



## **Report from APMP Technical Committee for Acoustics, Ultrasound and Vibration (TCAUV)**

Dr Prem Narang, Chair of APMP/TCAUV

### **TCAUV Membership and Meetings**

The APMP TCAUV has active members from NMIs of 11 regional economies (Australia, China, Chinese Taipei, Hong Kong, India, Indonesia, Japan, Korea, Malaysia, Singapore and Thailand) that are involved in the AUV field. Egypt, an Associate member of APMP, is now also participating in the TCAUV. The TCAUV was created in 1999 and holds annual meetings just prior to the annual APMP General Assembly meetings. The 7<sup>th</sup> TCAUV meeting was held in October 2007 in Sydney and the next meeting is due on 3-4 November 2008 in Jakarta.

### **Regional Key and supplementary Comparisons**

#### **APMP.AUV.A-K1 – Comparison of LS1P Microphone Calibrations**

This Key Comparison is now complete and the results have been published in the KCDB.

#### **APMP.AUV.A-K3 – Comparison of LS2P Microphone Calibrations**

This regional Key Comparison involves determination of pressure sensitivity of two LS2P microphones in the frequency range 63 Hz to 25 kHz with 31.5 kHz as the optional frequency. KRISS, Korea is the pilot laboratory and ten NMIs from the APMP region are participating. Draft B of the report has been reviewed by the participants and is planned to be circulated to the CCAUV members before end September 2008. The results of the comparison have been linked to the CIPM Key Comparison CCAUV.A-K3 using the linking laboratories (KRISS, NMIJ, NIM, and NMIA) by introducing correction factors. This Key Comparison, like APMP.AUV.A-K1, also utilised international delivery services for transporting microphone artefacts (rather than hand-carrying) using a specially built container lined with a cushioning material and with small holes in outer casing to prevent damage from shocks and changes in environmental conditions..

#### **APMP.AUV.A-S1 – Supplementary Comparison on Multi-frequency Sound Calibrator**

After approval of the technical protocol, this Supplementary Comparison was started on 1 September 2008. Eleven NMIs from the APMP region are participating with the NIMT, Thailand acting as the pilot laboratory. The artefact consists of a Bruel & Kjaer type 4226 multifunction acoustic calibrator. The measurands are generated sound pressure level (dB) at nominal 94 dB and 114 dB settings, output frequency (Hz) and total distortion (%). The frequencies for measurements are: 31.5, 63, 125, 250, 500, 1000, 2000, 4000, 8000, 12500 and 16000 Hz. The artefact will return to NIMT each time two participants have completed their measurements to monitor its stability. So far the NIMT has completed initial measurements and the artefact is currently with the NMIA for measurements. Expected completion date of the measurements by all eleven participating laboratories is September 2009.

### **Proposed Comparison on Ultrasound Power**

The planned APMP Key Comparison in ultrasound power measurements has been abandoned (to avoid duplication) as a corresponding CCAUV.U-K3 is being done and interested NMIs from APMP can participate in that comparison. This is possible because there are only a few NMIs in the APMP with the capability to measure ultrasound power and they can be accommodated in the CCAUV.U-K3 Key Comparison. The APMP NMIs that will be participating in the CCAUV.U-K3

comparison are: NMIJ, KRISS, NIM, NPLI and NMIA. The pilot laboratory for this Key Comparison is PTB, Germany and expected completion date of the measurements by all eleven participating laboratories is November 2010.

### **Bilateral Comparisons**

A bilateral comparison in vibration, CCAUV.V-K1.1, involving NPLI, NIM, PTB and INMETRO for the calibration of a single-ended and a back-to-back accelerometer has progressed to Draft B. The results of the report will be used as supporting evidence for CMCs of NPLI and NIM in vibration.

To support the acceptance of the CMCs of KIM-LIPI in reciprocity calibration of microphones, a recently acquired acoustics measurement capability by KIM-LIPI, two bilateral comparisons between KRISS and KIM-LIPI have been organised. The artefacts are a LS1P microphone and a LS2P microphone with the technical protocol closely following the corresponding APMP comparisons. The bilateral comparison is currently in progress.

### **CMC Reviews and Additions**

CMC submissions from NIM, China in acoustics and ultrasound been approved and published in the KCDB (Appendix C), and their vibration CMCs are to be reviewed later. The CMCs of CMS/ITRI, Chinese Taipei in shock sensitivity calibrations were also approved and are now published in the KCDB (Appendix C). With the completion of Draft B report of the APMP.AUV.A-K3, the CMCs of SCL, Hong Kong and NPLI, India will be able to proceed to the next stage of the approval process.

Technical peer reviews of KRISS, CMS/ITRI, NPLI, NMIJ (vibration) and NMIA were completed during the last 12-24 months and there were some changes in the uncertainties of measurements.

### **Other Items**

A three day APMP workshop on calibration of microphones by reciprocity and its uncertainty analysis was held at KIM-LIPI, Indonesia on 19-21 November 2007. Participants from seven NMIs with involvement in such measurements attended the workshop. A guest expert from Bruel & Kjaer, Denmark (Mr Erling Frederiksen) was also available throughout the workshop for technical discussion and delivered a number of presentations.

The Journal of Metrology Society of India published a Special Issue (Apr-Jun 2007) on Acoustics & Vibration and there were a number of technical papers on the current status of AUV metrology and/or new developments from the APMP region. I was the guest editor for the special issue.

To assist the developing economies in the APMP region acquire basic acoustic metrology capability, a project proposal was agreed at the APMP TCAUV meeting in Sydney in October 2007. It involves development of a low cost sound level meter calibration system with minimum hardware requirement but with a capability of periodic testing in accordance with the IEC 61672-3:2006 Standard. A questionnaire was sent to the technical contacts for acoustics of the developing economies in the APMP region to seek their views and interest in such an idea. Several NMIs replied that they are interested but the issues such as the cost of development and availability of funds for purchasing equipment still require resolution.

I attended the APMP TC Chairs meeting held in Dhaka, Bangladesh in May 2008. Issues discussed at the meeting included: awareness raising on the importance of national measurement system for trade and quality of life, implementation of CIPM MRA and acceptance of new RMOs in MRA, requirements for Quality System for CMC submissions, JCRB reports and actions, and issues related to linking of RMO/Supplementary Comparisons.

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