Consultative Committee for Acoustics, Ultrasound and Vibration (CCAUV)
President H. Laiz, Executive Secretary G. Panfilo

Meets every - 2 years **Last meeting** – October 2023 **Members/Observers/Liaisons** 18/13/3	**Working groups**: Key Comparison (CCAUV-KCWG); Strategic Planning (CCAUV-SPWG); Regional Metrology Organization (CCAUV-RMOWG), Task Group on Digitalization (CCAUV-TG-DIG)		
Comparison activity	**Completed**	**In progress**	**Planned**
CCAUV KCs (& CC Supplementary)	19	0	18
RMO KCs (& SCs)	46	7	1
BIPM comparisons (all on-going)	0	0	0
CC Pilot studies	4	0	No data
CMCs	1257 CMC entries are published in KCDB.		

Pointers to the future, stakeholder needs and technological developments

- **Airbourne sound**

  a) Metrology infrastructure, sensors and instrumentation: Miniaturization technologies for microphones is enabling new distributed sensor applications, driving their production exceeding 2 billion units per annum, and requiring new calibration methodologies to underpin them.

  b) Hearing assessment and conservation: Development of metrology to support the investigation of the perception mechanisms will lead to a rational basis for non-audible sound assessment that is needed for technologies such as wind turbines, heat pumps, and sonochemical reactors.

  c) Product and machinery noise: New metrology is needed for acoustic signature recognition and multi-parameter and/or distributed input data-based decision making.

  d) Environmental noise assessment: Cost-effective widespread distributed noise measurement is needed. International treaties for banning nuclear testing require establishing acoustic traceability for frequencies down to 0.02 Hz.

- **Ultrasound**

  a) Medical: Applications involving the spatially and temporally-controlled application of ultrasound-induced heating or acoustic cavitation, high-frequency imaging or micro-machined transducers will come into use and bring with it a demand for underpinning metrology at various stages.

  b) Industrial: There is a need for broadband measurement methods capable of resolving non-uniformity in acoustic field distributions, providing information on the spatially-varying degree of cavitation.

- **Underwater Acoustics**

  a) Marine environmental noise pollution: Improvements in metrology infrastructure are needed for characterizing sound sources and establishing long-term monitoring to support legislative frameworks.

  b) Oceanographic science: Studies related to climate change use acoustics as a tool to probe the ocean conditions. There is also increasing interest in quantitative imaging with application to sonar.

  c) Marine energy: Metrology required for assessing marine renewable energy developments, and offshore oil and gas energy requires acoustic systems to work at greater depths and over greater ranges.

  d) Defense and security: Traceability is requested by the Comprehensive Test Ban Treaty Organization whose deep-ocean hydroacoustic listening stations operate from frequencies of 1 Hz to 100 Hz.

- **Vibration**

  a) Sinusoidal vibration: The Global Seismographic Network giving immediate alert requests calibration at ultra-low-frequencies below 0.5 Hz, and with some requirements as low as 0.008 Hz.

  b) Shock acceleration: Primary and secondary shock calibration of accelerometers in the range from 50 m/s^2 to 10^6 m/s^2 are requested.

  c) Inertial Acceleration: Miniaturization technologies for inertial measurement units is driving new applications, significant growth in their production, and needs for primary calibration technologies to support new applications. Compatibility with digital sensor interfaces is also requested; this need is recognized to be a cross-cutting need in AUV and well as other CCs.

Workload Trend and Workload Management in respect to KCs

- There is no significant work in progress for reviewing current CMCs, but plans are to pursue a risk-based assessment approach towards reviewing them in the future. The planning process for KCs involves careful deliberation to optimize resource requirements needed to respond to the needs of its stakeholders. Some mature key comparisons (KCs) have reached the stage where repeats of CC KCs, normally in a 10-year cycle, are being conducted to assess them as well as to extend their calibration range.

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.