



Agenda Item 21.3:
Updates by other organisations in liaison

Agenda Item 21.3f:
Update from the BIPM

BIPM Liaison Report to the 57th CIML Meeting

October 2022

THE VISION, MISSION AND OBJECTIVES OF THE BIPM

The BIPM is the intergovernmental organization established by the Metre Convention, through which Member States act together on matters related to measurement science and measurement standards.

Its **vision** is to be universally recognised as the world focus for the international system of measurement.

Its **mission** 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,
- Improving the quality of life and sustaining the global environment.

THE OBJECTIVES OF THE BIPM

- **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 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.

KEY HIGHLIGHTS

- As of September 2022, the BIPM had [64 Member States](#), and [36 Associates](#) - Costa Rica (previously an Associate State) became the 64th Member State on 5 September 2022.
- "[Joint Statement of Intent On the digital transformation in the international scientific and quality infrastructure](#)" was signed by the BIPM, OIML, ISC, CODATA, IMEKO, ISO, IEC, ILAC and CIE in March, April, May and August 2022 respectively.
- The [BIPM-SIM Training course: KCDB 2.0](#) was held on 20-22 April 2022 and welcomed more than 160 participants from 20 countries over the three days.
- The World Metrology Day (20 May) theme for 2022 is "Metrology in the Digital Era". The 2022 World Metrology Day Resource Website is <https://www.worldmetrologyday.org/>.
- Suite of [CIPM MRA brochures](#) launched by the BIPM CBKT programme to provide information and assistance on key roles and mechanisms within the CIPM MRA. The brochures have been written in accessible way for both metrologists and non-experts alike.
- "[Knowledge Transfer through Metrologia](#)" initiative highlights the service rendered to the world-wide metrology community by senior scientists devoting time to publishing review papers on topics of interest and these papers being made openly available to all through Open Access publication in *Metrologia*.
- The BIPM Physical Metrology Department has developed [two CBKT e-learning courses on the kilogram](#) - the fundamental unit of mass in the International System of Units (SI).
- The BIPM and the OIML, with sponsorship from the METAS (Switzerland), have launched an initiative to develop e-learning and publication material by mid-2023 in support of the *BIPM-OIML publication: National Metrology Systems - Developing the institutional and legislative framework*.
- The online [Workshop on Metrology for Climate Action](#), was hosted by the BIPM and the WMO on 26-30 September 2022.
- The 27th meeting of the CGPM will be held on 15-18 November 2022 at the Palais des Congrès de Versailles. The webpage is available at <https://www.bipm.org/en/cgpm-2022>.

THE CIPM

Session II of the 111th meeting of the CIPM was held in June 2022. All CIPM Decisions are available on the BIPM webpage at <https://www.bipm.org/en/committees/ci/cipm/outcomes>.

The BIPM hosted a webinar in March 2022 on the topic of Git for metrology, with a focus on the “git” free software, which is widely used for “version control” in software development.

The webinar was organized by the Consultative Committee for Ionizing Radiation (CCRI) and attracted more than 250 participants.

CCRI runs webinars on various topics (as far as I know every month), so far they have around 16 videos on the YouTube https://www.youtube.com/playlist?list=PL-vj-3_a7wTAY-QmW_azu78hR1UXvBiu.

The “[CCQM Roadmap to Metrology Readiness for Infectious Disease Pandemic Response](#)” has been published. This document identifies priorities and sets out pathways for pandemic preparedness for the metrology community resulting from the 2021 series of Consultative Committee for Amount of Substance: Metrology in Chemistry and Biology (CCQM) Webinars and Workshop held on 5-7 October 2021. The roadmap vision is Identify measurement priorities and outline pathways needed to provide effective contributions in a timeline appropriate for pandemic response and which raise awareness of the metrology community with wider stakeholders.

Recently CCEM has started webinars and the videos are available at https://www.youtube.com/playlist?list=PL-vj-3_a7wTBegF3ivBEsLpTtG2Z4apM4.

Digital transformation

Most of the digital tools that accompany our lives are based on exchange of data, ruled by specific protocols. The GO-FAIR initiative <https://www.go-fair.org/>, launched in 2017, promotes realizations compliant with the FAIR guiding principles, where data should be Findable, Accessible, Interoperable and

Reusable, the cornerstones for the robust management of data exchange [M.D. Wilkinson et al. Scientific Data, 2016 18 <https://doi.org/10.1038/sdata.2016.18>]. Digitalization and exchange of data will have a large impact on metrology and quality infrastructure. The CIPM, whose mission is to promote world-wide uniformity in units of measurement, has formed a task group on the digital SI (CIPM TG DSI) to develop and establish a world-wide uniform, unambiguous and secure data exchange format based on the International System of Units (SI) described in the current SI Brochure <https://www.bipm.org/documents/20126/41483022/SI-Brochure-9.pdf/fcf090b2-04e6-88cc-1149-c3e029ad8232>].

One of the tasks of its Expert Group, working under the auspices of the CIPM TG SI, is to examine the feasibility of several web ontologies using notably the KCDB as a test case.

The BIPM is pleased to announce the publication of the first key comparison report embedding machine-readable (XML and JSON) versions of the document. Use of the PDF/A-3 standard in this way was originally suggested by METAS (Switzerland) in the context of Digital Calibration Certificates (DCC).[1] The recent update of the BIPM.RI(II)-K1.Ce-139 comparison – using the BIPM’s International Reference System (SIR) for radionuclide metrology – provided an opportunity to introduce this approach for the first time in reporting a key comparison.

The BIPM is presently engaged in several projects in digitalization. The initial goal is to make data machine readable, but where interoperability is to be integrated, dependent on the CIPM TG-DSI outcome.

The following project are being developed at the BIPM:

- Work on contents of the SI brochure to become a corner stone for the digitized system of units has much progressed. Associated documents known as Mises en Pratique, will be digitized subsequently, and groups

within each Consultative Committee are now successively being formed to advise on the contents.

- Providing digital and interoperable Calibration and Measurement Capabilities (CMCs) as listed in the Key Comparison Database (KCDB). The integration of interoperable information to become FAIR is an extension of the realization of an Application Programming Interface (API) for search of CMCs, implemented in 2021, giving access to machine readable data [<https://www.bipm.org/en/cipm-mra/kcdb-api>].
- The realization of an API and associated database to give machine readable access to recommended frequencies for the realization of the Metre is in progress.
- Digitized dissemination of the UTC. A beta version of an API is presently available [<https://webtai.bipm.org/api/index.html>].
- New web and database support for the Joint Committee for Traceability in Laboratory Medicine (JCTLM), where data will become FAIR [<https://www.bipm.org/jctlm/home.do>] is under validation.
- Development of a database on key values linked to comparisons of radioactive elements [<https://www.bipm.org/en/radionuclide-metrology>].

Other projects are planned (list not exclusive):

- Creating an accessible database on reference standards in gas metrology, supporting environmental issues.
- Creating an accessible database on quantitative nuclear magnetic resonance reference (qNMR) data in organic chemistry.
- Implementing digital calibration certificates for the calibration services provided by the BIPM.

Joint Statement of Intent – Digital Transformation

The BIPM, the International Organization of Legal Metrology (OIML), the International Measurement Confederation (IMEKO), the International Science Council (ISC) and its Committee on Data (CODATA), the International Organization for Standardization (ISO), the International Electrotechnical Commission (IEC) and the International Laboratory Accreditation Cooperation (ILAC), International Commission on Illumination (CIE) signed the [Joint Statement of Intent On the digital transformation in the international scientific and quality infrastructure](#) in March, April, May and August 2022, respectively.

The joint statement provides a platform for the signatory organizations to come together to indicate their support, in a way appropriate to their particular organization, to the development, implementation, and promotion of the SI Digital Framework as part of a wider digital transformation of the international scientific and quality infrastructure. The addition of IEC and ILAC further strengthens the collaboration and global reach of the initiative.

The joint statement is part of an ongoing initiative by the CIPM and its Task Group on the Digital SI (CIPM-TG-DSI) to develop and establish a world-wide uniform and secure data exchange format based on the SI.

The 27th meeting of the CGPM (2022)

The 27th meeting of the General Conference on Weights and Measures (CGPM) will be held on 15-18 November 2022 at the Palais des Congrès de Versailles. A “Special procedure” has been proposed by the CIPM to introduce the special technical arrangements for a hybrid meeting. The meeting webpage is available at: <https://www.bipm.org/en/cgpm-2022>.

INSTITUTIONAL NEWS

Liaison with Member States and Associates of the CGPM

As of September 2022, the BIPM had 64 Member States, and 36 Associate States and Economies of the CGPM.

Cuba and Sudan were ceased to be Associates in January 2022.

Seychelles withdrew as an Associate in January 2022.

On February 8, 2022, Zimbabwe was reinstated as an Associate of CGPM after ceasing to be Associate on January 1, 2021.

On 5 September 2022, Costa Rica became a Member State (previously having been an Associate State of the CGPM since 29 January 2004).

The list of Member States and Associates of the CGPM is annexed to this report and is also available at the BIPM website.

Liaison with international organizations

The BIPM has a series of ongoing institutional and technical interaction with over 30 international organizations and international bodies.

Liaison with the OIML

Links between the BIPM and the OIML:

- The BIPM interacts with the OIML at a senior level through annual bilateral and multilateral meetings at the BIPM (with ILAC and ISO);
- Periodic meetings take place between the Directors of the two organizations and the senior staff, to address both technical matters and organizational matters of common interest to the two organizations;
- The BIPM and the OIML collaborate to promote World Metrology Day, the website of which is hosted by the OIML;
- The OIML is one of the partners in INetQI;
- The OIML is a member of the JCGM and participates in the CCU;

- The BIPM and the OIML provide a [BIPM-OIML Resource Center](#) hosted by the OIML;
- The BIPM and the OIML collaborate on the potential participation of new States;
- The two organizations operate a watching brief when one organization attends relevant meetings and the other does not.
- The BIPM Director and Director of the International Liaison and Communication Department participate in the OIML CEEMS Advisory Group.

The Joint Task Group between the BIPM and the OIML was set up as outlined in Decision CIPM/109-15 (2020). The Task Group met on line in 2022 where it discussed joint representation for liaison activities, joint initiatives, promotion of metrology, and promotion of digital transformation. The Task Group is considering a joint event to celebrate the 150th anniversary of the signing of the Metre Convention and the 70th anniversary of the OIML in 2025.

The BIPM and the OIML, with sponsorship from the METAS (Switzerland), have launched an initiative to develop e-learning and publication material in support of the *BIPM-OIML publication: National Metrology Systems - Developing the institutional and legislative framework*. The work is about to begin and will be complete by mid-2023.

World Metrology Day

Each year on 20 May, the world-wide metrology community celebrates the day the *Metre Convention* was signed in 1875. The project is run jointly by the BIPM and the OIML. The theme for World Metrology Day 2022 is "*Metrology in the Digital Era*". This theme was chosen because digital technology is revolutionizing our community and is one of the most exciting trends in society today. The 2022 poster was designed under the auspices of the COOMET Regional Metrology Organization. The poster is translated into more than 20 languages and information on more than 30 national celebratory events are provided on the 2022 World Metrology Day Resource Website

<https://www.worldmetrologyday.org/>.

The theme for World Metrology Day 2023 will be related to the food production system and the poster will be developed in partnership with INTI (Argentina) from the SIM Region.

World Metrology Day/ Liaison with UNESCO

Building on the success of annual World Metrology Day celebrations worldwide and noting that the sound measurements are also key enablers for economic and social well-being and notably to achieving the UN SDGs, the BIPM and the OIML are working closely with UNESCO (Natural Sciences Sector) and the Republic of Kazakhstan with the aim of having 20 May proclaimed as a “World Metrology Day” by UNESCO and celebrated every year.

By support of the Republic of Kazakhstan World Metrology Day proposal was included in the provisional agenda of the 215th Session of the UNESCO Executive Board scheduled for 5-19 October 2022 (item 41 in the provisional agenda available at <https://unesdoc.unesco.org/ark:/48223/pf0000382686> and the text of the proposal is available at <https://unesdoc.unesco.org/ark:/48223/pf0000382833>).

On 22 September, the World Metrology Day proposal was for the first time discussed at the meeting of the Preparatory Group of the Executive Board. At this meeting Uzbekistan and Azerbaijan expressed their support for this initiative.

If the proposal is supported UNESCO Executive Board it will be then considered at the 42nd session of the UNESCO General Conference to be held in November 2023. A positive decision by the UNESCO General Conference will enable World Metrology Day to be celebrated every year, beginning 20 May 2024, as the world day proclaimed by UNESCO.

Liaison with ILAC

The BIPM and ILAC cooperate to ensure efficient and effective dissemination of metrological traceability, particularly to the SI, and also address the special case of accredited national metrology laboratories.

The BIPM promotes the SI and RMO-NMI/CIPM MRA interests during the revision of the ILAC documents.

The BIPM is an active participant in the ILAC Accreditation Committee (ILAC AIC) and particularly the AIC WG2. The accreditation community is one of the most important users of the KCDB 2.0. The updates from the CIPM MRA and KCDB are communicated during the meetings of the ILAC AIC.

Liaison with the WMO

The online workshop on Metrology for Climate Action was hosted by the BIPM and the World Meteorological Organization (WMO) on 26-30 September 2022 aiming to present progress and identify requirements for further development of advanced measurements, standards, reference data, comparisons, calibrations and metrological techniques to support the physical science basis for and adaptation to climate change, as well as efforts to mitigate greenhouse gas emissions.

Liaison with CODATA

A Session of the Units Summit coordinated by BIPM and CODATA was held during SciDataCon22 on 22 June 2022 <https://codata.org/call-for-sessions-scidatacon-2022/>.

The session included talks about how the BIPM was working on the digital transformation of its databases and services as well as the work being initiated in the Consultative Committees, with examples of the work going on within the Consultative Committee for Time and Frequency (CCTF) and the Consultative Committee for Length (CCL).

<https://www.bipm.org/en/bipm-workshops/dig-met>.

JCTLM

The new version of the JCTLM Database of Reference Materials, Methods and Services for in vitro diagnostics went live on 3 October 2022.

The database is accessible through the JCTLM web portal with the new search engine available at <https://www.jctlmdb.org/>. The database has been upgraded with extended search functions for reference measurement components, using free-text search and additional options for filtering and exporting data.

An Application Programming Interface (API) is being finalized and will be released towards the end of October 2022.

International Congress of Metrology - CIM 2023

The 21st edition of the International Congress of Metrology - CIM 2023 - will be held in Lyon (France) from 7 to 10 March 2023.

The CIM is the one event where metrology meets science, industry and quality infrastructure bodies. More information regarding the main aims of the congress can be found at <https://www.cim2023.com/en/>.

Liaison with the OECD

The OECD established the *Partnership of international organisations for effective international rulemaking (IO Partnership)* as a voluntary platform of IOs, academics and OECD Regulatory Policy Committee delegates, to exchange good practices and promote greater quality, effectiveness, and impact in international rulemaking. The French version of the [Compendium of International Organisations' Practices: Working Towards More Effective International Instruments](#) published in 2021, was launched in March 2022.

The Spanish version was launched in July 2022.

The Compendium lists the BIPM practices such as World Metrology Day, CBKT Programme, CIPM MRA Review, JCGM, etc. in five core focus areas.

The BIPM is the focal point of the WG2: Enhancing inclusiveness of international rulemaking.

CIPM MRA AND KCDB

The CIPM MRA is the '*Mutual Recognition Arrangement of National Measurement standards and of calibration and measurement certificates issued by National Metrology Institutes*'. Participation in the CIPM MRA continues to grow: it has been signed by representatives from 64 Member States, 36 Associates of the CGPM, and four international organizations – and covers a further 149 institutes designated by the signatory bodies.

As of September 2022, the [KCDB](#) included a total of 25 913 CMCs. There are 1133 key comparisons and 663 supplementary comparisons registered in the KCDB.

CAPACITY BUILDING AND KNOWLEDGE TRANSFER (CBKT) PROGRAMME

The BIPM Capacity Building and Knowledge Transfer Programme aims to increase the effectiveness with which Member States and Associates engage in the world-wide coordinated metrological system.

To date, there are 2739 participants in the various CBKT activities (in-person and online) from 102 countries, covering all six RMOs. At the time of writing, over 76 % of Member States and Associates have participated in the CBKT Programme (as trainees, lecturers and sponsors).

The covid-19 crisis accelerated the strategic plan to offer remote-learning opportunities for the NMI/DI and RMO communities. With remote-learning in the form of short courses and technical exchanges implemented in 2020, the BIPM took a further significant step in 2021 to develop a bespoke e-learning solution based on the Moodle - Open-Source software. The platform is accessible around the clock and is optimized for desktop and hand-held devices to provide learning support

to metrologists as conveniently as possible (<https://e-learning.bipm.org/>).

In 2022 the e-learning platform was expanded to enable it also to host the material from the interested RMOs (COOMET, EURAMET and GULFMET). To date, there are 16 courses available for metrology community.

The BIPM Physical Metrology Department has developed two CBKT e-learning courses on the kilogram - the fundamental unit of mass in the SI, which was redefined on 20 May 2019. The courses describe how to realize the mass unit and how the kilogram is disseminated following its redefinition.

Two e-learning courses are available:

- Dissemination of the kilogram following its redefinition.
- Realization of the kilogram following its redefinition.

The BIPM-SIM Training course: KCDB 2.0 was held on 20-22 April 2022 and welcomed more than 160 participants from 20 countries over the three days. The online course was organized for member NMIs and DIs of the Inter-American Metrology System (SIM). The three-day (3.5 hours/day) online training course was designed to deliver information for those who: write CMCs in the KCDB; review the CMCs; pilot comparisons; and for TC/WG Chairs who operate the CIPM MRA processes.

Metrology for Safe Food and Feed – Mycotoxins knowledge transfer programme has been transferred to online through the e-learning platform, so far there are around 80 participants currently receiving the courses. Those NMIs that are interested in the course, can indicate interests through the registration form available on the e-learning platform.

Metrology for Clean Air knowledge transfer programme, designed to allow NMIs to strengthen their gas standard capabilities, also available through the e-learning platform. NMIs and DIs are able to access the online course material after completing the registration form.

Metrology for Laboratory Medicine: Peptide standards will be launched in 2023.

The joint initiative "BIPM–TÜBİTAK UME project placements" was extended for another two cycles, which will be delivered in 2022 and 2023. This extension follows the success of the previous four cycles. Over four cycles of this initiative (from 2018 to 2021), the BIPM and TÜBİTAK UME have hosted thirty-seven talented metrologists from twenty-four countries for a period of 1 to 3 months at the TÜBİTAK UME laboratories. The reports received from the participants on completion of their placements have demonstrated that the projects were an extremely valuable method of knowledge transfer. The research projects have covered a diverse range of subjects from decreasing the uncertainty of measurement standards through to expanding metrological capabilities in the laboratory to underpin scientific activities, healthcare, and industry.

A suite of [brochures](#) has been published under the auspices of the BIPM CBKT programme to provide information and assistance on key roles and mechanisms within the CIPM MRA. The brochures have been written in accessible way for both metrologists and non-experts alike.

"Knowledge Transfer through *Metrologia*" initiative highlights the service rendered to the world-wide metrology community by senior scientists devoting time to publishing review papers on topics of interest and these papers being made openly available to all through Open Access publication in *Metrologia*. Authors interested in proposing a review paper for open-access publication are invited to contact the Editor of *Metrologia*.

The courses are available at:

<https://e-learning.bipm.org/> and require self-enrolment. Full details of the BIPM CBKT Programme are available at: <https://www.bipm.org/en/committees/cb/cbkt>

For highlights of the BIPM scientific programme for the period, please refer to the BIPM Annual Review 2021/2022: <https://www.bipm.org/en/publications/annual-review>

ANNEX

64 Member States

(as of September 2022)

Argentina	Korea (Republic of)
Australia	Lithuania
Austria	Malaysia
Belarus	Mexico
Belgium	Montenegro
Brazil	Morocco
Bulgaria	Netherlands
Canada	New Zealand
Chile	Norway
China	Pakistan
Colombia	Poland
Costa Rica	Portugal
Croatia	Romania
Czechia	Russian Federation
Denmark	Saudi Arabia
Ecuador	Serbia
Egypt	Singapore
Estonia	Slovakia
Finland	Slovenia
France	South Africa
Germany	Spain
Greece	Sweden
Hungary	Switzerland
India	Thailand
Indonesia	Tunisia
Iran	Turkey
Iraq	Ukraine
Ireland	United Arab Emirates
Israel	United Kingdom
Italy	United States of America
Japan	Uruguay
Kazakhstan	
Kenya	

36 Associates of the CGPM (States and Economies*)

(as of September 2022)

Albania	Hong Kong (China)*
Azerbaijan	Ghana
Bangladesh	Latvia
Bolivia	Luxembourg
Bosnia and Herzegovina	Malta
Botswana	Mauritius
Cambodia	Moldova
CARICOM* (11 members: <i>Antigua and Barbuda</i> <i>Barbados</i> <i>Belize</i> <i>Dominica</i> <i>Grenada</i> <i>Guyana</i> <i>Saint Kitts and Nevis</i> <i>Saint Lucia</i> <i>Saint Vincent and the Grenadines</i> <i>Suriname</i> <i>Trinidad and Tobago</i>)	Mongolia
	Namibia
	North Macedonia
	Oman
	Panama
	Paraguay
	Peru
	Philippines
	Qatar
	Sri Lanka
	Syrian Arab Republic
	Tanzania
Chinese Taipei*	Uzbekistan
Ethiopia	Viet Nam
Georgia	Zambia
Jamaica	
Kuwait	



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