİTAK UME project placements"**. The initiative will provide opportunities for young metrologists to gain in-depth knowledge and experience by conducting research on a subject of their choosing for a period of 1 to 3 months in TÜBİTAK UME's laboratories.

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

Collaboration with OIML continues to be very good.

The jointly organised World Metrology Day initiative has become an excellent and widely appreciated tool helping NMIs and authorities to raise awareness of metrology. The day is celebrated annually on May 20, the anniversary of the signing of the Metre Convention. The theme for 2017 is *'Measurements for transport'* and the poster design was undertaken in partnership with the Instituto Nacional de Metrología de Colombia (INM) in Colombia. The poster, Directors messages and details of some 30 events organised worldwide are available at <http://www.worldmetrologyday.org/>.

Work with OIML on World Metrology Day 2018 is well advanced. The theme of the World Metrology Day will be around the expected re-definition of SI. The World Metrology Day posters are designed by a volunteering NMI drawn from each of the regions in turn. For 2018 the NMI will be drawn from EURAMET, who have already completed a completion among interested NMIs, and final selection is imminent.

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, 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 a number of times at, for example, the WTO TBT Committee. OIML/BIML representatives will lecture on the new BIPM training courses developed under the BIPM CBKT (see above). OIML/BIML involvement ensures students hear first-hand how the key elements of the work of the international legal metrology community.

The BIPM is ready to contribute to the planned update of the OIML document D 1 Elements for a Law on Metrology and the BIPM is pleased to contribute to discussions around OIML CEEMS Advisory Board.

In the DCMAS Network (including ten international organizations) we have been jointly working to overhaul the dedicated website, and towards a common definition of “Quality Infrastructure”. The new definition of [“Quality Infrastructure” was adopted at the annual meeting of the DCMAS Network in June 2017](#) under the chairmanship of the OIML (World Bank also took part). The BIPM would like to thank BIML on behalf of all DCMAS Network members for the work on new [DCMAS website](#).

Moreover, as a result of strategic partnership between the BIPM, the UNIDO and the OIML within the DCMAS Network in May 2017 on the occasion of World Metrology Day these organizations has jointly developed a new brochure [“The role of metrology in the context of the 2030 Sustainable Development Goals”](#), which highlights the contribution of metrology to the implementation of the 2030 Agenda for Sustainable Development. This new brochure is a successful continuation of two additional brochures dedicated to [the role of standards](#) and [the role of accreditation in the context of the 2030 Sustainable Development Goals](#) that were published in 2016.

Furthermore, joint work has started towards the organization of the next meeting of the CGPM to be held in November 2018.

### **The proposed revision of the SI**

Work towards 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 are converging 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 9<sup>th</sup> edition of the SI brochure is being finalised in anticipation of redefinition and is open for consultation.

The Task Group for the "Promotion of the SI" set up by the CIPM prepared [“SI Brand Book” and SI graphics](#).

## Key BIPM staff and CIPM changes

- Chingis Kuanbayev joined the BIPM International Liaison and Communication Department in July 2016 to strengthen the CBKT and programme monitoring capability.
- Nikita Zviagin seconded from VNIIM (Russian Federation) as JCRB Executive Secretary for 2017 and 2018.
- Rahima Guliyeva joined the BIPM International Liaison and Communication Department in February 2017 to support the BIPM international and bilateral liaison activities for the period of two years (2017 and 2018).
- Dr Steven Judge joined the BIPM on 15 August 2017. He took over from José María Los Arcos as Director of the Ionizing Radiation Department.
- Dr Patrizia Tavella will join the BIPM on 1 November 2017. She will take over from Dr Felicitas Arias as Director of the Time Department.
- The 18 Members of the CIPM are now elected at each CGPM for a period that runs until the next CGPM. Where CIPM Members need to step down between CGPMs, provisional elections are held. There were three such elections completed. Full details of CIPM Members are available [on the BIPM relevant webpage](#).
- Dr Maria Luisa Rastello, INRIM (Italy) and CIPM Member, has officially taken over the Presidency of the CCPR from Dr Takashi Usuda, NMIJ AIST (Japan) in April 2017.

## News and developments in the participation in the activities of the BIPM

The **Federal Democratic Republic of Ethiopia** has officially completed all necessary steps to become an Associate State of the CGPM as from 1 January 2018.

The discussions continue with some other new states to become an Associate State in 2018, such as Tanzania, Kuwait, Uzbekistan, etc.

There are ongoing discussions with several Associate States to become a Member State in 2018 (*e.g.* Ukraine, Costa Rica, Panama, etc.).

The issue of the engagement of states with very-low GDP and with emerging metrology systems in the activities of the BIPM is currently under the consideration.

## BIPM Annual Review

The BIPM Annual Review 2016/2017 is now available [online](#).

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## Information from the Key Comparison Database

Full data is available from: <http://kcdb.bipm.org/>

### Key and Supplementary Comparisons on 1 September 2017

Entity	KC	SC
BIPM	92	1
CC	479	29
AFRIMETS	5	19
APMP	134	104
COOMET	48	87
EURAMET	160	176
GULFMET <sup>2</sup>	2	11
SIM	64	88

### Information on CMC statistics per RMOs and CIPM MRA signatories on 25 August 2017

Entity	Total number of CMCs
AFRIMETS	554
APMP	5803
COOMET	2477
EURAMET	11177
GULFMET	0
SIM	4717
ESA	0
IAEA	26
JRC	217
WMO	3

<sup>2</sup> The GULFMET was approved as an RMO on a provisional basis by the CIPM in October 2015.