

# Report from the BIPM Director

“Plans for the 150<sup>th</sup> anniversary of the signature of the Metre Convention”

**B**ureau  
International des  
**P**oids et  
**M**esures

**Dr Martin MILTON**  
20th October 2023



# Members and Associates *(May 2023)*



- 64 Member States\* and
- 36 Associates of the CGPM  
*(States and Economies)*

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

## 251 Institutes participating in the CIPM MRA

- 97 National Metrology Institutes + 3 Ministries
  - 64 Member States
  - 36 Associates
- 4 International organizations  
*(ESA, IAEA, JRC, WMO)*
- plus 150 Designated Institutes

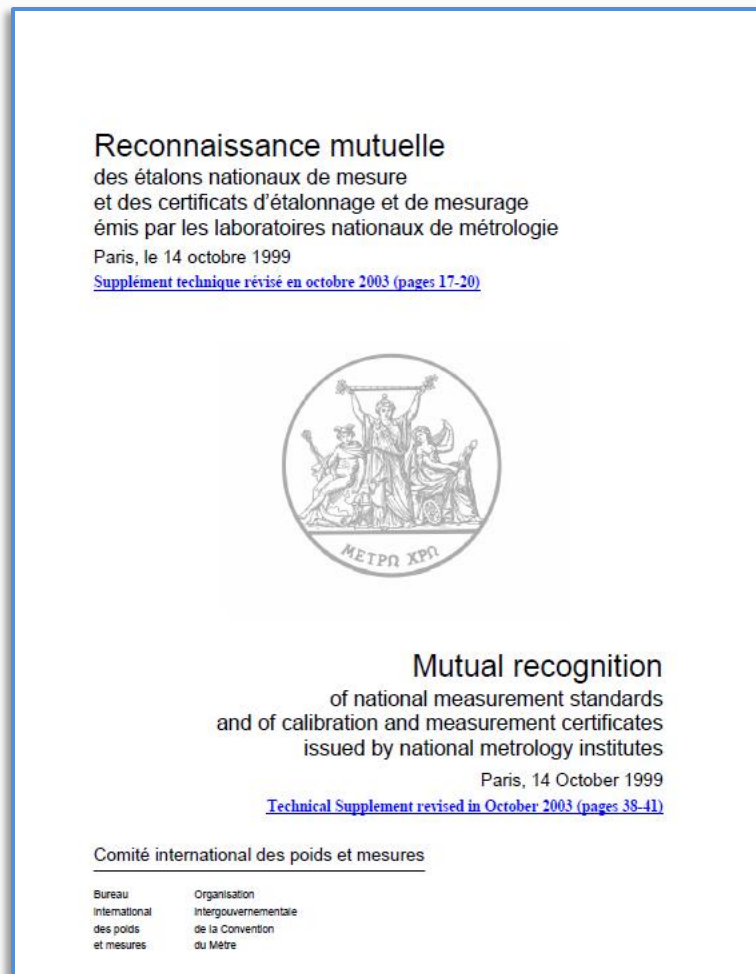
**1 825 comparisons**

1152 KCs, 673 SCs

**25 863 CMCs**

Peer-reviewed declarations

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# Laboratory highlights - Chemistry

New comparison services and reference data for chemical standards

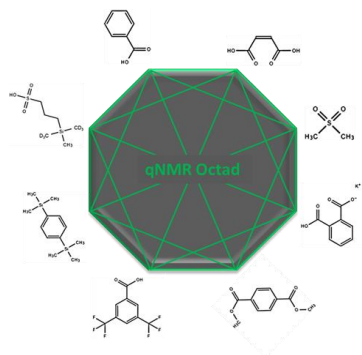
## Carbon dioxide (CO<sub>2</sub>) in air standards: On-demand comparisons

- BIPM reference facility validated (CCQM-P225)
- New on-demand comparison service for NMIs (2024)
- Supports global and national initiatives to verify GHG emissions



## Organic Standards

- 8th qNMR internal standard document available (for Benzoic acid)
- Ensemble for purity assignment of all small organic materials
- Supports CRM development at NMIs



# Highlights - Traceability for Laboratory Medicine

## JCTLM database

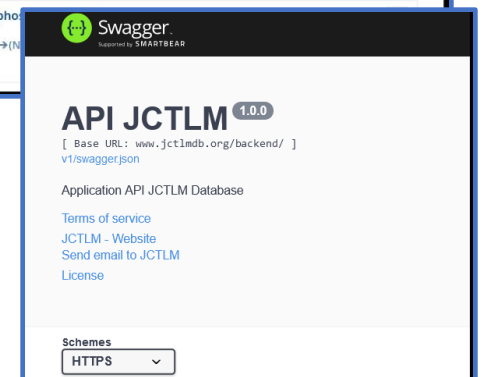
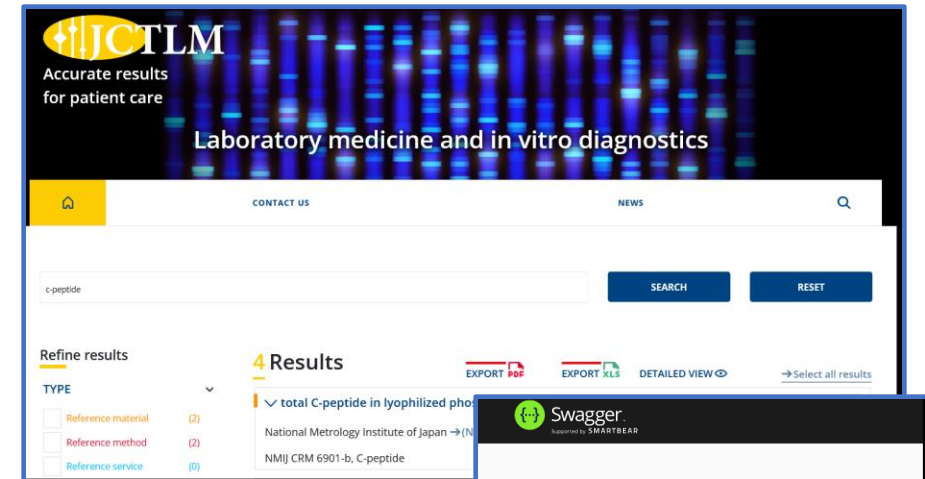
- Lists NMIs services for laboratory diagnostics and supports regulatory requirement for traceability.
- New version of database released (October 2022) and Application Programming Interface released (April 2023).

## Funding found for new web interface to be developed in 2024

- 70 000 € raised in 2023 from nine NMIs - KRISS, HSA, NIST, NIM, NMIA, LGC, PTB, IFCC, ICSH



Accurate results  
for patient care



# Laboratory highlights – Ionising radiation

## Renewed standard

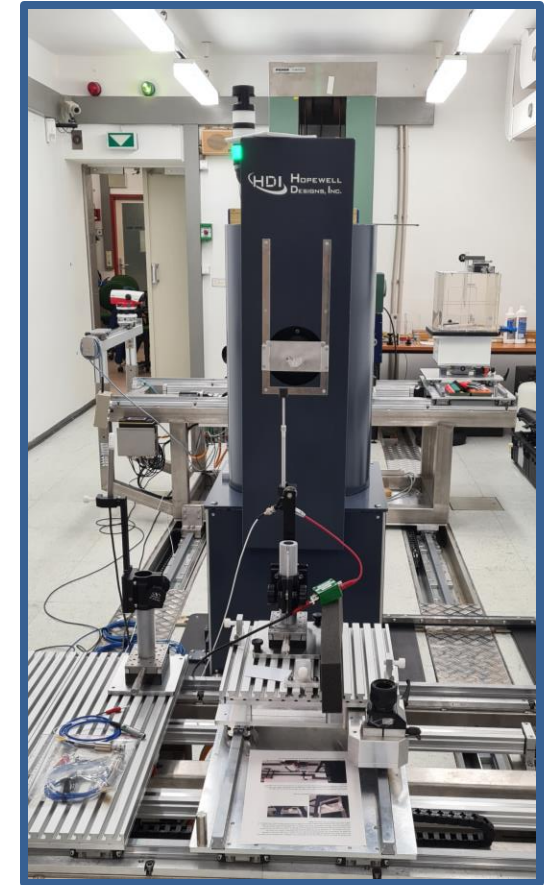
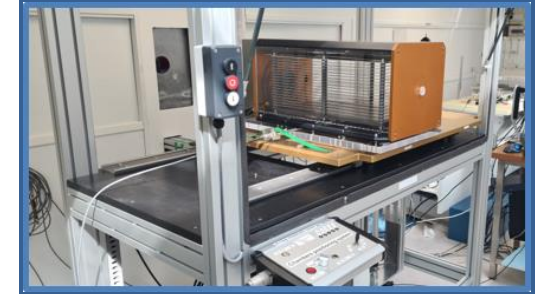
- **New primary standard for medium-energy x-rays tested and validated.**

## Expanded services

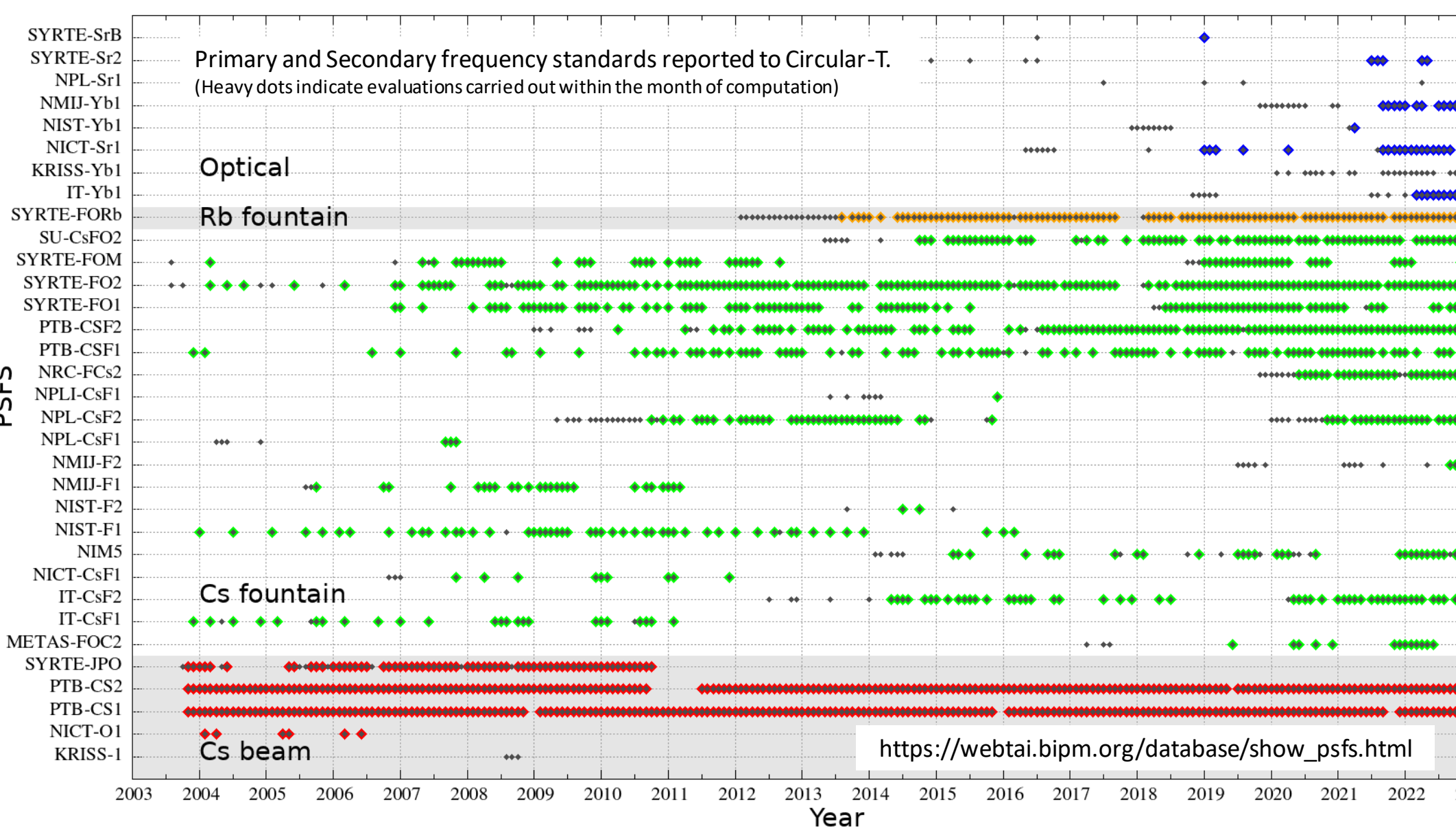
- **Establishment of the KCRV and comparisons in  $^{137}\text{Cs}$  beam by the BIPM using the facility at the IAEA (Seibersdorf, Austria)**
- **Validation of the extension of the SIR and definition of 11 radionuclides to open the ESIR K5 comparison in 2024.**
- **Metrological scheme established for the RMO copies of the SIRTI to increase the number of short-lived radionuclides comparisons.**

## Support CCRI & member states

- **10 bilateral comparisons, 17 comparison reports, 40 calibrations**
- **5 webinars, 3 workshops, 14 CCRI& WG/TG meetings**
- **Creation of the CCRI Digital Transformation TG (chaired by IR Dept)**

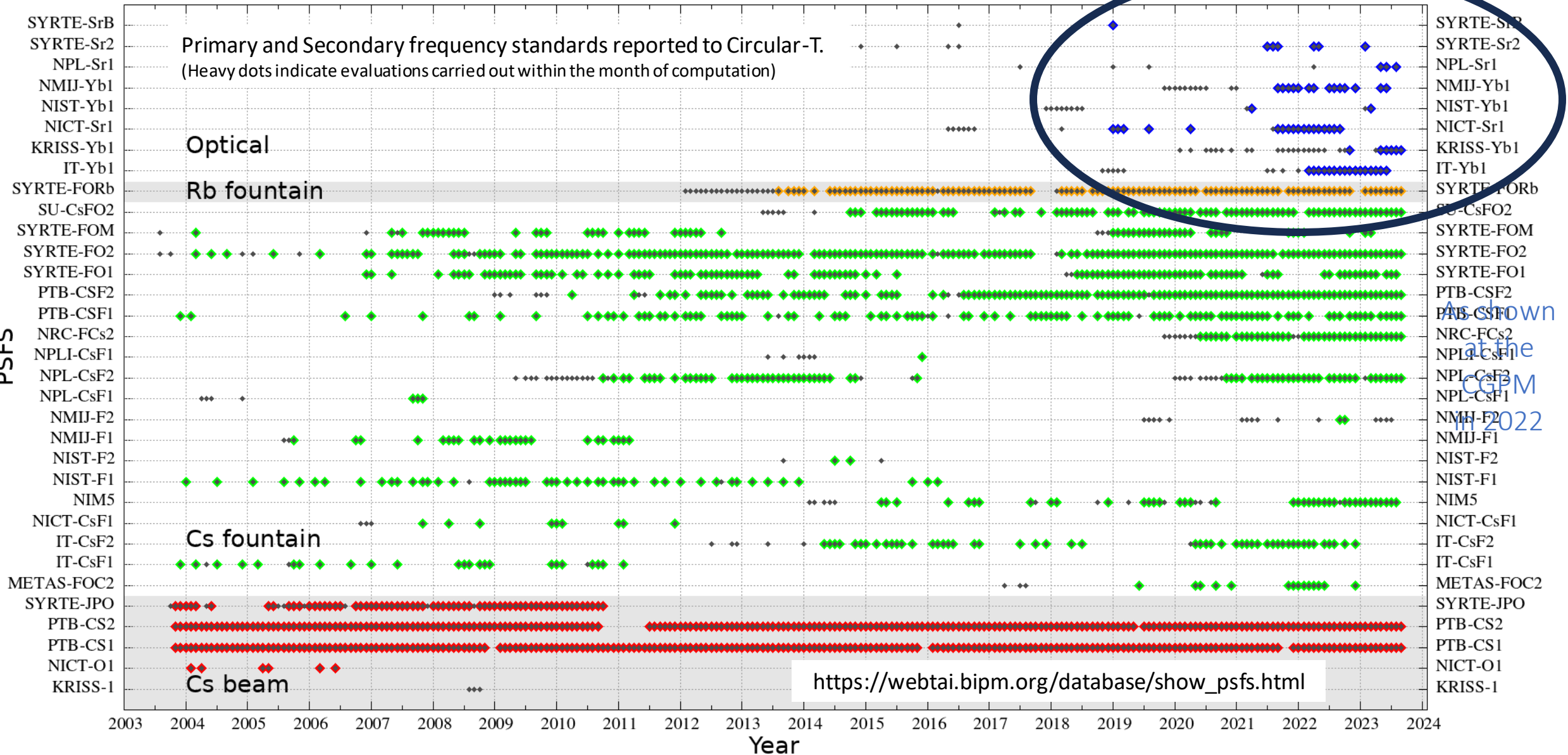


# Highlights - increasing participation by optical clocks in UTC



As shown  
at the  
CGPM  
in 2022

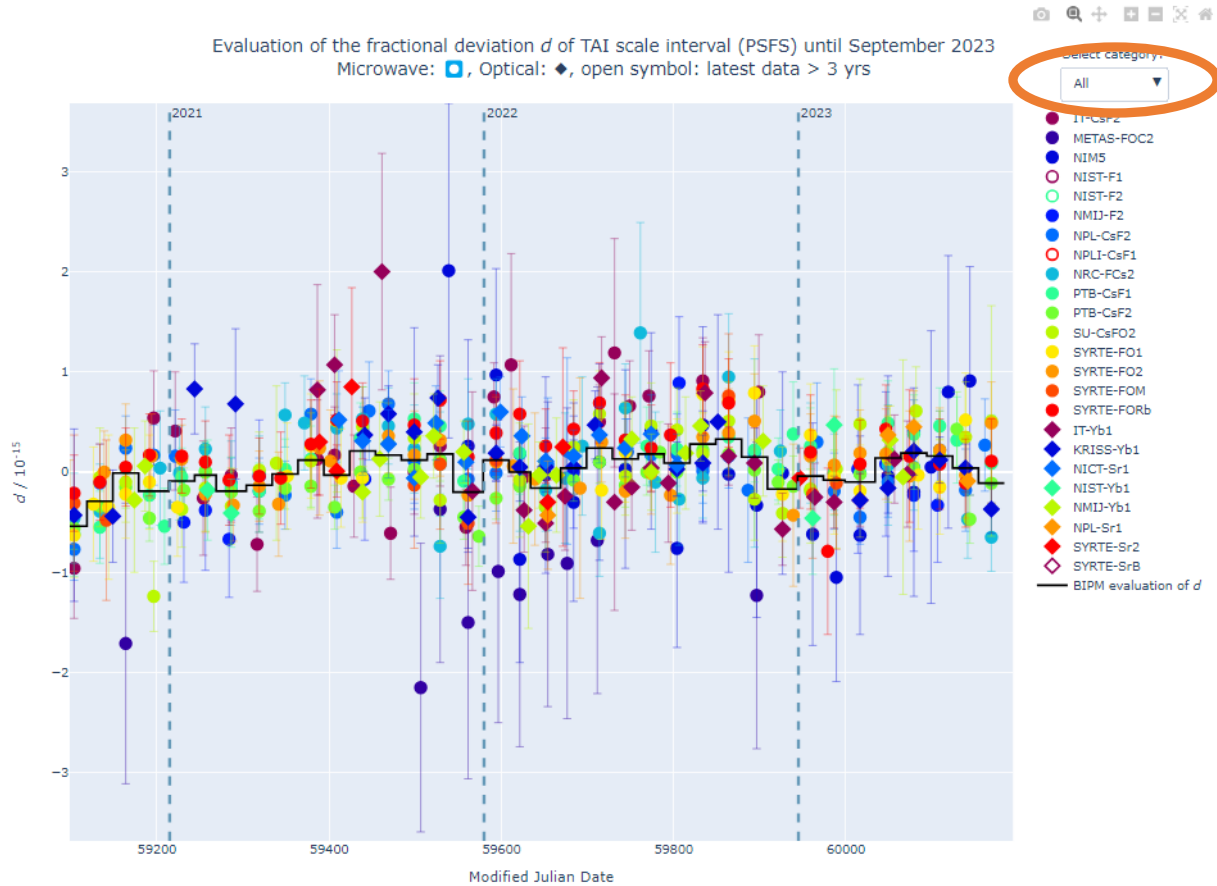
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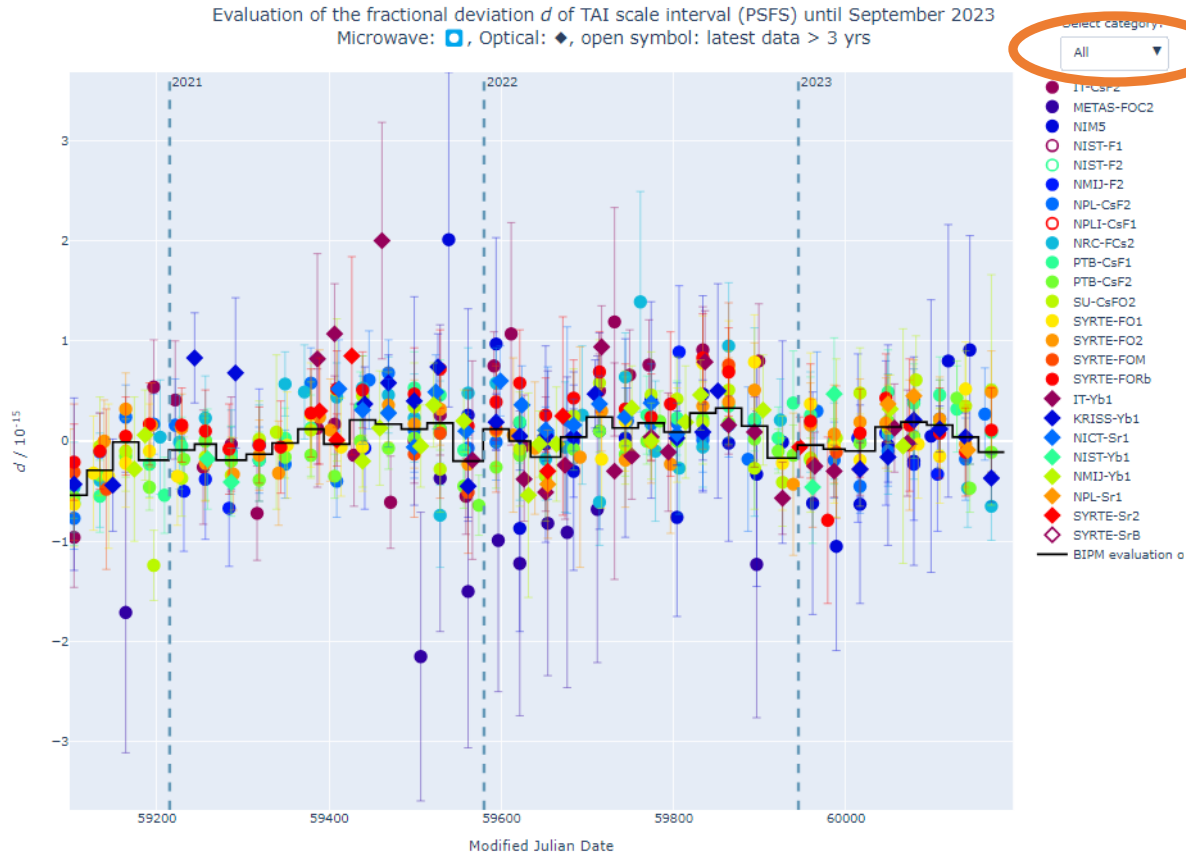
Fractional deviation  $d$  of TAI scale interval (PSFS)



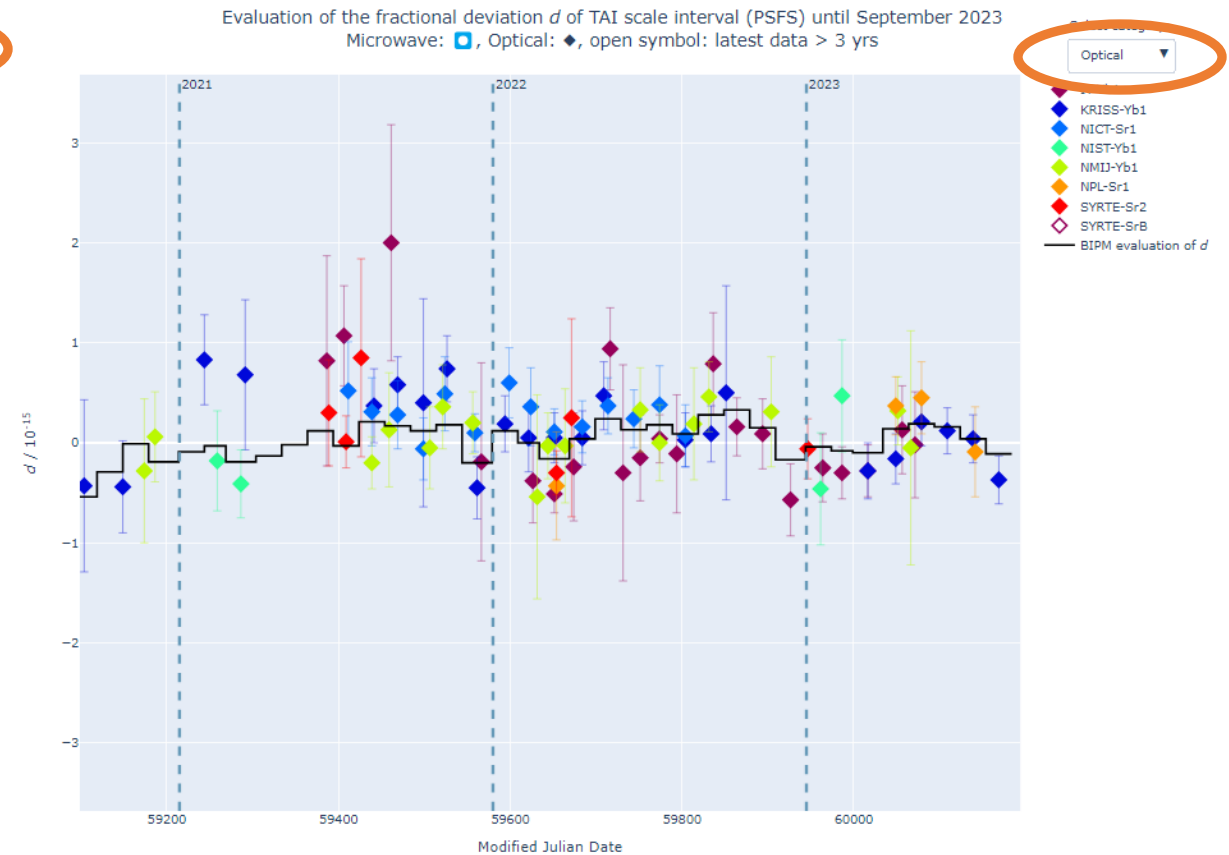
Interactive plot in collaboration with secondee Nelida Diaz (CENAM)

# Highlights - increasing participation by optical clocks in UTC

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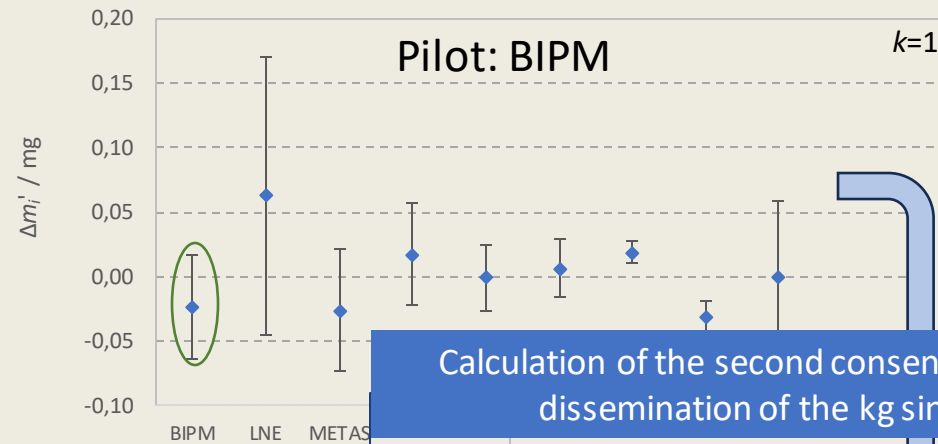
Fractional deviation  $d$  of TAI scale interval (PSFS)



# Laboratory highlights – Physical metrology

## Completion of the second key comparison of kilogram realizations

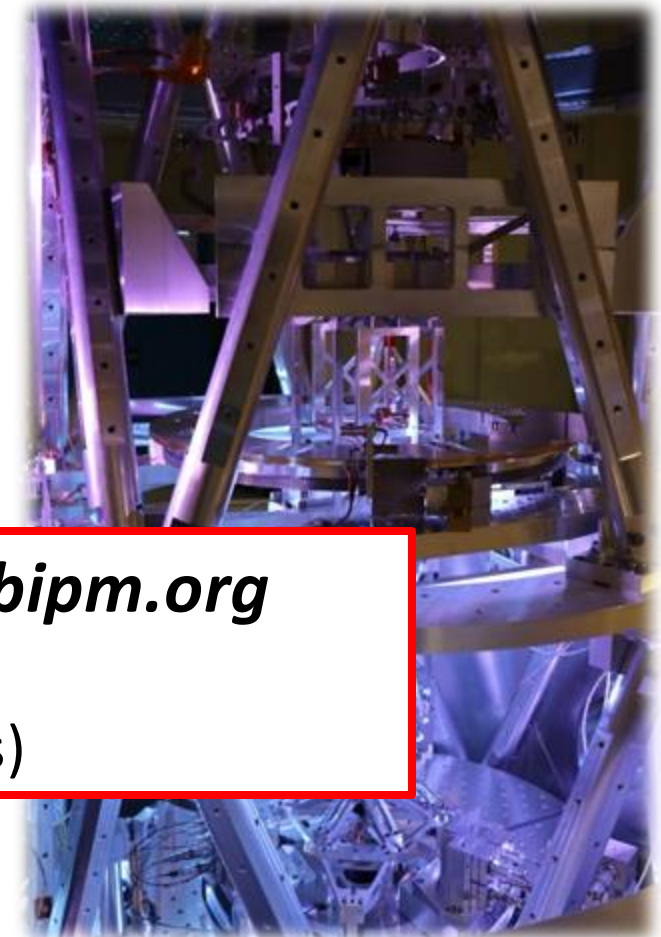
Realization of the kg using the Kibble balance and XRCD methods



Roadmap addressing the lack of agreement under development by CCM

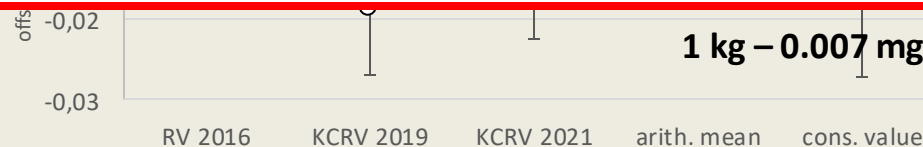
Calculation of the second consensus value – basis for the dissemination of the kg since 1 March 2023

BIPM Kibble balance participated with an uncertainty of  $41 \mu\text{g}$



### New e-learning courses on [e-learning.bipm.org](http://e-learning.bipm.org)

- Realization of the kilogram (53 users)
- Dissemination of the kilogram (73 users)



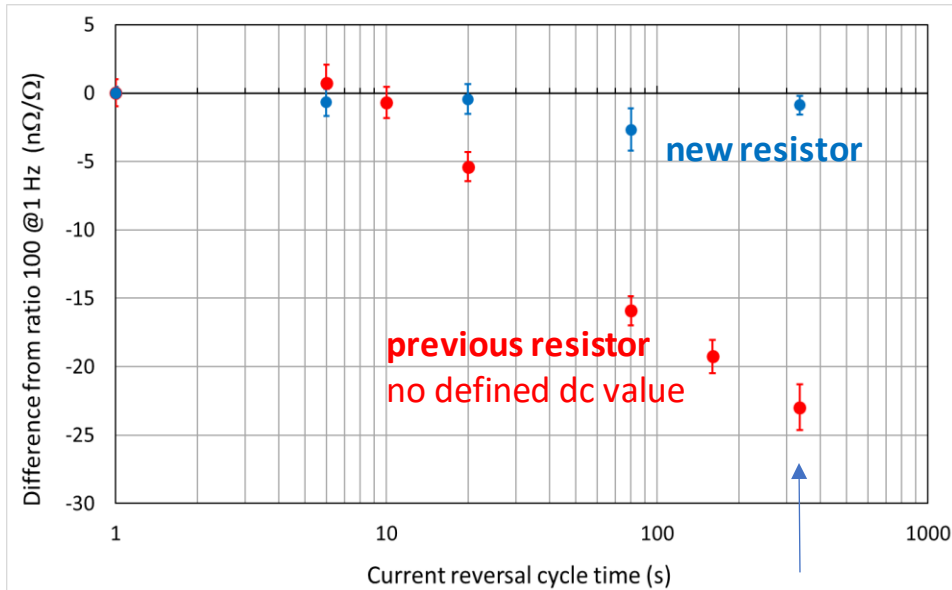
# Laboratory highlights – Physical metrology

Upgrading on-site comparisons of quantum standards for voltage and resistance

Improved 1  $\Omega$  standard resistors for comparison of quantum Hall resistance standards (BIPM.EM-K12)

(Present limitation: low-frequency dependence of 1  $\Omega$  resistors: dc value not well defined)

Collaboration with PTB and NMIJ on development and characterization of new resistors



3 mHz, frequency of BIPM measurement

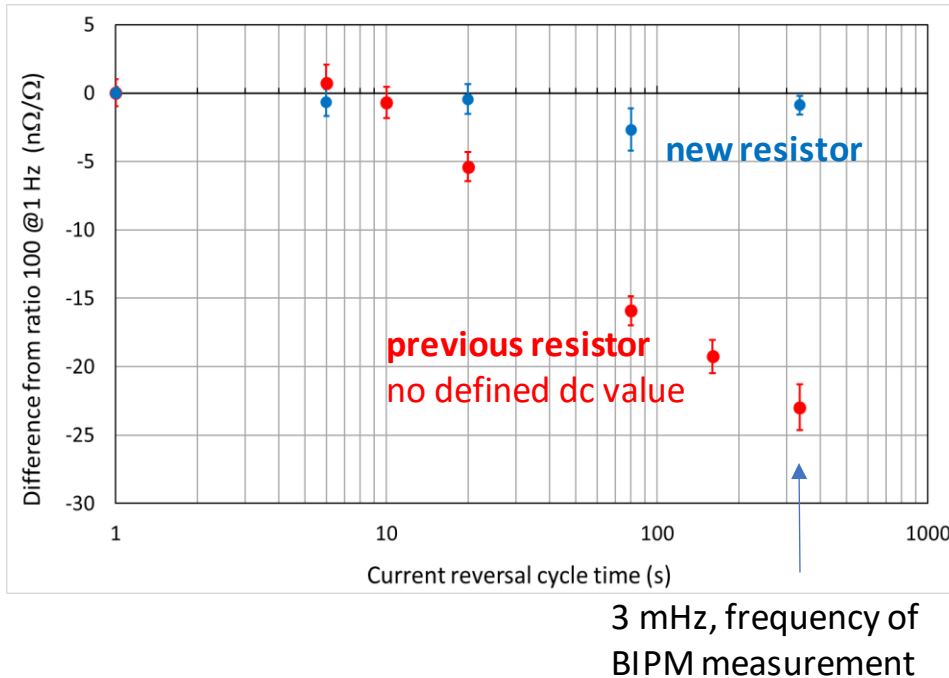
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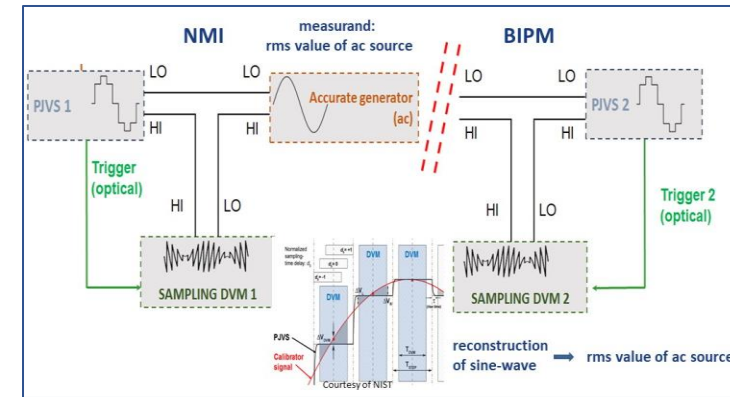
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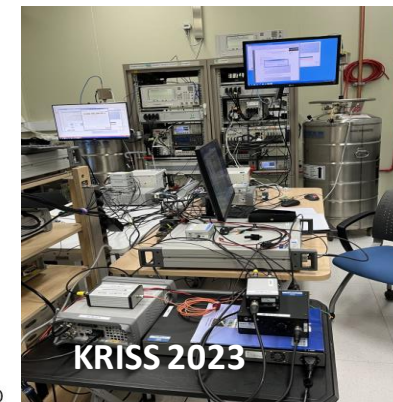
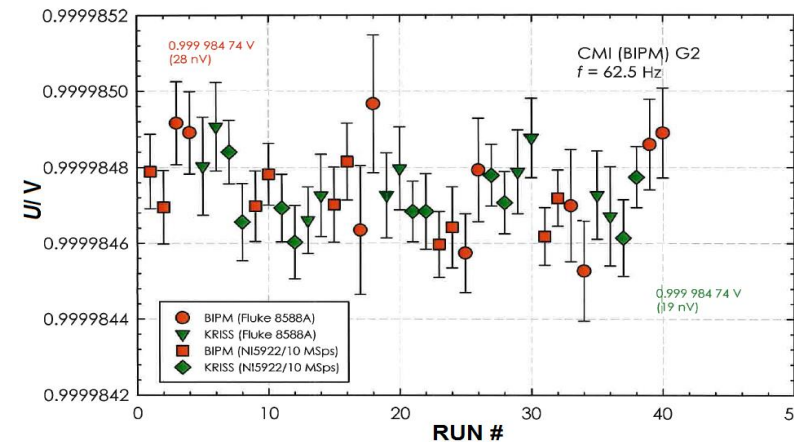
Collaboration with PTB and NMIJ on development and characterization of new resistors



New comparison scheme for AC voltage with voltage quantum standard BIPM.EM-K10



Successful pilot study at KRIS 08/2023



At 62.5 Hz:  $U(\text{KRIS}) - U(\text{BIPM}) = 5\ \text{nV}$

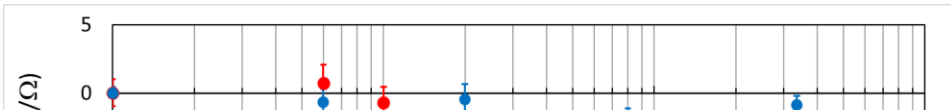
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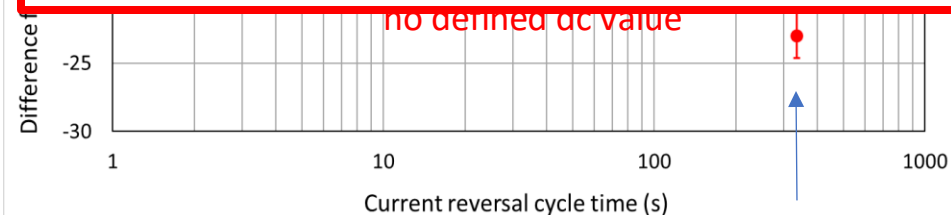
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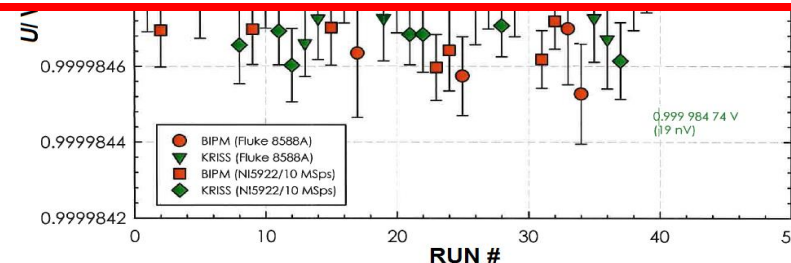
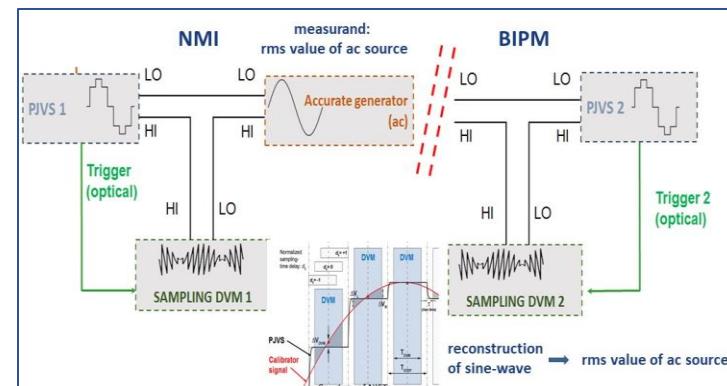
### Recent survey of NMI requirements

- 24 more NMIs interested in on-site comparison of JVs (dc and/or ac)
- 15 more NMIs interested in on-site comparison of QHR standards

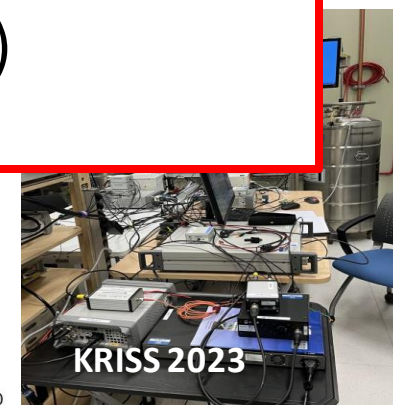


3 mHz, frequency of BIPM measurement

New comparison scheme for AC voltage with voltage quantum standard BIPM.EM-K10



At 62.5 Hz:  $U(\text{KRIS}) - U(\text{BIPM}) = 5\ \text{nV}$



# Communication and liaison with International Organizations

Promoting metrology to external communities

## METROLOGY FOR CLIMATE ACTION

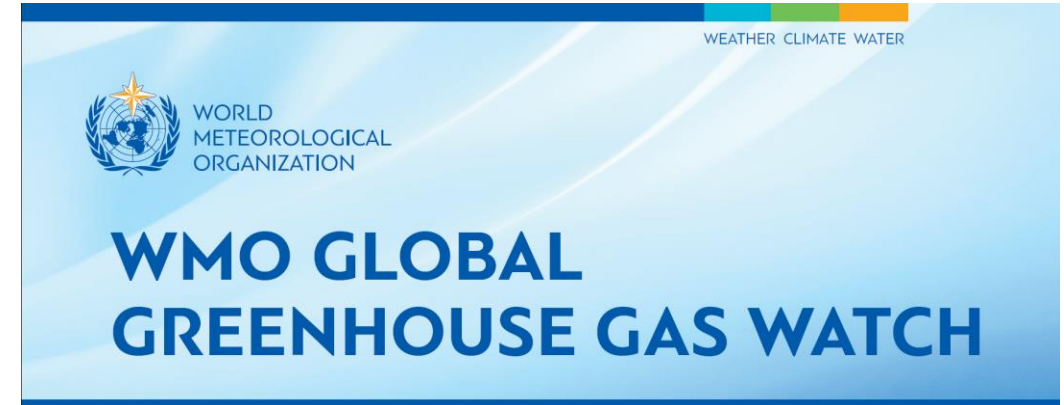


- 203 prerecorded presentations/posters
- 1078 participants

### Report Published in June 2023

- 81 technical issues identified
- 126 recommendations to address these
- CIPM STG-CENV coordinating

## BIPM/NMIs contribution to Session on Standard needs for an Operational Global Network



- Opens opportunity to progress workshop theme on 'Metrology as an integral component of operational systems to estimate greenhouse gas emissions based on accurate measurements and analyses'
- Requirements identified for NMI Greenhouse Gas Standards for newly developing monitoring networks

# Communication and liaison with International Organizations

Promoting metrology to external communities

## Climate Change

**BIPM an official observer to UNFCCC  
at COP28 in November 2023**



Fact-finding mission, maybe opportunity to participate in side events!

## Digitalization

**Joint Statement of Intent on the SI  
Digital Framework**



**Promoting metrology for solving global challenges in line with the CIPM strategy!**



# Communication and liaison with International Organizations

Promoting metrology to external communities



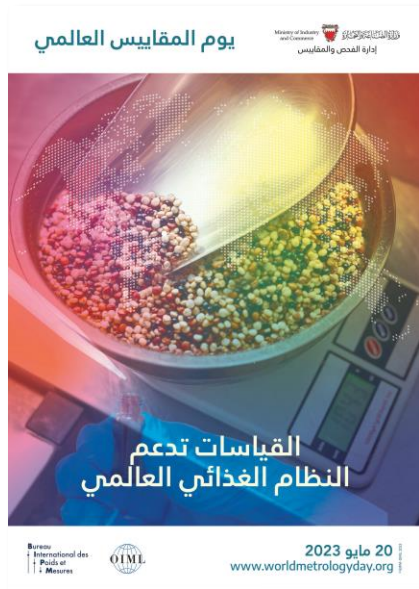
## World Metrology Day – 20<sup>th</sup> May 2023

- The theme related to the food production system
- Poster designed by the Instituto Nacional de Tecnología Industrial (INTI), Argentina (in association with SIM)
- *Translations into 62 local poster versions*
- Events listed in 66 countries

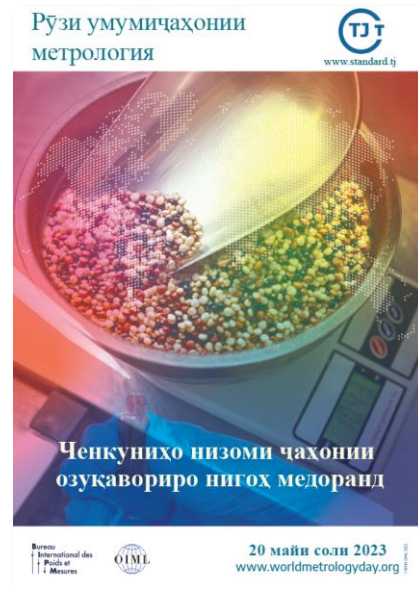
## UNESCO recognition of World Metrology Day

- On 13 October 2022 the UNESCO Executive Board took a key step towards recognizing World Metrology Day as a UNESCO event.
- Proposal formally presented by Kazakhstan and supported by the BIPM and OIML.
- Written support from 43 UNESCO Member States.
- We strongly expect formal recognition in 2024 at the UNESCO General Conference.

# World Metrology Day 2023



Bahrain



Tajikistan



Nigeria



Haiti

Examples of non-members participating in World Metrology Day 2023

# Liaison with the International Telecommunications Union

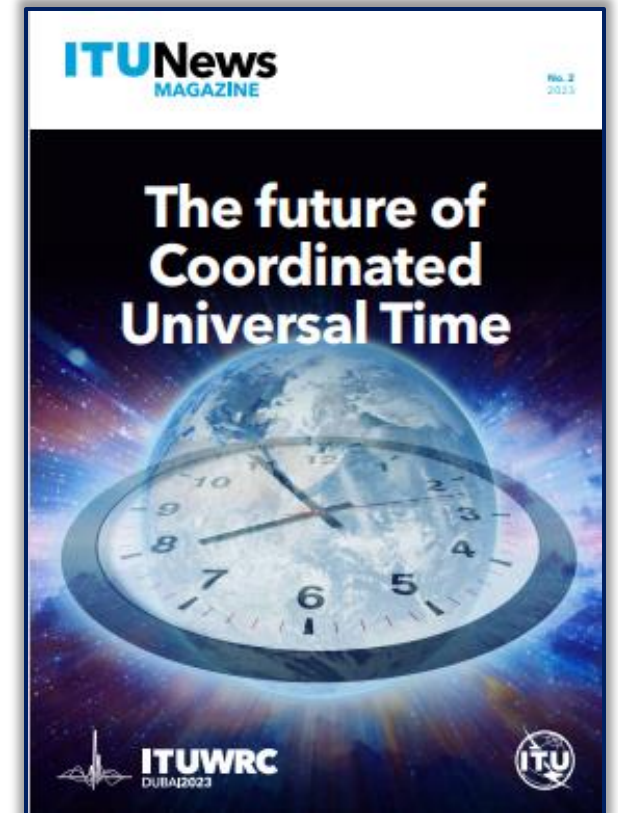
## Steps taken with ITU towards continuous UTC.

In 2020 an MoU was signed between ITU-R and BIPM –

- ITU-R Director and delegates participated to the CGPM 2022
- BIPM collaborated with ITU-R to organize a special session at the 2nd ITU Inter-regional workshop on Definition of time scale and dissemination of time signals via radiocommunication systems (Res. 655 (WRC-15)) in Nov 2022
- BIPM collaborated with ITU-R to produce a special issue of ITU News on The future of Coordinated Universal Time (April 2023)
- BIPM hosted a meeting of the ITU-R WP7A dealing with time signals and frequency standard emissions, in June 2023
- Networking continues with national and regional ITU delegations to explain Res 4 (CGPM 2022) and the upcoming discussion and the ITU World Radio Conference in Nov 2023

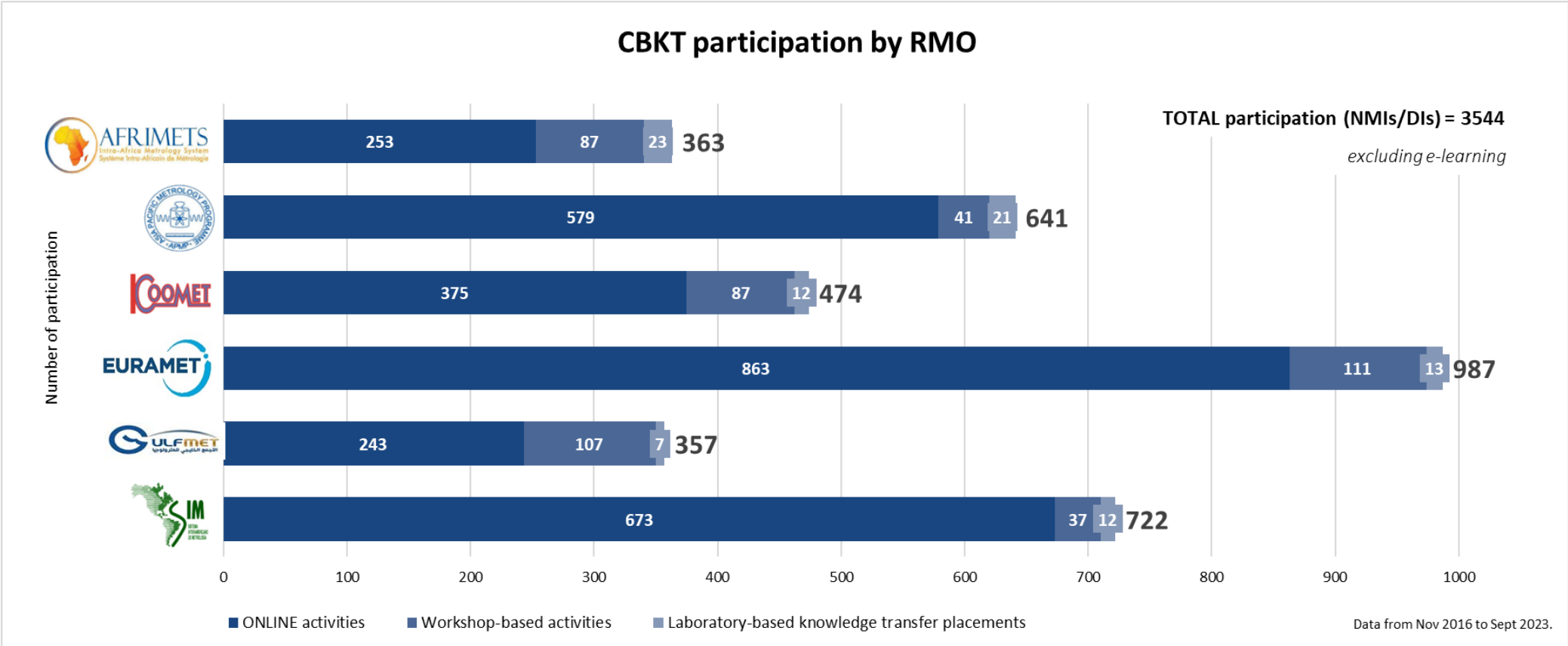
## Liaison with IERS

- Need of robust services disseminating UT1-UTC



# Capacity Building and Knowledge Transfer

Collaboration with all six RMOs



**Thanks for support from:**

- METAS, Switzerland
- NMISA, South Africa
- SCL, Hong Kong, China
- Plus
- NIM, China
- NPL, United Kingdom
- TÜBITAK UME, Türkiye
- All the RMOs
- NIST, USA
- PTB, Germany
- IEEE, USA

# BIPM/RMO forum - supporting the RMO Secretariats



## 21 Participants from 6 RMOs

*RMO Secretariats and those who assist the RMO in various interactions with the BIPM.*

**27 to 29 September 2023**

**Day 1:** *Participation in BIPM activities*

**Day 2:** *Gaining familiarity with the BIPM website, KCDB, CBKT and communication tools*

**Day 3:** *Emerging interactions*

**RMO Toolbox indexing:**

- *Membership*
- *CIPM MRA*
- *Communications*
- *CBKT*
- *Digital Transformation*

# e-Learning



<https://e-learning.bipm.org/>

A “training platform” operated by the BIPM, able to host BIPM and RMO e-learning material

- 950 users in the platform
- 5 RMOs have joined the initiative: APMP, COOMET, EURAMET, GULFMET, SIM
- 19 courses from BIPM and participating RMOs are available today
- Self-registration system
- Accessible around the clock and on any device

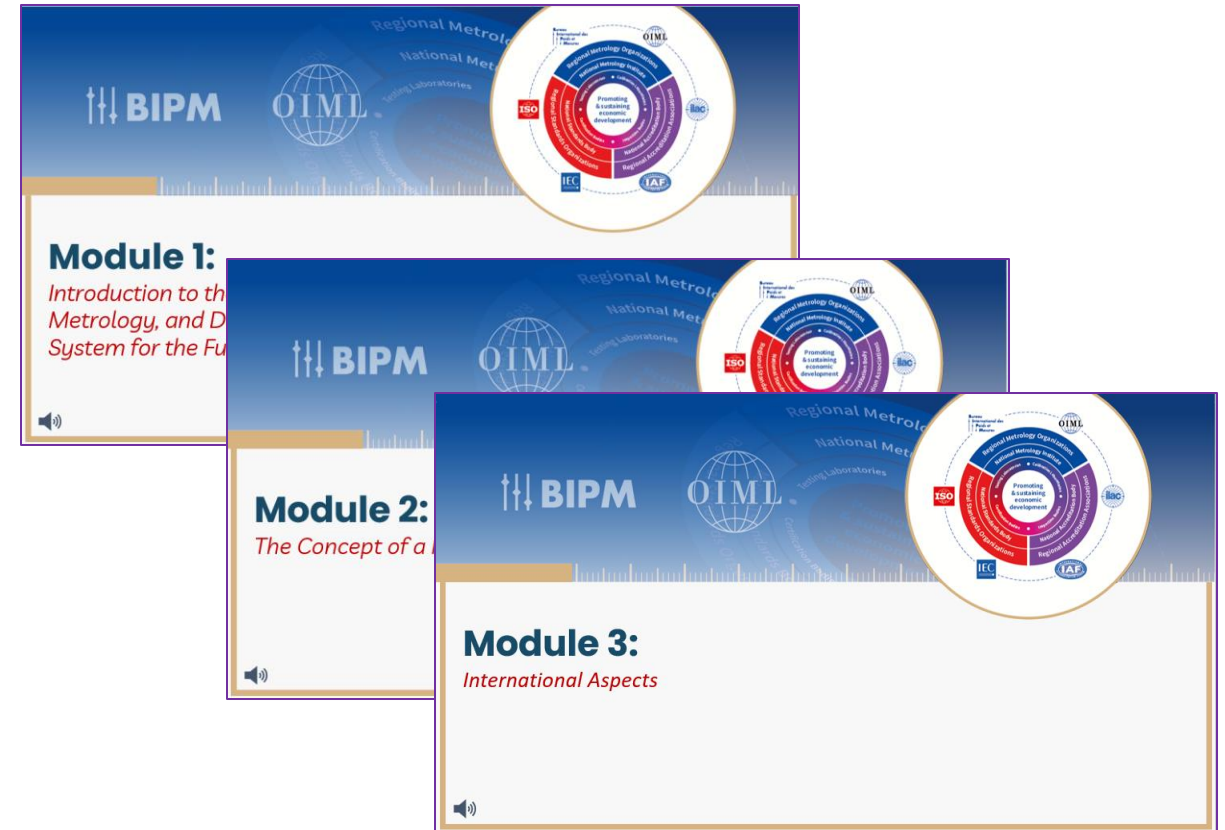
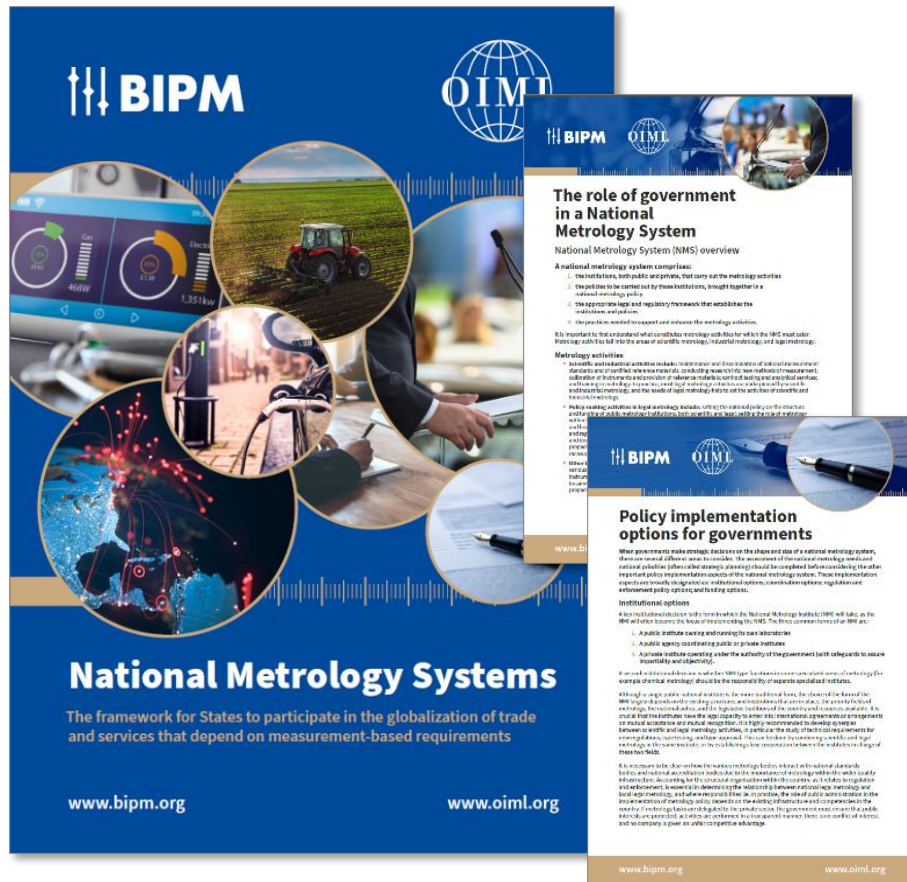
A screenshot of the e-learning.bipm.org website. The top navigation bar includes the CBKT logo, links for HOME, COURSE CATALOGUE, ABOUT US, and YOUTUBE, and a Log in button. Below the navigation is a large banner image of a group of people holding a blue banner with the CBKT logo and text: "...aims to provide online assistance to the NMI community to strengthen their capabilities, including their involvement in the CIPM MRA mechanisms". Below the banner are five navigation buttons: "About the CBKT", "KCDB help page", "What is New?", "BIPM YouTube", and "OIML e\_Learning". The main content area features six course categories, each with a logo and a button: "BIPM COURSES" (Bureau International des Poids et Mesures), "APMP COURSES" (APMP logo), "COOMET COURSES" (COOMET logo), "EURAMET COURSES" (EURAMET logo), "GULFMET COURSES" (GULFMET logo), and "SIM COURSES" (SIM logo).

# Joint BIPM/OIML publication D-01

## joint knowledge transfer initiative - National Metrology Systems

Brochure – in 3 languages

e-learning courses



“National metrology systems - Developing the institutional and legislative framework” (OIML D 1:2020)

# International liaison and Communication Department



**Dr Anna CYPIONKA**  
Director

## Institutional liaison and membership



**Ms Rahima GULIYEVA**  
Institutional liaison and membership  
*Principal Liaison Officer*

## Digital transformation



**Dr Janet R. MILES**  
Head of digital transformation  
*Principal Liaison Officer*

## Communications



**Dr Dana VLAD**  
Head of Communications  
*Principal Communications Officer*



**Mr Robert SITTON**  
Publications  
*Senior Communications Officer*



**Ms Céline PLANCHE**  
Web and translation  
*Senior Communications Officer*

## CIPM MRA and CBKT



**Mr Chingis KUANBAYEV**  
Head of CBKT and CIPM MRA support  
*Principal Liaison Officer*



**Dr Stephanie MANIGUET**  
KCDB coordination (and JCTLM for Chemistry)  
*Senior Liaison Officer*



**Mr Ibrahim AHMED**  
JCRB Executive Secretary  
*Secondee (KEBS)*



**Mr Kangyoung SUNG**  
Strategy Development and Capacity Building  
*Secondee (KRISS)*



# Meetings and local outreach

## Meetings 2023 (to date)

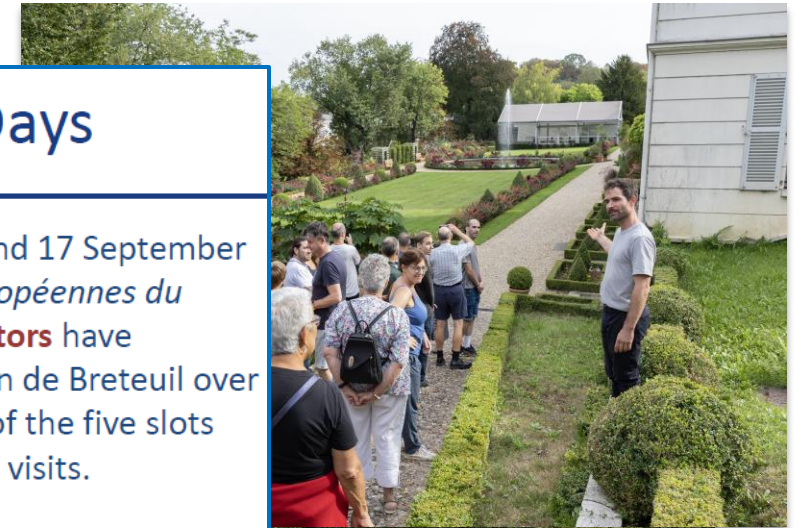
- 70 on-line meetings
- 37 hybrid meetings
- 5204 participations
- 8512 person-days



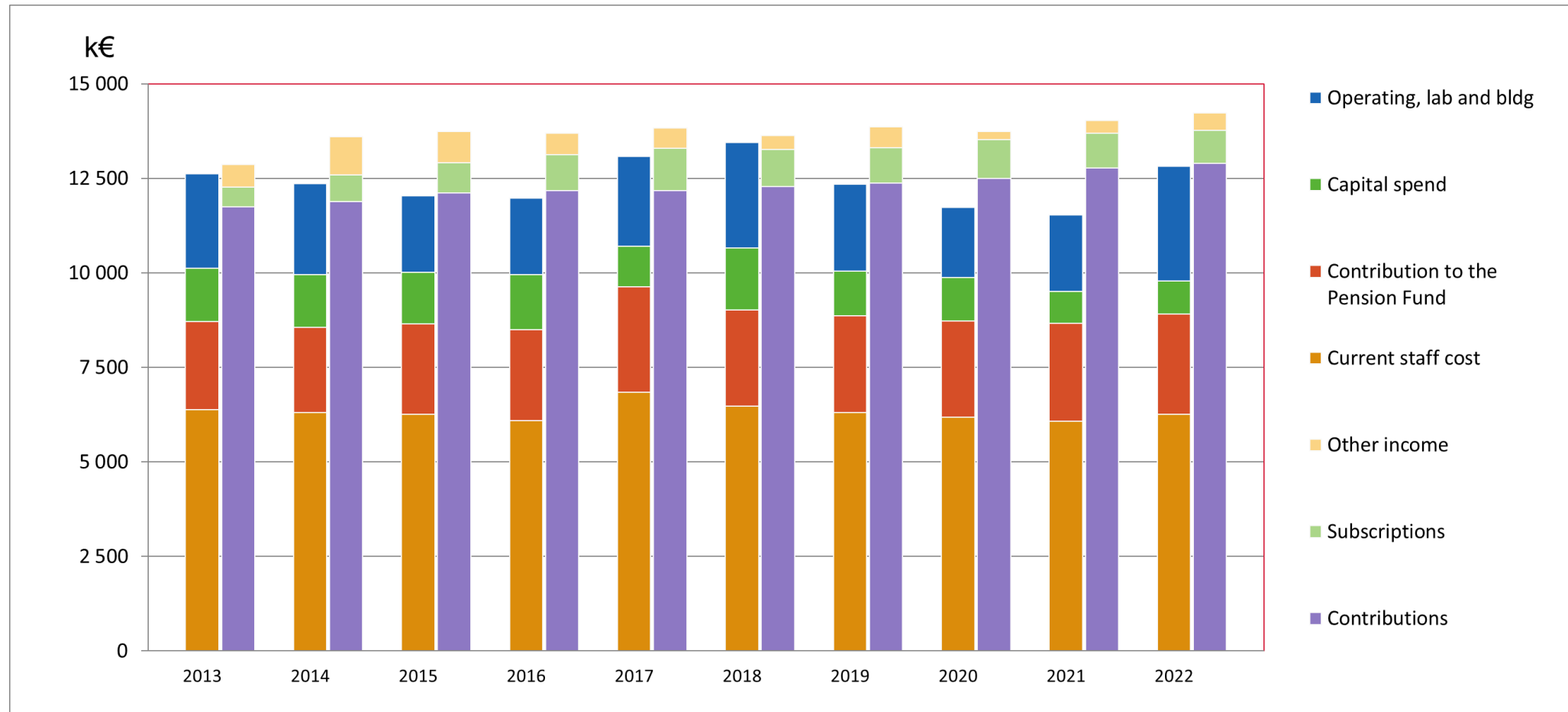
## Heritage Days

BIPM opened on 16 and 17 September for the « *Journées européennes du patrimoine* ». **423 visitors** have discovered the Pavillon de Breteuil over the week-end in one of the five slots offered for the guided visits.

Since 2020, **around 1500 visitors** have visited the BIPM on this occasion.



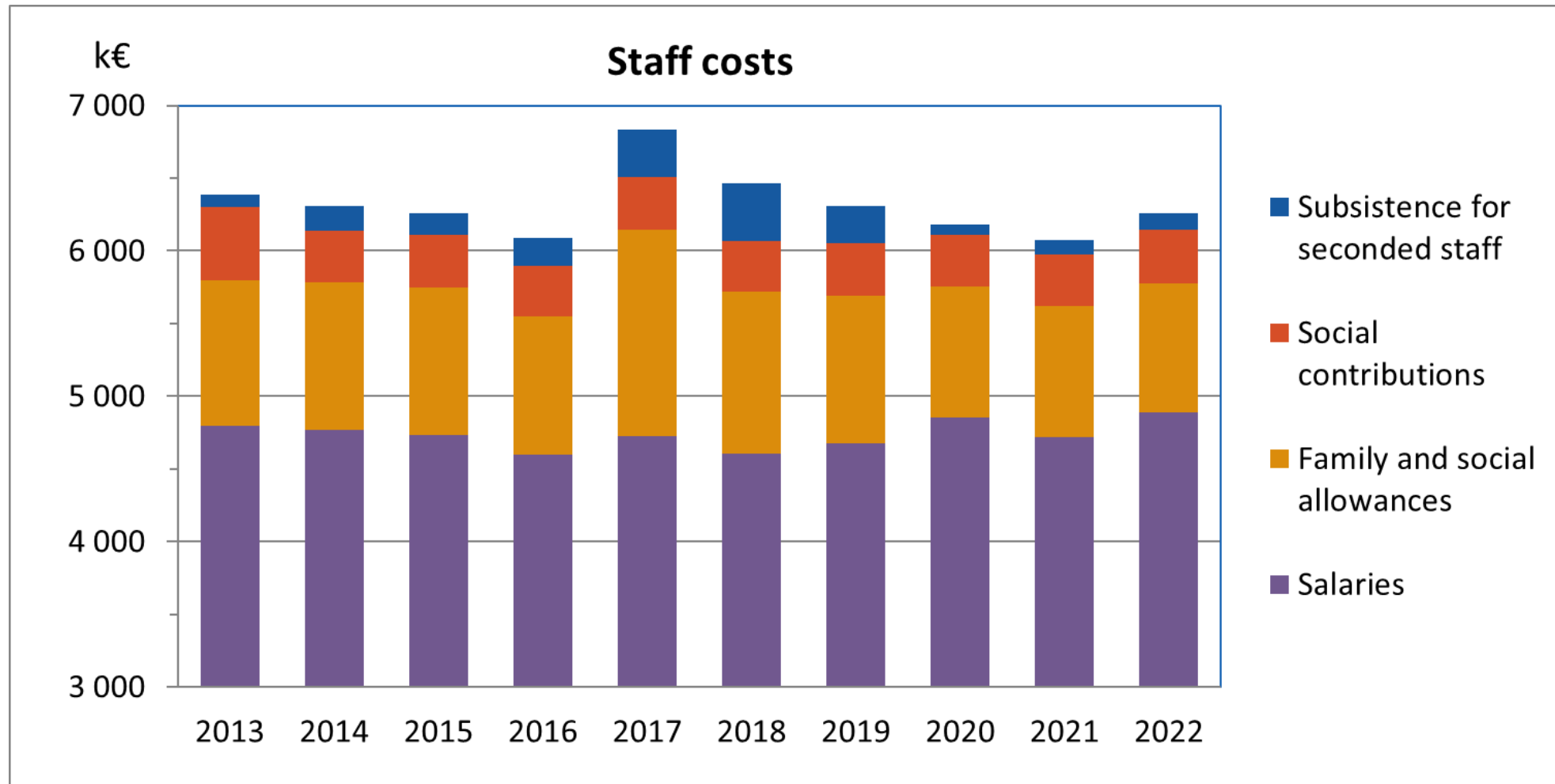
# Revenue versus expense (“budget basis”)



Revenue – increase - (due to small increase in contributions and sale of prototypes)

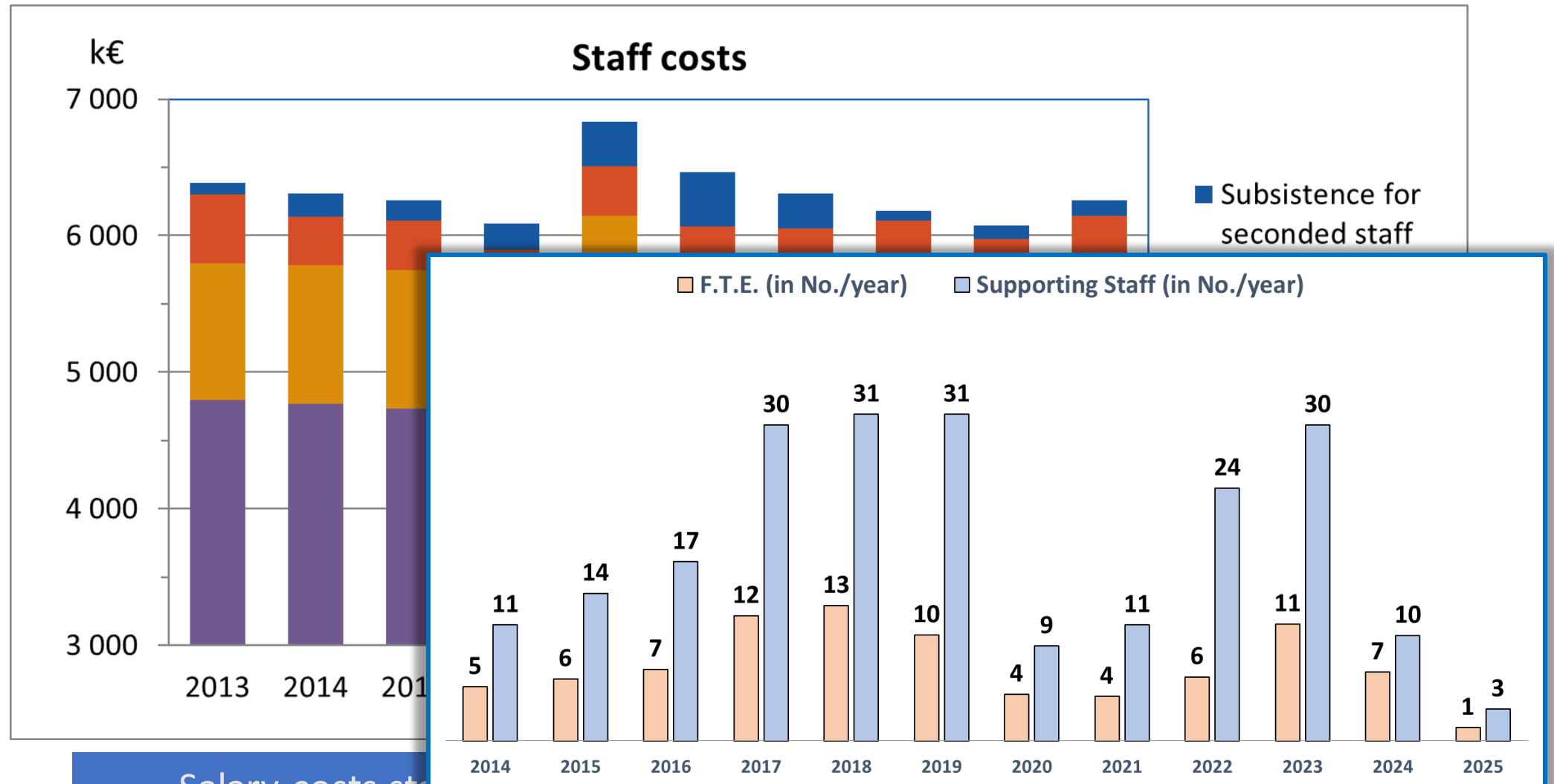
Expense – increase - (due to CGPM, Associate subs write off, electricity)

# Expenditure .... staff



Salary costs stable in real terms (and only 1.9% above 2013 level).  
Secondments re-building since pandemic.

# Expenditure .... staff



Salary costs stable in real terms (and only 1.5% above 2015 level).  
 Secondments re-building since pandemic.

# Young metrologists' 2050+ vision

Where do “young metrologists” think metrology will be in 2050+?

- **To complement the CIPM Strategy 2030+ with visionary ideas in collaboration with young metrologists from the RMOs**
  - RMO Coordinators nominated
  - Online questionnaire launched
  - Six RMO virtual workshops are planned (*end of 2023-June 2024*)
  - Consolidation workshop (in-person) with RMO Coordinators at BIPM HQ

Online questionnaire

<https://www.bipm.org/en/committees/cb/cbkt/ym-2050>



Mr Chingis KUANBAYEV  
Head of CBKT and CIPM  
MRA support



Mr Kangyoung SUNG  
Strategy Development and  
Capacity Building  
Secondee (KRISS)

**YOUNG METROLOGISTS' 2050+ VISION** **THEME 1 Q1**

**Question 1**

**Can you foresee technological or socioeconomic changes for your user community that will impact the needed metrological services?**

During the course of history, new technological advancements have shaped the world in multiple ways affecting economic, societal and industrial aspects on a global scale. Metrology has been involved in most of these areas to ensure specific needs, which have evolved with new technologies, challenges and social changes. Thus, the adaptation of metrology to these changes was necessary. This specific question is intended to envisage a new technology or change in the societal and economic order that would bring a noticeable change in the currently adopted metrological methods, procedures and work habits. A typical example from the past would be the introduction of interoperability in manufacturing or semiconductor technology that impacted all of the above-mentioned fields of society and industry. This has led to a shift from analogue measurements to digital measurements, which has increased the precision, reliability and range of measurements. It has also dramatically changed how measured data are stored and processed (from paper to digital files).

Are you able to identify possibilities ranging from incremental to fundamental changes in technology, socioeconomic changes or emerging needs, which can affect the entire demand side for the measurement system or infrastructure as it now exists?

[www.bipm.org](http://www.bipm.org)

# Young metrologists' 2050+ vision

## RMO coordinators

**AFRIMETS**



*Alphonsus KIPKEMBOI  
(Kenya)*

**AFRIMETS**



*Pritesh JIVAN  
(South Africa)*

**APMP**



*Oijai ONGRAI  
(Thailand)*

**APMP**



*Yin Hsien FUNG  
(New Zealand)*

**COOMET**



*Nikita ZVIAGIN  
(Russian Federation)*

**COOMET**



*Gulaikhan SUYEUBAYEVA  
(Kazakhstan)*

**EURAMET**



*Peter PAVLASEK  
(Slovakia)*

**GULFMET**



*Rayan ALYOUSEFI  
(Saudi Arabia)*

**GULFMET**



*Moza Khalfan  
ALMEMARI (UAE)*

**SIM**



*Rodrigo COSTA-FELIX  
(Brazil)*

**SIM**



*Fernando José Andrés  
MONGE (Costa Rica)*

## Annual Review 2022/2023



[www.bipm.org](http://www.bipm.org)

COMITÉ INTERNATIONAL DES POIDS ET MESURES

## RAPPORT FINANCIER

2022

RAPPORT ANNUEL AUX  
GOUVERNEMENTS DES HAUTES PARTIES CONTRACTANTES  
SUR LA SITUATION ADMINISTRATIVE ET FINANCIERE  
DU BUREAU INTERNATIONAL DES POIDS ET MESURES



## Annual Review: Supplement Activities of the BIPM Departments

1 January 2022 – 31 December 2022

# “thank you”

