

Open letter concerning the growing importance of metrology and the benefits of participation in the Metre Convention, notably the CIPM MRA

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The growing importance of metrology

The impetus of facilitating world trade and the associated need to eliminate technical barriers to trade is leading to a greater awareness worldwide of the role that measurement plays in underpinning activities in all areas of science and technology. It is now recognized that metrology provides a fundamental basis not only for the physical sciences and engineering, but also for chemistry, the biological sciences and related areas such as the environment, medicine, agriculture and food. Various high-level studies demonstrate the impact of measurement to society; most recently, the report *Evolving Needs for Metrology in Trade, Industry and Society and the Role of the BIPM* highlights current drivers and strategies to address the worldwide need for reliable measurement (see also references therein).

In this letter I draw your attention to the importance of participation in the activities carried out under the [Metre Convention](#) as a means of assuring national measurement capability in a global environment. In particular, I refer to the Mutual Recognition Arrangement (MRA) drawn up by the International Committee for Weights and Measures ([CIPM](#)).

The CIPM MRA

It is now over three years since October 1999 when the CIPM MRA between NMIs was formally established. This MRA¹ provides for international mutual recognition of national measurement standards and calibration and measurement certificates issued by signatory NMIs. Signature of the CIPM MRA is open only to Directors of the NMIs of Member States of the Metre Convention or Associate States or Economies of the CGPM. In August 2003, I can report that [signatories to the CIPM MRA](#) comprise the Directors of NMIs of forty-three Member States of the Metre Convention, two International Organizations, and ten States or Economies that have become Associates of the CGPM. Only a small number of these participants are from small and developing countries.

Objectives of the CIPM MRA

The objectives of the CIPM MRA are to provide governments and other parties with a secure technical foundation for wider agreements related to international trade, commerce and regulatory affairs. Thus it is intended to help eliminate technical barriers to trade (TBTs) for governments entering into international agreements involving trade of products and services.² An [economic analysis](#) of the benefits of the MRA, commissioned by the International Bureau of Weights and Measures (BIPM) and undertaken by KPMG Consulting, found that a conservative estimate of the impact of the CIPM MRA in reducing TBTs is likely to be very large; a sum of at least US\$4 billion was mentioned. The significance that Signatories attach to their participation can be appreciated by noting that around 89 % of world trade in merchandise exports is between MRA participant nations.³ As a tool in the reduction of TBTs, the CIPM MRA is already being referenced in intergovernmental trade agreements. The Joint US-EC Declaration on Cooperation in Metrology in Support of Trade sets out the steps required to reduce unnecessary duplicative measurements, including recognition of the measurement capabilities of NMIs that are signatories to the CIPM MRA and the establishment of the equivalence of national measurement standards based on the CIPM

¹ The CIPM MRA complements the MRA of the International Laboratory Accreditation Cooperation (ILAC), by providing the basis for international recognition of national measurement standards that are themselves the basis of traceability to the International System of Units (SI).

² The mechanisms by which this is achieved are outlined in the Appendix attached to this letter.

³ Based on figures from the *World Trade Organization 2001 International Trade Statistics*.

MRA. This Declaration is likely to be extended to cover trade between the EC and other countries.

Participation in the CIPM MRA

Participation in the CIPM MRA is a critical asset for all countries, large or small, seeking to demonstrate their technological capabilities in the international trade arena, particularly with its increasing applicability in underpinning measurements in areas such as the environment, agriculture and medicine.⁴ There is no doubt that more and more regulatory, governmental and intergovernmental bodies will look to the CIPM MRA as a source of technical support for trade, regulation and the demonstration of compliance with a range of formal requirements. These and other users will look for relevant data in the BIPM Key Comparison Database (KCDB)⁵ in respect of a given country and this will very likely become the only internationally accepted reference for the acceptability of calibration and measurement certificates. Participation is, therefore, increasingly necessary if countries want to support international policies on the reduction of TBTs and if they need to demonstrate their metrological competence and credibility to this growing number of formal and official users. Participation also provides countries with a voice in international discussions and ensures they are kept abreast of relevant international trends, benefits that translate to support for and facilitation of technology transfer within the domestic environment.

The creation of the category of “Associate” States/Economies of the CGPM at the time of the MRA’s establishment, with a much lower annual payment than that for Signatories to the Metre Convention, was specifically intended to assist this participation in the MRA by smaller States or developing countries through their Regional Metrology Organizations (RMOs). (In 2003, for example, the minimum annual subscription to be an Associate of the CGPM is approximately US\$4,700.⁶) In this respect, one of the outcomes from a proposed new joint collaboration involving the BIPM and bringing together all specialist organizations that operate at a global level and that are active in promoting MAS (metrology, accreditation and standardization) as a tool for sustainable economic development, is to provide an international framework to help developing countries prepare for participation in, and thereby access the benefits from, international arrangements such as the CIPM MRA. The intention of this joint collaboration, among other things, is to help meet the requirements for effective implementation of agreements negotiated by the World Trade Organization (WTO).

⁴ Chemistry is now a key area of activity in world metrology, coordinated by the CIPM’s Consultative Committee on Amount of Substance – Metrology in Chemistry (CCQM). The CCQM has been active in organizing international comparisons (notably key comparisons and pilot studies) of measurement capabilities related to chemical and biological quantities that have a high impact on quality of life (e.g., contaminants in food [such as pesticide residues and arsenic] and measurements related to health [including cholesterol and glucose] and the environment [e.g., atmospheric pollutants]). As a consequence, the benefits of the CIPM MRA and BIPM key comparison database (KCDB) are extending to the areas of environment, food, agriculture, medical and biotechnology measurements. Stronger links are being developed between the BIPM/CIPM and bodies such as the World Meteorological Organization (WMO), the World Health Organization (WHO) and the International Federation for Clinical Chemistry and Laboratory Medicine (IFCC). A Joint Committee on Traceability in Laboratory Medicine, the JCTLM, has now been established with the principal promoters being the BIPM, the IFCC, the ILAC and the WHO. Committee members include regulatory bodies (such as the US Federal Drug Administration, the FDA) the Enterprise Directorate-General of the European Commission, and industry associations.

⁵ The KCDB provides the technical data on which mutual recognition through the CIPM MRA is based.

⁶ “The annual subscription of each Associate State or Economy will be determined from its UN contribution, as for Member States but with a minimum equal to 0.05 % of the annual dotation of the BIPM” (Resolution 3, 21st CGPM, October 1999). Individual subscription levels are available on application from the BIPM.

Benefits of participation in the CIPM MRA

A recognized metrological competence is increasingly important not only in export matters but also in the verification that imported goods meet national and international standards and regulations. For developing nations the latter can have a significant impact on the quality of life of a population that often is critically dependent on imports of pharmaceutical as well as consumer and other manufactured products. Benefits of participation in the CIPM MRA identified by NMI Directors interviewed for the KPMG study include the networking, access and recognition it promotes between the NMIs of developing and developed countries.

With metrology underpinning all aspects of science and technology, the CIPM MRA plays a critical role in laying a sound foundation for recognition of each nation's technical infrastructure. In addition to metrology, this encompasses its legal system of measurement, its laboratory accreditation and conformity assessment schemes, as well as its documentary standards activities. The data provided in the MRA's KCDB form the most comprehensive, internationally recognized and credible information resource of the technical competence of participating nations to undertake accurate measurements at a level appropriate to their technological requirements.

An NMI's participation in the CIPM MRA enables national accreditation bodies and others to be assured of the international credibility and acceptance of the measurements the NMI disseminates. It also provides international recognition of the measurements made by accredited testing and calibration laboratories provided that these laboratories can demonstrate competent traceability of their measurements to a participating NMI. Taking advantage of this relationship, the ILAC and the CIPM signed a Memorandum of Understanding in November 2001 to ensure a sound, linked, technical framework to underpin cross-border trade arrangements and work towards the ideal of having products that are "tested once and accepted everywhere". Industrial, scientific and technological communities within participating countries can access this framework to assure the credibility in measurement capability they require to participate effectively in the global marketplace.

How your country can participate

I strongly urge you to present this letter to your governmental representatives in support of your NMI's participation in the CIPM MRA. The benefits are clear, as is the urgent need for your participation in order to achieve international recognition of your NMI's metrological capabilities through this means.

The formal procedure to become an Associate⁸ is simple and straightforward: a letter⁹ is sent to me, the Director of the BIPM, by a representative of the appropriate government or other official body (normally that responsible for metrological affairs in your country), expressing the wish of the State to be added to the list of Associates. At the same time the first annual contribution is sent to the BIPM. The amount and means of payment I can tell you at the moment of application.

Please do not hesitate to contact me if you need any further information.

Yours sincerely,

Terry Quinn
Director, BIPM.
August 2003.

⁸ Note that NMIs of Associates to the CGPM are entitled to participate in the CIPM MRA through their RMO. However, participation in CIPM Consultative Committees and associated activities is restricted to NMIs of Member States of the Metre Convention.

⁹ A draft form letter is provided as an attachment to this document.

**Draft Form Letter of Application to become an Associate State of the CGPM,
from appropriate Governmental or other Official Authority in [Name Of Country]
to the Director of the BIPM**

To: Dr T Quinn
Director, Bureau International des Poids et Mesures (BIPM)
Pavillon de Breteuil, F-92312 Sèvres Cedex
FRANCE.

Dear Sir,

I am writing to inform you that [NAME OF COUNTRY] wishes to become an Associate State of the General Conference on Weights and Measures (CGPM), under the terms of Resolution 3 of the 21st CGPM.

The organization in my country that will represent [NAME OF COUNTRY] in all related matters is the [NAME OF NATIONAL METROLOGY INSTITUTE OR OTHER PEAK NATIONAL INSTITUTE RESPONSIBLE FOR METROLOGY].

The first annual subscription is being sent to the BIPM at the same time as this letter.

I understand that on [NAME OF COUNTRY] becoming an Associate State of the CGPM, the Director of this Institute will be entitled to sign the Mutual Recognition Arrangement (MRA) of the International Committee for Weights and Measures (CIPM).

Yours, etc.

APPENDIX

The objectives of the CIPM MRA are: to establish the degree of equivalence of national measurement standards maintained by NMIs; to provide for the mutual recognition of calibration and measurement certificates issued by NMIs; and thereby to provide governments and other parties with a secure technical foundation for wider agreements related to international trade, commerce and regulatory affairs.

Participants recognize each other's capabilities based on the following criteria:

1. Credible participation in comparisons identified by the international measurement community as of *key* significance for particular quantities over specified ranges. Presently around 400 "**key comparisons**" have been designated and are being carried out by NMIs, of which about 130 have been completed.
2. Credible participation in other comparisons related to specific calibration services or that have some trade and/or economic priority for individual countries or geographic regions: so-called "**supplementary comparisons**". At this time, some fifty supplementary comparisons are being undertaken.
3. Having in place for calibration services a **quality system** that is recognized as being international best practice, in turn based on agreed criteria.

The first of these elements provides the technical basis for recognition under Part 1 of the MRA. Compliance with both criteria 2 and 3 enables recognition under Part 2 of the MRA. The BIPM key comparison database (KCDB: www.bipm.org/kcdb) contains the results of key and supplementary comparisons (Appendix B), together with lists of peer-reviewed and approved calibration and measurement capabilities (CMCs) of NMIs (Appendix C).¹⁰ At present, there are approximately 13 500 individual CMCs published in the KCDB, all of which have undergone a process of peer evaluation by NMI experts within the Regional Metrology Organizations, coordinated internationally by the Joint Committee of the Regional Metrology Organizations and the BIPM (the [JCRB](#)).

¹⁰ Appendix A lists the MRA signatories, and Appendix D lists all key and supplementary comparisons.

TABLE 1 (dated 3 August 2003)**A. The Directors of the NMIs of the following 43 Member States of the Metre Convention have signed the CIPM MRA**

Argentina ^A	Greece ^C	Russian Federation ^{EGH}
Australia ^F	Hungary ^C	Singapore ^F
Austria ^C	India ^F	Slovakia ^{CH}
Belgium ^C	Ireland ^C	South Africa ^{EGI}
Brazil ^A	Italy ^C	Spain ^C
Bulgaria ^{DH}	Japan ^F	Sweden ^C
Canada ^{AG}	Republic of Korea ^F	Switzerland ^C
Chile ^A	Malaysia ^F	Thailand ^F
China ^F	Mexico ^A	Turkey ^C
Czech Republic ^C	The Netherlands ^C	United Kingdom ^C
Denmark ^C	New Zealand ^F	United States ^A
Egypt ^{GJ}	Norway ^C	Uruguay ^A
Finland ^C	Poland ^C	Yugoslavia ^D
France ^C	Portugal ^C	
Germany ^{BCH}	Romania ^{DH}	

A: Member of SIM; B: Associate Participant of SIM

C: Member of EUROMET; D: Corresponding Applicant of EUROMET

E: Corresponding NMI of EUROMET

F: Member of APMP; G: Associate Member of APMP

H: Member of COOMET

I: Member of SADC MET; J: Associate Member of SADC MET

B. International Organizations that are Signatories to the CIPM MRA

International Atomic Energy Agency (IAEA)
Institute for Reference Materials and Measurements (IRMM), European Commission Directorate General, Joint Research Centre (JRC) ^C

C. The 10 Signatories to the CIPM MRA from Associates of the CGPM

Chinese Taipei ^F
Cuba ^H
Ecuador ^A
Hong Kong, China ^F
Kenya ^J
Latvia ^D
Lithuania ^{DH}
Malta ^D
Philippines ^F
Slovenia ^C

Note: Three other Associates of the CGPM – Belarus^H, Panama^A and the Ukraine^{DH} – have not yet signed the CIPM MRA.