

Report from the Key Comparison Working Group (KCWG) to the CCAUV

held at the BIPM
Tuesday, 24th September 2019, starting 2:00 pm

KCWG Chairman – Dr. Gustavo P. Ripper
KCWG Executive Secretary – Dr. Gianna Panfilo

Final Agenda for the meeting of the CCAUV-Key Comparison Working Group (P1)

- 1) Welcome to the BIPM (CCAUV President)
- 2) Opening of the KCWG meeting (KCWG chair and executive secretary)
- 3) Appointment of *rapporteur*
- 4) Confirmation of the agenda
- 5) Participants of the meeting
 - a. Members
 - b. Guests
- 6) History of the KCWG
- 7) Mission and Tasks of the KCWG
- 8) Review of current KCWG members and their expertise
 - a. Additional experts
 - b. Change of contributors
- 9) Report on the activities of the WG
 - a. Basic Fluxogram of activities related to comparisons
- 10) Recent comparisons carried out within the frame of the CCAUV
 - a. Published comparisons
 - b. RMO KCs linked to CCAUV.V-K3
 - c. Key Comparisons in progress
 - d. Supplementary Comparisons in progress
 - e. Pilot studies

Draft Agenda for the meeting of the CCAUV-Key Comparison Working Group (P2)

- 11) Guidance documents available
- 12) Technical protocols x risks
- 13) Some observations from the KCWG chair on recent comparisons
 - a. CCAUV.V-K4
 - b. CCAUV.A-K6
 - c. Considerations about guidance information for comparisons
 - d. Suggestions for future KC, SCs
- 14) Questions from executive secretary
 - a. Standardized documents
 - b. Regional participation in KCs
- 15) Strategic planning of CCAUV KCs (scope and periodicity of KCs)
- 16) Feedback and demands from RMOs, Pilots, etc
 - a. Hybrid comparisons
- 17) Publications of the CIPM
- 18) CCAUV KCWG coordination positions/membership
- 19) Any other business
 - a. Status of comparisons in progress
- 20) Date of next KCWG meeting
- 21) Report of the KCWG to the CCAUV
- 22) Closing of the meeting

1) Welcome to the BIPM (CCAUV President)

- Dr. Takashi Usuda, president of CCAUV

2) Opening of the KCWG meeting

- Dr. Gustavo Ripper, chair of KCWG
- Dr. Gianna Panfilo, executive secretary of KCWG

3) Appointment of *rapporteur*

- Dr. Thomas Bruns, PTB/Germany

Minutes already available!

4) Confirmation of the agenda

- Inclusions / changes

19) Any other business

a. Status of comparisons in progress

- Final agenda was approved

5) Participants of the meeting - members (1)

Name	Affiliation	Status	Did attend?
Gustavo Ripper	INMETRO / SIM MWG-9	KCWG member / KCWG chair	YES
Danuta Dobrowolska	GUM	KCWG member	YES
Peter Harris	NPL	KCWG member	No
Ryuzo Horiuchi	NMIJ / APMP TC-AUV	KCWG member	YES
Lars Nielsen	DTU	KCWG member	No
Akihiro Ota	NMIJ	KCWG member	YES
Andres Perez Matzumoto	CENAM	KCWG member	No
Sun Qiao	NIM	KCWG member / RMOWG chair	YES
Thomas Bruns	PTB	KCWG member	YES
Salvador B Figueroa	DFM	KCWG member	YES
Takashi Usuda	NMIJ	CCAUV president	YES
Gianna Panfilo	BIPM	CCAUV executive secretary	YES
Michael Gaitan	NIST	SPWG chair	YES

5) Participants of the meeting - guests (2)

Name	Affiliation	Status
Riaan Nel	NMISA / AFRIMETS TC-AUV	guest
Ian Veldman	NMISA	guest
Stephen Robinson	NPL / EURAMET TC-AUV	guest
Steven Crocker	NIST-USRD	guest
Richard Allen	NIST	guest
A. Chijioke	NIST	guest
Enver Sadikoğlu	UME / GULFMET	guest
Lixue Wu	NRC	guest
Hideaki Nozato	NMIJ	guest
Alexander Enyakov	VNIIFTRI / COOMET TC-AUV	guest
Anton Kozlyakovsky	VNIIM	guest
Andrey Yulievitch Smirnov	VNIIM	guest

6) History of the KCWG

2011 - The CCAUV KCWG was established by former CCAUV president Dr. Joaquín Valdés

- 1st Chairman: Dr. Thomas Bruns (February 2011)
- Executive secretary: Dr Susanne Picard

2013 – Change of chairperson of KCWG

- 2nd Chairman: Dr. Gustavo Ripper (October 2013)

2015 – Change of Executive secretary of KCWG

- Executive secretary: Dr. Gianna Panfilo

7) Mission and Tasks of the KCWG

Mission

- The Key Comparisons Working Group of the CCAUV supports the CC within the objective to establish and maintain a global compatibility in the measurements in the field of acoustics, ultrasound and vibration.
- It takes special responsibility for a consistent implementation of the requirements of the CIPM MRA in terms of comparisons between NMIs and DIs within the scope of the MRA.

Within this objective, its tasks are to:

- identify the need and feasibility of CCAUV key comparisons (KCs) and supplementary comparisons (SCs);
- review and approve technical protocols for all comparisons that are intended to be used for the subsequent support of CMC claims, i.e. CIPM KCs, RMO KCs and SCs;
- give advice on the analysis of KCs, calculation of KCRVs and linking procedures;
- review and comment Draft B reports prior to their submission to the CCAUV for approval;
- contribute to the SPWG on matters of key comparisons;
- give advice in case of disagreement during a comparison.

8) Review of current KCWG members and their expertise

			A	U	W	V	S	M
#	name	Affiliation	Acoustics	Ultra sound	Under water	Vibration	Shock	Math / Statistics
1	D. Dobrowolska	GUM	X					
2	Peter Harris	NPL						X
3	Ryuzo Horiuchi	NMIJ	X					
4	Lars Nielsen	DFM						X
5	Akihiro Ota	NMIJ				X	X	
6	Andres Perez Matsumoto	CENAM	X					
7	Thomas Bruns	PTB				X	X	X
8	Sun Qiao	NIM				X	X	
9	Gustavo Ripper	INMETRO				X	X	X
10	Salvador Barrera	DFM	X					

Lack in: U, W

Change of contributors

		A	U	W	V	S	M
member	Affiliation	Acoustics	Ultra sound	Under water	Vibration	Shock	Math / Statistics
Maria Nieves Medina	CEM				X		
Claire Bartoli	LNE				X		

- Maria Nieves Medina and Claire Bartoli left the KCWG in 2019

		A	U	W	V	S	M
Additional expert	Affiliation	Acoustics	Ultra sound	Under water	Vibration	Shock	Math / Statistics
Joanna Kolasa	GUM				X		

- Joanna Kolasa retired from GUM in 2019



New members / contributors are welcome to the KCWG!

9) Report on the activities of the WG

- Review and approval of **TPs**
- Review of **Draft B reports** of KCs, SCs and PSs
- Review and pre-approval of **Final reports** of KCs and SCs for submitting to the CCAUV for final approval

TPs and Final reports are published in the KCDB Appendix B

- Review of Final reports of **Pilot Studies** for publication in Metrologia

Final reports available in web page maintained by CCAUV executive secretary

- <https://www.bipm.org/en/committees/cc/ccauv/pilot-studies.html>

Pre-Circulation stage

PILOT LABORATORY IS DEFINED

QUESTIONNAIRE

POSSIBLE PARTICIPANTS

PARTICIPANTS SELECTED

Selection Criteria:

- Scope / Uncertainty
- CMC published
- # participants per RMO
- Link of RMO KC

DRAFT OF TECHNICAL PROTOCOL

PREPARATION OF POSSIBLE ARTIFACTS

PRE-CIRCULATION STABILITY MEASUREMENTS

SELECTION OF STABLE ARTIFACTS



FINAL TECHNICAL PROTOCOL

Reviewed and approved by KCWG

- Additional guidelines, Schedule, Results spreadsheet

Circulation of artifacts for measurements

MEASUREMENTS BY PARTICIPANTS

REPEATED MEASUREMENTS BY PILOT TO CHECK STABILITY

Results from participants

Stability control results

Post-Circulation stage



Draft A

Reviewed by participants

Draft B

Reviewed and approved by KCWG

Final Report

Approved by CCAUV & Published in KCDB

10) Recent comparisons carried out within the frame of the CCAUV

Concluded comparisons (published):

CC comparisons:

- None

RMO comparisons:

- **COOMET.AUV.A-S2** Metrologia, 2018, **55**, Tech. Suppl. 09001
- **EURAMET.AUV.A-K5** Metrologia, 2019, **56**, Number 1A, Tech. Suppl. 09001

RMO KCs linked to CCAUV.V-K3

- **APMP.AUV.V-K3** Metrologia, 2013, **50**, Tech. Suppl., 09001
- **EURAMET.AUV.V-K3** Metrologia, 2015, **52**, Tech. Suppl., 09003
- **AFRIMETS.AUV.V-K3** Metrologia, 2012, **49**, Tech. Suppl., 09001



3 RMO KCs were linked to the CIPM low-frequency vibration KC CCAUV.V-K3



Appendix with link was added to the Final Reports of RMO KCs

Key Comparisons in progress

CC Key Comparisons, in progress:

- **CCAUV.V-K4** Final report approved by CCAUV, to be published
- **CCAUV.V-K5** Measurements complete, Report in progress, Draft A
- **CCAUV.A-K6** TP complete, Measurements in progress
- **CCAUV.W-K2** Measurements complete, Report in progress, Draft A

RMO Key Comparisons, in progress:

- **COOMET.AUV.V-K1** Report in progress, Final Report reviewed by CCAUV on Dec/2017
- **APMP.AUV.V-K3.1** TP complete (Jun/2018), Measurements in progress
- **APMP.AUV.U-K3** TP complete (Jul/2018), Measurements in progress
- **EURAMET.AUV.V-K2** Report in progress, Final report is under review by the CCAUV – **Deadline for comments 21st October 2019**
- **EURAMET.AUV.V-K5** TP just reviewed by the KCWG – **Deadline for comments 19th September 2019**

Supplementary Comparisons in progress

RMO Supplementary Comparisons, in progress:

- **AFRIMETS.AUV.V-S4** TP complete (Jun/2016), Measurements in progress
- **AFRIMETS.AUV.A-S2** TP complete (Jun/2018), Measurements in progress
- **COOMET.AUV.A-S3** TP complete (Aug/2019), Measurements in progress
- **SIM.AUV.A-S2** TP complete (Aug/2018), Measurements completed, Report Draft A in progress
- **EURAMET.AUV.A-S2** Report in progress, Draft B - Comments of KCWG were reported to pilot laboratory (Dominique) on 23rd March 2019

Pilot studies

Pilot Study, published:

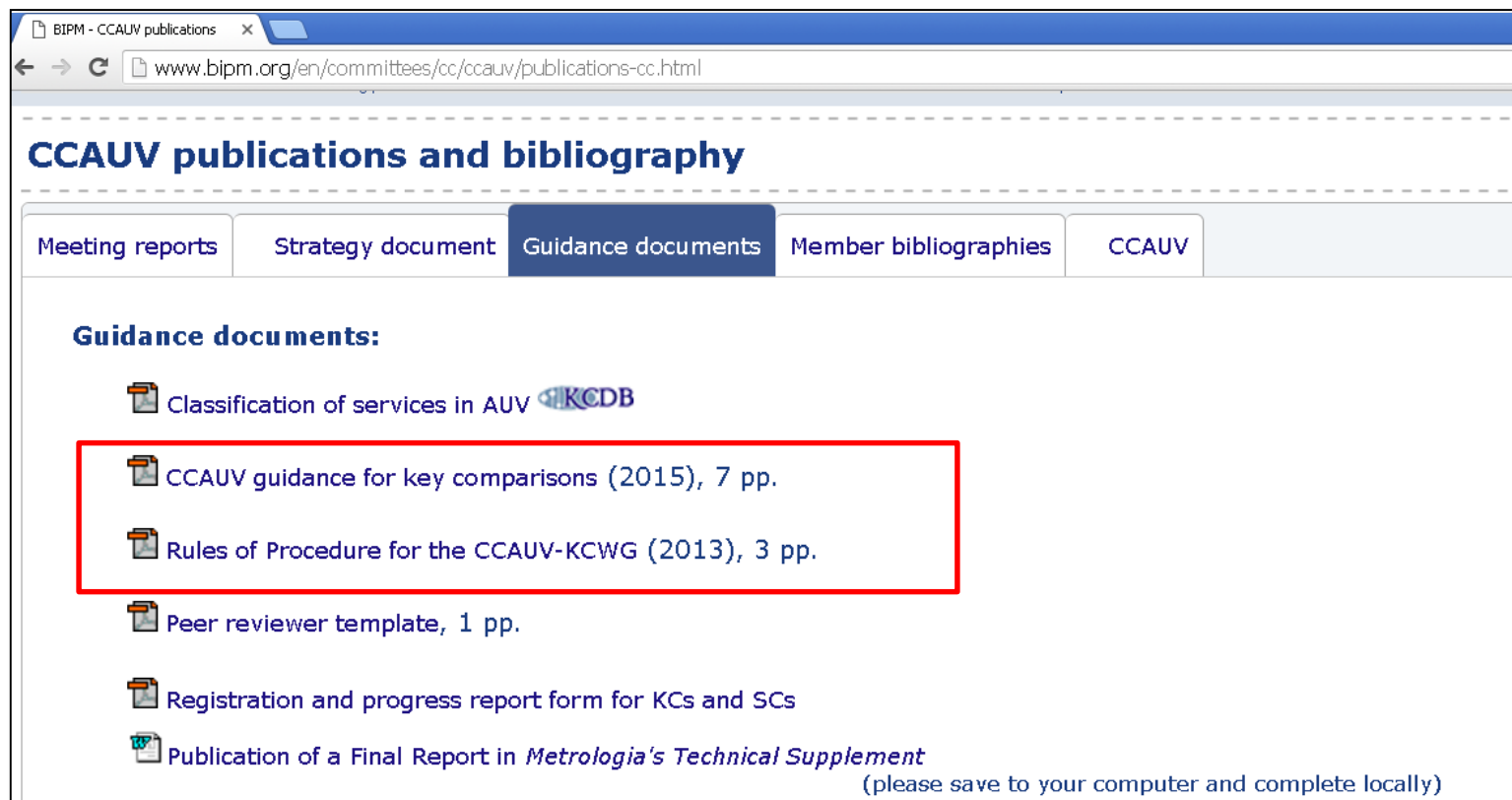
- None

Pilot Study, in progress:


- **COOMET.AUV.U-P1** Draft B Report was reviewed by the KCWG on Feb/2018 and submitted to Valentina Pozdeeva
(comparison formerly registered as COOMET.AUV.U-K3)

11) Guidance documents available

- *Guidance for carrying out key comparisons within the CCAUV*, November 2015
- *Rules of Procedure of the Key Comparison Working Group of CCAUV*, October 2013



The screenshot shows a web browser window with the address bar displaying "www.bipm.org/en/committees/cc/ccauv/publications-cc.html". The page title is "CCAUV publications and bibliography". A navigation menu includes "Meeting reports", "Strategy document", "Guidance documents" (which is highlighted), "Member bibliographies", and "CCAUV". Under the "Guidance documents" section, a list of documents is shown:

- Classification of services in AUV 
- CCAUV guidance for key comparisons (2015), 7 pp.
- Rules of Procedure for the CCAUV-KCWG (2013), 3 pp.
- Peer reviewer template, 1 pp.
- Registration and progress report form for KCs and SCs
- Publication of a Final Report in *Metrologia's Technical Supplement*
(please save to your computer and complete locally)

Proposals of updates are welcome!

12) Technical protocols x risks

- It is important to consider possible risks in advance!
- Recent Technical Protocols have implemented actions to reduce the effect of some components of influence in the uncertainty budgets and compare the best CMCs

For example:

- *CCAUV.V-K5 – use of mechanical adapter with SE accelerometers to reduce influence of shaker / mounting effects*
- *CCAUV.V-K4 – circulation of BTB accelerometer with a loading mass and requirement to measure acceleration at the centre of mass*

13) Some observations from the KCWG chair based on recent comparisons

Shock key comparison recently finished



- CCAUV.V-K4

Acoustics key comparison recently started

- CCAUV.A-K6

Low-intensity shock comparison CCAUV.V-K4

Questionnaire

Questionnaire for low intensity shock acceleration key comparison CCAUV.V-K4

Please complete this form electronically and return it to sung@nim.ac.cn by **18 January 2016**.

Laboratory name:

Contact person: **e-mail:**

I would like to participate in this key comparison
 I would not like to participate in this key comparison but nevertheless have a view on the scope

Please select your preferred parameter

	Ready now to conduct measurements	Will be ready to conduct measurements ¹	Will be unable to conduct measurements ²
Lower limit of peak acceleration ³ 500 m/s ²	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Upper limit of pulse duration ³ 3.0 ms	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Upper limit of peak acceleration ³ 5000 m/s ²	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Lower limit of pulse duration ³ 0.3 ms	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

¹ Expected measurement period start time: March 2017
² Gaussian, half-sine or half-sine squared shock pulse shape
³ Pulse duration defined as time width between rising edge point and falling edge point at 10% level of peak acceleration

Number of Transducer
 Preferred (select one option) One Two

Sensitivity
 Voltage Charge Compulsory Optional

Transducer⁴
⁴ Single-ended type
 Endevco 2276 PCB 357B03

Are the possible measurement options selected above currently performed **routinely** at your laboratory? Yes No

The amount of time you expect to complete measurement (not including time to transport the transducer) 2 weeks 3 weeks

Transportation
 Possible (can select more than one option) Courier Hand carry

Please enter any suggestions or comments here

CCAUV.V-K4Questionnaire: Issue 19/12/2015 Any queries about this form, please contact sung@nim.ac.cn



Technical protocol

Technical Protocol of CCAUV Key Comparison CCAUV.V-K4

1 Task and Purpose of the Comparison

According to the rules set up by the CIPM MRA the consultative committees of the CIPM have the responsibility to establish 'degrees of equivalence (DoE)' between the different measurement standards operated by the national NMIs. This is done by conducting key comparisons (KC) at different levels of the international metrological infrastructure.

However, in the sub-field of shock, there has been no formal key or supplementary comparison either at Consultative Committee (CC) level or Regional Metrology Organization Technical Committee (RMO TC) level at the time of this proposed comparison. Therefore during the 10th meeting of CCAUV in November 2015, the decision was taken to make preparations for a further key comparison targeted at low shock (acceleration).

In the field of shock, this key comparison is organized in order to compare primary measurements of Gaussian, half-sine or half-sine squared linear shock accelerations in the range from 500 m/s² to 5 000 m/s². It is the task of the comparison to measure shock sensitivity of an accelerometer measuring chain (a standard accelerometer (of back-to-back type) with a charge amplifier) (Accelerometer Chain) and an accelerometer (of single-ended type) at different peak acceleration values with associated pulse duration as specified in Section 3. The results of this key comparison will serve, after approval of equivalence, as the foundation at low intensity shock for the registration of 'calibration and measurement capabilities' (CMC) in the framework of the CIPM MRA.

The voltage sensitivity shall be calculated as the ratio of the peak amplitude of the Accelerometer Chain output voltage to the peak shock value at its reference surface. The shock voltage sensitivity shall be given in milli-volt per meter per second squared (mV/(m/s²)) for the different measurement conditions specified in Section 4. In addition, the charge sensitivity shall be calculated as the ratio of the peak amplitude of the accelerometer output charge to the peak shock value at its reference surface. The shock charge sensitivity shall be given in pico-Coulomb per meter per second squared (pC/(m/s²)) for the different measurement conditions specified in Section 4.

For the calibration of the Accelerometer Chain and the accelerometer, laser interferometry in compliance with method of the international standard ISO 16063-13:2001 [1] has to be applied.

The reported shock sensitivities and associated uncertainties are then supposed to be used for the calculation of the weighted mean as the key comparison reference value (KCRV) and the DoE between the participating NMI and the KCRV.

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Results spreadsheet

Results sheet for CCAUV.V-K4

Contact Person	NMI <input style="width: 90%;" type="text"/>	<input type="checkbox"/> I confirm that the data reported here has been checked against the data reported in the NMI certificate issued for the accelerometer
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Please return the completed form to sung@nim.ac.cn

No.	Recommended conditions for comparison		Actual conditions for calibration		Calibration results		Comments (Filter setting, etc)
	Peak Acceleration	Pulse Duration	Peak Acceleration	Pulse Duration	Charge Sensitivity	Rel. Expanded Uncertainty	
	in m/s ²	in ms	in m/s ²	in ms	in pC/(m/s ²)	in % (k=2)	
1	500	3.0					
2	1000	2.0					
3	2000	1.5					
4	3000	1.0					
5	4000	0.8					
6	5000	0.5					

Note1: Peak Acceleration and Pulse Duration with deviation less than ±10% are recommended.
Note2: Lower Freq. Limit of 0.1 Hz and Upper Freq. Limit of 100 kHz are recommended for charge amplifier.
Note3: Charge sensitivity with 4 digits shall be provided.

Guidelines for CCAUV.V-K4

- Technical Protocol + Results spreadsheet
 - TP: *published in the KCDB & distributed by e-mail to participants*
 - Spreadsheet : *distributed by e-mail to participants*
- Additional guidance information was included in the spreadsheet but not in the main text of the TP

Result:

- Some participants probably only saw the additional guidance after the end of measurement period, at the time of reporting results
- Some participants did not strictly follow the guidelines

Results sheet for CCAUV.V-K4 (acceleration measuring chain)

Results sheet for CCAUV.V-K4

NMI Contact Person email	<input type="checkbox"/> I confirm that the data reported here has been checked against the data reported in the NMI certificate issued for the acceleration measuring chain.
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Please return the completed form to sung@nim.ac.cn

No.	Recommended conditions for comparison				Actual conditions for calibration			Calibration results		Comments (Filter setting, etc)
	Peak Acceleration	Pulse Duration	Transducer set-up	Gain Setting	Peak Acceleration	Pulse Duration	Gain Setting	Voltage Sensitivity	Rel. Expanded Uncertainty	
	in m/s^2	in ms	in $pC/(m/s^2)$	in $mV/(m/s^2)$	in m/s^2	in ms	in $mV/(m/s^2)$	in $mV/(m/s^2)$	in % ($k=2$)	
1	500	3,0	1,0	10						
2	1000	2,0	1,0	10						
3	2000	1,5	1,0	10						
4	3000	1,0	1,0	3,16						
5	4000	0,8	1,0	3,16						
6	5000	0,5	1,0	3,16						

Note1: Peak Acceleration and Pulse Duration
Note2: Lower Freq. Limit of 0.1 Hz and
Note3: Voltage sensitivity with 4 digits
Note4: The estimated peak voltage at

Note 1– different pulse durations

Note 4 – different gain settings

Note 3

Note 2

ucer set-up and gain setting.

Additional guidance notes:

Note 1: Peak Acceleration and Pulse Duration with deviation less than $\pm 10\%$ are recommended.

Note 2: Lower Freq. Limit of 0.1 Hz and Upper Freq. Limit of 100 kHz are recommended for charge amplifier 2692.

Note 3: Voltage sensitivity with 4 digits shall be provided.

Note 4: The estimated peak voltage at peak acceleration of $2000 m/s^2$ is about 4 V under the measurement condition as the above-specified transducer set-up and gain setting.

Considerations about guidance information for comparisons

- It is important to note that guidance information are specified in order to improve the level of comparability between results and allow an Interlaboratory Comparison to support the smallest uncertainties available in a field.
- If recommended conditions are not followed by the participants then the comparison might not fit its purpose.

Suggestions for future KC, SCs

- Future Technical Protocols shall include all guidance information (measurement requirements) in the main text of the document.
- The pilot laboratory shall update the TP before circulation of the artifacts in order to include any later guidance information that can affect the results to be compared.
- Templates for reporting results are to be considered an integral part of the TP.
- Therefore, templates shall be included in the KCDB as well.
- The pilot laboratory shall release any updates of the TP and its associated documents as amendments and communicate them to all participants before starting the circulation of artifacts.
- Every participant must check the requirements stated in the latest version of the TP and its amendments published in the KCDB and in any additional document associated to it (e.g. the results spreadsheet) before starting their measurements.
- Observe carefully all guidance information, including:
 - Calibration conditions (frequencies, amplitudes, environmental conditions, etc.)
 - Instrumentation settings (filters, gain, sensitivity settings, etc.)
 - Recommended results formatting (number of decimal digits, etc.)

CCAUV.A-K6

Selected participants

Agreement to participate in CCAUV.A-K6

Name and address of laboratory

Contact person

Name:

E-mail:

Phone:

Methodology

IEC 61094-2:2009

Other (please give details in Additional Information below)

Scope

Frequency range	Sensitivity level	Sensitivity phase
2 Hz - 20 Hz (1/3 octave)		
20 Hz - 25 kHz (1/3 octave)		

Will you require an ATA Camet? Yes No

The proposed date for participation is acceptable

Additional information (specify the frequency range covered for the optional elements)

[Please return this form to dominique.rodrigues@lne.fr](mailto:dominique.rodrigues@lne.fr)

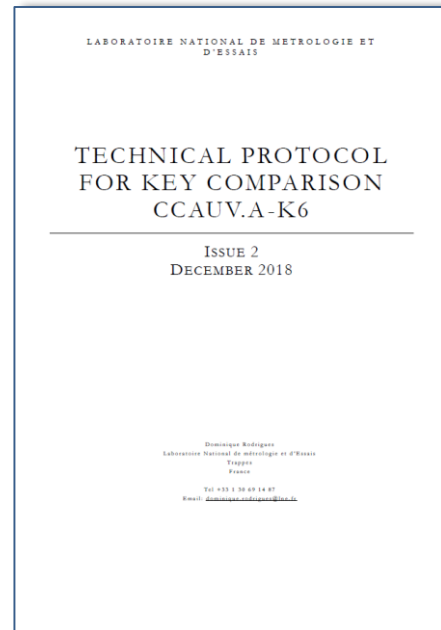
Questionnaire



Table A1 – Summary of responses from questionnaire

Responding NMI	Country/Economy	RMO	Frequency step			Phase	Selected
			1/3	1/12	LF		
BKSV-DPLA	Denmark	Euramet	●	●	●	●	●
CENAM	Mexico	SIM	●	●	●	●	●
GUM	Poland	Euramet	●	●	●	●	●
INMETRO	Brazil	SIM	●	●	●	●	●
KEBS	Kenya	AFRIMET	●	●	●	●	●
KRISS	Korea	APMP	●	●	●	●	●
LNE	France	Euramet	●	●	●	●	●
METAS	Switzerland	Euramet	●	●	●	●	●
NMC	Singapore	APMP	●	●	●	●	●
NMIA	Australia	APMP	●	●	●	○	○
NMIJ	Japan	APMP	●	●	●	●	●
NMISA	South Africa	AFRIMET	●	●	●	●	●
NRC	Canada	SIM	●	●	●	●	●
PTB	Germany	Euramet	●	●	●	●	●
UME	Turkey	Euramet	●	●	●	●	●
VNIIFTRI	Russia	COOMET	●	●	●	●	●

● Acceptable frequency ● Participation in full scope
 ● Preferred frequency resolution ○ Participation in partial scope



Technical protocol

CCAUV.A-K6

Criteria for selection of participants:

In order to constrain the duration of the key comparison, it is proposed that the maximum number of participants should be limited to 12 (excluding the pilot laboratory) and to have all RMOs represented proportionally to the number of countries providing CMCs. The number of responding laboratories therefore meant that some degree of selection was necessary.

Using the information provided in the questionnaire, the following criteria were therefore used in addition to the above, to select the final list of participants:

- Participant expects to be able to perform full proposed scope
- Participant expects to be able to perform mandatory element of scope
- Participant expects to be able to perform low frequency calibration
- Participant expects to be able to perform phase calibration
- Uncertainties of participants are within the lowest in the RMO in order to allow future linking of future subsequent regional key comparisons.
- Participant implements a unique or distinctive measurement system

Participation in CCAUV.A-K6

Outcome of the selection process

- 12 participants were selected plus the Pilot laboratory (Total = 13)

EURAMET	APMP	SIM	COOMET	AFRIMETS
BKSV-DPLA, Denmark	NMIA, Australia	CENAM, Mexico	VNIIFTRI, Russia	NMISA, South Africa
METAS, Switzerland	KRISS, Korea	INMETRO, Brazil	UME, Turkey	
GUM, Poland	NMIJ, Japan	NRC, Canada		
LNE, France*				
4	3	3	2	1

* Pilot laboratory

14) Questions from executive secretary

1) STANDARDIZED DOCUMENTS

- When a new comparison starts I usually receive a request from the pilot if some common format for TP, Draft A, Draft B documents exist.
- Do you think it is useful to work on a unique format for these documents? When a comparison is repeated it could facilitate the work of the pilot to have the previous document already accepted and approved. In general it could facilitate the revision process.
 - Can we use simpler and common format documents?

2) REGIONAL PARTICIPATION IN KCS

- When a KC starts there is not a unique way to select 3 NMI from one region following the recommendation of the CIPM MRA working group (LNE and PTB follow a different procedure). Do you think we could discuss on how this could be formalized? The concerned contact of NIM for CCAUV.A-K6 was not reached (for internal problem of NIM) and NIM is not in the list of the NMI for APMP in the KC CCAUV.A-K6.
 - Number of participants need to be limited due to time constraints!
 - Communication can be improved?
 - RMO WG subject: Participants defined by RMO or pilot laboratory following some criteria to assure RMO participation
 - KC WG priority: Participants in CIPM KCs shall have best measurement capabilities (broader scope / smallest uncertainties) to allow proper link of subsequent RMO KCs

14) Questions from executive secretary

1) STANDARDIZED DOCUMENTS

- When a new comparison starts I usually receive a request from the pilot if some common format for TP, Draft A, Draft B documents exist.
- Do you think it is useful to work on a unique format for these documents? When a comparison is repeated it could facilitate the work of the pilot to have the previous document already accepted and approved. In general it could facilitate the revision process.

– Can we use simpler and common

General guidance documents to be proposed

- **Minimum content for reports**

2) REGIONAL PARTICIPATION IN KCS

- When a KC starts there is not a unique way to select 3 NMI from one region following the recommendation of the CIPM MRA working group (LNE and PTB follow a different procedure). Do you think we could discuss on how this could be formalized? The concerned contact of NIM for CCAUV.A-K6 was not reached (for internal problem of NIM) and NIM is not in the list of the NMI for APMP in the KC CCAUV.A-K6.

- Number of participants needed
- Communication can be improved
- RMO WG subject: Participants to assure RMO participation
- KC WG priority: Participants / smallest uncertainties) to

RMO /pilot /KCWG shared responsibility?

- **NMI contact information shall be kept updated (both with RMO and CCAUV secretary)**

15) Strategic planning of CCAUV KCs (scope and periodicity of KCs)

- Periodicity of KCs: 10 years (typical)
- CCAUV KCs
 - Acoustics
 - LS1P A-K5 (pressure field w/LF)
 - LS2P A-K4 (free field) / A-K3 (pressure field), A-K6 (pressure field w/LF)
 - Vibration
 - Low-frequency V-K3
 - Mid to High frequency V-K5
 - Shock
 - Low-intensity shock V-K4
 - High-intensity shock
 - Ultrasound
 - Power U-K3
 - Hydrophone sensitivity U-K4
 - Underwater W-K2

Results of the SPWG meeting, held prior to KCWG, were adopted

16) Feedback and demands from RMOs, Pilots, etc

Important to have feedback and demands to improve the KCWG procedures

Sources:

- BIPM Guidelines, KCDB
- CCAUV president, executive secretary
- CCAUV WGs SPWG, RMOWG
- RMO TC-AUV chairs RMO KCs, linking between KCs, SCs
- Pilot laboratories Procedures, Data analysis, Reports, etc
- KCWG members Review of TPs, reports, Data analysis
- Participants in comparisons Quality of TPs, Content of reports => support to CMCs
- Other

16) Feedback and demands from RMOs, Pilots, etc

Important to have feedback and demands to improve the KCWG procedures

Sources:

- BIPM
- CCAUV
- CCAUV WGs
- RMO TC-AUV
- Pilot laborato
- KCWG memb
- Participants in
- Other

Feedback is welcome!
**KCWG is open for suggestions on
improvements to the operation and
reporting of key comparisons**

**Workshop on the topic prior to the
next CCAUV meeting**

16) Feedback and demands from RMOs, Pilots, etc

a. Hybrid comparisons

This subject is not directly related to the KCWG but with the KCDB because it acts on the level of “other technical evidence” to support CMCs.

It was agreed that this subject was to be discussed by the RMO WG

Question: Can a better naming be used instead of **Hybrid**?

- Self managed comparison
- Commercially based comparison

17) Publications of the CIPM

- Some CIPM guidelines have been developed,
<https://www.bipm.org/en/committees/cipm/other-documents-cipm.html#or>

CC WG chairpersons and deputy chairpersons are mentioned in two guidelines:

- Rules of procedure for the Consultative Committees (CCs), CC working groups and CC workshops, CIPM-D-01, 2018, 14 pp.
- Guidelines for selection of CIPM Consultative Committee Presidents, CC Working Group Chairpersons, and Working Group Deputy Chairpersons, CIPM, 2015, 5 pp.

Appointment Procedure and Term of Appointment

- A CCWG Chairperson and, as relevant, Deputy Chairperson is selected and **appointed by the CC President** concerned after the CC President has reviewed the Personal Attributes and Qualifications, while taking into account the General Considerations.
- Each CCWG Chairperson and **Deputy Chairperson** is selected/appointed to a term not to exceed **four years unless renewed**.
- The CIPM will be informed about the appointments of CCWG Chairpersons and Deputy Chairpersons by the CC President in their yearly report to the CIPM.

18) CCAUV KCWG coordination/membership

- CCAUV current chairperson Dr. Takashi Usuda, 2015-2019
 - *Appointed to CIPM Secretary, therefore will resign from CCAUV presidency after the upcoming meeting*
- CCAUV new chairperson To be elected by the CIPM, 2019-
 - *108th Meeting of the CIPM, 15-16 October 2019*
- KCWG Chairperson Dr. Gustavo Ripper, 2013-2017, 2017-**2021**
- KCWG Deputy chairperson **Position is Open for volunteers!**
- CCAUV/KCWG Executive secretary Dr. Gianna Panfilo, 2015-
- Members **New members to be added?**

18) Chairperson of KCWG

- Gustavo Ripper was reappointed as chairperson until 2021
- Appointment of a deputy chairperson

Name to be defined by CCAUV president

19) Any other business

- Status of comparisons in progress are frequently not updated

Immediate update of the comparison formular by pilot laboratories is highly recommended by the KCWG!

20) Date of next meeting

Right before next CCAUV meeting in 2021

21) Report of the KCWG to the CCAUV

22) Closing of the meeting

Thank you!