

**Report of the 46th Meeting of the JCRB**

Held on 15 / 16 March 2023

BIPM Headquarters, Sèvres, France

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## Participants

### **BIPM / CIPM**

Dr Martin Milton

Dr Olav Werhahn (remote login)

Dr Anna Cypionka

Dr Stéphanie Maniguet

Mr Chingis Kuanbayev

Dr. Janet Miles (on day-2)

Dr James Olthoff, CIPM representative to the JCRB

### **AFRIMETS**

Dr Wynand Louw

Dr Henry Rotich

Mrs Soumaya Chaieb

Prof Dr Noha Khaled

Mrs Duduzile Elouga

### **APMP**

Dr Hyun-Min Park

Dr Victoria Coleman

Ms Rugkanawan Wongpithayadisai

Dr Sam Yong Woo

Ms Tae-Yi Hong

### **COOMET**

Dr Valery Hurevich (remote login)

Mr. Evgency Lazarenko (remote login)

Ms Nino Mikanadze (remote login)

Dr Anna Chunovkina (remote login)

Mr Nikita Zviagin (remote login)

### **EURAMET**

Dr Jörn Stenger (remote login)

Dr Julien Vuillemin-Toledo

Dr Davor Zvizdić

### **GULFMET**

Eng Amina Hassan AlBastaki

H.E. Mr Saud Al Khusaibi

Dr Ismail A. AlFaleh

Ms Asma Al Hosani

Mr Omar Kanakrieh

### **SIM**

Lic Lucas Di Lillo (remote login)

Ms Sally Bruce

Mr Javier Arias

Dr Claire M. Saundry

Dr Marina Gertsvolf

Mr Olman Ramos *as invited expert from LACOMET, host of next JCRB meeting* (remote login)

Ms Isabelle Amen *as observer* (remote login)

The 46th meeting of the JCRB was conducted as two one-day sessions, held between 10:00 and 16:45 (UTC+1) on day-1 and 10 and 12:50 (UTC+1) on day-2. The items were generally addressed in the order foreseen in the agenda with items 1 to 9 on the first day, and items 10 to 12 on the second day. An exception was item 11.1 which was pushed ahead on day-1.

## **1. Welcome by the Chairman and confirmation of delegations' representatives with voting rights**

The JCRB Chairperson, Dr Milton opened the meeting, welcoming and identifying the representatives, advisors of each RMO delegation. He stated that all delegations were present with respective voting rights. He said that the JCRB had not met in person since September 2019 when it met in Dubai. He said that he was pleased to meet participants again after a long period of holding all meetings online.

The Chair asked the RMO representatives to allow the SIM delegation to be supported by two additional individuals remotely logged in. Mr Olman Ramos as expert invited by the JCRB Chairperson to represent the host of the next meeting in Costa Rica and Ms. Isabel Amen as an observer. All RMOs agreed.

All participants introduced themselves in a tour-de-table.

## **2. Approval of the agenda**

The Chair went through the agenda and pointed out that new agenda item had been raised by SIM on hybrid comparisons and by the BIPM on the number of RMO delegates to the JCRB, and on an IATF-related action. These items were added to agenda item 11 (11.2 on RMO delegations; 11.3 on hybrid comparisons, 11.5 on IATF). AFRIMETS asked to add another topic to item 11 as on ARAMET considerations (added as 11.4). With those changes the agenda was approved by the representatives, no objection being raised.

The Chair decided subsequently to move agenda item 11.1 from day-2 to day-1 after agenda item 9.1. In this report the agenda items are presented in numerical order. During the discussion of item 11 (AOB), 11.6 on Young Metrologist (YM 2050+) programme and 11.7 on the Princess-of-Asturias-Award has been added.

## **3. Approval of the minutes of the 45<sup>th</sup> meeting of the JCRB and review of pending actions**

The JCRB Chair recalled that the draft minutes of the 45<sup>th</sup> meeting of the JCRB had been circulated after the meeting. The Executive Secretary, Dr Olav Werhahn, reported that comments that have been received from AFRIMETS, COOMET, and EURAMET had been incorporated and the revised file version 1.1 was uploaded as working document to the BIPM website. Since no further comments were raised the minutes were approved.

*[The report of the 45<sup>th</sup> JCRB meeting is available on the unrestricted BIPM website  
<https://www.bipm.org/en/committees/jc/jcrb> ]*

The Chair went on to review the actions from the 45<sup>th</sup> meeting:

**Resolution JCRB/45-1** The JCRB noted that the RMOs have progressed successfully with a mix of in-person, online and hybrid periodic reviews of quality management systems of the institutes in their regions. The JCRB encouraged the RMOs to further develop these review routes and keep to the 5-year review period. Exceptionally, where this is not possible, they may extend the validity of these QMSs subject to a case-by-case evaluation by the RMO concerned. This extension of validity shall be for a period not exceeding one year. The power to grant such extensions will be re-evaluated at the time of the 46th meeting of the JCRB.

*This action has been completed.*

**Action JCRB/45-1** The JCRB noted that the RMOs have submitted reports to the JCRB on the status of the quality management systems of the institutes in its regions using a variety of different formats and content. The JCRB reminded the RMOs that the expected content is outlined in CIPM MRA-G-12 Section 5. To simplify the reporting obligation, the JCRB requests the JCRB Executive Secretary to draft a template and to circulate it to all RMOs for their comments in 3 months' time.

*This action has been completed and will be discussed further in agenda item 6.7.*

#### **4. Comments on the BIPM progress since the 45<sup>th</sup> JCRB meeting**

Dr Milton presented the BIPM report, uploaded as JCRB/46-04.1. He explained that the BIPM update will have an additional part on the CBKT activities (uploaded as JCRB/46-04.2) that will be presented by Mr Chingis Kuanbayev and one on the BIPM quality system report presented by Dr Anna Cypionka. The BIPM QS report has been uploaded as JCRB/46-04.3.

He started off with some words on the change in the BIPM International Liaison and Communication Department (ILC). The ILC is now directed by Dr Cypionka, taking over from Andy Henson since March 2023 who has retired. The ILC has been reorganised in subsections being one on communications now headed by the new staff member Dr Dana Vlad, the other one on CBKT and CIPM MRA support headed by Mr Kuanbayev, and finally a subsection on digital transformation headed by Dr Janet Miles. Dr Milton further-on pointed on the fact that the KCDB Coordination is now with Dr Stéphanie Maniguet following Dr Susanne Picard after her retirement in October 2022.

In his presentation, Dr Milton highlighted that there are now 64 Member States and 36 Associates to the CGPM and 251 institutes participating in the CIPM MRA. Notable changes include the reinstatement of Zimbabwe as an Associate of the CGPM as of 8 February 2022. On 5 September 2022, the Republic of Costa Rica changed from the status of an Associate (since 2004) to a Member of the CGPM.

The status of Associate States meeting the CIPM criteria for being encouraged to accede and become Member States were displayed and the series of World Metrology Day (WMD) themes was presented. Preparations for the WMD 2023 was collaboratively organised by OIML, BIPM and SIM with the poster prepared by INTI on the topic of "measurements supporting the global food system". He thanked INTI for their work and said that the theme was very topical.

Dr Milton recalled that following the established sequence, the 2024 WMD would be organised in cooperation with EURAMET, and that the BIPM will contact EURAMET to discuss the topic. Finally, Dr Milton gave an update on the uptake of the WMD as a UNESCO World Metrology Day, an initiative brought forward by the ambassador of Kazakhstan to the UNESCO and supported by 42 UNESCO Member states. When this succeeds, the 20 May 2024 could be the first UNESCO WMD.

In the timely course of the meeting, the presentation on agenda item 4 was then paused, and the word was given to the CIPM Representative to the JCRB to give his presentation on agenda item 5 first. Here, the meeting report is reported in the order of agenda items.

On agenda item 4, Mr Kuanbayev reported on the BIPM's Capacity Building and Knowledge Transfer (CBKT) programme. The presentation is uploaded as a working document JCRB/46-04.2. Mr Kuanbayev highlighted that CBKT covers core areas that are "of vital importance to Member States and the BIPM.", flexible topic-based activities "to address topics of interest to specific groups of Member States and Associates." And knowledge transfer activities which "take many forms, involving the BIPM staff, Visiting Scientists from NMIs/Dis, as well as groups of experts assembled from around the world. It also includes a wide range of other knowledge transfer activities defined by the BIPM." Types of work comprise workshops, remote learning online activities incl. e-learning modules and laboratory-based project placements next to general knowledge transfers by individuals.

Mr Kuanbayev presented some statistical analysis of the CBKT activities since its kick-off in 2016 in particular highlighting the impact of the need to use remote connectivities starting with the pandemic in 2020. In total there were 52 CBKT initiatives organized so far with 3227 participations by persons and just in the recent year from March 2022 to March 2023 five new initiatives attended by 989 participations from NMIs/Dis.

On the e-learning platform, initiated and hosted by the BIPM headquarters, Mr Kuanbayev reported that next to BIPM headquarters courses, there are meanwhile the four RMOs APMP, COOMET, EURAMET, and GULFMET which have joined the initiative planning to provide their own content. During the week of the 46<sup>th</sup> meeting of the JCRB, the SIM President signed the statement on behalf of SIM to join the e-learning programme.

In the following Mr Kuanbayev summarized the various activities of referring to Technical Exchanges on the KCDB, the preparation of a new suite of CIPM MRA brochures made available in English, French and Spanish via the BIPM website<sup>1</sup> and circulated to RMO secretariats in printed form. Finally, Mr Kuanbayev highlighted two new initiatives planned for the 3<sup>rd</sup> quarter of the year, a joint BIPM OIML knowledge transfer initiative and a BIPM-RMO Forum in support of RMO secretariats planned for September 2023.

Following the CBKT presentation, Dr Julien Vuillemin-Toledo replied that EURAMET wants to express their gratitude to the BIPM headquarters for this work, he also encouraged Mr Kuanbayev to think about what the number of participants in the various CKBT areas mean. Mr Kuanbayev responded that the interest in the CBKT programme is really impressive and that a detailed analysis of the numbers will be drawn up in the course of the programme's evolution.

The BIPM headquarters' quality management report was presented by Dr Anna Cypionka and is uploaded as working document JCRB/46-04.3. Dr Cypionka pointed out that in 2022, the Departments' services PMD-Electricity, IR-Radioactivity, Time, and IR-Dosimetry were audited by external auditors from KRIS, LNE, RISE, and ENEA-INMRI, respectively, with only two minor non-conformities reported that did not call into question the results of measurement. In 2023 only internal QMS audits are scheduled, with the KCDB among them.

Dr Cypionka furthermore reported about the use of customer satisfactory forms in the QMS. She pointed out that next to the general customer satisfactory a new one on the KCDB has been launched recently with feedback to come at the next JCRB meetings.

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<sup>1</sup> <https://www.bipm.org/en/committees/cb/cbkt/cipm-mra-brochures>

## 5. Comments on the report from the CIPM

Dr Olthoff presented slides that were uploaded as JCRB/46-05 to the working documents. In his talk he recalled the outcomes of Resolutions 1 to 6 of the 27<sup>th</sup> CGPM that was held in November 2022. Resolutions 1 to 6 of the 27<sup>th</sup> CGPM are online accessible from

<https://www.bipm.org/documents/20126/64811223/Resolutions-2022.pdf>.

Furthermore, Dr Olthoff gave an outline on the next CIPM meeting which took place the week after the 46<sup>th</sup> meeting JCRB at the BIPM headquarters from 20 to 23 March 2023. He highlighted that the CIPM will meet to execute the handover from the “old” CIPM to the new one including election of the CIPM Bureau. Furthermore, strategy discussions and modernization of membership terms were in the focus of the CIPM.

## 6. Comments on the RMO reports to the JCRB

Starting this time again in alphabetical order of the RMOs, the Chairman Dr Milton pointed out that for the 47<sup>th</sup> meeting of the JCRB, the Executive Secretary shall take care that the order of RMO presentations in the agenda should be reversed.

### 6.1. AFRIMETS (uploaded as JCRB/46-06.1-1 and JCRB/46-06.1-2)

Dr Louw reported that at the AFRIMETS general assembly Dr Henry Rotich from KEBS (Kenya) was elected as the new AFRIMETS Chair in July 2022. As vice-chair scientific metrology and vice-chair legal metrology Mr Mathew Ranganai from SIRDC (Zimbabwe) and Eng. John Paul Musimame from UNBS (Uganda) were elected, respectively.

On the membership structure, Dr Louw pointed on the approach of sub-regions within AFRIMETS, and he particularly emphasized that with the sub-region ECOMET where only Ghana as an Associate serves as the link to the international measurement system, the communication and interaction based on AFRIMETS projects has been improved a lot during the last year. Furthermore, on membership, Dr Louw raised a new initiative of Arabic speaking countries (within AFRIMETS and GULFMET) to form a new RMO ARAMET. He proposed this item to be discussed under agenda item 11 (AOB) in more detail.

Dr Louw explained that “as part of a strategy to make the RMO sustainable, a process has started for the registration of AFRIMETS as a Legal entity. Following this a Membership fee will be introduced to support pan-African and international participation.”

Regarding planned technical activities within AFRIMETS, Dr Louw reported that a new working group on digitalization with a primary focus on Digital Calibration Certificates and Digital Conformity assessment Certificates has been initiated. Furthermore, he stated that “an AFRIMETS services database” is being developed that is based on accredited and peer reviewed capabilities. The main aim is to support intra-trade as a goal of the African Continental Free Trade Area. It will make the peer reviewed activities of the institutes not participating in the international measurement system, visible to conformity assessment bodies in Africa (and to legal metrology for calibration of their artefacts).”

The AFRIMETS report concludes that “all AFRIMETS structures including the technical and quality system working groups are functioning, and the activities have basically normalized since the pandemic. Challenges are still being experienced with the transfer of artefacts between countries,

and travel of experts to certain parts of the continent, since airlines have reduced the frequency of flights, or cancelled routes during the pandemic, that have not resumed.”

The AFRIMETS QS report to the JCRB (JCRB/46-06.1-2) was presented by Dr Noha Emad Khaled. In her presentation she highlighted the publication of new CMCs in the KCDB, and the review status of QM systems of Member institutes within AFRIMETS.

Dr Milton asked about the AFRIMETS service data and Dr Louw replied that a number of 1500 – 2000 services were foreseen.

## **6.2. APMP (uploaded as JCRB/46-06.2-1 and -2)**

In his presentation (in addition to JCRB/46-06.2-1) Dr Hyun-Min Park highlighted that APMP has now 47 Full Members including 2 new Members, BQSF DMSc (Thailand) and NIMM (Myanmar) approved by the APMP GA in 2022 and additionally 14 Associate Member institutes from other regions. Furthermore, he pointed out that for the next 3-year-cycle until 2025, the APMP secretariat has been transferred from NIM (China) to KRISS (Korea) including the Chairperson and Secretary. Dr Park explained that next to the metrology disciplines represented by Technical Committees, there are 6 Focus Groups installed within APMP addressing cross-discipline solutions to challenges of Climate Change and Clean Air, Food Safety, Energy Efficiency, Medical Metrology, Clean Water, and Digital Transformation.

Dr Park then reported that the Executive Committee of APMP comprising 6 members next to the Chairperson was recently joined by two new members, Angela Samuel (NMIA) and Venu Gopal Achanta (NPLI). There were 3 new TC-Chairs appointed and 2 other committees' Chairs elected. APMP joined the BIPM e-learning initiative and signed a MoU with IMEKO to strengthen communication and collaboration. He closed with a brief summary on new APMP CIPM MRA activities.

APMP's QS report to the JCRB was uploaded as a working document JCRB/46-06.2-2. In an extra presentation (as uploaded additionally), Ms Rugkanawan Wongpithayadisai showed the structure of the APMP TCQS including the nomination of new members and the handover from the previous Chair Dr Yang Ping to her in 2022. She reported on updates of APMP QM guidelines and policy documents. Ms Wongpithayadisai then reported on the various activities within APMP on QMS reviews and QMS updates. She explained that, related to QMS, “the APMP monitoring procedure ensures that the member institutes' quality management systems continue to be valid, and comprised the following steps: To provide evidence that APMP QMS is operating correctly, NMI/DI shall submit the annual report and present the key issues as an abstract of their submitted annual report to the TCQS meeting. The submitted annual report will include a record of any recent assessments or review. Such record include technical peer reviewer's report, accreditation body's assessment/survey report, certification body's assessment/survey report and QMS expert's report, depending on the selected pathway. The TCQS must also be informed of any major changes affecting the QMS (including major changes to key staff, facilities, and equipment) that could negatively affect the NMI/DI's ability to provide measurement services covered by their CMCs. Reports of peer reviews/accreditation assessments during the year's term also need to be attached to the annual report. APMP mandates onsite (or online due to COVID 19 peer reviews every 5 years with peer reviewers endorsed in advance by the APMP. The peer review is held in conjunction with the accreditation assessment or conducted with QMS Experts endorsed in advance by the APMP as the review team leader. Completion of such peer reviews will trigger a CMC submission listed in Part A and/or reported with detailed evidence of its completion included in the Annual Report on Part B. In such manner, the 5-year full review of each NMI within APMP is conducted and annually checked/confirmed by the TCQS.”

Mr Kanakrieh asked APMP how often hybrid comparisons have been performed. Dr Park answered that within a year, NIM has operated 1 – 2 hybrid comparisons and e-learning activities on hybrid comparisons will be drafted.

### **6.3. COOMET (uploaded as JCRB/46-06.3-1 and -2)**

Mr Nikita Zviagin presented slides on the COOMET's report to the JCRB (JCRB/46-06.3-1) that were uploaded in addition to JCRB/46-06.3-1. He reported on the COOMET membership structure that currently 14 Full Members and an additional 5 Associate Members from other regions participate in COOMET. With the change of Georgia and Ukraine and the cease of Cuba as an Associate of the Metre Convention in 2022, COOMET is currently operating with 8 countries with CIPM MRA participating laboratories, including 3 which are not an Associate of the CGPM (Armenia, Kyrgyzstan, Tajikistan). Then, Mr Nikita Zviagin went on summarizing the CIPM MRA activities of COOMET members and explained the changes of chairs in the COOMET TC structure.

Mr Nikita Zviagin's presentation was followed by a presentation of Ms Nino Mikanadze on the COOMET QS report to the JCRB uploaded as JCRB/46-06.3-2. In particular, she pointed out the changes that took place when Ukraine and Georgia moved their CIPM MRA participation through EURAMET decreasing the total number of COOMET CMCs by 379. With respect to Cuba, Ms Nino Mikanadze's presentation showed an information that Cuba would have started to restore its membership of the CGPM at the end of 2022. Finally, Ms Nino Mikanadze summarized the status of recognition of the various COOMET institutes.

### **6.4. EURAMET (uploaded as JCRB/46-06.4)**

In his presentation (uploaded in addition to JCRB/46-06.4) Dr Jörn Stenger reported on the membership structure that EURAMET is now cooperating with 39 NMIs, plus additional 81 DIs, and collaborates with 16 international Liaison Organisations. He pointed out that recently Ukraine and Georgia have joined EURAMET. KazStandart (Kazakhstan) has become a Liaison Organization. He regretted that Iceland is no longer a EURAMET member.

Dr Stenger updated the information about EURAMET's Board of Directors and explained the structure of metrology areas mirrored by Technical Committees and in parallel the structure of European Metrology Networks (EMNs) addressing cross-discipline topics. The focus of the work of EMNs is on interaction with external stakeholders.

Then, he moved on to the European Partnership Metrology (EPM) programme on research succeeding the previous ones of EMPIR and EMPR. Like its predecessors, EPM is co-financed by participating EURAMET member states and the European Union, with an overall budget of 690 M€. In combination with the EPM, Dr Stenger stated that strategic priorities of EURAMET are to i. ensure international recognition of measurement capabilities, ii. to support members in developing measurement capabilities on all scientific-technical levels, iii. to liaise with stakeholders on higher level and more comprehensively. Thematic priorities were reported to be with the "twin transition" – Energy / Green Deal and Digital Transformation, ii. industrial innovation, and iii. with health.

Regarding the EURAMET QMS report Dr Davor Zvizdić reported (presentation uploaded in addition to JCRB/46-06.4) on the general structure of the TC-Q and its operational groups. He summarized the workflow on member institutes' QMS approvals within EURAMET including the periodically review and the outcome of the last annual TC-Q meeting, April 2022. Following this meeting and as a consequence of non-conformity with EURAMET rules, it was decided to grey-out all CMCs of the EURAMET member institute NMO (UK), Dr Zvizdić explained.



Finally, Dr Zvizdić outlined work ahead in 2023 and 2024 that may comprise among other the “Cooperation and support to Ukraine and Georgia to facilitate the transition to EURAMET and to subsequently attain TC Q QMS Confidence”, and the “Preparation for IT support of automation of peer Review project approval, construction of Part 2 of Declaration for Coverage of CMCs (ongoing). Possibility for cooperation with BIPM.”

APMP delegates asked on the interaction and formal status of TCs and EMNs within EURAMET. Dr Stenger replied that both, TCs and EMNs are substructures of EURAMET and not independent entities. Whereas for the TCs start from the CIPM MRA’s and SI units’ point of view, the EMNs start from the stakeholders’ point of view.

Mr Kanakrieh asked whether and how EMNs liaise with countries outside EURAMET. Dr Stenger answered that this is possible and subject of EMN project designs; examples exist with NIST and the other institutes.

Dr Milton recalled the situation with Iceland and Dr. Stenger replied that he only knows that HMS has handed-over the calibration services to another institute.

Dr Louw raised interest in the relation of HORIZON Europe and the EPM programme. Dr Stenger responded that there is a twofold picture, HORIZON Europe provides the financial allocation to the EPM but politically the EPM programme has some diplomatic level similar to that of HORIZON Europe.

#### **6.5. GULFMET (uploaded as JCRB/46-06.5-1 and -2)**

Eng Amina H. AlBastaki presented the GULFMET report uploaded as JCRB/46-06.5-1 stating that GULFMET has received a note “from the General Organization for Standardization and Quality in Iraq to join GULFMET as an Associate Member”. She then summarized the membership structure of GULFMET including those countries which are participating the CIPM MRA via other RMOs. In the following Ms AlBastaki updated the information about GULFMET TCs and their chairs, with now 8 TCs in operation. On the interim GA in December 2022 GULFMET established a working group for research and development (R&D WG) and agreed to sign a MoU with IMEKO.

She then summarized the GULFMET’s attendance to international metrology meetings and provided an overview on GULFMET CIPM MRA activities. GULFMET laboratories participated in comparisons in all but one metrology areas, excluding QM. CMCs are published by GULFMET laboratories in EM, L, M, and TF. To build up technical capacities GULFMET initiated the GULFMET Peer Reviewers Qualification Scheme in 2022. “This Scheme intends to outline the methodology to be followed to upgrade the capabilities of the potential peer reviewers of the GULFMET NMIs/DIs and to align its activities with internationally accepted practices.” Ms AlBastaki explained. She acknowledged the contribution of the BIPM’s ILC CBKT and CIPM MRA support team in this scheme.

With updates on GULFMET activities on digital transformation regarding DCCs Ms AlBastaki concluded her presentation.

In a separate presentation, Ms Asma Al Hosani reported on the GULFMET quality system (JCRB/46-06.5-2). She reported on the recent meetings of the TC-Q in 2022 where all GULFMET members were represented. Then Ms Al Hosani detailed the GULFMET Peer Reviewers Qualification Scheme with a total of 7 different events organized until now resulting to additional 17 experts from GULFMET laboratories being certified as reviewer for CMC and QMS review. Based on this experience, Ms Al Hosani reported, GULFMET concluded that holding such programs enhances the

efficiency and skills of members and enabling a 2<sup>nd</sup> stage could certify members from this programme as observers in peer assessment programs to gain experience and practical skills. She explained that GULFMET plans to coordinate and cooperate with accreditation bodies in GCC countries to consider the candidate as assessors and to create a peer reviewer database.

She concluded her presentation with a summary of the review status of GULFMET member institutes.

Dr Milton asked Ms AlBastaki about the outcome of the Iraq initiative. Ms AlBastaki replied that GULFMET received a formal letter and is now awaiting more detailed documents to progress this approach.

#### **6.6. SIM (uploaded as JCRB/46-06.6)**

Mr Javier Arias presented the SIM report to the JCRB. In his presentation he highlighted the membership status of SIM comprising 33 Members, 13 Associate Members, and 2 affiliate Members. SIM is organized in 5 subregional organizations with own coordination structures, spanning the whole American continent. As a new development Mr Arias highlighted that the GA and Steering Council had authorized the SIM President to sign an agreement to join the BIPM's e-learning activity.

He then continued to summarize the various SIM CIPM MRA activities and further projects and activity of SIM, including digital transformation in support of health services, quality infrastructure for circular economy related to plastics, construction, and agri-food. Finally, Mr Arias reported on a SIM-NIST-NCSLI Project, "Early Career Metrologist Contest" for metrologists under 5 years working experience that was successfully accomplished in 2022. The project aimed to enable young metrologists to write about scientific or industrial papers; 4 papers of young metrologists from all 5 SIM subregions were selected for the NCSLI annual Conference to present their projects. A new launch of the project has been initiated in 2023.

The QMS related part of the SIM report was presented by Ms Sally Bruce. She summarized the review status of SIM laboratories.

#### **6.7. Comments on the templates provided to the JCRB for RMO reports to the JCRB**

Following the RMO reports to the JCRB, the Chairman asked the RMO delegates about their experience of using the templates that were provided to the RMOs by the Executive Secretary following Action JCRB/45-1. He made clear that only a few RMOs had used them giving rise to the observation that even with templates available, RMO Reports to the JCRB were heterogeneous again. RMO delegates replied with the following concerns:

- Could information on CIPM MRA activities be added automatically by the KCDB Office, asked Nino Mikanadze (this was later on supported also by Dr Gertsvolf);
- APMP wants to provide exclusively information on changes, instead of all the data the template is asking for;
- Nikita Zviagin proposed to gather more experience and revisions to improve the templates before approving them;
- Olav Werhahn commented that the templates were not meant to be mandatory in all the required information, but leave RMOs with their own decision which way and to what level of detail the information is provided.

The Chairman concluded this agenda item, saying that the implementation of action JCRB/45-1 and the reporting templates will be continued, and further comments will be collected at the next meeting of the JCRB.

## **7. Comments on the KCDB report: providing statistical insights (uploaded as JCRB/46-07\_08.1)**

Dr Stéphanie Maniguet presented the KCDB Report to the JCRB (uploaded as JCRB/46-07\_08.1) slides that are summarising the first part of the KCDB report. Reports on the KCRB to the JCRB were published since the last JCRB meeting in September 2022 and in March 2023. All KCDB reports are publicly available from the website <https://www.bipm.org/en/cipm-mra/kcdb-reports>.

Dr Maniguet showed that the total number of CMCs is observed to be stable over the last decade, notwithstanding new CMCs being published each year, i.e. in the reporting period of the last six months 308 CMCs. Although the number of CMCs is approximately stable, an increasing amount of information is covered by the adoption of wider scope CMCs. However, for GULFMET an increase of 65 % over the last year was reported by Dr Maniguet as 56 new CMCs were published since the last meeting of the JCRB.

Each year, around 35 new Key Comparisons (KCs) are registered in the KCDB. The ratio of Supplementary Comparisons (SCs) with respect to KCSs is stable at 37 %. The number of KCs and SCs older than 5 years but still uncompleted was reported as around 40 KCs and 50 SCs. The number of incomplete KCs has almost constantly decreased since 5 years, the number of SCs uncompleted has not.

Dr Maniguet concluded with an update on the API of the KCDB.

Following Dr Maniguet's presentation, Mr Kanakrieh asked about the possibility to infer the number of JCRB reviews an RMO has performed. Dr Werhahn answered that this is currently not possible from the KCDB web platform, another option, however, would be to implement a new service of the KCDB Office on this request.

## **8. Comments on the status of CMC submissions and review of reporting on the system's performance**

### **8.1 Reporting on the system's performance (uploaded as JCRB/45-07\_08.1)**

Dr Olav Werhahn reported on review durations for submitted CMCs in both the intra-RMO and the JCRB reviews. The reduction in review times already seen in the previous KCDB reports has been maintained at the March 2023 KCDB report when looking at the long run data covering the time since the implementation of the KCDB 2.0 platform. In contrast, for the current reporting period Dr Werhahn showed that the JCRB review duration has increased as compared to the September 2022 KCRB report. However, the average across all metrology areas and all RMOs in both review stages shows a mean duration per CMC of 67 days. Again, Dr Werhahn's plot shows data for the reviews of the last six months and the long term broken down to the different metrology areas. Comparing both review stages, it seems that CMCs in some metrology areas where a very short intra-RMO review has been achieved, a rather long JCRB review followed and vice versa. Since this was also observed in the previous reporting period it might be worth to look at it again in more detail for the next KCDB report. With QM being the final metrology area that has completed full year cycles using the KCDB 2.0 it is interesting to note that the JCRB review duration has continued

to stay long. Whereas the mean duration was reported as 110 days for QM in September 2021, the March 2023 numbers show a duration of 173 days. The earlier predicted seasonal effect with variations between the September and March meetings of the JCRB gets support from this. The September 2022 KCDB report reveals a JCRB review duration of only 60 days for the QM area. This seasonal effect is linked to the CCQM's specific schedule of KCWG meetings where CMC review is concerned and that is closer in time to the September meeting of the JCRB than to the March meeting. On the increase of JCRB review durations within the reporting period of the last six months, Dr Werhahn further pointed out that this time CMCs have finally been published (and therefore counted here) that have suffered from JCRB review deadlines set by some RMO more than a year ahead in time in 2022. Other reasons are often related to personalities when TC Chairs have changed or other personal challenges.

Following Dr Werhahn's presentation Mr Zviagin raised a question on the meaning of RMOs on the x-axis of Dr Werhahn's graphs. He answered that these are the RMOs that have submitted CMCs not the ones they reviewed. Dr Louw stated that some more impact could be gained to reduce intra-RMO review durations and to improve the intra-RMO review of CMCs if more experts in the NMIs/DIs could be encouraged to be registered as CMC reviewers.

## **8.2 Reporting on issues regarding the CMC review since the 45th meeting of the JCRB (uploaded as JCRB/46-08.2)**

Referring to his task as Executive Secretary to continuously monitor the review status of CMC (CIPM MRA-G-13, section 5.2) Dr Werhahn reported the outcome of an investigation on (i) the loss of rights in CMC review and (ii) on the phenomenon of CMCs "slipping through" the JCRB review.

On the loss of rights, he showed data of not-replied requests for review and of accepted but not completed reviews for all metrology areas for the last 12 months. The data were downloaded from the statistics menu of the KCDB web platform and as such accessible by all logged in KCDB users. The numbers of non-replied requests for reviews over the last 12 months showed a number of cases that is not negligible between less than 10 and several hundred depending on the metrology area. A timely reply to a request to review a CMC would help other RMO TC Chairs to decide, help CC WGRMO Chairs to monitor the JCRB review and contributes to a time effective JCRB review process. More seriously would the CMC review affected by large numbers of RMOs accepting to review CMCs but not complete the review. As Dr Werhahn showed, numbers on this effect were not zero during the last year, sometimes showing several tens of cases for some RMOs in some metrology areas. These cases should have caused difficulties to the JCRB review. However, as Dr Werhahn recalled, a survey through CC WGRMO Chairs last year did reveal that no problem was observed for their metrology area.

On the phenomenon of CMCs slipping through the JCRB review, Dr Werhahn explained that this happens if no RMO expressed their intention to review a CMC within the period of 3 weeks. After this period the CMC is automatically submitted to the KCDB Office for publication. In this case and without interference of the KCDB Office, the JCRB Executive Secretary cannot react, and the CMCs are published without any JCRB review. Cases like this have happened during the previous year, although only for a small number of CMCs. However, special care will be invested to search for such cases more systematically in the future. A very recent case was solved by publishing the CMCs and followed by a posterior review.

Based on the data, Dr Werhahn asked the RMO Representatives to emphasise this phenomenon in their regions.

Following the presentation Ms Mikanadze asked why non-replied requests to review CMCs caused harm. Dr Werhahn answered that this eases the decision of other RMOs and allows CC WGRMO Chairs to better monitor and steer the JCRB review, giving rise to a time effective JCRB review.

On the “slipping-through” of CMCs, Dr Di Lillo commented that this was probably related to a situation in EM in early 2022.

## **9. CIPM MRA documents and matters arising from them**

### **9.1 Reporting feedback from the CC consultations regarding the Statistics Task Group’s proposal revising CIPM MRA-G-11**

On this item Dr Milton recalled the situation saying that the Statistics Task Group’s proposal had been circulated to the RMOs and then to the CCs. He asked Dr Werhahn to summarize the updated scenario.

Dr Werhahn reported that all CCs have sent feedback to the JCRB Executive Secretary and that the outcome, presented at the 45<sup>th</sup> meeting of the JCRB (uploaded as JCRB/45-10.1) was confirmed by the remaining CCs which, at the time of the 45<sup>th</sup> JCRB, had not been able to report a consolidated CC view. Dr Werhahn said that in particular some CCs have raised concerns and in conclusion expressed the opinion that could be summed up as: *‘CIPM MRA-G-11 seems not to be the appropriate type of document for recommendations with this level of detail’*, as expressed by four CCs: CCQM, CCEM, CCM and CCTF.

With that resumé, the Chairman Dr Milton asked the JCRB whether it would decide to close this item, and make no revision of the CIPM MRA-G-11 guidelines. Nevertheless, the work of the Statistics Tasks Group, including the text and details on possible evaluations of comparison results is highly appreciated by the JCRB. All CCs may benefit from this for their own guidelines on analysing comparison results.

Following agenda item 9.1, the Chairman asked the Executive Secretary to bring up agenda item 11.1 in the course of the meeting. (The meeting report will continue in the order of the agenda.)

### **Young metrologist’s 2050+ vision (uploaded as JCRB/46-09.2)**

Outside the agenda, an item “Young metrologists 2050+ vision” (YM2050+) was discussed. Mr Kuanbayev introduced this initiative that aims to collaborate with RMOs and the BIPM headquarters to work with RMO-nominated “Young Metrologists” on a vision for metrology in the year 2050 and beyond. A joint vision statement shall be the outcome of this study, which will be presented at the 125<sup>th</sup> anniversary of the Metre Convention 2025. With the YM2050+ and its vision the initiative seeks also to contribute to the CIPM Strategy 2030+ and refers to Resolution 1 of the 27<sup>th</sup> CGPM to “... develop a long-term vision for an international measurement system that will remain relevant and adequately address new metrological challenges”.

Mr Kuanbayev outlined the project to start in June 2023 with the support of the CIPM and asked the RMOs for their support and contribution. Details and schedule of the initiative can be accessed from JCRB/46-09.2.

At 16:30h, the Chairman closed day-1 of the meeting with the decision to start day-2 the next morning at 10am.

## 10. Digital transformation

Deviating from the order in the agenda, the Chairman started day-2 with agenda item 10.2 and followed by 10.3 before item 10.1 concluded the discussion on digital transformation. (The report will continue in the order of the agenda.)

### 10.1 Taking up the idea of Action JCRB/43-1

With action JCRB/43-1, in 2020 the RMOs were asked "... to communicate to M. Dobre the email addresses of contact persons in order to exchange information on digital transformation by the end of March." Following this action, an informal group of the communicated contact persons has met four times in 2021 to 2022 to discuss digital topics. Since March 2022 no further meetings occurred.

Noting that all information has been sent, the Chairman asked for the consent of the JCRB Representatives to conclude that action JCRB/43-1 will be closed and no further cross-RMO group on digital transformation would be required. The meeting agreed.

### 10.2 Evaluation Report of the survey on digital transformation (uploaded as JCRB/46-10.2)

Dr Werhahn presented slides uploaded as JCRB/46-10.2 summarizing the evaluation of the feedback on a survey sent to all CCs. In this survey CC members were asked to provide answers on their activities, needs and benefits of digital transformation. The survey was conducted in two phases, the first in 2021/2022 with CCAUV and CCEM, the second, with the identical questionnaire with all other CCs (incl. CCU) in 2022. The evaluation of the CC members' responses revealed four main findings:

1. Digital transformation is interesting to many NMIs.
2. DCC is the DT-topic with the greatest interest to NMIs.
3. The concept of how to provide a statement of metrological traceability in DCCs is not yet clear.
4. The API-KCDB is still at early stage of usage.

Dr Werhahn referred to agenda item 10.3 for more details about a solution to 3. The full report is accessible as Rapport BIPM 2023/1 from:

<https://www.bipm.org/documents/20126/27085544/RapportBIPM-2023-01.pdf/ff5aac7a-56d7-4ff7-7de1-04d024fedb65> .

Following his presentation, Dr Werhahn was asked by Mr Zviagin whether finding 4 on the API-KCDB could trigger some adaptation in the BIPM's CBKT activities. Mr Kuanbayev replied that he agrees with this proposal and that the use of the API-KCDB could be added to the topics covered in Technical Exchanges on the KCDB.

### 10.3 Enabling the introduction of a FAIR SI-traceability statement in digital calibration certificates through a machine-readable link to the supporting CMC – Update from the BIPM on Digital Transformation

This agenda item was introduced by Dr Milton pointing out that Dr Miles was recently appointed as Head of Digital Transformation at the BIPM headquarters.

Dr Miles presented an update from the BIPM (headquarters) on digital transformation (uploaded as JCRB/46-10.3-1) where she highlighted the relevance of this work to Resolution 2 of the 27<sup>th</sup> CGPM on developing and promoting a SI Digital Framework and to adopting FAIR principles for digital metrological data and metadata. Dr Miles explained the two data planes the BIPM

headquarters, and the community are working on, founded on the BIPM Core References including the SI Digital Reference Point up to the NMI/DI and user driven applications where digital calibration certificates belongs to.

The following part of the agenda item showed a presentation uploaded as JCRB/46-10.3-2 by which Dr Miles demonstrated the general idea and principal possibility to use CMC identifiers as specified by CIPM MRA-G-13 to generate a digital (or analogue) link to a specific CMC for use in calibration certificates. This would address the finding of the survey on digital transformation as expressed at agenda item 10.2 and enable a digital and machine-readable SI traceability statement in digital calibration certificates.

Dr Miles concluded with a draft text for a formulation of an outcome as Recommendation

*“Noting the availability in the KCDB of a unique and persistent identifier for each CMC (and each version of a CMC), the JCRB recommends use of these CMC identifiers by the participating NMIs/DIs (for example in their quality documentation) and asks the BIPM Headquarters to make available appropriate training material to encourage this.”*

Following the Chairman’s question, all RMO accepted the draft text as an outcome of the meeting.

## **11.Any other business**

### **11.1 Comments on the CCL approach to improve the KCDB on digital information on KCs**

(already discussed on day-1 but reported here)

On this item the Chairman asked the Executive Secretary to summarize the CCL’s work. Dr Werhahn reported that the CCL WG-MRA has drafted a paper (CCL/WG-MRA/22-04.02-1) that was brought to the attention of the JCRB Chair. The paper sketches the approach of the CCL by which they maintain an overview about comparison result of member institutes with respect to published CMCs of them and new CMC claims being supported by the member’s results in comparisons. All of that is very efficient but also labor intensive. All is done manually and by one single person in CCL. To modernize and automate the approach, the CCL WG-MRA proposed a possibility to gain from the digital transformation efforts.

Dr Werhahn, however, continued to report on the transformation efforts invested in the KCDB that the main priority lays on the CMC data first. Comparison data are going to be FAIRified in a subsequent second step in the future. With this second step, the CCL request to make use of a digital link to the KCDB for their tracking of member results and CMCs would be able to become addressable more likely. The Chair proposed that the JCRB should return to this when the BIPM’s Digital Transformation efforts are more advanced.

### **11.2 RMO delegations in meetings of the JCRB**

Raised by the Chairman, the question was discussed to whether the size of RMO delegations is considered sufficient by the RMOs or requires adaptation. Ms Bruce resumed that in previous meetings there was the option for RMOs to nominate up to two observers and that this would mean a great opportunity for new people getting acquainted to the work of the JCRB.

She was supported by Dr Louw stating that he would be in favour of the option of two observers remotely logged in to the meetings but would call for physical attendances sticked to the well-proven max five members per delegation.

Dr Milton closed this discussion saying that the JCRB should continue with a flexible approach to online participation.

### 11.3 Hybrid Comparisons (raised by Ms Sally Bruce)

Ms Bruce introduced this item saying that within SIM some discussions started recently to make use of this option. She recalled the earlier discussions and Resolutions of the JCRB and asked what experience the RMOs have had.

Dr Louw replied that within AFRIMETS hybrid comparisons did not yet happen but said that he still finds it an interesting approach.

GULFMET reported that they do not have any experience but would look forward to learning more from the APMP experiences with hybrid comparisons.

COOMET stated that they do not see any need for hybrid comparisons within COOMET.

APMP stated that hybrid comparisons were an APMP initiative due to broad diversity of capabilities. There has been an uptake of this option by some technical communities specifically in countries that sought access to metrological traceability where they could not link to a key comparison. It has not found large spread among the technical committees. In this specific niche, hybrid comparisons were successful in the APMP region.

### 11.4 Update on the Arab Association of Metrology (ARAMET)

Dr Louw gave a presentation uploaded as JCRB/46-11.4 that was given to him by Ms Souad Bouaziz from the Arab Association of Metrology (ARAMET).

He explained that ARAMET was created in 2012 under the ambit of the Arab Industrial Development, Standardization, and Mining Organization (AIDSMO), previously (AIDMO). AIDSMO is a specialized organization affiliated to the League of Arab States (LAS) and has its own legal entity and administrative and financial autonomy. ARAMET has 14 member states which include five that are States Parties to the Metre Convention (Tunisia, Kingdom of Saudi Arabia, Iraq, Egypt and Morocco) two that are Associates of the CGPM (Sudan and Kuwait) plus nine that are neither. In their presentation, ARAMET included a request to attend the JCRB.

Dr Olthoff asked whether ARAMET aims to move members/associates out of AFRIMETS or simply to address those countries that are not yet attached to an RMO? Dr Louw answered that he can see both possibilities, but the relevant AFRIMETS members he consulted indicated that they stay committed to AFRIMETS.

Mr Kanakrieh stated that all current GULFMET members are fully committed to GULFMET and that there are relations on a technical basis between states in GULFMET and ARAMET.

Javier Arias observed that the situation appeared like the one in the Americas which had many language differences between countries, but they managed to stay aligned in one single RMO.

Furthermore, Dr Gertsvolf asked whether there are any criteria other than that of language that unite the ARAMET countries? Dr Louw replied that in addition to language, it is the LAS affiliation only.

Dr Louw summarised the discussion in the meeting by saying that states/economies within existing RMOs should continue with their participation through the existing RMOs. States/economies that are not members of an RMO should consider joining one of them as an associate member. Dr Milton proposed that the CIPM might debate the merits of establishing a “non-aligned” RMO structure in the future for States/economies that could not join any of the RMOs.

Dr Louw agreed to feed the views expressed in the discussion back to ARAMET.



### 11.5 IATF 16949 (uploaded as JCRB/46-11.5)

Mr Kuanbayev reported on the International Automotive Task Force (IATF) and their document IATF 16949 and that the inclusion of CIPM MRA related calibration certificates was successfully promoted during recent months. Informed about a difficulty at a European NMI which found that certificates they had issued to an automotive producer were not accepted by IATF auditors, the BIPM headquarters reached out to discuss the situation with the IATF. Based on the discussion the International Automotive Oversight Bureau agreed to introduce certificates issued in the CIPM MRA context to a next revision of the IATF 16949. In the meantime, the issue will be tackled amongst their FAQs.

### 11.6 Young metrologist's 2050+ vision

On day-2 this topic was resumed by Mr Kuanbayev stating that all discussions he had following the meeting on day-1 at the reception had generated positive comments from RMO delegation members.

From the discussion of the YM2050+ an JCRB outcome was formulated as Action JCRB/46-1:

*The JCRB asks each RMO to nominate (one or two) RMO coordinators for the "Young metrologists' 2050+ vision" foresighting exercise and to send their names to C. Kuanbayev (BIPM) by 31st March 2023.*

### 11.7 Princess of Asturia Award

Dr Milton informed the JCRB that the Spanish NMI CEM has proposed the BIPM to receive the Princess of Asturia Award. Some RMOs have sent support letters, either to CEM or the Executive Office of the BIPM headquarters. The process is under way now.

## 12. Next meetings and meeting closure

### 12.1 The 47th meeting of the JCRB

Dr Milton pointed out that following the long period of pandemic restrictions, the 47<sup>th</sup> meeting of the JCRB will be hosted by a member state of SIM. The Costa Rican NMI (Laboratorio Costarricense de Metrología) has offered to host the meeting in September.

Mr Olman Ramos presented slides with the invitation to organize the meeting of the JCRB in Costa Rica. Tentative dates were mentioned in September 2023<sup>2</sup>.

### 12.2 The 48th meeting of the JCRB

The March 2024 meeting was planned provisionally at the BIPM headquarters for the week 11 to 15 March. It was agreed to discuss at the 47<sup>th</sup> JCRB meeting, if a second meeting was necessary in 2024 and whether it would be held at the BIPM headquarters or in a region.

### 12.3 Reading of the Outcomes of the meeting

The Resolutions, Recommendations, and Actions were circulated by the Executive Secretary in the following week with the options for RMOs to comment. All RMOs' feedback supported the drafted texts:

**Resolution JCRB/46-1 (2023)** The 47th meeting of the JCRB will be held in Costa Rica (Laboratorio Costarricense de Metrología); tentative dates are in September 2023.<sup>2</sup>

**Recommendation JCRB/46-1 (2023)** Noting the availability in the KCDB of a unique and persistent identifier for each CMC (and each version of a CMC), the JCRB recommends use of these CMC identifiers by the participating NMIs/DIs (for example in their quality documentation) and asks the BIPM Headquarters to make available appropriate training material to encourage this.

**Action JCRB/46-1 (2023)** The JCRB asks each RMO to nominate (one or two) RMO coordinators for the “Young metrologists’ 2050+ vision” foresighting exercise and to send their names to C. Kuanbayev (BIPM) by 31st March 2023.

The Chairman, Dr Milton took the opportunity to thank all delegates for their attendance and contributions to the meeting.

He then closed the 46<sup>th</sup> meeting of the JCRB at 12:50h.

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<sup>2</sup> Dates confirmed are 12 and 13 September 2023.