

ANNUAL REPORT

of the Chairperson of TC 1.2 «Acoustics, Ultrasound, Vibration»

1 GENERAL FEATURES OF COOPERATION IN THE SUBJECT AREA

Currently NMIs of 13 countries are represented in TC 1.2 "Acoustics, Ultrasound, Vibration".

Information about the initiative of NMIs in organizing and piloting COOMET comparisons

NMI - initiators of comparisons	NMI – Pilot laboratory							
	BY	DE	DN	RU	UA	CN	PL	TR
BY	300/BY/04 337/BY/05 369/BY/06 434/BY/08 482/BY/09			626/BY/13				
DE		226/DE/01						
RU				308/RU/04 405/RU/07 448/RU/08 473/RU-a/09 531/RU/11 561/RU/12 706/RU/16 757/RU/18 786/RU-a/19		646/RU/14		
UA		316/UA/04	323/UA/04	609/UA/13	392/UA/07 431/UA/08 535/UA/11		666/UA/15	
TR								790/TR/19

2 TC MEETINGS

The scheduled 14th meeting of TC 1.2 was held on 27 - 28 September 2019 at the premises of the National Metrology Institute of Russia - VNIIFTRI.

TC members and representatives of the NMIs of the following countries: Belarus (BelGIM), Lithuania (Vilnius Metrology Centre), China (NIM, HAARI), Russia (VNIIFTRI, VNIIM, VNIIMS), Uzbekistan (Uzbek National Institute of Metrology) took part in the meeting.

The main issues discussed:

- status of comparisons (COOMET and CC AUV);
- proposals to COOMET Program of comparisons;
- prospects for preparation of CMC on the basis of the results of completed and published comparisons and organization of new comparisons;
- implementation of the resolutions of TC 1.2 meetings (11th to 13th);
- information on the recent ISO TC43 and IEC TC87 meetings and on standards under development and proposed for development;
- resolutions of the 29th COOMET Committee meeting, primarily those, directly relating to the activities of technical committees.

Considerable attention was paid to the subject of hybrid comparisons, presented by a representative from APMP during the COOMET Committee meeting in April 2019 in Dresden, Germany. As a result of the discussion proposals from TC 1.2 were prepared and forwarded to the JCMS Chairperson.

The participants of the meeting discussed new proposals to the COOMET Program of comparisons. It was decided to organize two comparisons in the field of audiometry. The first one is the calibration of a tone audiometer; currently the NMIs of Russia, Belarus and Lithuania expressed their wish to take part in the comparisons. The second one is the calibration of impedansometers and artificial ears; Russia and China are potential participants of the comparisons. The possibility of cooperation of Russia and China in the field of angular vibration was discussed.

It was also decided to organize pilot comparisons in the field of measuring parameters of an ultrasonic field in aqueous media. Russia and China are potential participants of the comparisons.

Planned COOMET comparisons are generally linked to the CCAUV development strategy for 2017-2027.

During the TC meeting a **Seminar on the current issues of metrology, problems, state and development of measurements in the field of acoustics, ultrasound and vibration in countries/regional centers, represented in COOMET**, was held.

At the seminar reports were presented on the current trends of metrological control in the AUV field.

The most interesting of them included reports on new methods for low frequency vibration measurements using computer vision technologies («New methods for low frequency vibration calibration»), new methods for ultrasound microphone calibration using lasers («Feasibility discussion on airborne ultrasound microphone calibration using photon correlation in free-field conditions»), new application of medical ultrasound (contact lithotripters, weak-focusing emitters) and problems of metrological support.



*Participants of the 14-th TC 1.2 meeting, VNIIFTRI, Russia, September 2019
Belarus, Lithuania, China, Russia, Uzbekistan*

3 STATUS OF COOMET PROJECTS IN THE FIELD OF "AUV"

Comparisons, completed in 2019

Project №	Title of the project	Project code in KCDB	Project coordinator	Status
646/RU/14	Comparisons of national measurement standards for the unit of aqueous medium particle velocity	pilot	Isaev A. E. VNIIFTRI, Russia	The report is published on the TC 1.2 page; in the journal «Measurement Techniques» №7-2019 Participants of the comparisons: VNIIFTRI, Russia HAARI, China

Comparisons in progress

Project №	Title of the project	Project code in KCDB	Project coordinator	Status
706/RU/16	Comparison of longitudinal ultrasonic wave propagation velocity in solid media	pilot	V.A. Lugovoi Far East branch of FGUP «VNIIFTRI»	At a measurement stage. Participants of the comparisons: BelGIM, Belarus FEB VNIIFTRI, Russia Ukrmetrteststandart, Dneprstandartmetrologiya, Ukraine NIM, China
757/RU/18	Comparisons of national measurement standards for the unit of sound pressure in the air in the frequency range from 0,1 to 100 Hz	COOMET. AUV.A-S3	A. Nikolaenko VNIIFTRI, Russia	At a measurement stage. Participants of the comparisons: BelGIM, Belarus VNIIFTRI, Russia DNDI, Ukraine NIM, China TÜBİTAK UME, Turkey

Planned comparisons

Project №	Title of the project	Project code in KCDB	Project coordinator	Status
790/TR/19	Calibration of sound calibrators	supplementary	E. Sadikoglu TÜBİTAK UME, Turkey	Participants of the comparisons: TÜBİTAK UME, Turkey BelGIM, Belarus VMC, Lithuania VNIIFTRI, Russia NSAI-NML, Ireland DNDI, Ukraine SASO-NMCC, Saudi Arabia Monitoring of calibrator stability and preparation of a technical protocol

786/RU-a/19	Comparisons of the results of amplitude-phase calibrations of hydrophones in the frequency range from 10 kHz to 500 kHz	pilot	Chen Yi HAARI, China	At the stage of a draft Technical protocol preparation <i>Participants of the comparisons:</i> VNIIFTRI, Russia HAARI, China
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4 STATUS OF AUV CMCs OF COOMET NMIs

Information on AUV CMCs of COOMET National Metrology Institutes, published in KCDB

CMC AUV	Date of publication in KCDB	NMI	Number of published entries
COOMET.AUV.1.2001 COOMET.AUV.5.2009	2002-06-07 2009-09-18	VNIIFTRI, Russia	72
COOMET.AUV.2.2003 COOMET.AUV.7.2014 COOMET.AUV.9.2017	2004-04-07 2015-01-27 2018-01-17	BelGIM, Belarus	31
COOMET.AUV.3.2005 COOMET.AUV.4.2007 COOMET.AUV.6.2011 COOMET.AUV.7.2014 COOMET.AUV.8.2007	2005-08-31 2008-01-09 2011-10-05 2015-01-27 2017.09.21	DP NDI «Systema», Ukraine	30

5 PARTICIPATION OF COOMET IN INTERREGIONAL REVIEW OF CMCs

During the reporting period the TC took part in the interregional review of the following CMCs:

- EURAMET.AUV.18.2018 (published on 2019.04.30);
- EURAMET.AUV.21.2019 (consideration completed on 2019.09);
- EURAMET.AUV.20.2019 (consideration completed on 2019.12);
- APMP.AUV.14.2018 (published on 2019.05.09);
- ARMP.AUV.15.2019 (under reconsideration);
- SIM.AUV.4.2019 (under reconsideration).

6 COOPERATION WITH INTERNATIONAL AND REGIONAL ORGANIZATIONS IN THE FIELD OF AUV

6.1 During the reporting period TC representatives took part:

- in the meeting of the TC “Acoustics. Ultrasound. Vibration” of EURAMET, PTB, Germany (April 2019);
- in the meeting of IEC TC87, «Ultrasonics», Shanghai, China (October 2019);
- in the meetings of CCAUV and its working groups: on Strategic Planning, for Key Comparisons, for RMO Coordination, Paris, France (September 2019);
- in the meeting of IEC TC 29 "Electroacoustics", Warsaw, Poland (March 2020);

6.2 Participation in international and national conferences and seminars

- Seminar on «Diagnosis and examination on the basis of AUV measurements, BIPM, Paris, France (September 2019);
- International scientific and practical conference "Environmental, industrial and energy safety" Sevastopol, Russia (September 2019);
- International conference of metrologists ICM-2019, Lviv, Ukraine (September 2019);
- 20th meeting of the COOMET Quality Forum, UME, Turkey (30.09.2019-02.10.2019);
- Conference and exhibition on underwater acoustics UACE 2019, Greece (June 2019);
- Seminar on the topic "Redefinition of the International System of Units (SI)", VNIIM named after D.I. Mendeleev, Saint-Petersburg, Russia (October 2019).

In 2020 it's planned to attend:

- the meeting of the TC "Acoustics. Ultrasound. Vibration" of EURAMET, Bern, Switzerland (April 2020);
- the meeting of ISO/TC43/SC3 "Hydroacoustics", Paris, France (June 2020);
- the meeting of IEC/TC87 "Ultrasonics", Madrid, Spain (June 2020);
- the training seminar of BIPM-COOMET on KCDB 2.0 within the framework of the Program BIPM CB&KT, BelGIM, Minsk, Belarus (2020);
- the XV All-Russian conference «Applied Technologies of Hydroacoustics and Hydrophysics» GA-2020, Saint-Petersburg (May 2020);
- the 4th international conference «Ultrasonics-2020», Lisbon (June 2020);
- the international scientific and practical conference and exhibition «Sensor and Measurement Science International» (SMSI 2020), (June 2020);
- the international scientific and practical conference «ENVIRONMENTAL, INDUSTRIAL AND ENERGY SAFETY -2020», Sevastopol (September 2020);
- the XII international scientific and technical conference «Metrology and Measuring Equipment» («Metrology-2020»), National Scientific Center «Institute of metrology», Kharkiv, Ukraine (October 2020).

7 PROSPECTS

1. Creation and upgrade of national measurement standards

VNIIFTRI: An improved State primary measurement standard of the unit of ultrasound power in water GET 169-2019 was put into operation with an extended dynamic range of reproduction and transmission of the power unit (was: from 5 mW to 12 W; has become: from 1 mW to 200 W) and with a raised upper limit of the frequency range from 12 to 20 MHz.

TÜBİTAK UME: The system for calibrating microphones by a reciprocity method based on the PULSE LAN-X analyzer was updated, which allowed to extend the frequency range to infrasound area (from 0.4 Hz); a system for calibrating accelerometers and other vibration sensors according to ISO 16063-11; a new measurement standard was put into operation- the measurement standard of the impact unit in the interval from 50 m/s² to 20 km/s², providing the calibration according to ISO 16063-13.

2. Ongoing and completed comparisons of the RMO and CCAUV.