



Written reports from liaison organizations

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Report to the 46 CIML Meeting on BIPM Activities
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The end of 2010 saw the retirement after some eight years of service of Professor Andrew Wallard, and the appointment of Professor Michael Kühne, who joined the BIPM in 2009 as the BIPM Deputy Director and Director Designate. Prior to joining the BIPM Michael was a member of the Presidential Board of the Physikalisch-Technische Bundesanstalt (PTB), Germany. Michael is well known in the metrological community, bringing with him a scientific career in metrology as well as wide experience in scientific management, gained both in the PTB and as Chairperson of EURAMET e.V. (the European Association of National Metrology Institutes). Upon his retirement, Professor Wallard became a Director Emeritus of the BIPM.

Article 9 of the Regulations annexed to the Metre Convention provides that the President and the Secretary of the CIPM and the Director of the BIPM shall belong to different countries. Thus Professor Ernst Göble stepped down as President of the CIPM following the CIPM meeting in October 2010, but remains a Member of the CIPM. Dr. Barry Inglis was elected as the new President and Dr. Willie May elected as a new Vice President (the other Vice President being Jim McLaren). Dr Duan Yuning (China) became a new Member of the CIPM. Luis Mussio, who had been seconded to BIPM from LATU, the NMI for Uruguay as the JCRB Executive Secretary secured a permanent post at the BIPM in late 2010, and has been replaced by Mr. Ahmet Ömer Altan, seconded from UME, the NMI for Turkey who took up post in December 2010. Richard Davis, the Director of the BIPM Mass Department, retired at the end of October 2010 and Alain Picard was appointed as his replacement. Richard continues to provide advice to the BIPM Director on part time basis.

The Director's Office is a new structure of the BIPM, created by Michael Kühne in January 2011. It currently includes five members: the Director of the BIPM, Prof. Michael Kühne; two BIPM permanent staff, the International Liaison Officer, Mr Andy Henson, and the KCDB Coordinator, Dr Claudine Thomas; the JCRB Executive Secretary, Mr Ahmet Ömer Altan, and Dr Takashi Usuda, on secondment from NMIJ/AIST (Japan) at the BIPM for approximately 14 months starting September 2010, studying the economic impact related to the comparability of national metrology standards. This structure enhances internal BIPM collaboration towards improved international cooperation.

As a result of intensive discussions over the past few years, there is now firm consensus in favour of a redefinition of the kilogram, the ampere, the kelvin and the mole based on fixed numerical values of the Planck constant, h , the elementary charge, e , the Boltzmann constant, k , and the Avogadro constant, N_A , respectively. There is also agreement that the values to be associated with the fixed-value constants should be those set by the CODATA Group and therefore represent the best available data. The definitions of all

seven base units of the SI would also be uniformly expressed using the explicit-constant formulation, and specific *mises en pratique* should be drawn up to explain how to realize the definitions of each of the base units in a practical way. Despite some impressive progress made during recent years in the NMIs, the CIPM, based on advice from the CCs and the criteria they have set for acceptable confidence in the values of the constants, has decided that there is not yet an adequate degree of convergence between the results from watt balance experiments and those from the International Avogadro Coordination (IAC) Project to give confidence in the selection of a value for the Planck constant. The forthcoming CGPM is likely to encourage the NMIs, the BIPM and academic institutions to maintain their efforts towards the experimental determination of the fundamental constants h , e , k and N_A , and also to foster communication, awareness and debate on the possible revision of the SI. To this aim, in February 2011, the BIPM launched the “New SI” web pages on its website, including “Why?”, “What?”, and “When?”. The new web pages also include the presentations given at the Royal Society Discussion Meeting of 24-25 January 2011 on “The New SI: Units of measurement based on fundamental constants”. A page including “Frequently Asked Questions” was launched in April 2011.

The 24th meeting of the General Conference on Weights and Measures (CGPM) will be held in Paris from 17 to 21 October 2011. One of the core topics on the agenda will be the discussion and approval of the Programme of Work of the BIPM for the four years 2013 to 2016, and the corresponding dotation. During the last meeting of the CGPM a number of delegates expressed the need to have preliminary discussions on these two subjects. The CIPM therefore invited delegates from Member States to an informal discussion at the BIPM in Sèvres in May 2011, devoted to the Programme of Work and the corresponding dotation. This meeting was preceded by a meeting of the CIPM and by a meeting of the Directors of the National Metrology Institutes of Member States and Associates. The meetings provided an opportunity to discuss issues of interest related to the proposed Programme of Work and associated budget as well as the long-term strategy for the BIPM. These discussions aid the BIPM, the CIPM and the Member States as they prepare for the October 2011 CGPM. The proposed Programme of Work includes provision to update the BIPM Ionizing Radiation Department facilities with a linear accelerator, nowadays the instrument of choice in many countries for cancer therapy, to compliment the Cobalt 60 world reference standard operated by the BIPM. Additionally advances in chemistry offer an opportunity for a more rigorous metrological approach for molecules larger than those that have been so far possible, such as insulin, and the Programme of Work consequently includes additional activities in the Chemistry Department. However discussions with the Member States indicate that the current financial climate worldwide is such that the discussions on the BIPM dotation will be tough. There is general consensus regarding the need for a review of some sort of the governance of the BIPM, and for the development of a longer term strategy, and a number of draft Resolutions will be debated related to these issues at the CGPM in October.

Following the designation of 2011 as “The International Year of Chemistry” by UNESCO and IUPAC the World Metrology Day (20 May) focused around Chemical Metrology. The joint BIPM/OIML website was revamped with posters (in English and

French), messages from the two Directors and a press release made available. Over 30 countries took the opportunity to list and provide information on the events they were organizing to celebrate the day, and a further 15 different translated versions of the poster were made available by them.

Participation in the activities of the BIPM continues to increase. In 2010 Kenya, (previously an Associate of the CGPM) became a Member State, and Bangladesh, Mauritius, the Seychelles, Zambia and Zimbabwe all became Associates of the CGPM. So far in 2011 Saudi Arabia has become a Member State and Bosnia and Herzegovina has become an Associate of the CGPM. Thus at the end of July 2011 there are 55 Member States of the BIPM, and 33 Associate States and Economies of the General Conference (including CARICOM as an Economy, comprising 11 States). Thus one way or another well over 90 countries participate in the activities of the BIPM.

Participation in the CIPM MRA continues to grow. The CIPM MRA has now been signed by the representatives of 86 institutes from 50 member States, 33 Associates of the CGPM and 3 international Organisations (IAEA, IRMM, WMO) and covers a further 137 institutes designated by the signatory bodies as holders of specific national standards. A year ago there were 78 institutes from 48 Member States, 27 Associates of the CGPM, and three international organizations, covering a further 128 institutes.

At the beginning of July 2011 the key and supplementary comparisons database contains 740 key comparisons (84 from the BIPM, 366 from the CCs, 1 from AFRIMETS, 101 from APMP, 28 from COOMET, 118 from EURAMET, and 42 from SIM) and 263 supplementary comparisons, which gives a total in excess of 1000. On average, about 40 new key comparisons are registered each year. A comprehensive study of BIPM key comparisons is available in the KCDB Newsletter No 14. Updated graphs illustrating the participation in key and supplementary comparisons were made available in the Statistics page of the KCDB. The Final Reports of 66 % of the comparisons registered are currently posted in the KCDB. Tables of individual laboratory results, degrees of equivalence and graphs of equivalence are published in the KCDB for key comparisons only. Altogether, the KCDB currently holds a total of more than 1600 graphs of equivalence.

The BIPM is involved in 171 key comparisons, of which 84 are BIPM key comparisons, i.e. series in time of bilateral comparisons between NMIs and the BIPM, based on international facilities maintained at the BIPM. The BIPM acts as the Pilot Laboratory for 132 of these 171 key comparisons, although it may not participate in the exercises themselves. A typical example is CCTF-K001.UTC, the key comparison based on the computation of UTC: the BIPM is responsible for collecting data from time laboratories and observatories, and for producing and distributing the resulting time scale, but does not provide any data taken in its laboratory. The BIPM may also participate in RMO key comparisons, without acting as the Pilot laboratory, for the sake of linkage. An example is EUROMET.EM.BIPM-K11: BIPM participation made it possible to link the EURAMET results to those of the BIPM key comparison BIPM.EM-K11.b (10 V DC voltage, Zener diode).

At the beginning of July 2011, some 24000 CMCs had been published in the KCDB, an increase of approximately 1000 compared with July 2010. There is continuous movement related to temporary removal and re-instatement of CMCs, although the total number of temporarily removed (“greyed-out”) CMCs has remained roughly constant (~ 400) for one year. Up-to-date details on the number of CMCs currently published in the KCDB, per country and per metrology area, are available from the Statistics page of the KCDB. In addition, a record of the history of CMC publications (including greying-out and re-instatement following QS approval) is kept in the form of an EXCEL file, which is made available in real-time from the restricted-access part of the JCRB CMC website.

During 2010, some 86000 visitors have opened a total of more than 1250000 KCDB web pages. The average number of monthly visits remains roughly constant (at a level of about 7200 visits each month), while the average number of pages consulted during each visit has increased significantly, as has the average duration of each visit.

BIPM continues to work closely with other intergovernmental/international bodies, most notably OIML, ILAC, WMO and ISO.

With OIML the BIPM collaboration ranges from working closely on the revision of OIML Document DI: "Elements for a Law on Metrology", through the World Metrology Day joint activities in which 2011 saw a significantly heightened level of cooperation, to significantly increased “backroom” cooperation on IT and administrative matters.

The collaboration with ILAC has also been intense, as ILAC revises a number of its documents, most notably its P10 Traceability of Measurement Results, and a joint communication on the accreditation of NMI services. The drafts of both documents are well advanced.

With WMO discussions have taken place to follow up the joint WMO-BIPM Workshop “WMO-BIPM Workshop on Measurement Challenges for Global Observation Systems for Climate Change Monitoring: Traceability, Stability and Uncertainty” and a WMO-BIPM Joint Liaison Group has been established to facilitate progress on the many recommendations which came out of the workshop. Work continues to include ISO in a joint BIPM, OIML, ILAC and ISO declaration tying up the elements that are collectively known as the “quality infrastructure”.