

# Report from the BIPM... .... to the SIM GA

Andy HENSON

BIPM

September 2019

**B**ureau  
♦ **I**nternational des  
♦ **P**oids et  
♦ **M**esures





## About the BIPM



20 May 2019 - World Metrology Day

The new definitions of the SI base units  
have now come into effect!

### Metrology area:

- ↘ Acoustics, Ultrasound and Vibration
- ↘ Chemistry and Biology
- ↘ Electricity and Magnetism
- ↘ Ionizing Radiation
- ↘ Length
- ↘ Mass and related quantities
- ↘ Photometry and Radiometry
- ↘ Thermometry
- ↘ Time and Frequency
- ↘ Units

## The International System of Units (SI)

Introduction

Definition of the SI

SI base units

SI prefixes

The 2018 revision of the SI

How to realize the SI units

SI Brochure

History

→ The recommended practical system of units of measurement is the International System of Units (*Système International d'Unités*), with the international abbreviation **SI**.



The SI is defined by the **SI Brochure**, which is published by the BIPM.

In a landmark decision, the BIPM's Member States voted on 16 November 2018 to revise the SI, changing the world's definition of the kilogram, the ampere, the kelvin and the mole.

This decision, made at the 26th meeting of the General Conference on Weights and Measures (CGPM), means that from 20 May 2019 all SI units are defined in terms of constants that describe the natural world. This will assure the future stability of the SI and open the opportunity for the use of new technologies, including quantum technologies, to implement the definitions.

The seven defining constants of the SI are:

- the caesium hyperfine frequency  $\Delta\nu_{\text{Cs}}$ ;
- the speed of light in vacuum  $c$ ;
- the Planck constant  $h$ ;
- the elementary charge  $e$ ;
- the Boltzmann constant  $k$ ;
- the Avogadro constant  $N_{\text{A}}$ ; and
- the luminous efficacy of a defined visible radiation  $K_{\text{cd}}$ .

The SI was previously defined in terms of seven base units and derived units defined as products of powers of the base units. The seven base units were chosen for historical reasons, and were, by convention, regarded as dimensionally independent: the metre, the kilogram, the second, the ampere, the kelvin, the mole, and the candela. This role for the base units continues in the present SI even though the SI itself is now defined in terms of the defining constants above.



## SI Brochure: The International System of Units (SI)

9th edition (2019)

Appendix 1

Appendix 2


Appendix 3

Appendix 4

Previous editions

→ We are pleased to present the 9th edition of the SI Brochure (2019), which defines and presents the *Système International d'Unités*, the SI (known in English as the International System of Units).

◦ **Complete brochure**  (French and English)

◦ Concise summary 

◦ Text in English 

◦ Text in French 

- Appendix 1: Decisions of the CGPM and the CIPM
- Appendix 2: Practical realization of the definition of some important units
- Appendix 3: Units for photochemical and photobiological quantities
- Appendix 4: Historical notes on the development of the SI and its base units



## The International System of Units - making measurements fundamentally better

Some small changes that come into effect for laboratories working at the highest levels in the mass and electricity communities.

for electricity:

[https://www.bipm.org/utis/common/pdf/CC/CEM/ccem\\_guidelines\\_revisedSI.pdf](https://www.bipm.org/utis/common/pdf/CC/CEM/ccem_guidelines_revisedSI.pdf)

for mass:

[https://www.bipm.org/utis/common/pdf/CC/CCM/BIPM\\_Note-on-kilogram-redefinition.pdf](https://www.bipm.org/utis/common/pdf/CC/CCM/BIPM_Note-on-kilogram-redefinition.pdf)

→ The 20th May 2019 marks a particularly special celebration of World Metrology Day because it is the day chosen for the implementation of the changes agreed to the definitions of the SI base units. These landmark changes were decided at the 26th meeting of the General Conference on Weights and Measures (CGPM), which took place in Versailles in November 2018.

From 20 May 2019 the International System of Units (SI) embraces one of the most significant changes since its establishment - the definitions of four units (the kilogram, the ampere, the kelvin and the mole) are also linked to physical constants, which ensure their stability and universality. For more information on the impact redefinition has on the realization of the units see <https://www.bipm.org/utis/common/pdf/SI-statement.pdf>.

The world-wide promotional activities surrounding the meeting of the CGPM last November were very successful; we hope that the efforts to generate awareness about the implementation of the decisions will be similarly effective. Many examples of initiatives under way around the world are available from the World Metrology Day resource website (<http://www.worldmetrologyday.org/>).

Whilst the motivation for the changes to the definitions has been to provide new opportunities to increase access to accurate measurements there are some small changes that come into effect today that will concern laboratories working at the highest levels in the mass and electricity communities. Information about these changes is available from:

[https://www.bipm.org/utis/common/pdf/CC/CEM/ccem\\_guidelines\\_revisedSI.pdf](https://www.bipm.org/utis/common/pdf/CC/CEM/ccem_guidelines_revisedSI.pdf)

for electricity, and

[https://www.bipm.org/utis/common/pdf/CC/CCM/BIPM\\_Note-on-kilogram-redefinition.pdf](https://www.bipm.org/utis/common/pdf/CC/CCM/BIPM_Note-on-kilogram-redefinition.pdf)

for mass.

We wish success to all activities around the world on World Metrology Day that are raising awareness of how the SI is "Fundamentally Better".



### Select a topic:

- ☒ BIPM highlights
- ☒ BIPM CBKT programme
- ☒ CIPM MRA
- ☒ Committees
- ☒ Member States and Associates
- ☒ Metrology events
- ☒ Publications
- ☒ Revision of the SI
- ☒ Staff and recruitments

Read more...



## Information for users about the redefinition of the SI

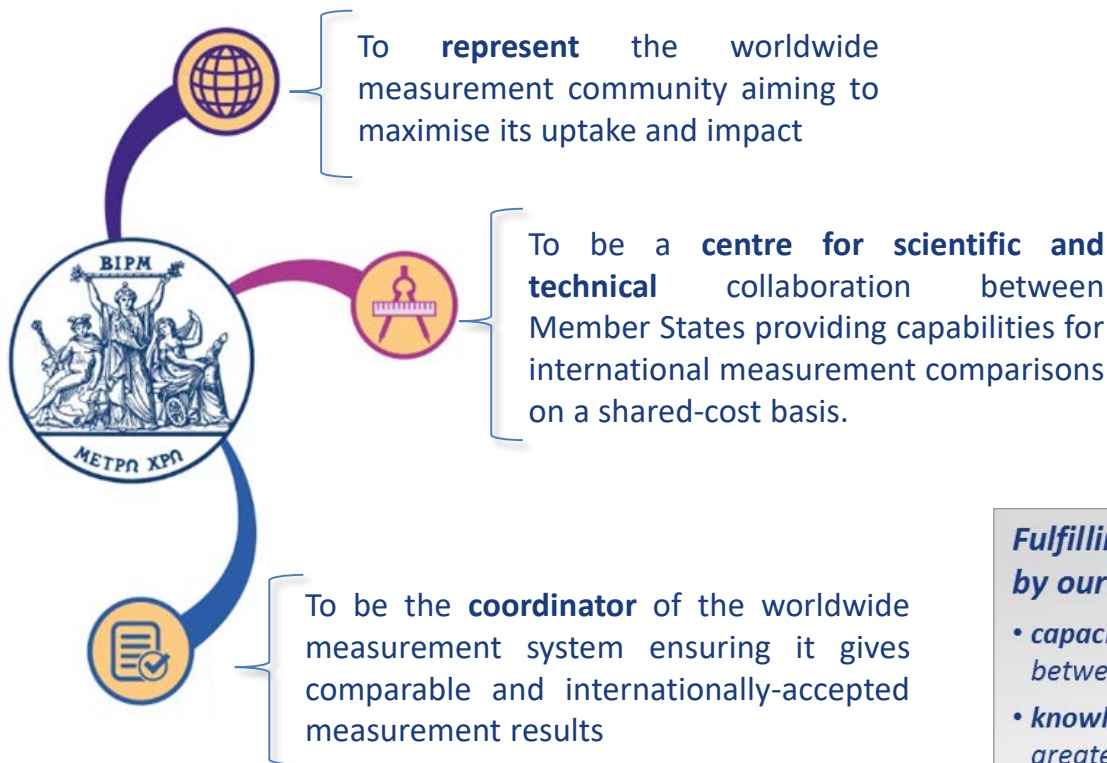
*Updated May 20, 2019*

The International System of Units, the SI, which is based on the **second**, the **metre**, the **kilogram**, the **ampere**, the **kelvin**, the **mole** and the **candela** (the base units), has been revised to update the definitions of four of these units. In November 2018 revised definitions of the **kilogram**, **ampere**, **kelvin** and **mole** were approved by the General Conference on Weights and Measures (CGPM), the international body responsible for the global comparability of measurements, with the adoption of Resolution 1 (2018)<sup>1</sup>. The revised definitions came into force on 20 May 2019.

The revised definitions are based on seven physical constants (for example the speed of light, the Planck constant and the Avogadro constant) and are therefore inherently stable. The quantities have been chosen so that the revised definitions will not need to be modified to accommodate future improvements in the technologies used to realize them. The revision of the SI in this way was foreseen in Resolutions of the CGPM adopted in 2011 and 2014. Additional requirements contained in these Resolutions have ensured a smooth transition to the four revised definitions. Most users will not notice the change. A new edition of the SI Brochure<sup>2</sup> provides essential information for users, including, in its Appendix 2, guidance on the practical realization of the units<sup>3</sup>.

# The objectives of the BIPM

*Approved by Resolution 3 of the 26th CGPM*



***Fulfilling our mission and objectives is underpinned by our 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.

## Results of the election of the CIPM

→ On 16 November 2018, the CGPM conducted an election for all 18 seats on the CIPM.

Twelve current members stood and were re-elected:

- Dr F. Bulygin (Russian Federation),
- Dr I. Castelazo (Mexico),
- Dr Y. Duan (People's Republic of China),
- Dr H. Laiz (Argentina),
- Dr T. Liew (Singapore),
- Dr W. Louw (South Africa),
- Dr M.L. Rastello (Italy),
- Dr P. Richard (Switzerland),
- Dr G. Rietveld (Netherlands),
- Dr M. Sené (United Kingdom),
- Dr T. Usuda (Japan),
- Prof. J. Ullrich (Germany).

In addition, the following six new members were elected and will start their term at the next session of the CIPM, scheduled for March 2019:

- Dr D. del Campo Maldonado (Spain),
- Dr N. Dimarcq (France),
- Dr P. Neyezhnikov (Ukraine),
- Dr J. Olthoff (United States of America),
- Dr S.-R. Park (Republic of Korea), and
- Dr A. Steele (Canada).

The next session will also mark the retirement of six CIPM members who did not stand for re-election:

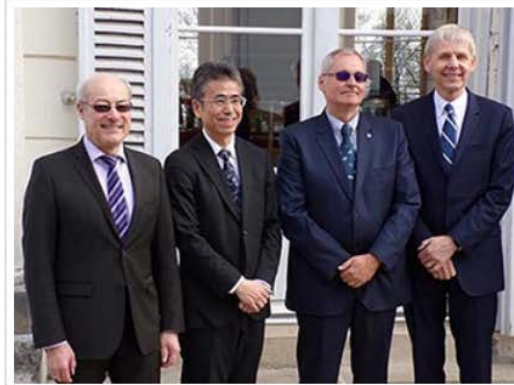
- Dr M. Buzoianu (Romania),
- Mr L. Erard (France),
- Dr B. Inglis (Australia),
- Dr D.-I. Kang (Republic of Korea),
- Dr W. May (United States of America), and
- Dr J. McLaren (Canada).



## Election of the CIPM bureau

→ During the first session of its 108th meeting (20-21 March 2019) the CIPM elected the following to form the bureau of the Committee:

- President - Dr W. Louw (South Africa)
- Secretary - Dr T. Usuda (Japan)
- Vice-Presidents - Prof. J. Ullrich (Germany) and Dr J. Olthoff (United States of America)



The CIPM bureau (left to right): Prof. J. Ullrich, Dr T. Usuda, Dr W. Louw and Dr J. Olthoff.



The six new CIPM members (left to right): Dr S.-R. Park, Dr D. del Campo Maldonado, Dr A. Steele, Dr J. Olthoff, Prof. P. Neyezhmakov and Dr N. Dimarcq.

The 108th meeting was the first to be held following the 26th meeting of the CGPM (November 2018), at which all 18 CIPM members were elected. Six of those elected participated in the CIPM for the first time:

- Dr D. del Campo Maldonado (Spain)
- Dr N. Dimarcq (France)
- Prof. P. Neyezhmakov (Ukraine)
- Dr J. Olthoff (United States of America)
- Dr S.-R. Park (Republic of Korea)
- Dr A. Steele (Canada).

## Current CIPM:

### → CIPM bureau members:

|                         |  | Election to the CIPM bureau (or first election) | Most recent (re)election to the CIPM by the CGPM | First election to the CIPM by the CGPM (or provisional election by the CIPM) |   |
|-------------------------|--|---|--|--|---|
| ↘ <b>President</b>      | Dr W. Louw (South Africa)                | 20 March 2019                                   | 2018   | 15 May 2013  | ☑ |
| ↘ <b>Secretary</b>      | Dr T. Usuda (Japan)                      | 20 March 2019                                   | 2018   | 1 July 2012  | ☑ |
| ↘ <b>Vice-President</b> | Prof. J. Ullrich (Germany)               | 9 March 2015                                    | 2018   | 15 May 2013  | ☑ |
| ↘ <b>Vice-President</b> | Dr J. Olthoff (United States of America) | 20 March 2019                                   | 2018   | 2018   | ☑ |

### → Other CIPM members:

|                     |   | Most recent (re)election to the CIPM by the CGPM | First election to the CIPM by the CGPM (or provisional election by the CIPM) |   |
|---------------------|---|--|--|---|
| ↘                   | Dr F. Bulygin (Russian Federation)                      | 2018   | 2014   | ☑ |
| ↘                   | Dr I. Castelazo (Mexico)                                | 2018   | 2014   | ☑ |
| ↘                   | Dr D. del Campo Maldonado (Spain)                       | 2018   | 2018   | ☑ |
| ↘                   | Dr Y. Duan (People's Republic of China)                 | 2018   | 8 March 2010   | ☑ |
| ↘                   | Dr N. Dimarcq (France)                                  | 2018   | 2018   | ☑ |
| ↘                   | Dr H. Laiz (Argentina)                                  | 2018   | 7 Dec. 2016  | ☑ |
| ↘                   | Dr T. Liew (Singapore)                                  | 2018   | 2014   | ☑ |
| ↘                   | Prof. P. Neyezhmakov (Ukraine)                          | 2018   | 2018   | ☑ |
| ↘                   | Dr S.-R. Park (Republic of Korea)                       | 2018   | 2018   | ☑ |
| ↘                   | Dr M.L. Rastello (Italy)                                | 2018   | 7 Dec. 2016  | ☑ |
| ↘                   | Dr P. Richard (Switzerland)                             | 2018   | 2014   | ☑ |
| ↘                   | Dr G. Rietveld (Netherlands)                            | 2018   | 2014   | ☑ |
| ↘                   | Dr M. Sené (United Kingdom)                             | 2018   | 7 Dec. 2016  | ☑ |
| ↘                   | Dr A. Steele (Canada)                                   | 2018   | 2018   | ☑ |
| ↘ <b>ex officio</b> | Dr M.J.T. Milton (United Kingdom), Director of the BIPM |  |  | ☑ |

## The CIPM appoints new Presidents of the CCQM and CCTF

→ The CIPM appointed two new Consultative Committee (CC) Presidents at Session I of its 108th meeting (March 2019).

Dr Sang-Ryoul Park, President of the Korea Research Institute of Standards and Science (KRISS), Republic of Korea, was appointed as President of the Consultative Committee for Amount of Substance: Metrology in Chemistry and Biology (CCQM) for a four-year term. Dr Park succeeds Dr Willie May, who has stepped down from the role that he had held since 2011.

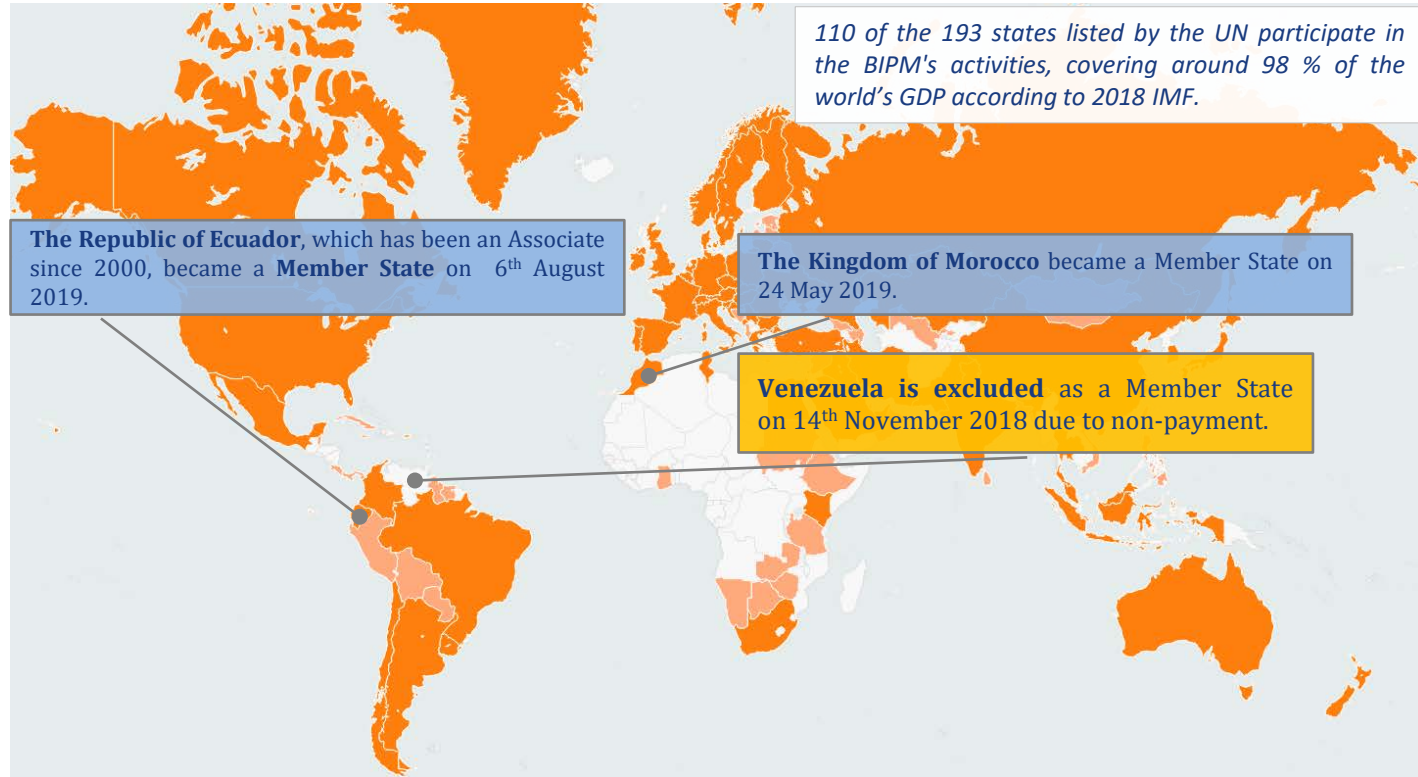
Dr Noël Dimarcq, Deputy Director of the Observatoire de la Côte d'Azur, France, was appointed as the President of the Consultative Committee for Time and Frequency (CCTF) for a four-year term. Dr Dimarcq succeeds Mr Luc Énard, who had been CCTF President since 2007.

Both Dr Park and Dr Dimarcq were elected to the CIPM at the 26th meeting of the CGPM in November 2018. They took their seats at the CIPM for the first time in March 2019.

# Member States and Associates

As of 06 August 2019, there are:

- 61 Member States\*
- 41 Associates of the CGPM  
(States and Economies)



\* The official term is "State Parties to the Metre Convention";  
the term "Member States" is its synonym  
and used for easy reference.

# KCDB figures *(August 2019)*

## 262 Institutes

- 102 National Metrology Institutes
  - 61 Member States
  - 41 Associates
- 4 International organizations  
(ESA, IAEA, JRC, WMO)
- plus 156 Designated Institutes

## 6 RMOs

Playing an important role to support mutual confidence in the validity of calibration and measurement certificates issued by participating institutes



1,613 comparisons

1039 key, 574 supplementary  
comparisons

25 242 CMCs

regionally and internationally peer-  
reviewed CMC declarations

# CIPM MRA review and outcomes

### **Recommendation 3 - (On constraining the proliferation of CMCs):**

- a. The results of KCs and SCs should be interpreted as widely as reasonably applicable to indicate coverage of CMCs.
- b. The use of CMCs to cover as many services as is technically justified should be encouraged, so that CMCs become representative rather than comprehensive. It should be emphasized that the goal is for NMIs to develop services and that CMCs are tools for describing the capabilities maintained to underpin the delivery of those services. The NMI Qs should document the relationship between services and CMCs. The CCs should work towards better consistency in the expression of CMCs (e.g. units, uncertainty ranges) .
- c. The CCs and NMIs are encouraged to use uncertainty equations and matrices to reduce the number of CMCs where possible.
- d. CMCs shall reflect the services available to customers under normal conditions, in accord with the MRA, and shall not be artificially subdivided.
- e. NMIs should be advised to use the percentage of coverage of their services by CMCs as a metric of success rather than the number of CMCs (The number of CMCs alone should not be considered a metric of the success of an NMI).



## CIPM ad hoc Working Group on Implementing the Recommendations from the Review of the CIPM MRA

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**Action 2/03/2017:** We recommend the following interpretation of terms:

- The term *'how far the light shines'* - is taken to refer to the use of comparisons as the evidence base supporting CMC claims.
- The term *'broad scope CMCs'* - is taken to refer to the possibility of NMIs summarising their capabilities with the smaller number of CMCs each with a broader scope.
- That the issue of what CMCs should/ or should not cover be articulated around the question of whether the CCs' service category lists are sufficiently detailed to cover the services delivered by the NMIs/DI participating in the CIPM MRA.
- That it is understood that some RMOs are considering the importance of NMI/DI services where recognition is required at regional level only.
- That the term *'flexible scope'* has a specialised meaning in accreditation, and is not applicable to the discussion on broad scope CMCs.

**Action 5/03/2018:** It is recommended that in future all parties should refer to what has so far been called the *'risk based approach'* as an *'efficient and effective'* review.



# Broad scope = Representative CMCs



Use of the CIPM MRA logo and  
certificates statement

CIPM MRA-D-02  
Version 3.3

The following words have been added to Section 2 as a footnote

A CMC is deemed to cover services that meet all of the following criteria:

- Use the same instrument type/measurement method as that identified in the CMC, noting that more than one instrument type/measurement method can be listed in one CMC,
- Fall within the range covered by the CMC,
- Have measurement uncertainty no less than the uncertainty quoted in the CMC, with appropriate treatment, documented in the quality system, for any methods/instruments listed that are derived, i.e. involve further steps in the metrological traceability chain.

<https://www.bipm.org/utils/common/documents/CIPM-MRA/CIPM-MRA-D-02.pdf>

# Why KCDB 2.0 ?

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1999: signature of the CIPM MRA

2000: implementation of the CIPM MRA, KCDB 1.0

**2014: CGPM resolution of revision of the CIPM MRA**

**2015: NMI Director meeting on the CIPM MRA**

**2016: CIPM WG Recommendations on revision of implementation**

2017: Call for tender for KCDB 2.0

2018: Start of development

2019: Validation of software...*launch end October 2019?*

# KCDB 2.0 $\alpha$ -demonstration

[← to BIPM.org](#)



All data listed in the KCDB have been reviewed  
CIPM Mutual Recognition Arrangement

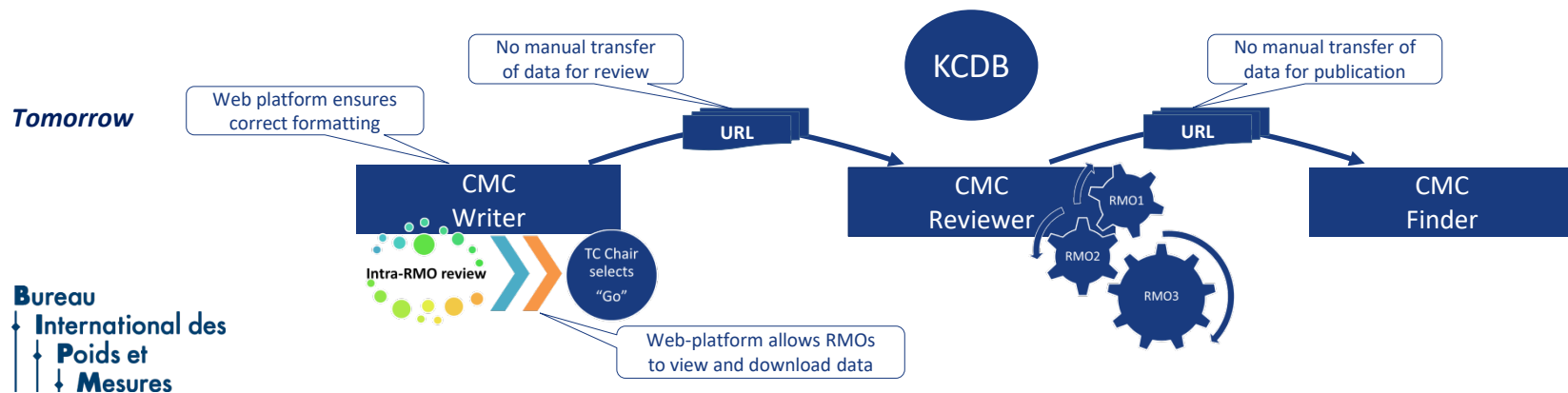
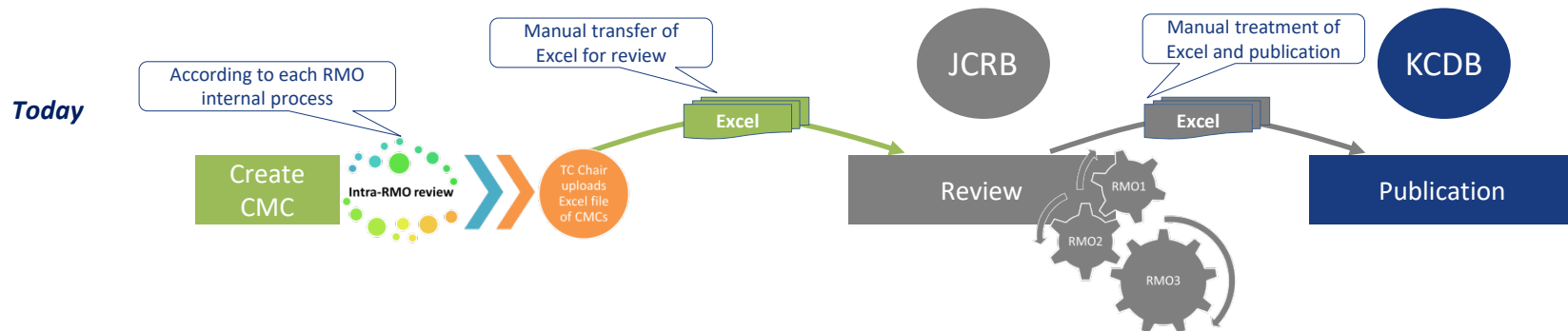
[Home](#) [CMCS](#)

## Comparison search

- Faster review
- Greater consistency
- Customized statistics
- Extended search facilities on CMCs and comparisons
- Web portal for CMC submission and review
- Support for registration and tracking of comparisons and associated approved final reports
- The CMC submitter, reviewer and TC Chair will each have access to the submitted and reviewed CMCs on the KCDB web in a dedicated space.
- TC Chair accounts will be created by the BIPM

| KCDB                                       |  | CIPM MRA           |  | CLASSIFICATION OF SERVICES          |                             |
|--|--|--------------------|--|-------------------------------------|-----------------------------|
| What is the KCDB                           |  | Participants       |  | Acoustics, Ultrasound and Vibration | Mass and related quantities |
| Help with searching                        |  | About the CIPM MRA |  | Chemistry and Biology               | Photometry and Radiometry   |
| Help on CMC edition, review and management |  | JCRB               |  | Electricity and Magnetism           | Thermometry                 |
| FAQs                                       |  | Policy documents   |  | Ionizing Radiation                  | Time and Frequency          |

# KCDB 2.0 – *General concept*



# What is the KCDB 2.0 ?

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KCDB 1.0  
JCRB web  
CMC platform  
extended search facilities  
+ module with statistics



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**KCDB 2.0**



Intra-RMO review integrated  
User account system

# KCDB 2.0 : Concept for CMC platform



CMC drafted at the NMI and placed on the CMC platform...



...made accessible to the Technical Committee Chair of the RMO for review...



...subsequently made accessible to the JCRB for approval...



...and made available on the KCDB web.

# KCDB 2.0 : Development

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Realization made in 3 main batches:



# KCDB 2.0 : Development

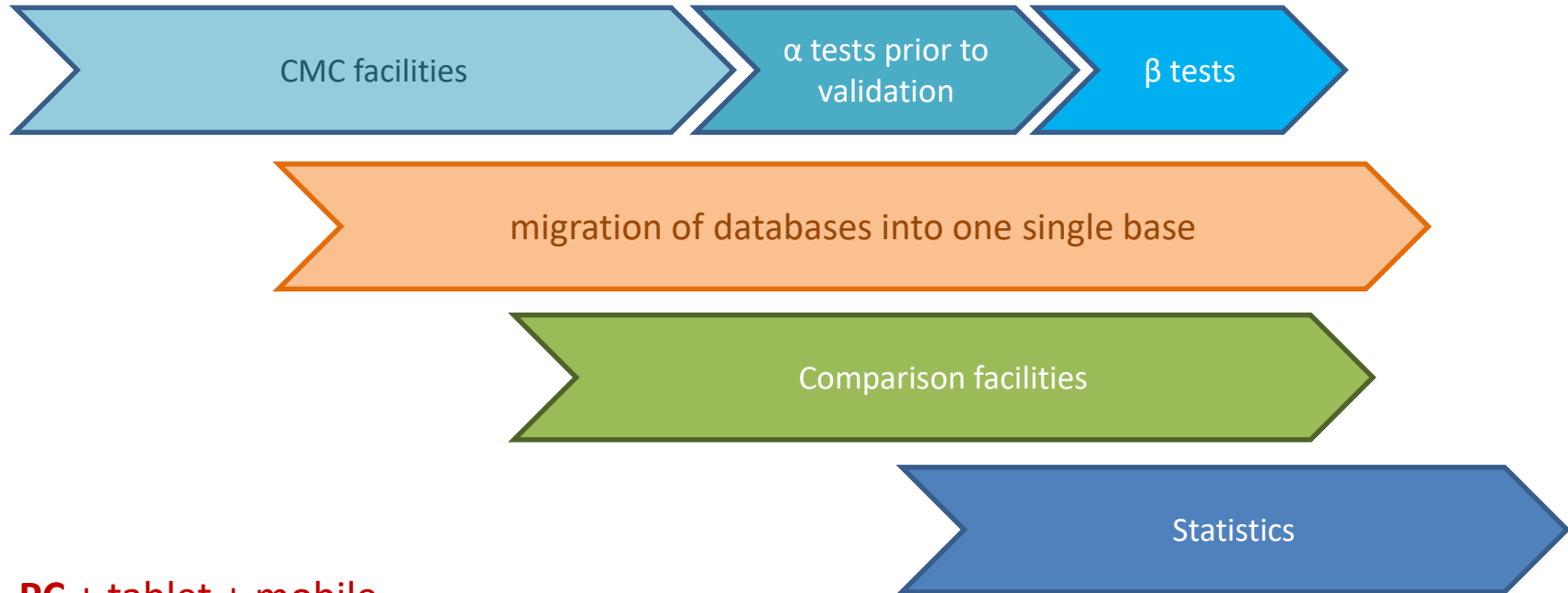
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Realization made in 3 main batches:



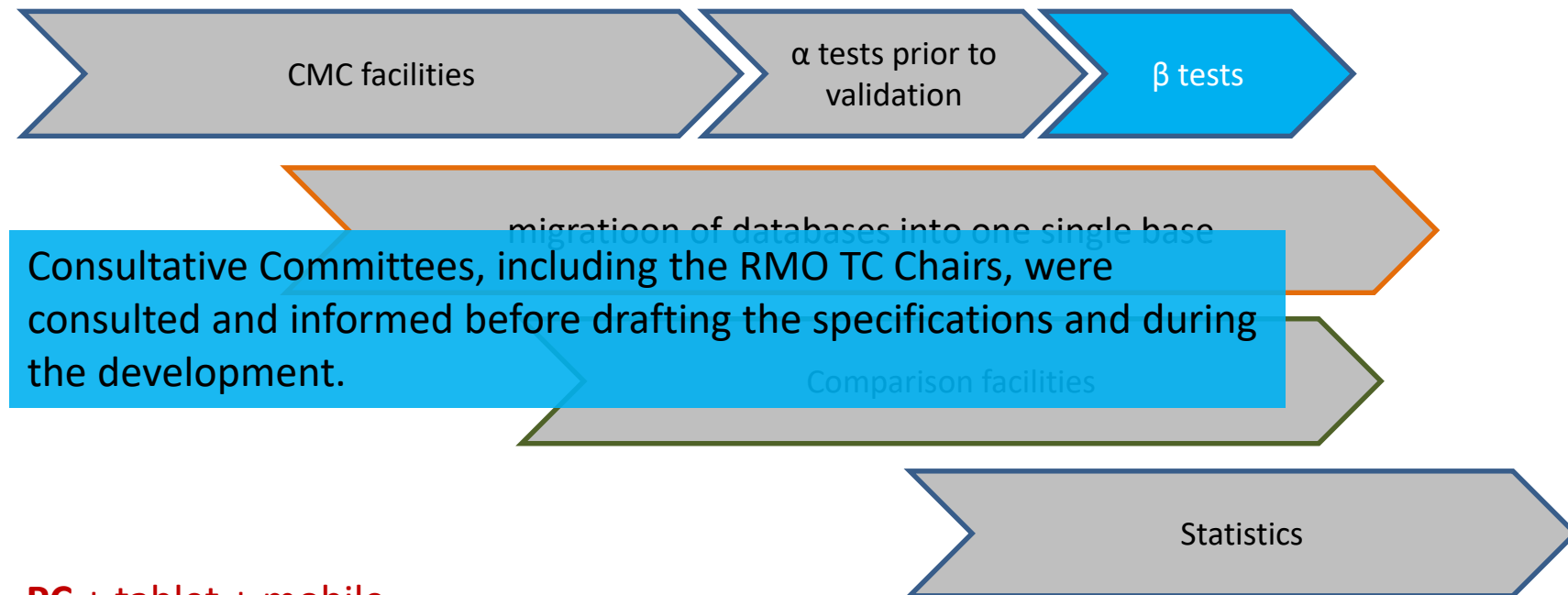


# Realization of the KCDB 2.0



**PC + tablet + mobile**

# Realization of the KCDB 2.0



**PC + tablet + mobile**

# Realization of the KCDB 2.0



August:

CCT ✓

*MIRS/UL-FE/LMK, CEM, KRISS, NIST, NMISA, PTB, INMETRO, IMM, INTI, CMI, METAS, NIM, VNIIM, ... others being added*

September:

CCRI ✓

CCQM ✓

CCPR ✓

CCAUV

October:

CCEM

CCM

CCTF

CCL


# Implementation of the KCDB 2.0

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- Preliminary information to JCRB and TC Chairs 23 August 2019, some feedback



Information to RMOs, NMIs, DIs and CCs within a few days

- Written « Getting started » on web-platform
- Written « Help » on search
- Video clips being developed, to be posted on  **YouTube**

# Implementation of the KCDB 2.0

| W-6                                  | W-5 | W-4       | W-3 | W-2 | W-1 | "GO LIVE"            | W+1                                    | W+2                                  | W+3                                  | W+4 |
|--------------------------------------|-----|-----------|-----|-----|-----|----------------------|--|--------------------------------------|--------------------------------------|-----|
| Serach on KCDB - 1.0                 |     |           |     |     |     | Search on KCDB - 2.0 |  |                                      |                                      |     |
| BIPM: Adding data to DB              |     | Migration |     |     |     |                      |  | BIPM: Adding data to DB              |                                      |     |
| Submission of CMCs (JCRB web)        |     |           |     |     |     |                      | Web platform available for Area 1 (QM) |                                      |                                      |     |
|                                      |     |           |     |     |     |                      |  | Web platform available for Area(s) 2 |                                      |     |
|                                      |     |           |     |     |     |                      |  |                                      | Web platform available for Area(s) 2 |     |
| Review in-train CMCs on the JCRB web |     |           |     |     |     |                      |  |                                      |                                      |     |
|                                      |     |           |     |     |     |                      | Review CMCs on platform                |                                      |                                      |     |

# Implementation of the KCDB 2.0

| W-6   | W-5 | W-4       | W-3 | W-2 | W-1 | "GO LIVE"                              | W+1 | W+2                     | W+3 | W+4 |
|---|-----|-----------|-----|-----|-----|--|-----|-------------------------|-----|-----|
| Serach on KCDB - 1.0  |     |           |     |     |     | Search on KCDB - 2.0                   |     |                         |     |     |
| BIPM: Adding data to DB   |     | Migration |     |     |     |  |     | BIPM: Adding data to DB |     |     |
| <p>Data migration scripts have been tested extensively, but actual CMCs tested on a sample basis.</p> <p><b>Please check your CMCs when the new KCDB goes live!</b></p> <p>The current CMCs will still be available for download from the JCRB CMC review website</p> |     |           |     |     |     | Web platform available for Area 1 (QM) |     |                         |     |     |
|   |     |           |     |     |     | Web platform available for Area(s) 2   |     |                         |     |     |
|   |     |           |     |     |     | Web platform available for Area(s) 2   |     |                         |     |     |
|   |     |           |     |     |     | CMCs on the JCRB web                   |     |                         |     |     |
|   |     |           |     |     |     | Review CMCs on platform                |     |                         |     |     |

# Joint BIPM, OIML, ILAC and ISO declaration



## *Joint declaration on metrological traceability*

The Joint Declaration was refreshed and resigned in November 2018, having been first reviewed by the four parties and agreed at the Quadripartite meeting of March 2018. The revised text was circulated and agreed by the CIPM

# Changes to the joint BIPM, OIML, ILAC and ISO declaration

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The refresh of the Joint BIPM, OIML, ILAC and ISO declaration was suggested by ISO WG44 during the revision of ISO/IEC 17025, who wanted to reference the Joint Declaration in the revised standard. The Quadripartite meeting agreed that there would be no substantive changes but the document should be reordered.

## **The following changes were made:**

- The order was reversed such that the description of the four signatory bodies came after, rather than before, the recommendations
- The descriptions of the organizations were generalized in as much as data that changes frequently would not be explicitly quoted (e. g the exact number of members of the originations)
- The OIML-CS system was introduced and the now redundant OIML Basic Certificate System and OIML MAA deleted.
- Some small parts of the text were “polished”.



'Single metrology' concept  
*Under development*

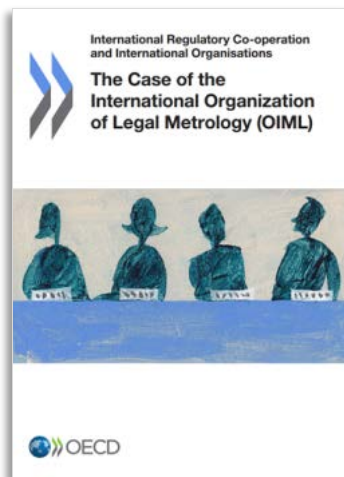
V6



# BIPM LIAISONS

OECD case studies (2017-2019)

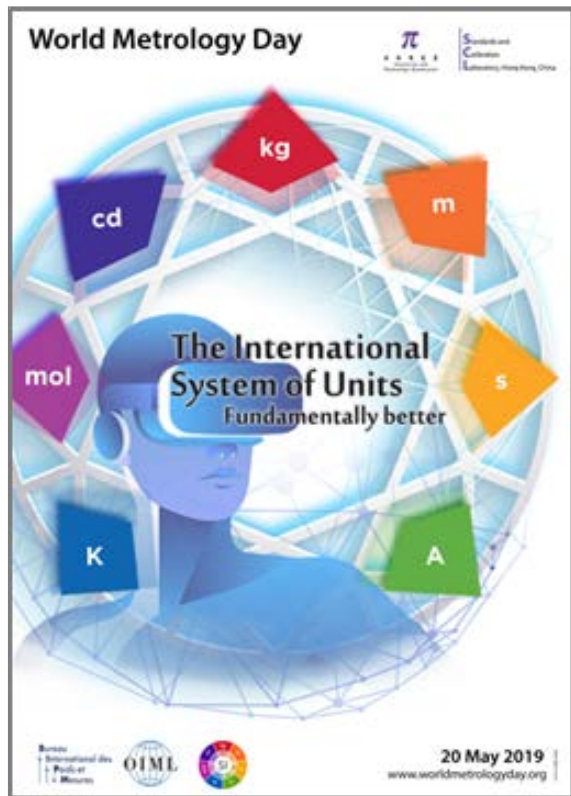
BIPM, WTO, ASTM International



## The Case of the International Bureau of Weights and Measures (BIPM)



# World Metrology Day 2019

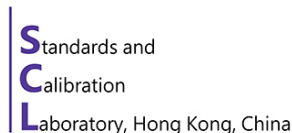


The theme of World Metrology Day in 2019 is ***“The International System of Units - Fundamentally better”***

Information on national WMD activities is posted on the website:

<http://www.worldmetrologyday.org>

The 2019 poster was designed by the Standards and Calibration Laboratory, Hong Kong, China.



RMO poster history:

2013: EURAMET

2014: APMP

2015: AFRIMETS

2016: COOMET - VNIIMs

2017: SIM –INM Colombia

2018: EURAMET

2019: APMP

2020: AFRIMETS

2021: GULFMET

# 9<sup>th</sup> Executive Secretary of the JCRB

## → Dr Sten **BERGSTRAND**

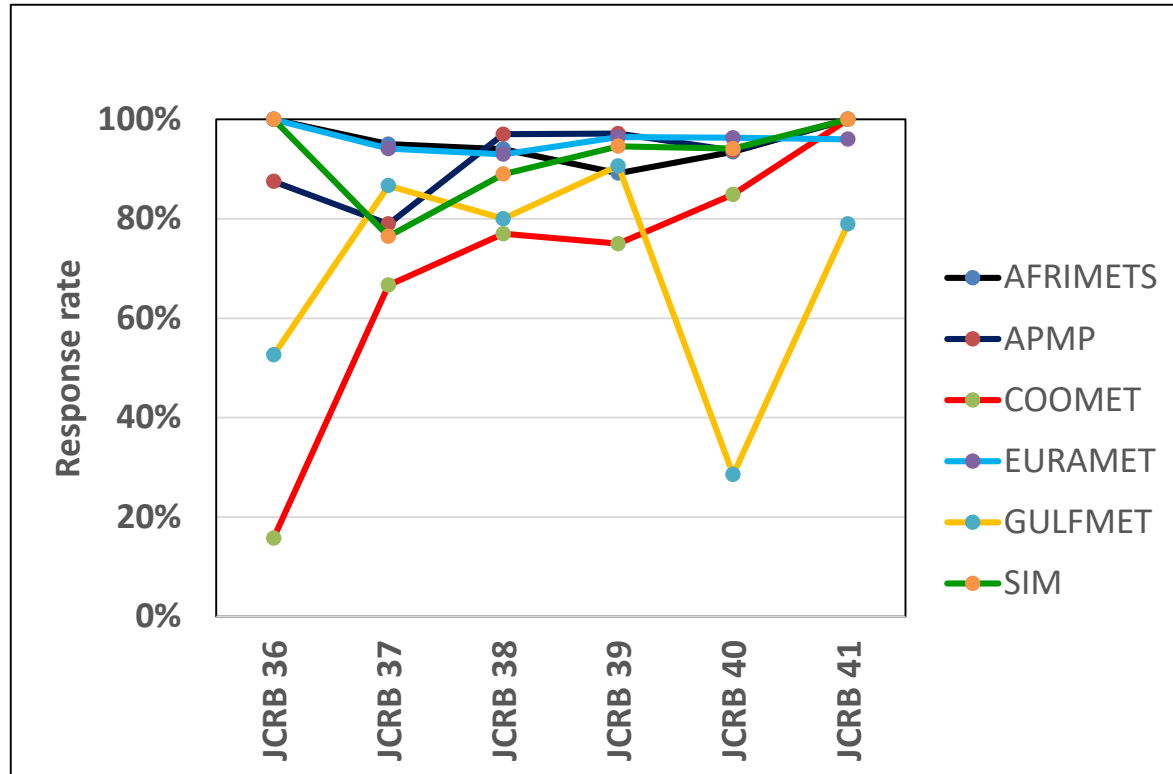
JCRB Executive Secretary; on secondment from RISE

### ▼ Contact details

|                     |   |
|---------------------|---|
| Dept./Section:      | International Liaison and Communication |
| E-mail (@bipm.org): | sten.bergstrand                         |
| Tel.:               | +33 1 45 07 62 94                       |



# Inter-RMO review performance: adherence to deadlines



25 sets since JCRB 40:

- 3 sets for review and voting
- 5 sets for voting only
- 17 sets for reviewing only

- AFRIMETS: 100 %
- APMP: 100 %
- COOMET: 100 %
- EURAMET: 96 %
- GULFMET: 79 %
- SIM: 100 %

Less than 100 % complete due to loss of right to review

- No response to review request
- Respond yes, no review
- Did not vote on final approval

# CBKT FIGURES:

Over 75 % of Member States and Associates have participated in the CBKT Programme  
*(as trainees, lecturers and sponsors)*

## 19 CBKT projects

- 16 Completed
- 3 Ongoing

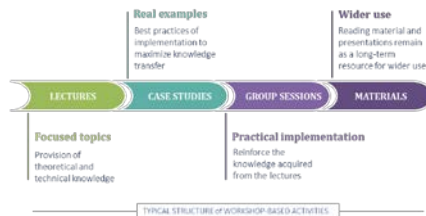
## 384 people

from 85 countries have benefited

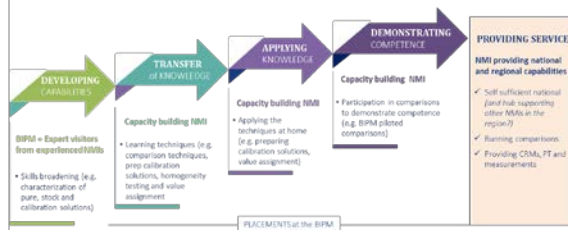
## 58 invited lecturers

from 28 countries supported to deliver the projects

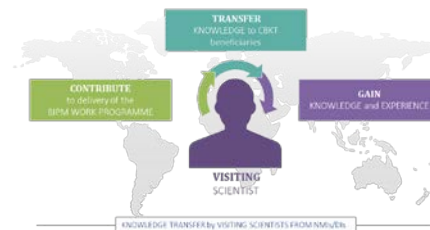
### Workshop-based activities



### Laboratory-based CB placements



### Knowledge transfer



# CBKT Projects

## 12 Workshop-based projects

- 5 in the BIPM
- 7 in the regional - joint RMO/BIPM

## 7 Lab-based placement projects

- 3 in the BIPM laboratories
- 4 with partner NMIs
  - 2 TUBITAK UME project
  - 2 Metrology School – METAS project

## 19 CBKT projects

- 16 Completed
- 3 Ongoing

| RMOs     | Projects in regions | title   |
|----------|---------------------|---|
| AFRIMETS | 1                   | • BIPM-AFRIMETS "Sound beginning in the CIPM MRA"   |
| APMP     | 1                   | • APMP-DEC "Leadership training"  |
| COOMET   | 2                   | • BIPM-COOMET "Sound beginning in the CIPM MRA"<br>• BIPM-COOMET "CIPM MRA review outcomes" |
| EURAMET  | 1                   | • EURAMET - BIPM Training on review of QMS  |
| GULFMET  | 2                   | • BIPM-GULFMET TC Workshop<br>• BIPM-GULFMET "CMCs and QMS Review"                          |
| SIM      | -                   |   |

# Planned projects

- 2019 course "Optimizing the CIPM MRA - the KCDB 2.0" **at the BIPM (Nov)** *applications closed*
- 2019 "EURAMET-BIPM "Organisation and Piloting of Inter-comparisons in IR" **at EURAMET (Oct)**
- 2019 BIPM-APMP Workshop "Important transitions in the CIPM MRA infrastructure" **at APMP (Nov)**
- 2019 "Metrology for Safe Food and Feed - Organic Analysis and Standards" **at GULFMET (Nov)**
- 2020 course "Optimizing the CIPM MRA - the KCDB 2.0" **for EURAMET at the BIPM (Feb)**
- 2020 "CIPM MRA Review outcomes and the KCDB 2.0" **rollout at SIM (Dates TBC)**
- **2020 & 2021 "BIPM - TÜBİTAK UME project placements" extended**
- **2023 (??) Varenna Metrology School and METAS project in Italy and at METAS**
- ???... Others.... Open for suggestions

Under  
discussion



# the KCDB 2.0 course

- Application period was finished on 31<sup>st</sup> August
- Online system registered 68 applications for 25 available slots
- Five registrations were from non Member States and non Associates

63 applications eligible for selection arrived from:

- 10 - AFRIMETS
- 5 - APMP
- 17 - COOMET
- 6 - EURAMET
- 10 - GULFMET
- 15 SIM

Metrology areas:

- 5 AUV
- 10 Chemistry
- 4 Electricity and Magnetism
- 6 Ionizing Radiation
- 15 Mass and Related quantities
- 6 Length
- 6 Photometry and Radiometry
- 5 Thermometry
- 1 Time and Frequency
- 5 other (Quality system, general metrology...etc..)

Distribution of slots:

- 6 AFRIMETS
- 3 APMP
- 3 COOMET
- 3 EURAMET
- 3 GULFMET
- 7 SIM + 3

Course at the BIPM will be followed up by courses in each region

| PRELIMINARY AGENDA (may change marginally) |   |                                    |   |
|--|---|------------------------------------|---|
| Date                                       | Topic   | Activity                           | Outline of content  |
| Day 1<br>Monday<br>Nov. 4                  | Introduction to the CIPM MRA and its mechanisms | Registration                       | Welcome and opening   |
|  |   | Lecture                            | General introduction to the course content  |
|  |   | Lecture                            | The BIPM  |
|  |   | coffee & tea                       |   |
|  |   | Lecture                            | CIPM MRA and its role in the QI   |
|  |   | Lecture                            | CIPM requirements/Metrological traceability   |
|  |   | Lunch                              |   |
|  |   | Lecture                            | Outcomes of the CIPM MRA review   |
|  |   | Case study:                        | CCEM CMC review approaches: experiences on reducing workload  |
|  |   | Group work:                        | What are the things you do (can do) to reduce the workload?   |
|  |   | coffee & tea                       |   |
|  |   | Group Work:                        | Test searching  |
|  |   | Wrap up                            |   |
|  |   | Home work:                         | Get started on the KCDB 2.0   |
| Day 2<br>Tuesday<br>Nov. 5                 | Introduction to the KCDB (MC, SC, CMCs)         | Close of day 1 & Welcome reception |   |
|  |   | Lecture                            | CCEM webpage/strategy/guidelines/membership   |
|  |   | Lecture                            | CCM webpage/strategy/guidelines/membership  |
|  |   | Lecture                            | Introduction to KCDB  |
|  |   | coffee & tea                       |   |
|  |   | KCDB demonstration:                | Environment and User accounts (WRITER, TC-CHAIR, REVIEWER)  |
|  |   | Group work:                        | Open my software and create my user account   |
|  |   | Wrap up                            |   |
|  |   | Lab visit:                         | Mass, Kibble balance  |
|  |   | Lunch                              |   |
|  |   | Lecture                            | Intra-regional CMC review process + CIPM requirements   |
|  |   | Lecture                            | Inter-regional CMC review process + CIPM requirements   |
|  |   | KCDB 2.0 Demonstration:            | WRITER: Writer space, Preparing New CMCs (PH, RI, Chem) + Uncertainty table. Updating existing CMCs               |
|  |   | coffee & tea                       |   |
|  |   | Group work:                        | Get acquainted with space. Write at least 1 new CMC and update 1 CMC and SAVE as                                  |
|  |   | Wrap up:                           |   |
| Day 3<br>Wednesday<br>Nov. 6               | Calibration and measurement capabilities        | Close of day 2                     |   |
|  |   | Lecture                            | CCQM webpage/strategy/guidelines/membership   |
|  |   | Case study:                        | CCQM CMC review approaches: Fast Track  |
|  |   | coffee & tea                       |   |
|  |   | KCDB 2.0 Demonstration:            | Intra-RMO review: submit CMC, TC Chair space, choose reviewer, review CMC, send back CMC for revision, accept CMC |
|  |   | Group work:                        | First registration/ Practical exercise- develop CMC   |
|  |   | Lecture                            | CCB: webpage/strategy/guidelines/membership   |
|  |   | Lab visit:                         | RI, Chemistry   |
|  |   | Lunch                              |   |
|  |   | KCDB 2.0 Demonstration:            | Inter-RMO review: submit CMC, TC Chair space, choose reviewer, review CMC, send back CMC for revision, accept CMC |
|  |   | Group work:                        | Get acquainted with space. Write at least 1 new CMC and update 1 CMC and SAVE as                                  |
|  |   | coffee & tea                       |   |
|  |   | KCDB 2.0 Demonstration:            | Intra-RMO review: submit CMC, TC Chair space, choose reviewer, review CMC, send back CMC for revision, accept CMC |
|  |   | Group work:                        | First registration/ Practical exercise- develop CMC   |
|  |   | Lecture                            | CCB: webpage/strategy/guidelines/membership   |
| Day 4<br>Thursday<br>Nov. 7                | Measurement comparisons                         | Lab visit:                         | RI, Chemistry   |
|  |   | Lecture                            | CCQM webpage/strategy/guidelines/membership   |
|  |   | Lecture                            | CCQM CMC review approaches: Fast Track  |
|  |   | coffee & tea                       |   |
|  |   | KCDB 2.0 Demonstration:            | Intra-RMO review: submit CMC, TC Chair space, choose reviewer, review CMC, send back CMC for revision, accept CMC |
|  |   | Group work:                        | First registration/ Practical exercise- develop CMC   |
|  |   | Lecture                            | CCB: webpage/strategy/guidelines/membership   |
|  |   | Lab visit:                         | RI, Chemistry   |
|  |   | Lunch                              |   |
|  |   | KCDB 2.0 Demonstration:            | Inter-RMO review: submit CMC, TC Chair space, choose reviewer, review CMC, send back CMC for revision, accept CMC |
|  |   | Group work:                        | Get acquainted with space. Write at least 1 new CMC and update 1 CMC and SAVE as                                  |
|  |   | coffee & tea                       |   |
|  |   | KCDB 2.0 Demonstration:            | Intra-RMO review: submit CMC, TC Chair space, choose reviewer, review CMC, send back CMC for revision, accept CMC |
|  |   | Group work:                        | First registration/ Practical exercise- develop CMC   |
|  |   | Lecture                            | CCB: webpage/strategy/guidelines/membership   |
| Day 5<br>Friday<br>Nov. 8                  | Brainstorming                                   | Lab visit:                         | RI, Chemistry   |
|  |   | Lecture                            | CCQM webpage/strategy/guidelines/membership   |
|  |   | Lecture                            | CCQM CMC review approaches: Fast Track  |
|  |   | coffee & tea                       |   |
|  |   | KCDB 2.0 Demonstration:            | Intra-RMO review: submit CMC, TC Chair space, choose reviewer, review CMC, send back CMC for revision, accept CMC |
|  |   | Group work:                        | First registration/ Practical exercise- develop CMC   |
|  |   | Lecture                            | CCB: webpage/strategy/guidelines/membership   |
|  |   | Lab visit:                         | RI, Chemistry   |
|  |   | Lunch                              |   |
|  |   | KCDB 2.0 Demonstration:            | Inter-RMO review: submit CMC, TC Chair space, choose reviewer, review CMC, send back CMC for revision, accept CMC |
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|  |   | coffee & tea                       |   |
|  |   | KCDB 2.0 Demonstration:            | Intra-RMO review: submit CMC, TC Chair space, choose reviewer, review CMC, send back CMC for revision, accept CMC |
|  |   | Group work:                        | First registration/ Practical exercise- develop CMC   |
|  |   | Lecture                            | CCB: webpage/strategy/guidelines/membership   |

going to be very busy)))

# Upcoming meetings and events at the BIPM

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|                              |  |
|------------------------------|--|
| From 23 to 27 September 2019 | <i>12th meeting of the CCAUV and related meetings</i>                          |
| From 8 to 9 October 2019     | <i>24th meeting of the CCU</i>   |
| 10 October 2019              | <i>BIPM Workshop ATFT: the ultimate frontier for remote comparison methods</i> |
| From 17 to 18 October 2019   | <i>Meeting of NMI Directors and Member State Representatives</i>               |
| From 2 to 3 December 2019    | <i>Meeting of JCTLM Members and Stakeholders</i>                               |
| From 3 to 6 December 2019    | <i>JCGM Working Group 1: GUM</i>   |
| 4 December 2019              | <i>Meeting of the JCTLM-WG-TEP</i>   |
| 4 December 2019              | <i>Meeting of the JCTLM-DBWG</i>   |
| From 5 to 6 December 2019    | <i>21st meeting of the JCTLM Executive Committee</i>                           |
| From 9 to 13 December 2019   | <i>JCGM Working Group 2: VIM</i>   |

Thank you.

[andy.henson@bipm.org](mailto:andy.henson@bipm.org)



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Poids et  
Mesures

