Director’s Report to the 25th CGPM

Dr Martin Milton
BIPM Director
Highlights

**Actions completed since the 24th CGPM (2011)**
- Renewal of strategic direction
- Improvements in the accountability of the BIPM
- Review of the long-term sustainability of the BIPM

**Highlights from the BIPM Work Programme**
- Coordination and liaison activities
- Projects in physical and time metrology
- Projects addressing global coordination challenges in chemistry and ionizing radiation metrology
Renewal of the Mission, Role and Objectives

The role of the BIPM for the 21st century has been confirmed in a renewed statement of its Mission, Role and Objectives.

The mission of the BIPM is to ensure and promote the global comparability of measurements, including providing a coherent international system of units for:

- Scientific discovery and innovation,
- Industrial manufacturing and international trade,
- Sustaining the quality of life and the global environment.
Renewal of the Mission, Role and Objectives

- The role of the BIPM for the 21st century has been confirmed in a renewed statement of its Mission, Role and Objectives.

The mission of the BIPM is to ensure and promote the global comparability of measurements, including providing a coherent international system of units for:

- The unique role of the BIPM enables it to achieve its mission by developing the technical and organizational infrastructure of the International System of Units (SI) as the basis for the world-wide traceability of measurement results. **This is achieved both through technical activities in its laboratories and through international coordination.**
A Strategic Plan has been developed for the BIPM which, for the first time, brings together strategies for the short, medium and long terms.

**Five areas driven by the BIPM Work Programme:**
- Physical metrology
- Time metrology
- Metrology in chemistry and ionizing radiation in support of emerging global needs
- Liaison and coordination
- Communication and promotion

**Two underpinning areas:**
- People
- Infrastructure

Targets have been set for 2020 and beyond
- Some are very ambitious
- They are still the subject of consultation and review
Impressions in the accountability of the BIPM

- Data summarizing the performance of the BIPM in key areas of its laboratory and coordination work are now published annually in the document “Core Data”.
Improvements in the accountability of the BIPM

- Data summarizing the performance of the BIPM in key areas of its laboratory and coordination work are now published annually in the document “Core Data”.

- A new website has been designed that provides quicker access to relevant information for different users communities.
Review of the long-term sustainability of the BIPM

- The Financial Statements for 2013 were approved by the independent auditor without adding any “qualification” to his report.

- The future costs of pension benefits and healthcare insurance have been the subject of independent studies.

- The long-term financial stability of the BIPM has been confirmed under a range of possible assumptions about future funding levels.
Observer status awarded on the Technical Barriers to Trade Committee of the World Trade Organization.

The reach and impact of the annual World Metrology Day has been raised.
- More than 20 languages
- In more than 30 countries
Highlights from the BIPM Work Programme
Projects in **mass metrology**

Evolution in mass since the initial calibration of the official copies from 1889 until 2014. Official copies Nos. 43 and 47 were first calibrated in 1946, all others in 1889. The positive mass drift of some of the official copies with respect to the IPK, observed during the 2nd and 3rd PV, has not been confirmed for the period from 1991 to 2014. The standard Type A uncertainties of each of these data points are: 3.2 µg (1889); 5.4 µg (1946); 2.3 µg (1991); about 1 mg (2014).
The BIPM watt balance has been installed in a new dedicated laboratory and the novel magnet system has been integrated into the apparatus.

The standard deviation of repeated measurements of the Planck constant has been reduced from 1.4 parts in $10^6$ to 5 parts in $10^7$. 
The first of a new series of comparisons of quantum Hall resistance standards between the BIPM and NMIs has been completed.

The results have elucidated new information about the limiting factors in resistance calibration.
New “rapid” version of UTC published weekly.

- Based on research into new algorithms and extended validation, which have led to differences from the monthly UTC of no more than 2 ns.

Accuracy of clock comparison has been improved by at least a factor 2 through a programme of time-link calibrations in cooperation with the RMOs.

- This will reduce the accuracy of UTC-UTC(k) to about 1~2 ns.
Highlights from Projects addressing global coordination challenges in ionizing radiation metrology

- New comparison technique developed for short half-life radionuclides demonstrated for $^{99m}$Tc (6 h half-life), to $^{18}$F (1.83 h half-life).

- New fundamental data from BIPM measurements and comparison data will underpin improved calorimetry of accelerator beams.

BIPM result published in 2014 in *Physics in Medicine and Biology*
Highlights from Projects addressing global coordination challenges in chemical metrology

- New qNMR facility opened following a collaborative programme with the NMIJ, Japan, and donation of a 400 MHz NMR facility by JEOL (Japan).

- The most accurate absolute measurements of the absorption cross section of ozone confirm the existence of significant bias in data used by global air quality networks.
Setting objectives and activities for future Work Programmes

Debate about the balance of activities carried out at the BIPM has been facilitated by a new approach to the development of the proposals for our work programme for 2016-2019:

- full costs and staff resources shown
- new focus on laboratory activities in three areas:
  - physical metrology, time metrology and thematic projects.
- scope of coordination and liaison activities has been highlighted

- The draft programme has been available on the website for consultation.
Summary

- The strategic direction has been renewed.
- The accountability of the BIPM has been improved.
- The long-term sustainability of the BIPM has been studied and confirmed.

- Highlights from the BIPM Work Programme:
  - Delivered progress in all areas of the work programme,
  - Engaged more effectively with International Organizations,
  - Found new sources of support.