

15th meeting of the CCM

BIPM, 26-27 February 2015

Report of the WGD-kg

Stuart Davidson (vice chair)

Report of the WGD-kg

- WG on dissemination of the kilogram (WGD-kg). This WG includes the former WGM, TG1 and TG2. This WG is responsible for all maintenance and dissemination issues (including vacuum and uncertainties).
- Chair: Chris Sutton (MSL)
- Official start: 19 February 2013

Report of the WGD-kg

WGD-kg Terms of Reference

- The terms of reference of CCM-WGD-kg are:
- To study, develop and advise the CCM on issues related to mass standards and their dissemination;
- To define, organize and approve the necessary key comparisons; and
- To collaborate with the CCM Working Group on the Realization of the kilogram and other relevant WGs.

Membership

- 22 members
- No proposals for additional members

	<i>Institute</i>	<i>Country</i>
1	BEV	Austria
2	BIPM	
3	CEM	Spain
4	CENAM	Mexico
5	DFM	Denmark
6	INRIM	Italy
7	KRISS	Korea
8	LNE	France
9	NIM	China
10	NIST	USA
11	NMIA	Australia
12	NMISA	South Africa
13	VSL	The Netherlands
14	NMIJ	Japan
15	NPL	United Kingdom
16	NPLI	India
17	NRC	Canada
18	METAS	Switzerland
19	MSL	New Zealand
20	PTB	Germany
21	SMU	Slovakia
22	VNIIM	Russian Federation

Report of the WGD-kg

2nd meeting of the CCM WGD-kg

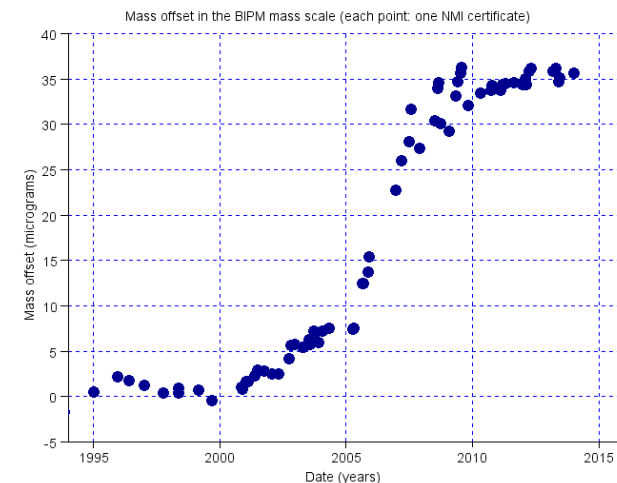
- 24 February 2015
- 20 of 22 members represented
- 25 attendees from member NMIs
- 2 Guests

2nd meeting of the CCM WGD-kg

Kilogram calibrations with respect to the IPK

- Predicted mass values of the BIPM prototypes compared to the results of the Extraordinary Calibration - Lars Nielsen (DFM)
- Extraordinary Calibrations - modelling of the mass evolution of the BIPM working standards - Estefania De Mirandes (BIPM)
- Extraordinary Calibrations - phase 2, the calibrations of NMI standards - Pauline Barat (BIPM)
- Dissemination of mass from Pt-Ir - Lee Shih Mean (NMC)

Change of (up to) 35 μg in
BIPM mass scale since 2005

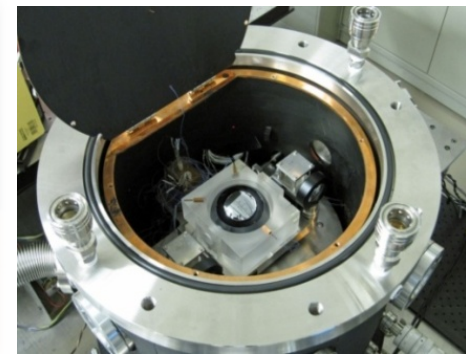
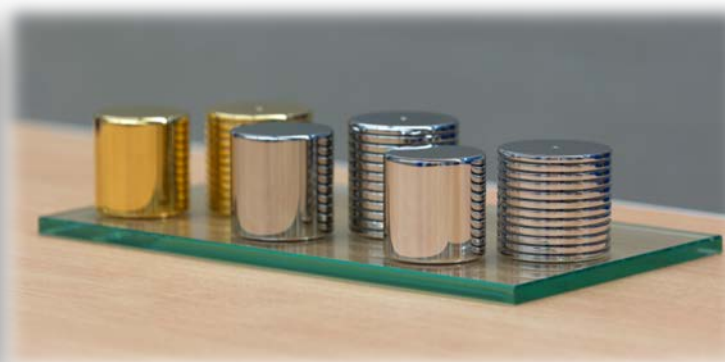
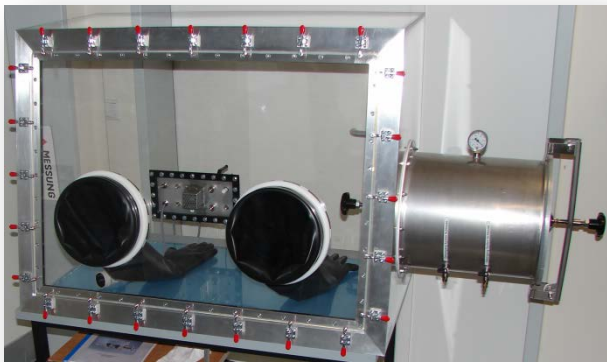
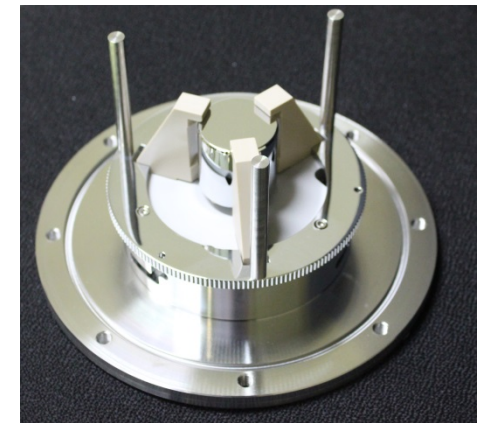
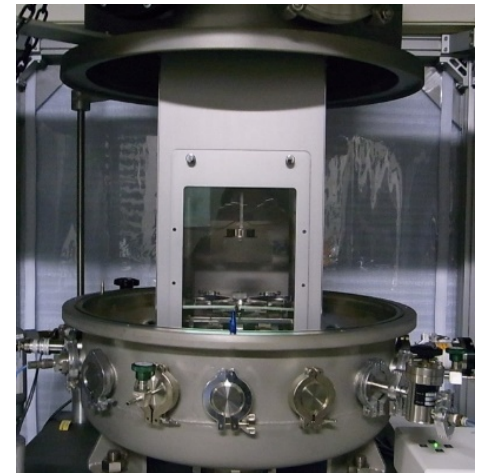
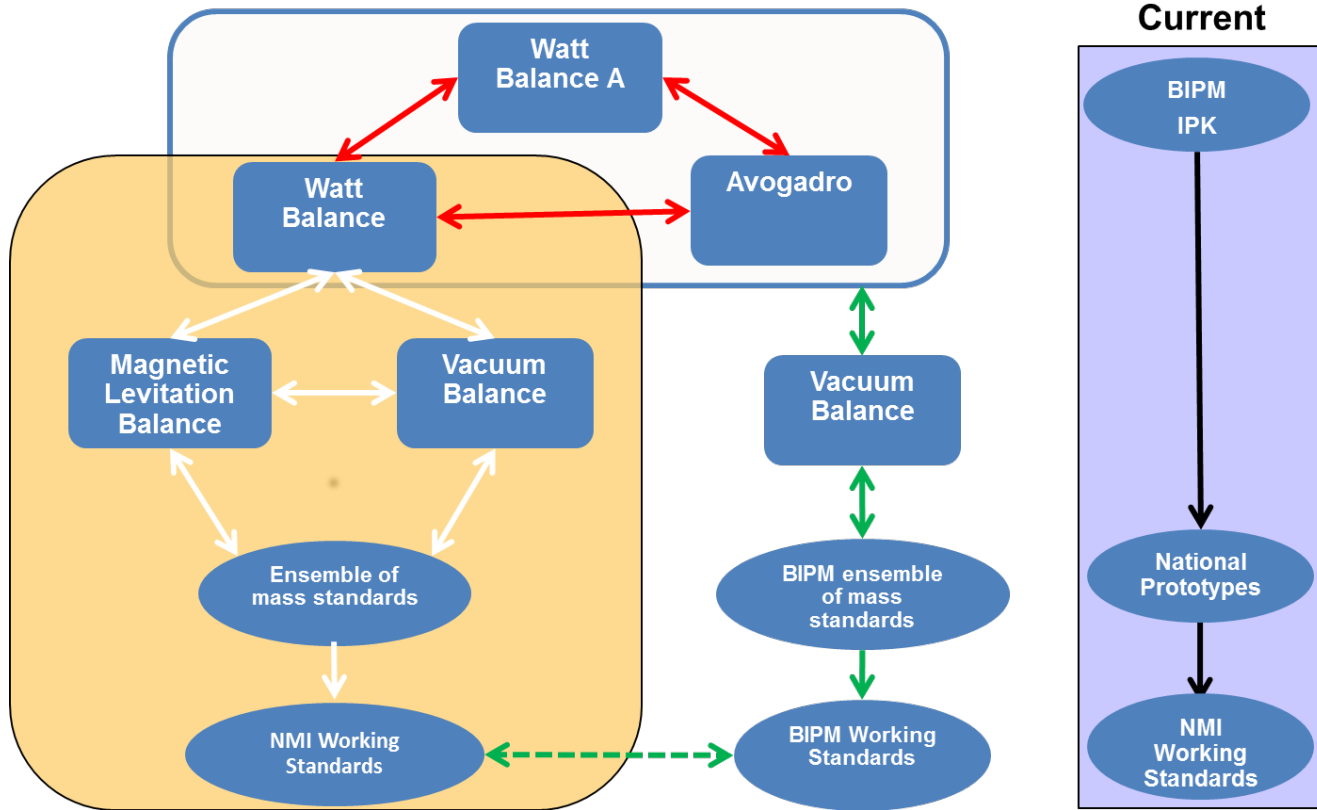


2nd meeting of the CCM WGD-kg

Short presentations on scientific activities (focus on dissemination after the re-definition of the kilogram)

- Work at the BIPM on the ensemble of mass standards - Estefania De Mirandes (BIPM)
- Dissemination of the redefined kilogram at NIST - Patrick Abbott (NIST)
- Recent work on 1-kg mass standards at the NMIJ - Shigeki Mizushima (NMIJ)
- Dissemination of the redefined kilogram at NRC - Richard Green (NRC)
- Transfer storage and cleaning of kilogram standards - James Berry (NPL)
- A study of materials and procedures for future mass standards: latest results at METAS - Kilian Marti (METAS)
- Development of weights smaller than 1 milligram - Nieves Medina (CEM)
- PTB activities for the dissemination of the redefined kilogram – Horst Bettin (PTB)
- Uncertainty evaluation for the calibration and use of balances considering buoyancy effects and correlations- Andrea Malengo (INRIM)

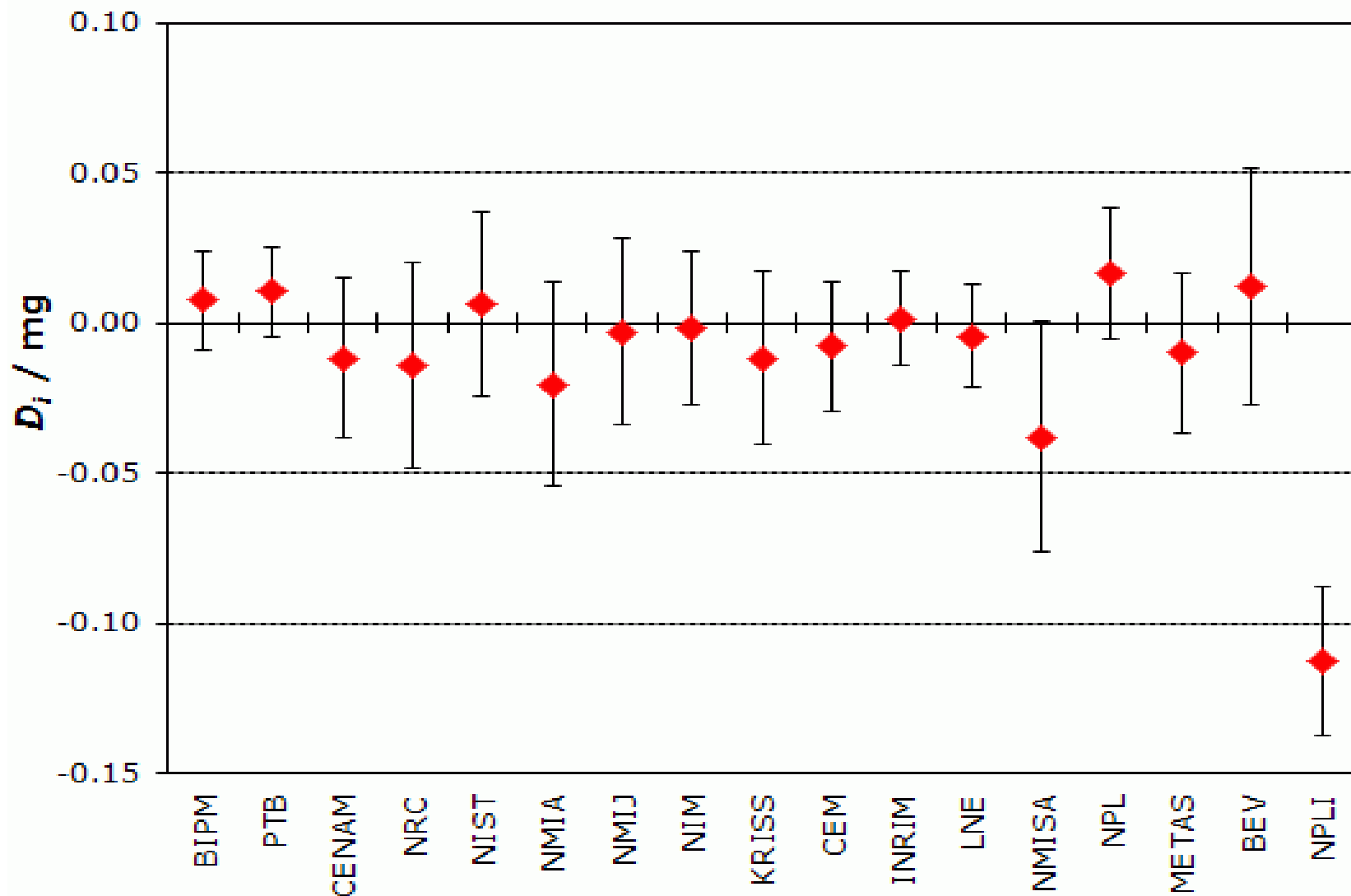
Dissemination after the re-definition of the kilogram



CCM Key Comparisons

- CCM.M-K4 – 1 kilogram SS, pilot BIPM
 - Approved for equivalence, Final report published 24 July 2104
 - 16 participants 14 results consistent with KCRV
 - No correction for change in BIPM mass scale proposed

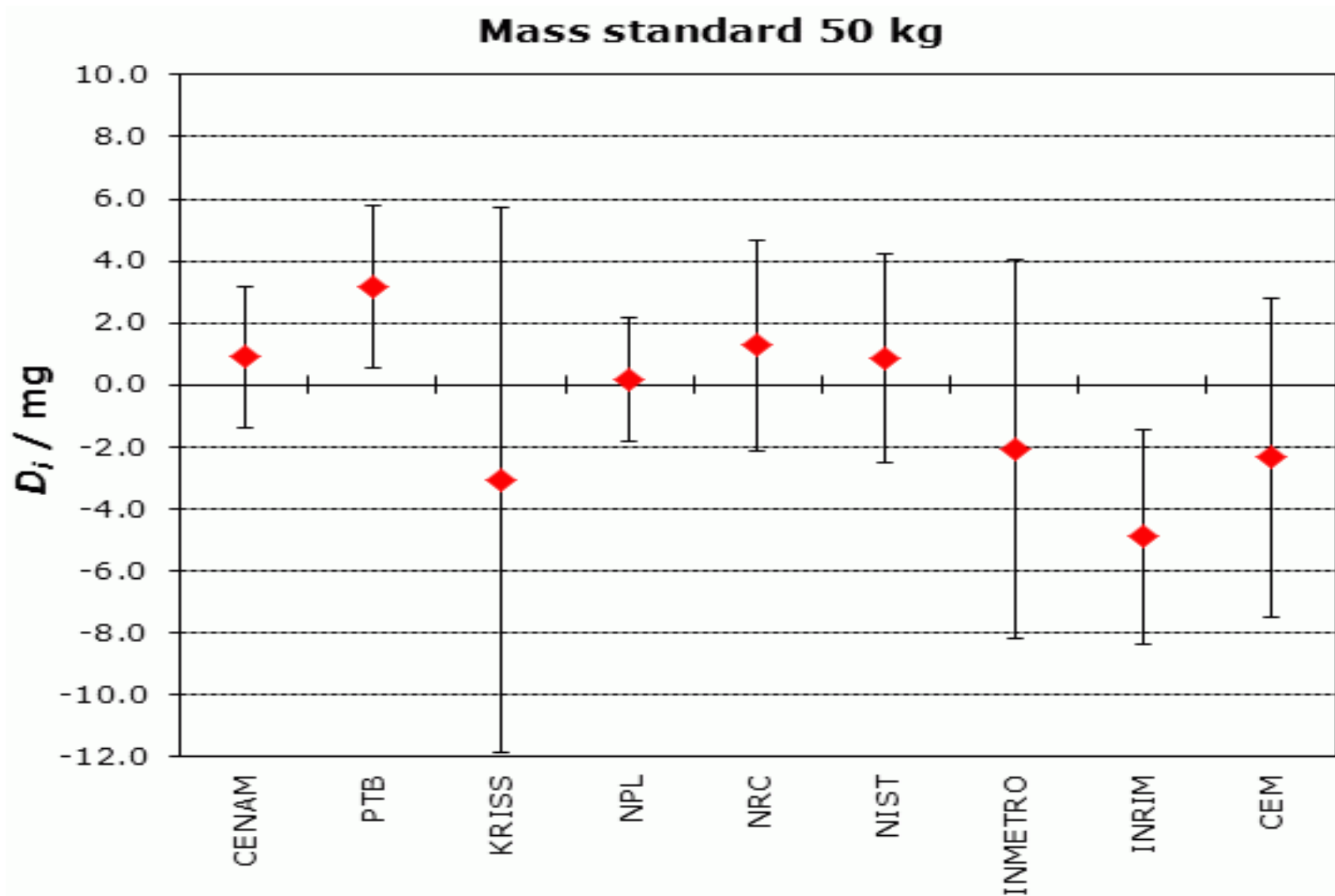
CCM.M-K4 1 kg SS standard



CCM Key Comparisons

- CCM.M-K4 – 1 kilogram SS, pilot BIPM
 - Approved for equivalence, Final report published 24 July 2014
 - 16 participants 14 results consistent with KCRV
 - No correction for change in BIPM mass scale proposed
- CCM.M-K6 – 50 kilogram SS, pilot CENAM
 - Approved for equivalence, Final report published 16 Jan 2015
 - 9 participants 7 results consistent with KCRV

CCM.M-K6 50 kg SS standard



CCM Key Comparisons

- CCM.M-K4 – 1 kilogram SS, pilot BIPM
 - Approved for equivalence, Final report published 24 July 2014
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- CCM.M-K6 – 50 kilogram SS, pilot CENAM
 - Approved for equivalence, Final report published 16 Jan 2015
 - 9 participants 7 results consistent with KCRV
- CCM.M-K7 – 500 mg, 5 g, 10 g, 100 g, 5 kg SS, pilot KRISS
 - approved and registered in KCDB
 - Results received from participants, Draft A in preparation

RMO Comparison reports

- SIM

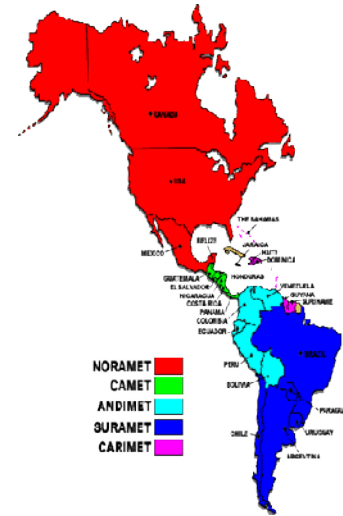
- SIM.M.M-K1, -K5 (both Draft B stage)
- 6 Additional SCs plus SIM.M.M-S9 on magnetic properties of mass standards

- AFRIMETS

- 2 SCs AFRIMETS.M.M-S3 and S6 (sub-multiples of the kilogram)

- APMP

- APMP.M.M-K1.2 (Draft A) K2.2 (in progress)
- APMP.M.M-K5 (planned)



RMO Comparison reports



- EURAMET

- EURAMET.M.M-K2.5 published K2.6 in progress
- EURAMET.M.M-K4 proposed
- EURAMET.M.M-S4 and S6 published
- EURAMET.M.M-S7 and S8 in progress (large mass)

- COOMET

- COOMET.M.M-K5 Final report published
- COOMET.M.M-K8 (50 mg, 50 g, 1 kg, 2 kg) measurements started
- COOMET.M.M-S1 (50 mg, 10 g and 1 kg) complete



Conclusions

- Adjustment of BIPM mass scale (since 2005 by up to 35 ug) reported. New values for national standards will be issued to NMIs.
- Pilot study to check dissemination from primary realisations to mass (in air) in development
- TG1 comparison of weighing in vacuum complete and will be published
- Many NMIs undertaking research into maintenance and dissemination of the mass scale following redefinition
- 3 KCs recently completed or near completion
(1 kg, 50 kg, 500 mg – 5 kg)
- No new KCs required at present. Periodicity of 10 years adequate.
- Linking of RMO KCs underway
- Issues with changes to the BIPM mass scale need to be taken into account to ensure consistent linking

Thank you for
your attention