



Report of the CCM Working Group on Mass

Stuart Davidson
19th CCM meeting, 25-26 May 2023

CONSULTATIVE COMMITTEE
FOR MASS AND RELATED QUANTITIES

WG Meetings held since last CCM

- Meeting of the CCM WG Mass
 - 23rd May 2023
- Three meetings of the CCM Task Group on the Phases for the Dissemination of the kilogram following redefinition (CCM-TGPfD-kg)
 - Monday 3rd October 2022
 - Friday 21st April 2023
 - Wednesday 25th May 2023

WG Meetings planned

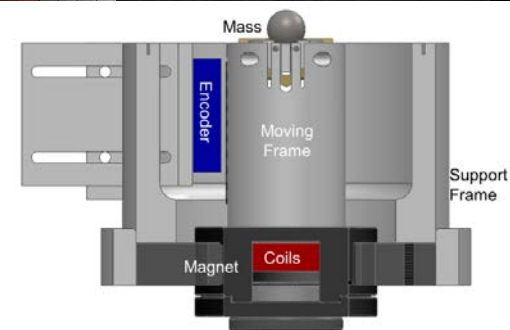
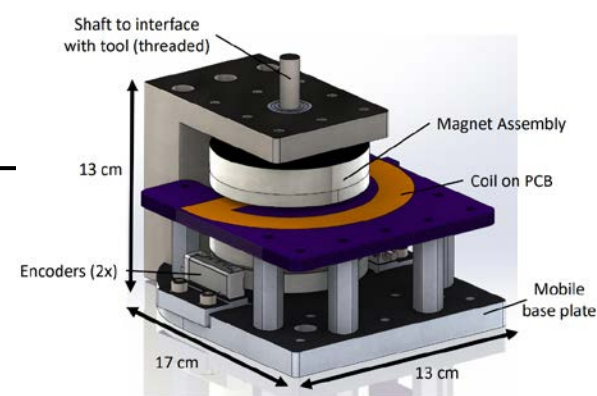
- Meeting of the CCM WG Mass
 - 2025 to coincide with the next CCM meeting
- Meetings of the CCM Task Group on the Phases for the Dissemination of the kilogram following redefinition (CCM-TGPfD-kg)
 - July 2023 to review feedback from questionnaire on repeat periodicity for CCM.M-K8.20xx Key Comparison of realisation experiments

Main actions taken and main achievements

- Completion of latest KC of realisation experiments (CCM.M-K8.2021)
- Implementation of a new consensus value for the kilogram (1 March 2023)
- (Draft) CCM recommendation on addressing lack of agreement in the realisation experiments

Progressing the state of the art

- Improvements in uncertainties of realisation experiments and increase in number of experiments
- Application of Kibble balance technology to develop:
 - Table top balances
 - Micro-Kibble balance
 - Torque realisation instruments
 - Radiation force balance



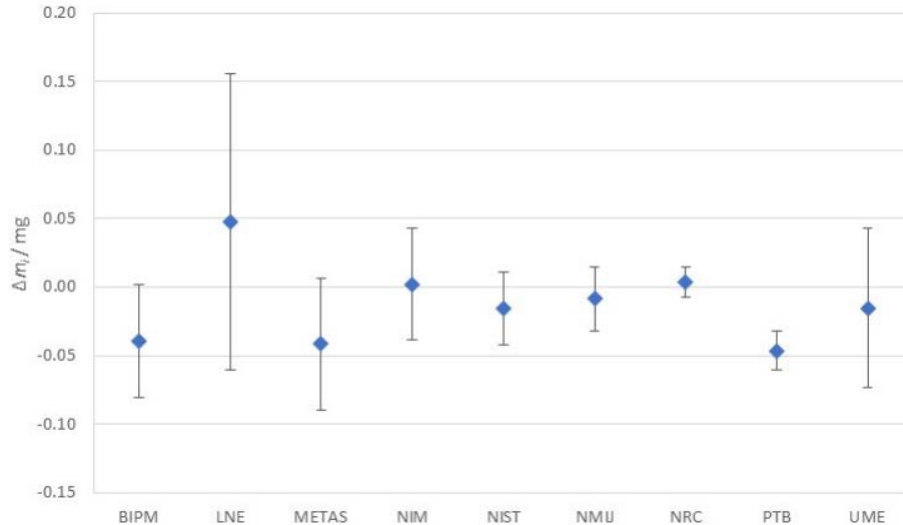
Liaison & stakeholders

- **IMEKO TC3 Conference, November 2022, Dubrovnik**
 - Presentations of new kilogram (inc. plenary) and Kibble applications (e.g. radiation force balance and micro-balances)
 - Participants from NMIs, academia, industry, accreditation bodies
- **International Conference of Weighing, April 2023, Hamburg**
 - Main focus of conference was industry, standards bodies (e.g. OIML) and weighing industry associations (e.g. CECIP)
 - Presentation by Philippe Richard on The kilogram in the quantum era
 - Session on exploitation of the “new” kilogram by PTB, NPL and NIST
- **EURAMET calibration guide 18 (Non-automatic weighing instruments) translated into Spanish and adopted in the SIM area**

KCs completed and underway

– KC of realisation experiments (CCM.M-K8.2021)

- Completed 2022
- 9 Participant (all uncertainties less than 108 μg)
- KCRV contributed to new Consensus Value for the kilogram



KCs planed

- **CCM.M-K2.2024 Multiples and sub-multiples of a kilogram**
 - 10 kg, 500 g, 20 g, 2 g, 100 mg
 - NRC pilot, 16 participants
- **CCM.M-K8.20xx Realisations of the kilogram**
 - BIPM pilot
 - Schedule depends on response to questionnaire to be circulated soon
- **CCM.M-K4.20xx Stainless steel kilograms**
 - BIPM pilot
 - Same comparison scheme as CCM.M-K8 (participants send wts to BIPM)
 - Schedule depends on time of CCM.M-K8 comparison

Program of work for the next 2 years

- Publish CCM recommendation on addressing lack of agreement in the realisation experiments
- Start Key Comparisons CCM.M-K2, CCM.M-K4 and CCM.M-K8
- Produce guide to rationalisation of CMC entries for mass with worked examples
- Produce guide for mass CMC submission and (risk-based) review process
- Produce end-user document to explain the need for the consensus value
- Produce roadmap and strategy document for investigating the lack of agreement in realisation experiments

Proposed changes (membership, chairmanship, ToRs)

- Terms of reference reviewed – no change
- Stuart Davidson and Richard Green to remain as Chair and Vice-Chair respectively (agreed by WG members)
- Proposals for membership from NIS and A*Star (presentations made at the WG meeting 23rd May 2023)
- Proposals from GUM and IPQ to be reviewed at next WG meeting (May 2025)

Thank you.

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