

Consultative Committee for Acoustics, Ultrasound and Vibration (CCAUVE) President J Valdés, Executive Secretary S Picard

Meets every - 2 years Last meeting - June 2012 Members/Observers 17/14	Working groups: Key Comparison (CCAUVE-KCWG); Strategic Planning (CCAUVE-SPWG); Regional Metrology Organization (CCAUVE-RMOWG)		
Comparison activity	Completed	In progress	Planned
CCAUVE KCs (& CC Supplementary)	9	3 + (1)	15
RMO KCs (& SCs)	19 + (3)	3 + (7)	No Data
BIPM comparisons (all on-going)	0	0	0
CC Pilot studies	1	0	5
CMCs	1071 CMCs in 51 service categories		

Pointers to the future, stakeholder needs and technological developments

- **Airbourne sound Healthcare (hearing assessment, product & machinery noise) and environment:** novel applications for acoustic measurement pushing the limits of frequency and dynamic range at which measurement traceability can be provided. Optical methods may provide a direct basis for traceability. Underpinning metrology for hearing assessment has not kept pace with modern audiological practices such as objective methods exploiting oto-acoustic emission and evoked brainstem response.
- **Ultrasound Healthcare (diagnostics and therapy) and industrial applications (material processing, pasteurization, cleaning):** Diagnostic tools in medicine with 250 000 ultrasound instruments and 250 million examinations per year worldwide. Novel therapeutic applications continue to emerge, supporting drug delivery concepts based on high-power ultrasound or cavitation and more extensive use of High Intensity Focused Ultrasound (HIFU) or High Intensity Therapeutic Ultrasound (HITU). Power & ultrasonic pressure are the measurands, extension of frequency range and power expected. Industrial developments are for higher frequency (>500 kHz) systems employed for fine-cleaning applications required for optical component and microelectronics manufacture. Notably, control and better understanding of cavitation severity and type (linked to process efficiency) are crucial to minimize surface damage.
- **Vibration Environment:** After major accidents due to seismic activity, improvements for earth quake monitoring sensors will provide traceability to thousands of seismometers and hundreds of observation stations in the Global Seismographic Network giving immediate alert to the population, needing calibration at ultra-low-frequencies below 0.5 Hz, even to 0.008Hz. A first vibration comparison will ensure international equivalence of vibration standards down to 0.1 Hz. **Industrial applications:** sinusoidal waveform metrology is still developing with more NMIs building capability. Established procedures are not adequate for comparisons for shock applications. Therefore some NMIs create new facilities to respond to the demand of shock/acceleration measurements in the range up to 10^5 m/s² and even beyond, required in many fields. Dynamic measurement of mechanical quantities (e.g. force and torque) establishes a new area where acceleration and angular acceleration becomes a base quantity.
- **Underwater acoustics Off shore energy (oil, gas & renewables) environment (marine noise, climate change monitoring, carbon capture/storage), defence, ocean science (including increasing legislation):** Key drivers in the future are linked to the increasing legislation with regard to assessing and mitigating the exposure of marine life to noise pollution. This problem, already subject to regulation, increases the need for absolute acoustic measurements in the ocean, and placing more stringent requirements on the underpinning metrology.

Workload Trend & Workload Management in respect to KCs

- 20 KCs/Pilot studies with proposed dates established running through to 2023 covering the 4 areas (6 sound in air, 5 ultrasound, 4 vibration, 5 underwater acoustics).
- The extension of NMI community active in AUV is a major factor, newly participating NMIs requesting comparison activity to underpin their CMCs.
- Thorough strategic planning is undertaken in terms of KC selection, and by default the original stated ideas for repeat comparisons on a 5 – 7 year timescale has not happened.
- Resources for piloting KCs varies from about 3.5 PM to about 12 PM but typically around 6 PM.
- Resources for participating in CCs is typically around 1 PM.

BIPM – references to laboratory activity at the BIPM

- BIPM has no laboratory activity in AUV. There are no suggestions in the strategy for activity at the BIPM.