



# **Report of Secretariat**

## **Annual Reports of Structural Bodies**

### **Members of Structural Bodies**

**For 20<sup>th</sup> meeting of COOMET Committee**

21-22 April 2010  
Astana, Kazakhstan



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Report of COOMET Secretariat (May 2009 – April 2010)  
**COOMET-20/05.1 (1\_En)**

Annual Reports of Chairpersons of COOMET Structural Bodies (2009)  
**COOMET-20/5.2 (En)**

Members of COOMET Structural Bodies  
**COOMET-20/10.1 (1\_En)**

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**COOMET-20/05.1**

**Report  
of COOMET Secretariat**

**May 2009 – April 2010**



## REPORT OF COOMET SECRETARIAT (as of 31 March 2010)

The activity of COOMET in 2009–2010 was performed in all main areas and subject fields of cooperation stipulated in the Memorandum of Understanding and aimed at the implementation of the COOMET Development Programme for 2008-2010.

The brief information summing up the results of cooperation is given below.

### 1. General characteristic of the activity

Report on the progress of work with regard to the fields of COOMET cooperation was prepared by the Secretariat in accordance with the materials submitted by the Chairpersons of Structural Bodies (COOMET-20/05.2 (1)) and COOMET Member Countries.

#### 1.1. Information on the implementation of COOMET projects

The total number of projects proposed as of 31 March 2010 is **495**.

The lists of agreed, proposed and completed projects of COOMET, statistical information on the status of projects, dynamics of the number of proposed projects, distribution of projects in accordance with the fields of cooperation and coordinating countries are given in *Appendix 1*.

Nowadays the work on **87 agreed projects** (6 of which are on-going) is being carried out.

**95 proposed projects** are under agreement.

Since the 19<sup>th</sup> COOMET Committee Meeting **24 new projects** were proposed, **6** of which are from the area of “Thermometry and Thermal Physics”, **4 projects** are from the area of “Physical Chemistry”, **3 projects** are in each of the areas of “Training and Raising the Proficiency Level of Experts” and “Acoustics, Ultrasound, Vibration”, **2 projects** are in the area of “Reference Materials”, **1 project** is in each of the areas of “Legal Metrology”, “Ionizing Radiation and Radioactivity”, “Flow Measurement”, “Length and Angle”, “Electricity and Magnetism” and “Research and Development”.

14 projects were proposed by Russia; 5 projects – by Ukraine; 1 project – by Armenia, Belarus, Germany, Georgia and Moldova each.

**13 proposed projects** are related with regional comparisons of measurement standards of physical units. **6 projects** are aimed at the organization of the meetings of the Structural Bodies as well as events within COOMET; **2 projects** aim at the elaboration and testing of reference materials; **1 project** is in each of the following activities: development of COOMET documents, creation of a COOMET webportal, development of a conception for joint research in metrology in COOMET member countries.

During the reporting period **14 projects were agreed**, 7 of them are related with the arrangement of comparisons in various subject fields (AUV, F, EM, RM),

included into the Programme of Comparisons of Measurement Standards of COOMET NMIs.

The total *number of projects completed* during the reporting period is **14** aimed at carrying out comparisons of measurement standards of COOMET NMIs, developing reference materials and holding meetings of the Structural Bodies of COOMET (the full list of completed projects is given in part 3 of *Appendix 1* of this report).

## 1.2. Implementation of the CIPM MRA

**4259** CMC lines declared by NMIs of COOMET member countries were published in the KCDB as of 29 March, 2010, including by countries and types of measurements:

Country	Total	AUV	L	TF	T	PR	M	EM	RI	QM
Belarus	101	8	13		8	3	2	12	51	4
Bulgaria	190	30	9	16	24	8	24	69	7	3
Germany	1696	76	88	25	68	66	209	334	237	593
Georgia	0									
Kazakhstan	0									
Cuba	63						12		51	
Lithuania	85		9	16	6		21	33		
Moldova	0									
Russia	1413	72	19	36	137	44	59	325	329	392
Romania	227	8	15	9	24	8	30	98	34	1
Slovakia	401	6	22	16	70	11	53	79	76	68
Ukraine	83	15	25	17			3	14		9

Belarus, Georgia, Kazakhstan, Cuba, Moldova, Russia, Ukraine declare their CMCs through COOMET. The rest of the countries make their declaration through EURAMET.

The activity of the Structural Bodies of COOMET related with the following is aimed at the implementation of the CIPM MRA:

1. Implementation of the Programme of Comparisons of Measurement Standards of COOMET NMIs;
2. Preparation and review of CMCs;
3. Carrying out of the evaluation of QMS of COOMET NMIs;
4. Development of new COOMET publications and updating of old publications.

## 2. Meetings of COOMET bodies

The following meetings were held in the reporting period (May 2009 – April 2010):

**In 2009:**

- 19<sup>th</sup> meeting of **COOMET Committee**  
(20–21 May 2010, Baku, Azerbaijan);
- 14<sup>th</sup> meeting of **COOMET President’s Council**  
(17–18 November 2009, Braunschweig, Germany).

Meetings of the **Technical Committees** of COOMET:

- **TC 1.1** “General Metrology”  
(2 July 2009, Saint-Petersburg, Russia);
- **TC 1.4** “Flow Measurement”  
(10–15 October 2009, Chisinau, Moldova);
- **TC 1.5** “Length and Angle”  
(11–12 November 2009, Saint-Petersburg, Russia);
- **TC 1.6** “Mass and Related Quantities”  
(29–30 September 2009, Bratislava, Slovakia);
- **TC 1.9** “Ionizing Radiation and Radioactivity”  
(21–22 October 2009, Chisinau, Moldova);
- **TC 1.10** “Thermometry and Thermal Physics”  
(14 October 2009, Kharkov, Ukraine);
- **TC 1.12** “Reference Materials”  
(13–15 October 2009, Minsk, Belarus);
- **TC 2** “Legal Metrology”  
(15–16 September 2009, Vilnius, Lithuania);
- **TC 3.1** “Technical Committee for Quality Forum”  
(4 December 2009, Chisinau, Moldova).

**In 2010:**

- 8<sup>th</sup> meeting of the **Joint Committee for Measurement Standards**  
(20 April 2010, Astana, Kazakhstan).

Meetings of the **Technical Committees** of COOMET:

- **TC 1.7** “Photometry and Radiometry”  
(30 March – 1 April 2010, Saint-Petersburg, Russia).

The Secretariat keeps and updates the Schedule of Meetings of COOMET Bodies for 2010 (*Appendix 2*).

A number of meetings are planned to be held by the end of 2010. They are in particular:

- 15<sup>th</sup> meeting of **COOMET President’s Council**  
(November 2010, Belarus).

Meetings of the **Technical Committees** of COOMET:

- **TC 1.1** “General Metrology”  
(11 October 2010, Kharkov, Ukraine);
- **TC 1.2** “Acoustics, Ultrasound and Vibration”  
(May 2010, Lvov, Ukraine);
- **TC 1.3** “Electricity and Magnetism”  
(22–23 September 2010, Chisinau, Moldova);
- **TC 1.4** “Flow Measurement”  
(25–28 October 2010, Astana, Kazakhstan);
- **TC 1.5** “Length and Angle”  
(September 2010, Astana, Kazakhstan);
- **TC 1.6** “Mass and Related Quantities”  
(21–24 September 2010, Kyiv, Ukraine);
- **TK 1.8** “Physical Chemistry”  
(16–17 September 2010, Saint-Petersburg, Russia);
- **TC 1.10** “Thermometry and Thermal Physics”  
(October 2010, Chisinau, Moldova);
- **TC 1.12** “Reference Materials”  
(September–October 2010, Yerevan, Armenia);
- **TC 2** “Legal Metrology”  
(29–30 September 2010, Bratislava, Slovakia);

The dates of the meetings of **TC 1.9** “Ionizing Radiation and Radioactivity”, **TC 1.11** “Time and Frequency”, **Quality Forum (QF)**, **TC 3.1** “Technical Committee for Quality Forum” and **TC 4** “Information and Training” to be held in 2009 are being specified.

The information on the meetings of COOMET Bodies can be found on [www.coomet.org](http://www.coomet.org).

### **3. Establishment of the Structural Bodies of COOMET**

In 2009–2010 the activity on the establishment of Structural Bodies of COOMET continued within the on-going agreed COOMET Project 274/BY/03 “Establishment of the Structural Bodies of COOMET”.

The information on the staffs of bodies, nominees for the positions of the chairpersons of their subcommittees submitted for the approval of the COOMET Committee will be considered within the relevant items of the Agenda.

## **4. Information activity**

### **4.1. Preparation and publication of the COOMET Directory**

The Secretariat updated the information contained in the Directory (as of 31 March, 2010). The draft electronic version of the COOMET Directory 2010 can

be found on [www.coomet.org](http://www.coomet.org) and on the CD included in the set of documents of the meeting. The hardcopy of the Directory will be distributed after the COOMET Committee approves the proposed changes in the structural bodies.

#### 4.2. Development and registration of COOMET publications

In accordance with the resolutions of the 19<sup>th</sup> COOMET Committee Meeting the following new publications were registered and posted on [www.coomet.org](http://www.coomet.org):

No.	Publication	Designation
1.	<b>Recommendation</b> “State System of Measurement Uniformity Assurance. Measurement Scales. Terms and Definitions”	<b>COOMET R/GM/20:2009</b>

The following publications updated in 2009–2010 were also posted on [www.coomet.org](http://www.coomet.org):

- **COOMET D1:2009:** “COOMET Memorandum of Understanding”;
- **COOMET D2:2009:** “COOMET Rules of Procedure”;
- **COOMET D9:2010:** “Programme of Comparisons of the Measurement Standards of COOMET NMIs (as of 15 December 2009)”;
- **COOMET I/RM/2:2009:** “Register of Certified Reference Materials of Composition and Properties of Substances and Materials Developed within COOMET” (as of 30 September 2009).

The drafts of 8 revised COOMET documents and publications were put on the agenda of the 20<sup>th</sup> COOMET Committee Meeting.

#### 4.3. Maintenance of the COOMET Website

The COOMET Website ([www.coomet.org](http://www.coomet.org)) is maintained by the experts of VNIIFTRI (Administrator – V. Bugayev); the page of the COOMET Quality Forum is updated by the experts of Slovak Metrology Institute.

The COOMET Secretariat together with the Website Administrator performs constant updating of the information posted on the COOMET Website (the database on the COOMET Projects, information on the COOMET Committee Members, Chairpersons of the Structural Bodies, COOMET Publications, etc.). The CMC database was being updated in accordance with *Appendix C* of the KCDB.

In accordance with the resolution of the 19th COOMET Committee Meeting COOMET Project 478/UA/09 on creation of a working COOMET webportal was registered. The activities on the development of an interaction structure and design of the portal were performed within the project.

A workshop for on-line editors of the new COOMET webportal was held (18–23 March 2010, Braunschweig, Germany).

#### 4.4. Reports and information on the COOMET activity

The COOMET Secretariat prepared **presentations and reports on the COOMET activity** for the following meetings:

- 3<sup>rd</sup> General Assembly of EURAMET (8–10 June 2009);
- NCSLI International Conference “Metrology Impact on Global Trade” (26–30 July 2009);
- International Seminar within COOMET “10 Years to the CIPM MRA: Results and Prospects of Cooperation” (22 September 2009);
- 23<sup>rd</sup> meeting of JCRB (23–24 September 2009);
- Round Table of Regional Legal Metrology Organizations within the 44<sup>th</sup> meeting of CIML (26–30 October 2009);
- 25<sup>th</sup> General Assembly of APMP (17–18 December 2009);
- Meeting of the Technical Committee for Quality (TCQS) of APMP (14 December 2009);
- 19<sup>th</sup> meeting of Developing Economies’ Committee (DEC) of APMP (15 December 2009);
- 24<sup>th</sup> meeting of JCRB (16–17 March 2010).

The reports on the COOMET activity with regard to the implementation of the CIPM MRA for the 23<sup>rd</sup> and 24<sup>th</sup> meetings of JCRB were prepared by Vice-President S. Musil, Head of Secretariat P. Neyezhnikov and Chairperson of the Joint Committee for Measurement Standards S. Korostin.

COOMET Secretariat together with the National Secretariat of COOMET in Germany prepared and published “Support of Cooperation among COOMET Member Countries” booklet for NCSLI international conference.

According to the information received by the COOMET Secretariat articles about the events held under the aegis of COOMET appeared in the national publications of Belarus, Kazakhstan, Russia, and Ukraine during 2009–2010.

#### 5. Participation of COOMET representatives in international and national metrology event

Since the 19<sup>th</sup> COOMET Committee Meeting the official representatives of COOMET took part in the meetings of the following international metrology organizations at which they presented information on the COOMET activities:

**In 2009–2010:**

- 3<sup>rd</sup> General Assembly of EURAMET  
(8–10 June 2009, San Anton, Malta):  
*COOMET representative – P.Neyezhnikov (Ukraine);*
- NCSLI International Conference “Metrology Impact on Global Trade”  
(26–30 July 2009, San Antonio, USA):  
*COOMET representative – P.Neyezhnikov (Ukraine);*
- 23<sup>rd</sup> meeting of JCRB  
(23–24 September 2009, Kazan, Russia)  
*COOMET representative – V.Krutikov, S.Korostin, S.Komissarov (Russia), S.Musil (Slovakia), P.Neyezhnikov (Ukraine);*
- Round Table of Regional Legal Metrology Organizations within the 44<sup>th</sup> meeting of CIML  
(26–30 October 2009, Mombassa, Kenya):  
*COOMET representative – G.Sydorenko, T.Omielicheva (Ukraine), L.Issaev, S.Kononogov, S.Komissarov (Russia), V.Mikhalchenko, Zh.Eleusizova (Kazakhstan);*
- 24<sup>th</sup> meeting of JCRB  
(16–17 March 2010, Paris, France):  
*COOMET representative – P.Neyezhnikov (Ukraine), S.Korostin, S.Komissarov (Russia);*
- 25<sup>th</sup> General Assembly of APMP  
(17–18 December 2009, Kuala-Lumpur, Malaysia):  
*COOMET representative – P.Neyezhnikov (Ukraine).*

COOMET representatives participated in the meetings of Consultative Committees and Working Groups in the following subject fields: meeting of APMP TCQS (14 December 2009, Kuala-Lumpur, Malaysia), 19<sup>th</sup> meeting of - Developing Economies’ Committee (DEC) of APMP (15 December 2009, Kuala-Lumpur, Malaysia), meeting of EURAMET TC for Quality (24–25 February 2010, Brussels, Belgium).

Representatives of the metrological organizations of COOMET member countries also participated in the following international meetings:

- 29<sup>th</sup> meeting of NTCMetr of EASC  
(16–17 April 2009, Minsk, Belarus);
- 25<sup>th</sup> meeting of WELMEC Committee  
(7–8 May 2009, Rotterdam, the Netherlands);
- 32<sup>nd</sup> meeting of ISO/REMCO  
(3–6 July 2009, Teddington, Great Britain);
- 30<sup>th</sup> meeting of NTCMetr of EASC  
(29–30 September 2009, Mendeleyevo, Russia);

- 36<sup>th</sup> meeting of EASC  
(10–12 November 2009, Saint-Petersburg, Russia).

as well as in a number of international and national conferences and workshops on metrological problems among which are:

- International Workshop “ISO 17025. General Requirements to Competence of Testing and Calibration Laboratories” and “Measurement Uncertainty” organised by the Inter-Regional Standardization Association (IRSA) (February 2009, Gebze, Turkey);
- International Seminar “Mathematical, Statistic and Computer Support of Measurement Quality” (30 June – 2 July 2009, Saint-Petersburg, Russia);
- NCSLI International Conference (26–30 July 2009, San-Antonio, USA);
- NCSLI International Exhibition (26–29 July 2009, San-Antonio, USA);
- International Seminar “Support of Quality Infrastructure in the Central Asia” (7–11 September 2009, Bangkok, Thailand);
- 12<sup>th</sup> meeting of NMIs directors and symposium on occasion of the 10<sup>th</sup> anniversary of the CIPM MRA (7 October 2009, Paris, France);
- International Seminar “Resistance Thermometers, Thermometer Sets for Differential Temperature Measurements. Production, Standardization, Verification, Operation” (10–12 November 2009, Saint-Petersburg, Russia);
- Metrological Symposium (16 December 2009, Kuala-Lumpur, Malaysia);
- EURAMET-WELMEC Workshop “Metrology and Conformity Assessment” (1–2 March 2010, Brussels, Belgium).

The following documents were prepared and sent to the participants of the cooperation by the Secretariat:

- schedule of the meetings of governing bodies of international organizations for 2010;
- schedule of the meetings of governing and working bodies of regional organizations for 2010;
- schedule of international conferences, symposiums and workshops on metrological problems for 2010.

The information can be found on [www.coomet.org](http://www.coomet.org).

## **6. Training and professional development of experts in metrology**

The following events were held in 2008–2009:

## 6.1. Conferences and workshops under the aegis of COOMET

1. International Workshop “Calibration, Verification, Traceability” within COOMET SC 4.5 “Support in Developing the Basic Metrological Infrastructure of COOMET Member Countries” (14–16 July 2009, Yerevan, Armenia).
2. International Seminar “10 Years to the CIPM MRA: Results and Prospects of Cooperation” within COOMET (22 September 2009, Kazan, Russia).
3. International Workshop “Implementation of Quality Management Systems in NMIs according to ISO/IEC 17025” within COOMET SC 4.5 “Support in Developing the Basic Metrological Infrastructure of COOMET Member Countries” (14–15 October 2009, Tbilisi, Georgia).
4. Training workshop for COOMET auditors carrying out peer reviews of Quality Management Systems of NMIs (peer review) according to ISO/IEC 17025 (1–3 December 2009, Chisinau, Moldova).
5. Training workshop for on-line editors of the new COOMET webportal (18–23 March 2010, Braunschweig, Germany).

## 6.2. Training and probation of experts

In accordance with information received by the Secretariat the following events on raising the proficiency level of experts in metrology were held in the reporting period:

### Azerbaijan:

- experts from Azstandart Committee raised their professional skills at BELGIM, Belarus, in metrology control at enterprises;
- an employee of NMC at Azstandart Committee was probated at the National Production Enterprise Mars-Energo, Saint-Petersburg, Russia, and learned the operation of an automated three-phase stationary installation for verifying energy meters and UPPU-VE 3.1K energy measuring instruments;
- representatives of PTB, Germany, conducted workshops on
  - Implementation of Quality Management Systems at NMIs in accordance with ISO/IEC 17025;
  - 2004/108/EC Directive for Electromagnetic Compatibility;
  - Legal Metrology.

### Belarus:

- Georgian experts visited BELGIM in December 2009;
- two experts from Azerbaijan were trained on professional development courses in IPKPK BNTU in November 2009;
- two experts from Azerbaijan visited BELGIM in 2010.

Kazakhstan:

- participated in the training course for time and frequency measurement standard within APMP (16–23 October 2009, Tokyo, Japan);

Kyrgyzstan:

- more than 40 experts were trained at the Professional Development and Retraining Centre in 2009;
- six metrology experts from economic entities were qualified as measuring instrument verifiers;
- four experts from CSM were trained in Germany in the area of mass and temperature measurements within the World Bank Project for elimination of technical barriers to enterprise and trade;

Tajikistan:

- five experts from Tajikstandart were trained in accordance with ISO 17025 in Turkey (Turkish Institute of Standards) in 2009;
- eight experts participated in training workshops on ISO 17025 and interlaboratory comparisons organised within PTB regional project (17–20 March 2009, Almaty, Kazakhstan; 29 March 2009, Bishkek, Kyrgyzstan; 12–14 October 2009, Bishkek, Kyrgyzstan);

Ukraine:

- a seminar of flow measurement within Twinning project (TACIS) was held at the NSC “Institute of Metrology” in April 2009;
- experts of DP “Ukrmetrteststandart” visited PTB, BAM (Germany) on 23–27 November 2009 for the purpose of extending the cooperation and exchanging knowledge in metrological assurance of measurements of the composition, properties and amount of substances and materials.

In conclusion, I would like to thank all of the participants of cooperation within COOMET who provided the COOMET Secretariat with the information for this report.

Dr Pavel Neyezhnikov  
Head of COOMET Secretariat

**DESCRIPTION OF THE SCOPE OF COOMET COOPERATION****1. List of agreed COOMET projects**  
(as of 31 March 2010)

No.	Project	Sub. field	Name
1.	<b>12/RU-a/92</b>	TF	ERP determination on the basis of data from observatories of COOMET countries
2.	<b>15/RU-a/92</b>	TF	Intercomparisons of the National Time Scales.
3.	<b>17/RU-a/92</b>	TF	Research into the primary caesium standards
4.	<b>157/UA-a/97</b>	PR	Creation and comparison of high precision transducers for measurement of energy and power of high level laser radiation
5.	<b>168/RU-a/98</b>	PR	A status of a measurement standards base in the field of photometry and radiometry for the countries-members of COOMET
6.	<b>169/UA-a/98</b>	RI	Rn - 222 volume activity in air measurement means comparison
7.	<b>170/UA-a/98</b>	EM	The state of the standard base of the countries-participants of COOMET on the basic electric quantities
8.	<b>174/RU-a/99</b>	TF	A status of a measurement standards base in the field of time and frequency for the countries-members of COOMET
9.	<b>175/RU-a/99</b>	RI	A status of a measurement standard base in the field of ionizing radiation and radioactivity for the countries - members of COOMET
10.	<b>186/RU-a/99</b>	RM	Development of the Programme of RM joint production within COOMET
11.	<b>190/RU-a/99</b>	F	Recommendations on Measurements of Quantity both Quality of Oil and Petroleum using dynamic and static methods
12.	<b>191/RU-a/99</b>	F	Condition of Standard Base of the Countries Being COOMET- Members in the Field of Flowmetering and Quantity Measurement of Gas
13.	<b>192/RU-a/99</b>	F	Working Out the Recommendations on Check, Metrological Approving and Calibration of Sampling Systems for Oil and Petroleum
14.	<b>206/RU-a/00</b>	LM	The analysis of the acts on metrology and preparation of the proposals on harmonisation of the requirements, rules and norms.
15.	<b>211/RU-a/00/06</b>	QM	Carrying out interlaboratory comparisons on the determination of toxic microimpurities in vodkas
16.	<b>221/RU-a/00</b>	L	Metrological assurance of uniformity of measurements of deviations from straightness and flatness
17.	<b>222/RU-a/01</b>	PR	Development of new methods and new types of high precision measuring instruments for measuring irradiance in the range from 200 to 400 nm

No.	Project	Sub. field	Name
18.	<b>223/RU-a/01</b>	PR	Comparison of standard measuring instruments to measure optical fiber parameters
19.	<b>224/RU-a/01</b>	PR	Improvement of a metrological assurance system of instruments for measuring optical radiation average power in FOTS
20.	<b>225/RU-a/01</b>	PR	Comparisons of national measurement standards of the unit of optical radiation average power in FOTS
21.	<b>226/DE-a/01</b>	AUV	Pressure reciprocity calibration of LS1P microphones
22.	<b>228/UA-a/01</b>	T	Comparisons of national standards of the unit of combustion energy
23.	<b>230/SK-a/01</b>	AS	Interpretation and implementation of the quality systems of COOMET members RMOs in conformity with the ISO 17025 (INSISK)
24.	<b>234/BY-a/01</b>	AUV	Setting up a COOMET Working Group with the purpose to participate in the review of CMC data in the subject field "AUV"
25.	<b>235/RU-a/01</b>	M	Mutual Comparisons of the National and Secondary Standards of Pressure in the Field of Low Absolute Pressure in the Range $10^{-2}$ -1000 Pa
26.	<b>257/SK-a/02</b>	M	Mutual Comparisons of the results of calibration of 1 kg stainless steel mass standards
27.	<b>265/UA-a/02</b>	L	Conducting of comparisons of highest accuracy interferometers for gauge blocks measurements
28.	<b>271/RU-a/03</b>	GM	Elaboration of the Program of COOMET comparisons and calibrations
29.	<b>274/BY-a/03</b>	IA	Establishment and organization of work of COOMET Structural bodies
30.	<b>276/RU-a/03</b>	PR	Comparisons of measurement standards of the unit of refractive index
31.	<b>277/UA-a/03</b>	L	Conducting of comparisons of highest accuracy interferometers for gauge blocks measurements
32.	<b>278/UA-a/03</b>	L	Conducting of comparisons of line scales comparators
33.	<b>283/UA-a/03</b>	L	Comparison of range-finder equipment of higher precision
34.	<b>285/RU-a/03</b>	T	Regional comparisons of national standards for temperature measurements in the range from the triple point of mercury to the zinc freezing point
35.	<b>301/UA-a/04</b>	GM	The development of recommendations on drawing up the calibration and measurement certificates, which are issued by COOMET national metrological institutes according to MRA
36.	<b>302/RU/04</b>	GM	Development of the schemes for conducting and of algorithms for data processing of the supplementary COOMET comparisons arranged with the aim to support the CMCs of NMIs
37.	<b>305/RU-a/04</b>	GM	Metrology of nanotechnology
38.	<b>308/RU-a/04</b>	AUV	Key Comparison of the National Measurement Standards of the vibration parameters units (in regard to the

No.	Project	Sub. field	Name
			vibration acceleration) in the frequency range from 40 Hz to 5 kHz
39.	<b>311/UA-a/04</b>	PR	Comparison of national measurement standards of the unit of average power of laser radiation
40.	<b>313/UA-a/04</b>	L	The comparison of the flatness standards
41.	<b>315/UA-a/04</b>	L	The metrological measurement assurance of the coating thickness and films up to 10 $\mu\text{m}$
42.	<b>316/UA-a/04</b>	AUV	Bilateral comparison by means of calibration of the microphone type LS1P
43.	<b>318/RU-a/04</b>	RI	Regional comparison COOMET.R(I)-K1 of national measurement standards of the Kerma in air for the energy of gamma radiation Co-60
44.	<b>319/RU-a/04</b>	RI	Comparison measurements of radionuclide volume sources
45.	<b>331/LT-a/05</b>	M	International Comparisons of the National Pressure Standards in the Field of Gauge Pressure in the range (10 - 100) MPa
46.	<b>332/RU-a/05</b>	L	Comparisons of the external diameter (plug gages) standards
47.	<b>336/RU-a/05</b>	GM	Development of the guidelines for KOOMET KC data evaluation
48.	<b>344/UA-a/05</b>	EM	Keeping and maintenance of the State Standards of electrical power and power factor in order to provide an uniformity of measurements
49.	<b>345/UA-a/05</b>	EM	Keeping and maintenance of the State Standards of electrical capacitance and tangent of losses in order to provide an uniformity of measurements
50.	<b>347/RU-a/05</b>	GM	Possibility of simultaneous usage of concepts “errors of measurements” and “uncertainty of measurements” in different metrological tasks
51.	<b>348/RU-a/05</b>	GM	Analysis of the types and levels of the financial supporting of the National Standards keeping and development
52.	<b>361/RU-a/06</b>	QM	Pilot comparisons in the field of electrical conductivity measurements
53.	<b>362/RU-a/06</b>	QM	Pilot comparisons in the field of measuring the aqueous glucose solutions
54.	<b>376/RU-a/0</b>	T	3-rd All-Russia Conference with international contributions on Temperature Measurements TEMPERATURE 2007
55.	<b>386/RU-a/07</b>	RI	Standardization of Cs-137 radionuclide solution
<b>In 2007–2008 (after 17<sup>th</sup> COOMET Committee Meeting)</b>			
56.	<b>352/RU/06</b>	RM	Development of CRMs for fractional composition of petroleum products (petroleum fuel) (3 types)
57.	<b>353/RU/06</b>	RM	Development of CRMs of petrol antiknock value (octane number) by motor method
58.	<b>354/RU/06</b>	RM	Development of CRMs of petrol antiknock value (octane

No.	Project	Sub. field	Name
			number) by research method (2 types)
59.	<b>355/RU/06</b>	RM	Development of CRMs of sulphur content in petroleum and petroleum products (9 types)
60.	<b>356/RU/06</b>	RM	Development of CRMs of saturated vapour pressure in petroleum and petroleum products (5 types)
61.	<b>357/RU/06</b>	RM	Development of CRMs for benzene content in petrol (4 types)
62.	<b>358/RU/06</b>	RM	Development of CRMs for oxygenate content in petrol (4 types)
63.	<b>390/BY/07</b>	L	International comparison of length standards in the range measurement of gauge blocks
64.	<b>396/UA/07</b>	EM	Comparison of AC voltage ratio standards
65.	<b>397/RU/07</b>	M	The key comparison of national standards of absolute pressure in average pressure
66.	<b>400/RU/07</b>	QM	Key comparisons of standard natural gas samples
67.	<b>401/RU/07</b>	QM	Key comparisons of standard samples of CO gas mixtures in Nitrogen (10 and 1000 ppm)
68.	<b>404/RU/07</b>	IT	The development of the procedure and technology for the presentation on the COOMET web-site of data on calibration and management capabilities (CMC) of metrological centers (laboratories) not published on the BIPM web-site
69.	<b>409/UA/07</b>	EM	Comparison of the basic reference standard of the units of maximum values of the strength of impulse electric and magnetic fields of Ukraine (ИЭМПТ) and the national standard of the units of maximum values of the strength of impulse electric and magnetic fields of the Russian Federation ГЭТ148-93
70.	<b>415/RU/08</b>	RM	Development of CRM (2 types) for composition of soil (agrochemical parameters)
<b>In 2008–2009 (after 18<sup>th</sup> COOMET Committee Meeting)</b>			
71.	<b>387/UA-a/07</b>	T	Comparison of national standards of the unit of temperature at the fixed points of silver, gold and copper freezing
72.	<b>395/BY-a/07</b>	T	Regional comparisons of national measurement standards of the triple point of water for temperature measurements
73.	<b>405/RU-a/07</b>	AUV	Comparisons of the sound pressure standards in water in the low frequency and infrasound range (2 kHz to 4 kHz)
74.	<b>406/UA/07</b>	F	Comparisons of mass and volume units national standards
75.	<b>411/RU-a/07</b>	EM	Key comparisons of reference instruments measuring high voltage alternating current
76.	<b>412/UA-a/07</b>	F	Realization of reference gas flow meter's test rigs comparisons in flow range: (4-160) m <sup>3</sup> /h
77.	<b>417/UA-a/08</b>	T	Supplementary comparisons of national standards of the unit of temperature at the fixed points of gallium melting, indium, tin and zinc freezing

No.	Project	Sub. field	Name
78.	426/BY/08	LM	Development of recommendation regarding realization of interlaboratory comparisons (PT schemes) for verification laboratories for assessing their technical competence
79.	431/UA/08	AUV	The comparison of the measurement standards of the pressure unit in air at low frequency range
80.	433/BY/08	F	The harmonization of normative base on metrological maintenance of turbine gas meters
81.	434/BY/08	AUV	Comparison of national standards for sound pressure (Pa) in air using calibration of working standard microphones
<b>In 2009–2010 (after 19<sup>th</sup> COOMET Committee Meeting)</b>			
82.	391/RU-a/07	TR	Working out of an internships program within the COOMET framework
83.	418/RU-a/08	RM	Development of CRM for composition of ilmenite concentrate (SO-35)
84.	424/BY-a/08	LM	Translation and analysis of new edition of VIM
85.	449/RU-a/08	EM	Key comparisons of DC measuring reference instruments
86.	452/SK-a/09	F	Comparison of cold water flow calibration laboratories in a range of flow rates (3 - 20) m <sup>3</sup> /h
87.	454/RU-a/09	RM	Development of CRM for composition of KATEK coal fly ash (ZUK-2)
88.	455/RU-a/09	RM	Pilot comparisons of certified reference materials of alloyed steel, type 5XB2CΦ (GSO 918-90P), X6BΦ (GSO 1527-84P) и 31X19H9MBET (GSO 2251-82)
89.	457/RU-a/09	RM	Development of CRM for composition of below cenosphere concentrate (CBC-1)
90.	458/RU-a/09	RM	Development of CRM for composition of magnetic microsphere concentrate (CMM-1)
91.	459/RU-a/09	RM	Development of CRM for composition of moscow cenosphere concentrate (CMC 1)
92.	469/RU-a/09	EM	International supplementary comparisons of the inductance standards for the working frequencies up to 10 MHz
93.	470/RU-a/09	EM	Pilot comparisons of national standards in the field of measuring the ratio and angle scaling conversion of sinusoidal current (MPST) in the range 1 ... 10000A/5A(1A)
94.	473/RU-a/09	AUV	Pilot study of the sound pressure standards in water (for free-field calibration) in the frequency range 250 Hz to 200 kHz
95.	482/BY-a/09	AUV	Comparison of measurements of velocity of longitudinal ultrasonic wave propagation in solid media by impulse method

**Total: 95 agreed projects**

## 2. List of proposed COOMET projects (as of 31 March 2010)

No.	Project	Sub. field	Name
1.	208/UA/03	LM	Preparation of COOMET Recommendation concerning formal description of bilateral agreements for mutual acceptance of the test results and the initial verification of measuring instruments
2.	209/RU/00	GM	Development of a recommendation for applying "Guide to the expression of uncertainty in measurement"
3.	252/UA/02	RM	Development of RMs of special carbon steels
4.	254/RU/02	EM	Comparison of Voltage Standards at 1 V
5.	255/RU/02	RI	Comparisons of the software (programs - measurement techniques) of scintillate spectrometers for activity measurements
6.	258/RU/02	M	Mutual Comparisons of the results of calibrations of the multiples and submultiples of the kilogram
7.	259/RU/02	M	COOMET comparisons in the field of force measurements
8.	260/UA/02	M	Weighing of vehicles in motion
9.	262/LT/02	M	Development of a data base of the results of finished comparisons in the field of "Mass and related quantities
10.	267/RU/02	EM	Comparison of Standards the units of electromagnetic power flux density ( $W/m^2$ ) at frequencies of 2,45 GHz and 10,0 GHz
11.	284/DE/03	EM	Comparison of Josephson array voltage standards by using a portable Josephson transfer standard
12.	294/RU/03	M	International Comparisons of the National Pressure Standards in the Field of Exressive Pressures in the range (0,05-0,5) MPa
13.	295/RU/03	M	Mutual Comparisons of the He leaks in range ( $10^{-6}$ -1) $m^3 \cdot Pa/s$
14.	303/DE/04	M	Bilateral key comparison of National Vickers hardness standards
15.	317/DE/04	M	Bilateral key comparison of national Vickers hardness standards
16.	333/RU/05	M	Intercomparisons of standards in the viscosity field
17.	341/RU/05	M	Key comparison of Brinell and Vickers hardness scales
18.	343/MD/05	TR	Development of recommendations on working out criteria and structure of training programs in the filed of metrology
19.	360/SK/06	AQ	Arranging and holding of the Workshop "Quality and Metrology"
20.	366/RU/06	PR	Comparison of reference materials of whiteness
21.	367/RU/06	QM	Pilot comparison in the field of blood elements studies
22.	368/BY/06	PR	Bilateral comparisons of the units of luminous intensity and illumination
23.	370/RU/06	L	Interlaboratory comparison of length standards in the nanometer range
24.	371/KZ/06	M	Bilateral key comparisons of national Rockwell and Rockwell superficial hardness scales standards
25.	375/RU/06	QM	Pilot comparisons "Determination of gene-modified objects

No.	Project	Sub. field	Name
			in food”
26.	<b>377/UA/06</b>	L	The 6th meeting of COOMET TC 1.5
27.	<b>388/BG/07</b>	TR	XII national scientific symposium with international participation “Metrology and metrology assurance 2007” (September, 10-14 , 2007, Sozopol, Bulgaria)
28.	<b>389/RU/07</b>	RI	Comparison of the well-type ionization chamber (IC) calibrations factors for the medical radionuclides (“Dosecalibrators”)
29.	<b>394/RU/07</b>	GM	Organization of the meeting of TC 1.1 June 22, 2007
30.	<b>398/RU/07</b>	TF	Comparisons of the National Standards of Time and Frequency with RF scale UTC(SU)
31.	<b>399/RU/07</b>	GM	Methodology for uncertainty evaluation of measurement results obtained by data processing software
32.	<b>408/UA/07</b>	EM	Comparisons of national standards of direct voltage at the voltage of 1V
33.	<b>410/UA/07</b>	RI	COOMET Regional comparisons of National standards of consumed dose unit in water for gamma-radiation Co-60
34.	<b>413/KZ/07</b>	RM	Revision of COOMET document R/RM/6:1998 “COOMET Recommendation “Register of certified reference materials of composition and properties of substances and materials developed within COOMET. Basic principles”
35.	<b>414/UA/08</b>	RM	Revision of COOMET Document R/RM/5:2002 “COOMET Recommendation. Contents and rules for drawing up documentation on reference materials developed within COOMET”
36.	<b>419/UA/08</b>	L	The 7th meeting of COOMET TC 1.5
37.	<b>420/RU/08</b>	GM	Development of the Recommendation for uncertainty evaluation in calibration
38.	<b>422/RU/08</b>	GM	Development of the COOMET recommendation “Calibration techniques. General requirements”
39.	<b>423/RU/08</b>	RI	Standardization of Eu-152 radionuclide solution
40.	<b>425/BY/08</b>	LM	Development of a template of test procedure for software of measuring instruments
41.	<b>427/BY/08</b>	LM	Analysis of requirements in the field of legal metrology including examples of application of these requirements to measuring instruments
42.	<b>429/CU/08</b>	PR	Comparisons of measurement standards of the units of spectral regular transmittance in the (250 to 900) nm wavelength range
43.	<b>435/RU/08</b>	QM	Pilot comparisons in the field of aerosol particles mass concentration measurements
44.	<b>436/RU/08</b>	QM	Pilot comparisons in the field of moisture mass fraction measurements in barley cereal grain
45.	<b>437/BY/08</b>	LM	Development of a program for generating ‘reference’ data sets for the purpose of software testing
46.	<b>438/RU/08</b>	PR	International comparisons of national measurement standards of the unit of refractive index

No.	Project	Sub. field	Name
47.	439/RU/08	PR	International comparisons of national measurement standards of the unit of an angle of rotation of a plane of polarization
48.	440/RU/08	L	International comparison of stabilized He-Ne/I2 lasers at 633 nm
49.	441/RU/08	LM	Development of template of bilateral agreement on recognition of national prepackages control mark
50.	442/UA/08	LM	Analysis of criteria of technical competence used for assessment of verification laboratories
51.	443/RU/08	L	Comparisons of national standards in the area of measuring surface density of coatings within the range of (0,001-1,000) kg/m <sup>2</sup> and coating thickness within the range of (1-100) μm
52.	444/DE/08	M	Key comparison of national pressure standards in the range 100 Pa to 5 kPa of gauge pressure
53.	445/DE/08	RI	Comparison of the national standards of air kerma for Cs-137 at protection level
54.	446/DE/08	RI	Comparison of the national standards of air kerma for low-energy x-rays
55.	447/DE/08	RI	Comparison of the national standards of air kerma for medium-energy x-rays
56.	448/RU/08	AUV	Comparison of longitudinal ultrasonic wave propagation velocity in solid media
57.	450/UA/09	L	Comparisons of reference instruments of unit are length for parameters of a roughness
58.	451/KZ/09	RM	Development of the List of certified reference standards to be transported for metrological certification, which are exempted from customs duties, taxes and special permits according to clauses 1-3 of Agreement of February the 10, 1995
59.	461/RU/09	PR	Comparisons of measurement standards of the unit of laser power (0.532, 10,6 microns)
60.	462/RU/09	RI	Comparisons of measurement standards of the unit of laser power (0.532, 10,6 microns)
61.	463/RU/09	RM	Additional certification of CRM 8515-2004 for composition of iron ore (SO-20)
62.	464/RU/09	RM	Additional certification of CRM 8516-2004 for composition of manganese ore (SO-21)
63.	465/RU/09	RM	Development of CRM for composition and properties of coal, T rank (SO-34)
64.	466/RU/09	RM	Development of CRM for composition of zircon concentrate (SO-36)
65.	467/KZ/09	RM	Joint development of dry remain of sulphate- chlorides sodium type water containing copper, zinc, lead, cadmium, selenium, mercury; cobalt, nickel
66.	468/RU/09	EM	Additional comparisons of amplitude modulation depth HF oscillations
67.	471/RU/09	GM	Preparation and holding of the workshop for NMI Directors "10 years of CIPM MRA: results and perspectives of the

No.	Project	Sub. field	Name
			cooperation” and 23rd JCRB meeting on the 22nd – 24th of September, 2009, in Kazan
68.	474/RU/09	RM	Development of CRM for composition of copper
69.	475/RU/09	RM	Conducting of international comparison tests of CRMs for composition of graphite powder SOG - 21 (a set of 5 CRM types)
70.	476/GE/09	TR	Preparing and conducting the workshop “Implementation of Quality Management Systems at NMIs according to ISO/IEC 17025”
71.	477/UA/09	L	The 7th meeting of COOMET TC 1.5
72.	478/UA/09	TR	Creation of a COOMET working Web portal
73.	479/RU/09	QM	Supplementary comparisons in the field of moisture mass fraction measurements in cereal grain and cereal products
74.	480/MD/09	RI	Arranging and holding the 6d meeting of COOMET correspondents and coordinators in the field of ionizing radiation and radioactivity (TC 1.9)
75.	483/RU/09	QM	Key comparisons of primary standards of concentration of components in gas media - NO in Nitrogen (100 and 1000 $\mu\text{mol/mol}$ )
76.	484/RU/09	QM	Key comparisons of primary standards of concentration of components in gas media - SO <sub>2</sub> in Nitrogen (100 and 1000 $\mu\text{mol/mol}$ )
77.	485/UA/10	AUV	Organization and conducting the 6th meeting of Technical Committee 1.2 AUV COOMET
78.	486/RU/10	T	Regional comparisons of copper cells for contact thermometry
79.	487/RU/10	T	The regional comparisons of thermocouples of types S
80.	488/RU/10	T	Regional comparisons of national standards of the energy of combustion by means of gas mixes
81.	489/RU/10	T	Regional comparisons of national standards of the energy of combustion by means of high-purity graphite
82.	490/RU/10	EM	Supplementary comparisons of AC high voltage measuring reference systems
83.	491/UA/10	LM	Development of recommendations of COOMET “General requirements to the competence of verification laboratories”
84.	492/DE/10	RD	Development of a concept for joint metrological research in COOMET member countries
85.	493/RU/10	QM	Bilateral comparison: Determination of fullerenes C <sub>60</sub> and C <sub>70</sub> mass fraction in fullerene concentrate
86.	494/RU/10	T	Supplementary comparisons of national standards for temperature measurements in the range from the triple point of water to the zinc freezing point
87.	495/RU/10	T	The pilot thermal conductivity comparison in the range from 0.03 to 0.05 W•m <sup>-1</sup> •K <sup>-1</sup> at temperature from 10 to 40 °C

**Total: 87 proposed projects**

**3. List of completed COOMET projects**  
(for the period of 15 May 2009 to 31 March 2010)

No.	Project	Sub. field	Name
1.	<b>182/BG-a/99</b>	RM	Development of CRMs for composition of alcoholic drinks rakiyas (brandies) (3 types)
2.	<b>183/BG-a/99</b>	RM	Development of CRMs for composition of ethyl alcohol of agricultural origin (3 types)
3.	<b>219/SK/00</b>	F	Performance of comparison measurements of testing standard equipment working in the gas flowrate range: A) (0,06-10) m <sup>3</sup> /h; B)(100-1000)m <sup>3</sup> /h
4.	<b>251/BY-a/01</b>	IT IA	Development and realization of suggestions for improvement of COOMET Web-site
5.	<b>287/RU-a/03</b>	GM	Development of Recommendation “Scales of measurements. General principals”
6.	<b>293/RU-a/03</b>	RM	Development of CRMs for comparison of dry residue of Baikal water SOVB-1, birch leaf LB-1, mixture of meadow herbs Tr-1, Canadian pond weed EK-1 and perch tissue Bok-2
7.	<b>393/RU/07</b>	TR	Development of criteria for assessing qualification of the expert-metrologist
8.	<b>407/RU-a/07</b>	GM	Holding a meeting of the Working Group COOMET project # 305/RU-a/04 and a seminar on the problems of the metrological support for nanotechnologies
9.	<b>416/RU/08</b>	RM	Organization and conducting the 13th meeting of COOMET Technical Committee 1.12 “Certified Reference Materials” (TC 1.12 “CRMs”)
10.	<b>421/RU/08</b>	QM	The additional comparison of pH working standards
11.	<b>456/RU-a/09</b>	RM	Organization and conducting the 14th meeting of COOMET Technical Committee 1.12 “Certified Reference Materials” (TC 1.12 “CRMs”)
12.	<b>460/SK/09</b>	L	Comparison of 24-sided polygon
13.	<b>472/AM/09</b>	TR	Preparing and conducting the workshop “Calibration and Verification - Differences between Obligatory and Facultative Measurements”
14.	<b>481/UA-a/09</b>	F	Arranging and holding of the COOMET Technical Committee TC 1.4 “Flow measurement” meeting

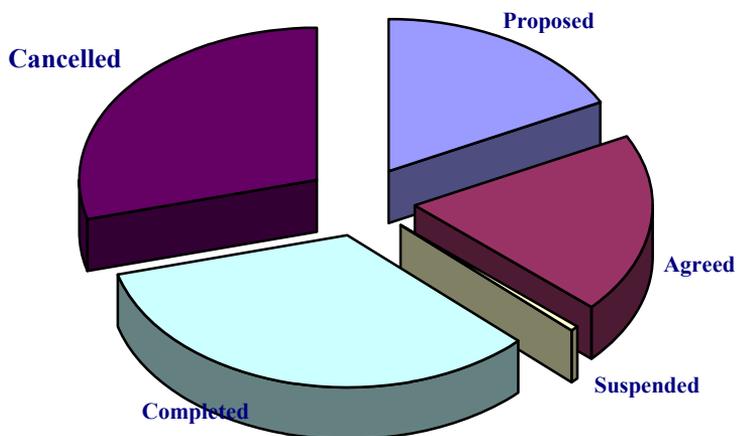
**Total: 14 completed projects**

**4. List of cancelled COOMET projects**  
(for the period of 15 May 2009 to 31 March 2010)

No.	Project	Sub. field	Name

**Total: no cancelled projects**

**5. Status of COOMET projects**  
(as of 31 March 2010)



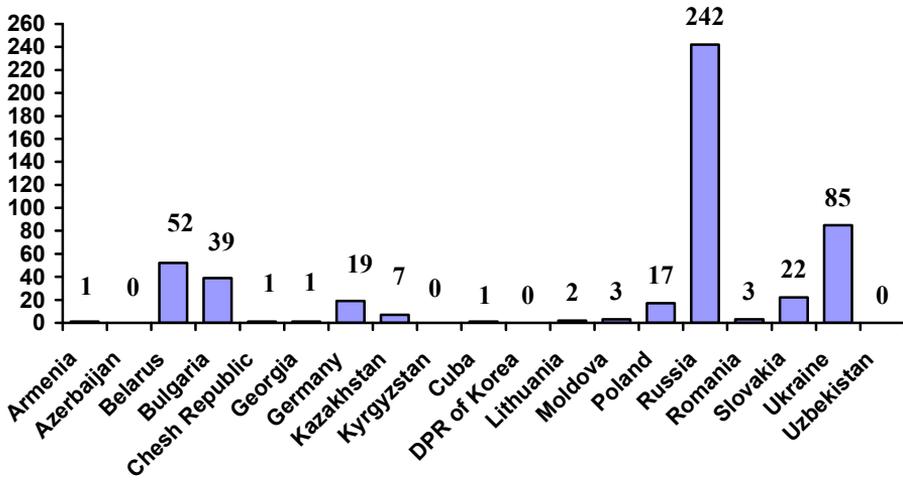
State (status)	Number of projects
Proposed	87
Agreed	95
Suspended	2
Completed	167
Cancelled	144
<b>Total number of projects</b>	<b>495</b>

**6. Distribution of COOMET projects by fields of cooperation**  
(as of 31 March 2010)



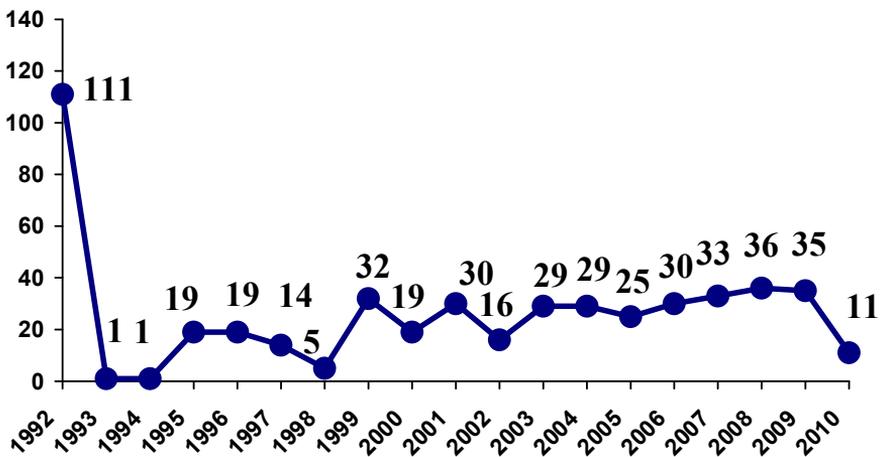
**Total: 495**

**7. Distribution of proposed COOMET projects by coordinating countries**  
(as of 31 March 2010)



Total: 495

**8. Distribution of COOMET Projects by date of registration in the COOMET Working Programme**  
(as of 31 March 2010)



**9. COOMET projects proposed  
after the 19<sup>th</sup> COOMET Committee meeting  
(as of 31 March 2010)**

No.	Project	Sub-field	Name	NMI-coordinator
1.	472/AM/09	TR	Preparing and conducting the workshop “Calibration and Verification - Differences between Obligatory and Facultative Measurements”	NIM RA, Armenia PTB, Germany
2.	473/RU/09	AUV	Pilot study of the sound pressure standards in water (for free-field calibration) in the frequency range 250 Hz to 200 kHz	VNIIFTRI, Russia
3.	474/RU/09	RM	Development of CRM for composition of copper	“Gipronickel Institute, Ltd.”, Russia
4.	475/RU/09	RM	Conducting of international comparison tests of CRMs for composition of graphite powder SOG – 21 (a set of 5 CRM types)	UGTU-UPI, Russia
5.	476/GE/09	TR	Preparing and conducting the workshop “Implementation of Quality Management Systems at NMIs according to ISO/IEC 17025”	GEOSTM, Georgia, PTB, Germany
6.	477/UA/09	L	The 7th meeting of COOMET TC 1.5	NSC “IM”, Ukraine
7.	478/UA/09	TR	Creation of a COOMET working Web portal	NSC “IM”, Ukraine, VNIIFTRI, Russia, PTB, Germany
8.	479/RU/09	QM	Supplementary comparisons in the field of moisture mass fraction measurements in cereal grain and cereal products	UNIIM, Russia
9.	480/MD/09	RI	Arranging and holding the 6d meeting of COOMET correspondents and coordinators in the field of IONIZING RADIATION and RADIOACTIVITY (TC 1.9)	INSM, Moldova
10.	481/UA/09	F	Arranging and holding of the COOMET Technical Committee TC 1.4 “Flow measurement” meeting	NSC “IM”, Ukraine
11.	482/BY/09	AUV	Comparison of measurements of velocity of longitudinal ultrasonic wave propagation in solid media by impulse method	BelGIM, Belarus
12.	483/RU/09	QM	Key comparisons of primary standards of concentration of components in gas media - NO in Nitrogen (100 and 1000 $\mu\text{mol/mol}$ )	VNIIM, Russia
13.	484/RU/09	QM	Key comparisons of primary standards of concentration of components in gas media - SO <sub>2</sub> in Nitrogen (100 and 1000 $\mu\text{mol/mol}$ )	VNIIM, Russia

No.	Project	Sub. field	Name	NMI-coordinator
14.	485/UA/10	AUV	Organization and conducting the 6th meeting of Technical Committee 1.2 AUV COOMET	DP NDI “Systema”, Ukraine
15.	486/RU/10	T	Regional comparisons of copper cells for contact thermometry	VNIIM, Russia
16.	487/RU/10	T	The regional comparisons of thermocouples of types S	VNIIM, Russia
17.	488/RU/10	T	Regional comparisons of national standards of the energy of combustion by means of gas mixes	VNIIM, Russia
18.	489/RU/10	T	Regional comparisons of national standards of the energy of combustion by means of high-purity graphite	VNIIM, Russia
19.	490/RU/10	EM	Supplementary comparisons of AC high voltage measuring reference systems	VNIIMS, Russia
20.	491/UA/10	LM	Development of recommendations of COOMET “General requirements to the competence of verification laboratories”	NSC “IM”, Ukraine
21.	492/DE/10	RD	Development of a concept for joint metrological research in COOMET member countries	PTB, Germany
22.	493/RU/10	QM	Bilateral comparison: Determination of fullerenes C60 and C70 mass fraction in fullerene concentrate	VNIIM, Russia
23.	494/RU/10	T	Supplementary comparisons of national standards for temperature measurements in the range from the triple point of water to the zinc freezing point	VNIIM, Russia
24.	495/RU/10	T	The pilot thermal conductivity comparison in the range from 0.03 to 0.05 W•m-1•K-1 at temperature from 10 to 40 °C	VNIIM, Russia

**Total: 24 projects**

**Meetings of COOMET bodies  
in 2010**

Name of event	Date	NMI, city, country
<b>20<sup>th</sup> Committee Meeting</b>	April 21–22	<i>Astana, Kazakhstan</i>
<b>15<sup>th</sup> Meeting of President’s Council</b>	November	<i>Belarus</i>
<b>Joint Committee for Measurement Standards</b>	April 20	Astana, Kazakhstan
<b>TC 1.1</b> “General questions concerning measurements (General metrology)”	October 11	NSC “IM”, Kharkov, Ukraine
<b>TC 1.2</b> “Acoustics, ultrasound, vibration”	May	DP NDI “Systema”, Lviv, Ukraine
<b>TC 1.3</b> “Electricity and magnetism”	September 22–23	INSM, Chisinau, Moldova
<b>TC 1.4</b> “Flow measurement”	October 25–28	WKS RSE “KazInMetr”, Kazakhstan
<b>TC 1.5</b> “Length and angle”	September	RSE “KazInMetr”, Astana, Kazakhstan
<b>TC 1.6</b> “Mass and related quantities”	September 21–24	DP “Ukrmetrteststandard”, Kyiv, Ukraine
<b>TC 1.7</b> “Photometry and radiometry”	March 30 – April 1	VNIIM, Saint-Petersburg, Russia
<b>TC 1.8</b> “Physical chemistry”	September 16–17	VNIIM, Saint-Petersburg, Russia
<b>TC 1.9</b> “Ionizing radiation and radioactivity”	<i>Under consideration</i>	<i>under consideration</i>
<b>TC 1.10</b> “Thermometry and thermal physics”	October	INSM, Chisinau, Moldova
<b>TC 1.11</b> “Time and frequency”	<i>Under consideration</i>	<i>Under consideration</i>
<b>TC 1.12</b> “Reference materials”	September– October	NIM RA, Yerevan, Armenia
<b>TC 2</b> “Legal metrology”	September 29–30	SMU, Bratislava, Slovakia
<b>Quality Forum (QF) &amp; TC 3.1</b> “Quality Forum Technical Committee”	June	<i>Under consideration</i>
<b>TC 4</b> “Information and training”	June	<i>Under consideration</i>



**COOMET-20/5.2**

# **Annual Reports of Chairpersons of COOMET Structural Bodies**



**ANNUAL REPORT  
of Chairperson of  
Joint Committee for Measurement Standards**

**1. General description of JCMS activity**

The round of regional key and supplementary comparison in accordance with CIPM and JCRB requirements has been gone on in the almost all subject fields.

**2. The Technical committees meetings**

During the period of time after the 18<sup>th</sup> Meeting of COOMET Committee the Meetings of the next TC were made:

- **TC 1.1** “General Metrology” (2 July 2009, Saint-Petersburg, Russia);
- **TC 1.4** “Flow Measurement” (10-15 October, 2009, Chisinau, Moldova);
- **TC 1.5** “Length and Angle” (11-13 November, 2009, Saint-Petersburg, Russia);
- **TC 1.6** “Mass and Related Quantities” (29-30 September, 2009, Bratislava, Slovakia);
- **TC 1.9** “Ionizing Radiation and Radioactivity” (21-22 October, 2009, Chisinau, Moldova);
- **TC 1.10** “Thermometry and Thermal Physics” (14-15 October, 2009, Kharkov, Ukraine);
- **TC 1.12** “Reference Materials” (13-15 October, 2009, Minsk, Belarus);
- **TC 3.1** of Quality Forum (4 Dec 2009, Chisinau, Moldova).

TC 1.1 “General Metrology” made the seminar Mathematics, statistics and computation to support measurement quality 30.06.2009-02.07.2009 Saint-Petersburg, Russia.

TC 1.10 is going to make the conference “Temperature-2010”.

**3. Fulfillment of the comparison projects.****Project 271/RU/03 “Elaboration of the programme of COOMET comparisons and calibrations”**

Development of the Programme of comparison has been made last year. The programme contains three parts: planned comparisons, comparisons in progress and completed comparisons. The summary of the Programme is given in the Appendix 1. Paper version of the Programme was approved by the 19<sup>th</sup> COOMET Committee Meeting, signed by the COOMET President, sent to all the Committee members and posted on the COOMET website. The Programme contains 99 comparisons at the present time (1 March 2010) (there were 85 Comparisons in the Programme in 2009). On the other hand only 3 comparisons

were included in the Appendix B MRA (KCDB) (60 comparisons at 1 March 2010).

Table 1 New comparisons in the KCDB

No	KCDB ID	COOMET project	Name	Pilot	Amount of participants
1	COOMET.AUV.A-S1	434/BY/08	Comparison of national standards for sound pressure (Pa) in air using calibration of working standard microphones	BelGIM	4
2	COOMET.EM-S7	449/RU/08	DC high voltage	VNIIMS	3
3	COOMET.EM-S8	469/RU/09	Comparison of inductance standards	SNIIM	5

8 comparisons were completed last year:

No	KCDB ID	COOMET project	Name	Pilot	Amount of participants
1	2	3	4	5	6
1	COOMET.AUV.A-K1	226/DE/01	Comparison of laboratory standard microphone calibrations	PTB	6
2	COOMET.AUV.A-K1.1	316/UA/04	Comparison of laboratory standard microphone calibrations	PTB	2
3	COOMET.M.M-K1	257/Sk-a/02	Comparisons of 1 kg mass standards	SMU	6
4	COOMET.RI(I)-K1	318/RU/04	Measurement of air kerma for Cobalt 60	PTB	6
5	COOMET.RI(II)-S2.Cs-137	319/RU/04	Comparison measurements of Cs-137 specific activity radionuclide volume sources	VNIIFTRI	11
6	COOMET.RI(II)-S2.Eu-152	319/RU/04	Comparison measurements of Eu-152 specific activity radionuclide volume sources	VNIIFTRI	11

1	2	3	4	5	6
7	COOMET.T-S1	417/UA-a/08	Supplementary regional comparisons of national standards of the unit of temperature at the fixed points of gallium melting, indium, tin and zinc freezing.	VNIIM	2
8	COOMET.QM-K1.a	401/RU/07	Key comparisons of standard samples of CO gas mixtures in Nitrogen (10 and 1000 ppm)	VNIIM	4

The application for including comparisons to the COOMET Programme has not been submitted (until 1 March 2010). Some of the comparisons started before November 2009 were included in the Programme by the JCMS Chairperson. At present time comparison are being included in the COOMET Programme only in accordance with the Recommendation COOMET R/GM/12:2007.

In the framework of the development of the methodical base for comparisons revision of the final report template was done. It is caused by publication of the reports in “Metrologia” Technical Supplement.

For methodical supporting of the comparisons TC 1.1 “General Metrology” have developed the next projects:

302/RU/04 Development of the schemes for conducting and of algorithms for data processing of the supplementary COOMET comparisons arranged with the aim to support the CMCs of NMIs.

336/RU/05 Development of the guidelines for COOMET KC data evaluation.

Important tasks for future activity 2010/11 are the next ones:

- development of the CMC database on the COOMET web-portal;
- completing comparisons started in 2007-2008.

#### 4. Fulfillment of the projects in other areas

Developing documents have decreased the last year. Only three TCs have made this kind of work:

TC 1.4 433/BY/08 “The harmonization of normative base on metrological maintenance of turbine gas meters”. EN 12261 “Turbine gas meters. General requirements and test methods” will be translated.

TC 1.12 have revised acting documents and developed the new ones for RM s creation and using in framework of four projects.

451/KZ/09 “Development of the List of CRM materials subject to transportation for the purposes of metrological certification, exempted from customs duties, and taxes and granting special permissions according to Articles 1 - 3 of the Agreement of 10 February 1995”.

186/RU/99 “Programme of joint CRM production within COOMET”. TC 1.12 approved for October 2009 the draft, which made it possible to start the works on 3 new projects and once again confirmed its significance as the source of preparing new proposals for initiating new projects on the development of new COOMET CRMs.

TC 1.12 almost completed started in 2007 revising set of the basic COOMET documents in the field of RM. In 2009 drafts of two revised documents:

414/UA/08 Revision of COOMET document R/RM/5:2002 “COOMET methodical recommendation. Contents and rules of drawing up documents for CRMs developed within COOMET”;

413/KZ/07 Revision of COOMET document R/RM/6:1998 “COOMET Recommendation. Register of certified reference materials of composition and properties of substances and materials developed within COOMET. Basic Principles.”

The total number of 29 CRM types developed in 2009 includes 24 CRM types for composition and properties of petroleum and petroleum products (6 projects); 4 CRM types for composition of coal fly ash and microsphere products of energetic ashes (ceno-and microsphere concentrates) (4 projects) and 1 CRM type for composition of chloride-sulphate type water dry residue.

At the present time TC 1.12 has developed methods of the CRM comparisons. This activity should be coordinated with TC 1.8.

TC 1.1 except comparison methodical supporting projects has been making the next ones:

347/RU/05 Possibility of simultaneous usage of concepts “errors of measurements” and “uncertainty of measurements” in different metrological tasks. Translation to English is being made).

422/RU/08 Development of the COOMET Recommendation “Calibration techniques. General requirements”. The Draft1 is being prepared.

420/RU/08 Development of the Recommendations for uncertainty evaluation in calibration. The first draft of Recommendation is worked out and it is distributed for comments and remarks. The first replies are already received. The next

version of the documents will be discussed on the next meeting of TC 1.1 COOMET (October 11, 2010, Kharkov).

399/RU/07 Development of the document “Methodology for uncertainty evaluation of measurement results obtained by data processing software. The information material is being prepared. It will be submitted to the next meeting of TC 1.1 COOMET (October 11, 2010, Kharkov).

287/RU/03 Development of the Recommendation “Scales of measurements. General principles”. The project is completed. COOMET recommendations R/GM/20:2009 “Scales of measurements. Terms and definitions” was adopted.

### **5. Activity on participation in fulfillment of the mutual recognition agreement of national measurement standards**

Summary of the current CMC reviewing is given in the Appendix 3. CMC sunder inter-regional reviewing in the Appendix 4.

It should be recognized that reviewing of the CMCs is being much better then in 2008. Especially TC 1.6 “Mass and related quantities” should be indicated due to a big work made. However, TC 1.5 “Length and Angle” and TC 1.11 “Time and Frequency” have not participated in the CMC reviewing.

For the reporting period a lot of CMCs were published: QM (Ukraine and Russia); AUV (Russia); T (Russia and Belarus); TF (Ukraine). CMC of Belarus (M) under the electronic approval.

In the COOMET intra-regional reviewing are the next CMCs:

EM – INIMET (Cuba, the absence of comparisons is the problem);

Flowmetry – BelGIM (Belarus), NISM (Moldova);

L – there are not any data;

M – there are not any data;

PR – there are not any data;

QM – Arrangements made for the COOMET CMCs review of cycle XI are as follows: It was completed the intraregional review of the COOMET CMCs claimed by:

VNIIM (Russia): in the field of gas analysis (12 new positions, 6 corrected former positions and 1 deleted former position), inorganic analysis (17 positions);

Ukrmrtrteststandart: in the field of gas analysis (2 new positions);

BelGIM: in the field of gas analysis (2 new positions);

UNIIM in the field of high purity chemicals (1 position).

RI – NSC IM (Ukraine), CENTIS-DMR (Cuba);

T – there are not any data;

TF – there are not any data.

Important task for future activity is development of the CMC database on the COOMET web-portal similar to JCRB one.

Dr Sergey Korostin  
JCMS Chairperson

## Appendix 1

**Summary of the Programme of comparisons of COOMET standards**

(Draft, 1 March 2010)

Field	Planned	In progress	Completed	Key	Supplementary	Pilot studies	Included in KCDB
AUV	1	5	7	5	1	6	6
EM	6	6	1	2	8	1	10
L	2	10	1	1	8		9
M		7	4	10	2		12
F		2	1		3		3
PR	6		3	1	4	1	5
QM	6	3	7	3		9	3
RI	3	2	6	4	4		8
T	5	2	2	3	1		4
TF	1						0
<b>Total</b>	<b>30</b>	<b>37</b>	<b>32</b>	<b>29</b>	<b>31</b>	<b>17</b>	<b>60</b>

## COOMET comparisons in KCDB (1 March)

[www.kcdb.bipm.org](http://www.kcdb.bipm.org)

60 result(s)

<b><u>COOMET.AUV.A- K1</u></b>	<b>Comparison of laboratory standard microphone calibrations 2002 - 2003</b>
Comparison type, Field	Key comparison in Acoustics, Ultrasound, and Vibration, Acoustics
Parameter(s)	Frequency: 63 Hz to 10 kHz
Status	<b>Approved for equivalence, <u>Results available</u></b>
<b><u>COOMET.AUV.A- K1.1</u></b>	<b>Comparison of laboratory standard microphone calibrations 2004</b>
Comparison type, Field	Key comparison in Acoustics, Ultrasound, and Vibration, Acoustics
Parameter(s)	Frequency: 63 Hz to 10 kHz
Status	<b>Approved for equivalence, <u>Results available</u></b>
<b><u>COOMET.AUV.A- K2</u></b>	<b>Comparison of laboratory standard microphone calibrations at low frequencies 2009</b>
Comparison type, Field	Key comparison in Acoustics, Ultrasound, and Vibration, Acoustics
Parameter(s)	LSP1 microphones Frequency: 2 Hz to 250 Hz
Status	<b>Report in progress, Draft A</b>
<b><u>COOMET.AUV.A- K3</u></b>	<b>Comparison of laboratory standard microphone calibrations 2005 - 2006</b>
Comparison type, Field	Key comparison in Acoustics, Ultrasound, and Vibration, Acoustics
Parameter(s)	Frequency: 31.5 Hz to 31.5 kHz
Status	<b>Approved for equivalence, <u>Results available</u></b>
<b><u>COOMET.AUV.A- S1</u></b>	<b>Comparison of national acoustic standards 2009</b>

Comparison type, Field	Supplementary comparison in Acoustics, Ultrasound, and Vibration, Acoustics
Parameter(s)	Frequency: 250 Hz and 1/3-octave frequencies from 20 Hz to 20 kHz
Status	<b>Report in progress, Draft A</b>

**COOMET.AUV.V- K1**      **Vibration acceleration**  
**2006 - 2007**

Comparison type, Field	Key comparison in Acoustics, Ultrasound, and Vibration, Vibration
Parameter(s)	Frequency: 20 Hz to 5 kHz
Status	<b>Measurements completed</b>

**COOMET.EM.BIPM-K11.a**      **DC voltage, Zener diode**  
**2006**

Comparison type, Field	Key comparison in Electricity and Magnetism, DC Voltage and Current
	DC voltage: 1.018 V
Status	<b>Approved for equivalence, <u>Results available</u></b>

**COOMET.EM- K4**      **Comparison of capacitors**  
**2006 - 2007**

Comparison type, Field	Key comparison in Electricity and Magnetism, Capacitance
	Capacitance: 10 pF
Parameter(s)	Frequency: 1592 Hz, 1 kHz
Status	<b>In progress</b>

**COOMET.EM- S1**      **Comparison of AC/DC voltage transfer standards**  
**2004 - 2007**

Comparison type, Field	Supplementary comparison in Electricity and Magnetism, AC Voltage, Current, Power, and AC/DC Transfer
Parameter(s)	Voltage: 1 V
	Frequency: 20 Hz, 1 kHz, 10 kHz, 100 kHz and 1 MHz
Status	<b>Measurements completed</b>

**COOMET.EM- S2**      **AC power measurements**  
**2008**

Comparison type, Field	Supplementary comparison in Electricity and Magnetism, AC Voltage, Current, Power, and AC/DC Transfer
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Parameter(s)	AC power Voltage: 120 V Current: 5 A Frequency: 50 Hz and 53 Hz Power factor: 1.0, -0.5, +0.5
Status	<b>Planned</b>
<b><u>COOMET.EM- S4</u></b>	
<b>Comparison of capacitors 2006 - 2007</b>	
Comparison type, Field	Supplementary comparison in Electricity and Magnetism, Capacitance
Parameter(s)	Capacitance: 100 pF Frequency: 1592 Hz, 1 kHz
Status	<b>In progress</b>
<b><u>COOMET.EM- S5</u></b>	
<b>AC voltage ratio 2008 - 2009</b>	
Comparison type, Field	Supplementary comparison in Electricity and Magnetism, AC Voltage, Current, Power, and AC/DC Transfer
Parameter(s)	Frequency: 50 Hz Primary voltage: 6 kV, 10 kV, 22 kV, and 35 kV Secondary voltage: 100 V
Status	<b>Planned</b>
<b><u>COOMET.EM- S6</u></b>	
<b>AC high voltage 2007 - 2009</b>	
Comparison type, Field	Supplementary comparison in Electricity and Magnetism, AC Voltage, Current, Power, and AC/DC Transfer
Parameter(s)	Voltage: 20 kV to 64 kV Frequency: 50 Hz
Status	<b>In progress</b>
<b><u>COOMET.EM- S7</u></b>	
<b>DC high voltage 2009 - 2010</b>	
Comparison type, Field	Supplementary comparison in Electricity and Magnetism, DC Voltage and Current
Parameter(s)	DC voltage: 1 kV to 100 kV Nominal current: 5 mA
Status	<b>In progress</b>
<b><u>COOMET.EM- S8</u></b>	
<b>Comparison of inductance standards</b>	

	<b>2010 - 2011</b>
Comparison type, Field	Supplementary comparison in Electricity and Magnetism, Inductance $1 \times 10^{-7}$ H to $1 \times 10^{-4}$ H
Parameter(s)	Frequencies up to 10 MHz
Status	<b>Planned</b>
<b><u>COOMET.EM.RF- S1</u></b>	<b>Comparison of power flux density 2009</b>
Comparison type, Field	Supplementary comparison in Electricity and Magnetism, Radio frequencies
Parameter(s)	Frequency: 2.45 GHz and 10.0 GHz
Status	<b>In progress</b>
<b><u>COOMET.L- K4.b</u></b>	<b>Diameter standards 2006 - 2008</b>
Comparison type, Field	Key comparison in Length, Dimensional Metrology External diameter
Status	<b>Report in progress</b>
<b><u>COOMET.L- S1</u></b>	<b>Comparison of comparators with photoelectric microscopes 2005 - 2008</b>
Comparison type, Field	Supplementary comparison in Length, Dimensional Metrology 1000 mm line standard
Status	<b>In progress</b>
<b><u>COOMET.L- S2</u></b>	<b>Comparison of gear standards 2005 - 2008</b>
Comparison type, Field	Supplementary comparison in Length, Dimensional Metrology
Status	<b>In progress</b>
<b><u>COOMET.L- S3</u></b>	<b>Comparison of interferometers 2004 - 2008</b>
Comparison type, Field	Supplementary comparison in Length, Dimensional Metrology 100 mm end standard

Status	<b>In progress</b>
<b><u>COOMET.L- S4</u></b>	<b>Comparison of interferometers 2004 - 2009</b>
Comparison type, Field	Supplementary comparison in Length, Dimensional Metrology 1000 mm end standard
Status	<b>In progress</b>
<b><u>COOMET.L- S5</u></b>	<b>Comparison of range-finder equipment of higher precision 2004 - 2009</b>
Comparison type, Field	Supplementary comparison in Length, Dimensional Metrology
Status	<b>In progress</b>
<b><u>COOMET.L- S6</u></b>	<b>Comparison of standards of evolvent surface 2005 - 2008</b>
Comparison type, Field	Supplementary comparison in Length, Dimensional Metrology
Status	<b>Report in progress, Draft B</b>
<b><u>COOMET.L- S7</u></b>	<b>Comparison of gauge blocks 2007 - 2008</b>
Comparison type, Field	Supplementary comparison in Length, Dimensional Metrology Length: 100 mm
Status	<b>In progress</b>
<b><u>COOMET.L- S8</u></b>	<b>Comparison of straightness and flatness national standards 2007 - 2008</b>
<b><u>COOMET.M.F- S1</u></b>	<b>Comparison of force standards 2008</b>
Comparison type, Field	Supplementary comparison in Mass, Force Force: 20 kN to 1000 kN
Status	<b>Proposed</b>
<b><u>COOMET.M.FF- S1</u></b>	<b>Comparisons of gas meters 2006</b>

Comparison type, Field Parameter(s) Status	Supplementary comparison in Mass, Fluid Flow Measurement of air flow rate Pressure: close to the atmospheric pressure Temperature: 19 °C to 24 °C <b>Approved and published</b>
<b><u>COOMET.M.FF- S2</u></b>	<b>Measurement of liquid flow rate 2008 - 2009</b>
Comparison type, Field Parameter(s) Status	Supplementary comparison in Mass, Fluid Flow Working liquid: tap water <b>In progress</b>
<b><u>COOMET.M.FF- S3</u></b>	<b>Reference gas flow meter's test rigs comparison 2008 - 2009</b>
Comparison type, Field Parameter(s) Status	Supplementary comparison in Mass, Fluid Flow Flow rate: from 4 m <sup>3</sup> /h to 160 m <sup>3</sup> /h Gas: air Pressure: close to the atmospheric pressure Temperature : 18 °C to 22 °C <b>In progress</b>
<b><u>COOMET.M.H- K1</u></b>	<b>Hardness (Vickers HV1, HV5, HV30) 2007 - 2010</b>
Comparison type, Field Status	Key comparison in Mass, Hardness Hardness levels: 400 HV, 700 HV <b>Protocol complete</b>
<b><u>COOMET.M.H- K1.b</u></b>	<b>Hardness (Vickers 1) 2004</b>
Comparison type, Field Status	Key comparison in Mass, Hardness Hardness: 240 HV, 540 HV and 840 HV <b>Report in progress, Draft B</b>
<b><u>COOMET.M.H- K1.c</u></b>	<b>Hardness (Vickers 30) 2004</b>
Comparison type, Field Status	Key comparison in Mass, Hardness Hardness: 240 HV, 540 HV and 840 HV <b>Report in progress, Draft B</b>
<b><u>COOMET.M.H- K2</u></b>	<b>Brinell Hardness 2007 - 2010</b>

Comparison type, Field Status	Key comparison in Mass, Hardness Hardness levels: 100 HBW, 200 HBW, 400 HBW <b>Protocol complete</b>
<b><u>COOMET.M.H- S1</u></b>	<b>Intercomparison in the field of Rockwell and Super-Rockwell hardness scales 2007 - 2008</b>
Comparison type, Field Status	Supplementary comparison in Mass, Hardness <b>Approved and published</b>
<b><u>COOMET.M.M- K1</u></b>	<b>Comparison of mass standards 2002 - 2005</b>
Comparison type, Field Status	Key comparison in Mass, Mass Standards Mass: 1 kg <b>Approved for equivalence, <u>Results available</u></b>
<b><u>COOMET.M.M- K5</u></b>	<b>Comparison of mass standards 2005 - 2008</b>
Comparison type, Field Status	Key comparison in Mass, Mass Standards Mass: 200 mg, 1 g, 50 g, 200 g and 2 kg <b>Planned</b>
<b><u>COOMET.M.P- K1</u></b>	<b>Pressure measurements in gas (gauge mode) 2004 - 2006</b>
Comparison type, Field Parameter(s) Status	Key comparison in Mass, Pressure Effective area of a piston-cylinder unit Pressure: 0.05 MPa to 0.5 MPa <b>Approved for equivalence, <u>Results available</u></b>
<b><u>COOMET.M.P- K2</u></b>	<b>Pressure measurements (gauge mode) 2005 - 2006</b>
Comparison type, Field Parameter(s) Status	Key comparison in Mass, Pressure Effective area of a piston-cylinder unit Pressure: 10 MPa to 100 MPa <b>In progress</b>
<b><u>COOMET.M.P- K14</u></b>	<b>Pressure measurements in gas (gauge mode) 2008 - 2009</b>

Comparison type, Field Status	Key comparison in Mass, Pressure Pressure: 100 Pa to 5 kPa <b>In progress</b>
<b><u>COOMET.M.V- K1</u></b>	<b>Viscosity measurements of standard liquids 2005 - 2006</b>
Comparison type, Field Status	Key comparison in Mass, Viscosity Kinematic viscosity: 30 mm <sup>2</sup> /s, 100 mm <sup>2</sup> /s, 1000 mm <sup>2</sup> /s, <b>Approved for equivalence, <u>Results available</u></b>
<b><u>COOMET.PR- K3.a</u></b>	<b>Luminous intensity 2009</b>
Comparison type, Field Status	Key comparison in Photometry and Radiometry, Photometry <b>Planned</b>
<b><u>COOMET.PR- S1</u></b>	<b>Whiteness and brightness 2009</b>
Comparison type, Field Status	Supplementary comparison in Photometry and Radiometry, Colorimetry <b>Planned</b>
<b><u>COOMET.PR- S2</u></b>	<b>Angle of rotation of plane of polarization 2009</b>
Comparison type, Field Status	Supplementary comparison in Photometry and Radiometry, Properties of materials <b>Planned</b>
<b><u>COOMET.PR- S3</u></b>	<b>Refractive index 2009</b>
Comparison type, Field Status	Supplementary comparison in Photometry and Radiometry, Properties of materials <b>Planned</b>
<b><u>COOMET.PR- S4</u></b>	<b>Laser power responsivity 2009</b>
Comparison type, Field Parameter(s)	Supplementary comparison in Photometry and Radiometry, Radiometry Wavelengths: 0.532 μm and 10.6 μm

Status	<b>Planned</b>
<b><u>COOMET.QM- K1.a</u></b>	<b>Carbon monoxide (CO) in Nitrogen (N<sub>2</sub>) 2007 - 2008</b>
Comparison type, Field	Key comparison in Amount of Substance, Gases
Status	<b>Approved for equivalence, <u>Results available</u></b>
<b><u>COOMET.QM- K3</u></b>	<b>Automotive emission gases 2005</b>
Comparison type, Field	Key comparison in Amount of Substance, Gases
Status	<b>Approved for equivalence, <u>Results available</u></b>
<b><u>COOMET.QM- K23.b</u></b>	<b>Synthetic natural gas 2008</b>
Comparison type, Field	Key comparison in Amount of Substance, Gases
Status	<b>Report in progress, Draft B</b>
<b><u>COOMET.RI (I)- K1</u></b>	<b>Measurement of air kerma for Cobalt 60 2005 - 2006</b>
Comparison type, Field	Key comparison in Ionizing Radiation, Section I (x and gamma rays, electrons)
Parameter(s)	Radiation type: Co-60 gamma rays
Status	<b>Approved for equivalence, <u>Results available</u></b>
<b><u>COOMET.RI (II)- K2.Am- 241</u></b>	<b>Activity concentration of the same Am-241 solution 2006</b>
Comparison type, Field	Key comparison in Ionizing Radiation, Section II (Measurement of Radionuclides)
Status	<b>Approved for equivalence, <u>Results available</u></b>
<b><u>COOMET.RI (II)- K2.Cs- 137</u></b>	<b>Activity concentration of the same Cs-137 solution 2007</b>
Comparison type, Field	Key comparison in Ionizing Radiation, Section II (Measurement of Radionuclides)
Status	<b>Approved for equivalence</b>

<b><u>COOMET.RI (II)- K2.Eu- 152</u></b>	<b>Activity concentration of the same Eu-152 solution 2009 - 2010</b>
Comparison type, Field	Key comparison in Ionizing Radiation, Section II (Measurement of Radionuclides)
Status	<b>Measurements completed</b>
<b><u>COOMET.RI (II)- S1.Rn- 222</u></b>	<b>Volume activity of Radon 2005</b>
Comparison type, Field	Supplementary comparison in Ionizing Radiation, Section II (Measurement of Radionuclides)
Status	<b>Approved and published</b>
<b><u>COOMET.RI (II)- S2.Cs- 137</u></b>	<b>Specific activity of Cs-137 2006</b>
Comparison type, Field	Supplementary comparison in Ionizing Radiation, Section II (Measurement of Radionuclides)
Status	<b>Approved and published</b>
<b><u>COOMET.RI (II)- S2.Eu- 152</u></b>	<b>Specific activity of Eu-152 2006</b>
Comparison type, Field	Supplementary comparison in Ionizing Radiation, Section II (Measurement of Radionuclides)
Status	<b>Approved and published</b>
<b><u>COOMET.RI (II)- S2.Sr/Y- 90</u></b>	<b>Specific activity of Sr/Y-90 2005</b>
Comparison type, Field	Supplementary comparison in Ionizing Radiation, Section II (Measurement of Radionuclides)
Status	<b>Measurements completed</b>
<b><u>COOMET.T- K3</u></b>	<b>Realizations of the ITS-90 from 302.9 K to 692.7 K 2005 - 2007</b>
Comparison type, Field	Key comparison in Thermometry, Standard Platinum Resistance Thermometers
Status	<b>Approved for equivalence, <u>Results available</u></b>
<b><u>COOMET.T- K5</u></b>	<b>Realizations of the ITS-90 between 961 °C and 1084 °C 2008 - 2009</b>

Comparison type, Field	Key comparison in Thermometry, Pyrometry Freezing points of Silver, Gold, and Copper
Status	<b>Proposed</b>
<b><u>COOMET.T- K7</u></b>	<b>Comparison of water triple point cells 2008 - 2009</b>
Comparison type, Field	Key comparison in Thermometry, Fixed Point Cells Temperature: 273.16 K
Status	<b>Proposed</b>
<b><u>COOMET.T- S1</u></b>	<b>Comparison of national standards for temperature measurements 2008 - 2009</b>
Comparison type, Field	Supplementary comparison in Thermometry, Fixed Point Cells From triple point of Water to Zinc freezing point
Status	<b>Approved and published</b>

## Appendix 3

**List of COOMET CMCs included into the Appendix C of the CIPM MRA during the period of time since the 20<sup>th</sup> meeting of COOMET Committee**

1 March 2010

JCRB code	Field	Date of publication in KCDB	Country	NMI	Amount of CMCs
COOMET.QM.14.2008	QM	10.09.2009	Ukraine	Ukrmetrtest-standard	2
COOMET.QM.14.2008	QM	10.09.2009	Russia	VNIIM	3
COOMET.QM.15.2008	QM	09-10-09	Ukraine	Ukrmetrtest-standard	3
COOMET.AUV.5.2009	AUV	18-09-09	Russia	VNIIFTRI	35
COOMET.TF.4.2009	TF	2009-12-15	Ukraine	NSC IM	17
COOMET.T.5.2009	T	2009-12-11	Russia	VNIIM	7
COOMET.T.5.2009	T	2009-12-11	Belarus	BelGIM	8
COOMET.M.10.2008	M (Flowmetry)	2009-10-05	Ukraine	Ivano-Frankivsk-standart-metrologia	3

**Waiting for approval**

JCRB code	Field	Country	NMI	Amount of CMCs
COOMET.M.13.2009 (Former COOMET.M.7.2008)	M (viscosity)	Belarus	BelGIM	2

**List of COOMET CMC under the inter-regional reviewing**

JCRB code	Field	Country	NMI
COOMET.EM.4.2008	EM	Ukraine	NSC IM
COOMET.EM.5.2010	EM	Ukraine	Ukrmetrteststandard
COOMET.M.5.2005	M (Flowmetry)	Russia	VNIIR
COOMET.M.8.2008	M (Mass)	Cuba	INIMET
COOMET.M.9.2008	M (Pressure)	Belarus	BelGIM
COOMET.M.11.2009	M (Hardness)	Kazakhstan	KazInMetr
COOMET.M.12.2009	M	Ukraine	NSC IM
COOMET.TF.3.2009	TF	Belarus	BelGIM

## Appendix 4

## Inter-regional CMC review

CMC	Status	Last changes	Information	Date of submitting for reviewing	COOMET participation
<a href="#">APMP.AUV.7.2010</a>	Review still in progress	2010-03-12	CMCs on Vibration - NIM - China	2010-02-15	yes
<a href="#">SIM.EM.3.2009</a>	Waiting for electronic approval	2010-03-10	CMCs from 3 (three) NMIs: ICE (Costa Rica), Inmetro (Brazil) and INTI (Argentina).	2009-04-17	yes
<a href="#">APMP.TF.8.2010</a>	Review still in progress	2010-03-10	CMC from VMI (Vietnam)	2010-02-05	нет
<a href="#">EURAMET.M.18.2010</a>	Review still in progress	2010-03-09	EIM, Greece - Mass CMC	2010-03-09	нет
<a href="#">EURAMET.EM.6.2009</a>	Approved by JCRB	2010-03-05	CMCs from 16 countries	2009-04-06	yes
<a href="#">APMP.L.15.2010</a>	Review still in progress	2010-02-19	CMC submission by KRISS, Korea	2010-02-01	no
<a href="#">APMP.L.14.2010</a>	Review still in progress	2010-02-19	CMC submission by NIMT, Thailand	2010-01-21	no
<a href="#">EURAMET.L.8.2010</a>	Review still in progress	2010-02-19	35 CMCs from 12 countries	2010-02-02	no
<a href="#">EURAMET.M.17.2010</a>	Review still in progress	2010-02-17	ZMDM, Serbia - Mass CMC	2010-01-11	yes
<a href="#">SIM.M.11.2009</a>	Published in BIPM KCDB	2010-02-12	INTI- Pressure	2009-05-14	yes
<a href="#">APMP.M.23.2009</a>	Published in BIPM KCDB	2008-02-11	NMI(Japan) - Mass, Differential Pressure and Hardness.	2009-09-09	yes
<a href="#">APMP.L.10.2009</a>	Published in BIPM KCDB	2010-02-03	New CMCs from NIM- China	2009-09-09	yes
<a href="#">APMP.L.12.2009</a>	Published in BIPM KCDB	2010-02-03	CMC submission by MSL, New Zealand	2009-07-15	no
<a href="#">APMP.L.13.2009</a>	Published in BIPM KCDB	2010-02-03	CMC submission by NMIJ, Japan	2009-09-16	no
<a href="#">EURAMET.T.7.2010</a>	Published in BIPM KCDB	2010-02-05		2010-01-12	yes
<a href="#">EURAMET.RI.9.2009</a>	Published in BIPM KCDB	2010-01-20	PTB dosimetry and radioactivity	2009-03-20	yes
<a href="#">APMP.L.11.2009</a>	Published in BIPM KCDB	2009-12-15	CMC submission by NMIJ	2009-08-07	no

<a href="#">SIM.QM.11.2009</a>	Published in BIPM KCDB	2010-01-28	Cycle IX non-fast track + Cycle X fast track	2009-11-13	yes
<a href="#">EURAMET.QM.18.2009</a>	Published in BIPM KCDB	2009-12-14	Cycle X - non fast track	2009-11-13	yes
<a href="#">APMP.QM.15.2009</a>	Published in BIPM KCDB	2009-12-11	Cycle X - non fast track	2009-11-13	yes
<a href="#">EURAMET.PR.9.2009</a>	Review still in progress	2009-11-23	CMC	2009-11-11	no
<a href="#">APMP.M.22.2009</a>	Waiting for electronic approval	2009-11-11	CMCs of NPLI - Mass standards	2009-06-23	yes
<a href="#">EURAMET.T.6.2009</a>	Published in BIPM KCDB	2009-12-11	Approved by CCT WG8. Fast track	2009-10-06	yes
<a href="#">APMP.T.4.2009</a>	Published in BIPM KCDB	2009-11-28	Approved by CCT WG8. Fast Track	2009-10-06	yes
<a href="#">AFRIMETS.T.3.2009</a>	Published in BIPM KCDB	2009-11-26	Approved by CCT - WG8. Posted for Fast Track.	2009-10-06	yes
<a href="#">EURAMET.L.7.2009</a>	Published in BIPM KCDB	2009-11-21	14 CMCs from 5 countries - updates & new services	2009-09-04	no
<a href="#">EURAMET.TF.6.2009</a>	Published in BIPM KCDB	2009-11-25	New CMC tables from SE,RO,LT,SK,BG	2009-06-30	no
<a href="#">SIM.T.5.2009</a>	Published in BIPM KCDB	2009-11-25	Approved by CCT WG8. Fast track	2009-10-06	yes
<a href="#">EURAMET.M.11.2009</a>	Waiting for electronic approval	2009-10-23	NIS Mass CMC	2009-03-12	yes
<a href="#">EURAMET.M.13.2009</a>	Published in BIPM KCDB	2009-10-23	NIS Force CMC	2009-03-27	yes
<a href="#">EURAMET.M.15.2009</a>	Published in BIPM KCDB	2009-10-24	Torque CMC submission from CEM, Spain	2009-04-17	no
<a href="#">SIM.TF.4.2008</a>	Published in BIPM KCDB	2009-10-20	CMCs from ONRJ Brazil	2008-10-06	No approval
<a href="#">EURAMET.M.14.2009</a>	Published in BIPM KCDB	2009-10-21	NIS Viscosity CMC	2009-03-27	yes
<a href="#">APMP.M.21.2009</a>	Review still in progress	2009-10-12	CMCs of NIM(China) - Mass standards	2009-06-23	yes
<a href="#">APMP.M.20.2009</a>	Published in BIPM KCDB	2009-10-12	Pressure CMCs of NPL, India	2009-05-20	yes
<a href="#">EURAMET.RI.10.2009</a>	Published in BIPM KCDB	2009-10-12	Greek (GAEC) dosimetry (35 lines)	2009-04-27	no
<a href="#">SIM.L.5.2009</a>	Published in BIPM KCDB	2009-10-09	DITUC - Chile, gage blocks calibration	2009-08-11	no

<a href="#">APMP.AUV.6.2009</a>	Published in BIPM KCDB	2009-10-24	NPLI (India) Acoustics	2009-01-19	yes
<a href="#">SIM.TF.5.2009</a>	Published in BIPM KCDB	2009-09-16	NRC Time and Frequency CMCs	2009-05-21	no
<a href="#">APMP.TF.7.2008</a>	Published in BIPM KCDB	2009-11-24	CMCs from APMP 6 NMIs	2008-09-02	no
<a href="#">APMP.PR.6.2009</a>	Published in BIPM KCDB	2009-09-08	CMC submission by APMP.TCPR including KRISS, Korea and NIM, China	2008-11-12	No report of reviewing
<a href="#">EURAMET.M.12.2009</a>	Published in BIPM KCDB	2009-08-27	NIS Pressure CMC	2009-03-27	yes
<a href="#">APMP.AUV.5.2009</a>	Published in BIPM KCDB	2009-08-26	SCL - Hong Kong	2009-01-13	yes
<a href="#">SIM.PR.4.2008</a>	Waiting for electronic approval	2009-08-13	Submissions from CENAM, INMETRO, NIST	2008-11-12	No report of reviewing
<a href="#">EURAMET.M.16.2009</a>	Published in BIPM KCDB	2009-09-09	Viscosity CMC submission from NCM, Bulgaria	2009-04-17	yes
<a href="#">APMP.QM.14.2009</a>	Published in BIPM KCDB	2009-08-12	Cycle X - Fast track	2009-07-15	yes
<a href="#">EURAMET.QM.17.2009</a>	Published in BIPM KCDB	2009-07-28	Cycle X - Fast track	2009-07-15	yes
<a href="#">AFRIMETS.QM.7.2009</a>	Published in BIPM KCDB	2009-08-10	Cycle X - Fast Track	2009-07-15	yes
<a href="#">APMP.M.18.2008</a>	Published in BIPM KCDB	2009-07-23	Mass-KIM-LIPI, Indonesia	2008-06-03	No approval
<a href="#">APMP.L.9.2009</a>	Published in BIPM KCDB	2009-06-08	CMC submission by SCL, Hong	2009-03-23	no

## ANNUAL REPORT of Chairperson of TC 1.1 “General Metrology”

In 2009, the following working projects were executed:

287/RU/03      Development of the Recommendation “Scales of measurements. General principles”

The project is completed. COOMET recommendations R/GM/20:2009 “Scales of measurements. Terms and definitions” was adopted.

302/RU/04      Development of the schemes for conducting and of algorithms for data processing of the supplementary COOMET comparisons arranged with the aim to support the CMCs of NMIs

336/RU/05      Development of the guidelines for COOMET KC data evaluation

In the frames of above projects the reports on key and supplementary comparisons are reviewed concerning the points of data evaluation.

347/RU/05      Possibility of simultaneous usage of concepts “errors of measurements” and “uncertainty of measurements” in different metrological tasks

COOMET recommendation is worked out and now it is being translated into English.

399/RU/07      Development of the document “Methodology for uncertainty evaluation of measurement results obtained by data processing software”

The information material is being prepared. It will be submitted to the next meeting of TC 1.1 COOMET (October 11, 2010, Kharkov).

420/RU/08      Development of the Recommendations for uncertainty evaluation in calibration

The first draft of Recommendation is worked out and it is distributed for comments and remarks. The first replies are already received. The next version of the documents will be discussed on the next meeting of TC 1.1 COOMET (October 11, 2010, Kharkov).

422/RU/08      Development of the COOMET Recommendation “Calibration techniques. General requirements”

The draft recommendation is being prepared.

Dr Anna Chunovkina  
TC 1.1 Chairperson

## ANNUAL REPORT of Chairperson of TC 1.2 “Acoustics, Ultrasound, Vibration”

### 1. General features of cooperation in this area

Currently, the NMIs from 14 COOMET member countries are represented in TC 1.2 “Acoustics. Ultrasound. Vibration”.

The TC 1.2 members and RMOs through which COOMET member countries submit CMCs of their NMIs are shown on fig. 1 below.

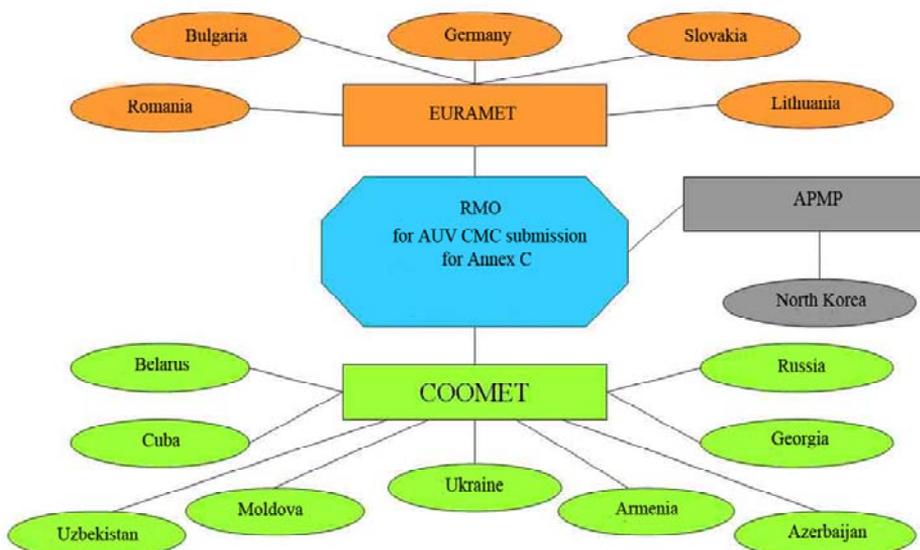


Figure 1

As usual, NMIs from Belarus (BelGIM), Russia (VNIIM, VNIIFTRI) and Ukraine (Systema) are actively involved in the TC work. “Ukrmetrtestandart” is a participant of COOMET key comparison COOMET.AUV.V-K1, and declared its participation in COOMET pilot comparison No 482/BY/09.

Romanian NMI (INM) is a participant of two COOMET key comparisons as: COOMET.AUV.A-K3 and COOMET.AUV.V-K1.

Slovakian NMI (SMU) participate in COOMET supplementary comparison No 434/BY/08.

Physicotechnical Institute of Germany (PTB) is a pilot laboratory in two COOMET key comparisons: COOMET.AUV.A-K1 and COOMET.AUV.A-K1.1.

### 2. TC meetings

Totally, there were five meetings of TC.

Information about participants and main issues under discussion is given in table 1.

Table 1

<b>Meeting of TC 1.2</b>	<b>Lineup</b>	<b>Main issues and decisions</b>
<b>1</b>	<b>2</b>	<b>3</b>
2001 BelGUM, Belarus	Belarus, Russia, Slovakia, Ukraine	<ul style="list-style-type: none"> <li>- Establishment of a working group for COOMET participation in the AUV CMCs review No. 234/BY/01</li> <li>- Measurement state and future development of AUV in member countries</li> <li>- CMC data preparation</li> <li>- TC 1.2 development and cooperation trends</li> </ul>
2003 VNIIFTRI, Russia	Belarus, Germany, Denmark, Russia, Ukraine	<ul style="list-style-type: none"> <li>- Discussion of TC 1.2 and CCAUV cooperation in the light of JCRB recommendations on working group establishment for CMC activity coordination</li> <li>- COOMET issues discussion</li> <li>- CMC data preparation</li> <li>- Reports and presentations on the development and research in AUV field in member countries</li> </ul>
2004 “Systema”, Ukraine	Belarus, Great Britain, Germany, Denmark, Russia, Ukraine	<ul style="list-style-type: none"> <li>- COOMET issues</li> <li>- proposals for the agenda of the Working Group of RMO CCAUV meeting</li> <li>- comparison arrangement issues</li> <li>- EUROMET cooperation discussion</li> <li>- Reports and presentations on the development and research in AUV field in member countries</li> </ul>
2006 BelGUM, Belarus	Belarus, Russia, Ukraine	<ul style="list-style-type: none"> <li>- Discussion of the state of work on issues of COOMET.AUV.A-K1, COOMET.AUV.A-K1.1 и COOMET.AUV.A-K3, COOMET.AUV.V-K1</li> <li>- Proposals for COOMET comparison programme - Proposals for the agenda of the Working Group of RMO CCAUV meeting</li> <li>- Reports and presentations on the development and research in AUV in member countries</li> </ul>

1	2	3
2008 VNIIM, Russia	Belarus, Denmark, Cuba, Russia, Ukraine	<ul style="list-style-type: none"> <li>- Discussion of the state of work on issues of 405/RU/07, 392/UA/07, 308/RU/04</li> <li>- Proposals for COOMET comparison programme</li> <li>- Information about the results of Technical Committee meeting TC 87 and TC 29 IEC</li> <li>- Proposals for the agenda of the Working Group of RMO CCAUV meeting and Classification of Services</li> <li>- Reports and presentations on the development and research in AUV in member countries</li> </ul>
It is planned to hold regular meeting in May 2010 at “Systema”, Ukraine		

### 3. Status of COOMET projects in AUV

The status of COOMET AUV projects is given in table 2 below.

Table 2

Project No	Description	KCDB code	Pilot of project	Status
1	2	3	4	5
234/BY-/01	Establishment of a working group for COOMET participation in the AUV CMCs review		V. Pozdeeva, BelGIM, Belarus	Working Group of experts from COOMET NMIs is active in this field since January 2002
323/UA/04	Comparison for primary method of pressure calibration of laboratory standard microphones over the frequency range from 20 Hz to 20 kHz	COOMET.AU V.A-K3	Dr. K. Rasmussen, DPLA, Denmark	Results published <a href="#">Metrologia, 2007, 44, Tech. Suppl., 09002</a> Participants of comparison: Denmark, Ukraine, Russia, Poland, Romania
226/DE-/01	Comparison of calibrations of laboratory standard microphones (63 Hz – 10 kHz)	COOMET.AU V.A-K1	Dr. T. Fedtke, PTB, Germany	Results published <a href="#">Metrologia, 2009, 46, Tech. Suppl., 09004</a> Participants of comparison: Ukraine, Russia, Germany, Poland, Turkey

1	2	3	4	5
316/UA/04	Bilateral comparison by calibration of microphones type LS1P	COOMET.AU V.A-K1.1	Dr. T. Fedtke, PTB, Germany	Results published <a href="#">Metrologia, 2009, 46, Tech. Suppl., 09005</a> Participants of comparison: Ukraine – Germany
308/UA/04	Key comparison of national standards for vibration parameters (in regard to sinusoidal acceleration) over the frequency range from 20 Hz to 5000 Hz	COOMET.AU V.V-K1	Dr. V. Smirnov, VNIIM, Russia	Measurements finished Draft A is available Participants of comparison: Russia, Belarus, Poland, Ukraine, Romania, Turkey
337/BY/05	Bilateral comparison of national standards by pressure calibration of microphones type WS1 and WS2 using electrostatic actuator technique	Pilot	V. Pozdeeva, BelGIM, Belarus	Comparison finished Participants of comparison: Russia – Belarus Research report is available
369/BY/06	Bilateral comparison of the national sound pressure standards	Pilot	V. Pozdeeva, BelGIM, Belarus	Comparison finished Participants of comparison: Russia – Belarus Research report is available
434/BY/08	Comparison of national standards for sound pressure in air (Pa) using calibrations of working standard microphones	COOMET.AU V.A-S1	V. Pozdeeva, BelGIM, Belarus	Draft A is under preparation BelGIM, Belarus VNIIFTRI, Russia SMU Slovakia Systema, Ukraine

1	2	3	4	5
392/UA/07	Comparison of the national standards for sound pressure in air over the low frequency range from 2 Hz to 125 Hz	Pilot	Dr. V. Chaly Systema, Ukraine	Completed in 2008 Draft B available Participants of comparison: Ukraine, Russia
431/UA/08	Comparison of national standards for sound pressure in air over a low-frequency range	COOMET.AU V.A-K2	Dr. V. Chaly Systema, Ukraine	Draft A available Systema, Ukraine VNIIFTRI, Russia
405/RU/07	Comparison of the national standards for sound pressure in water over infrasonic and low audio frequency range (2 Hz to 4 kHz)	Pilot	Dr. A. Isaev, VNIIFTRI, Russia	Completed in 2008 Draft B available Participants of comparison: Ukraine, Russia
448/RU/08	Comparison of measurements of the velocity of longitudinal ultrasonic wave propagation in solid media	Pilot	Dr. V. Lugovoi, Far East office of VNIIFTRI, Russia	Draft B is under preparation Russia (Far East office of VNIIFTRI), Belarus (BelGIM)
482/BY/09	Comparison of measurements of the velocity of longitudinal ultrasonic wave propagation in solid media by pulse method	Pilot	V. Pozdeeva, A. Dobrov BelGIM, Belarus	Technical Protocol is under preparation BelGIM, Belarus “Ukrmetrtestand art”, Ukraine
473/RU-a/09	Pilot comparison of the national standards for sound pressure in water (in regard to hydrophone calibration in free field) over the frequency range from 250 Hz – 200 kHz	Pilot	Dr. A. Isaev, VNIIFTRI, Russia	<b>On-going</b> VNIIFTRI, Russia HAARI, China

1	2	3	4	5
485/UA/10	Organization and conducting the 6th meeting of Technical Committee 1.2 AUV COOMET		Dr. V. Chaly Systema, Ukraine V. Pozdeeva, BelGIM, Belarus	

Currently, there are 10 completed projects: 275/RU/03 (meeting of TC 1.2), 309/UA/04 (meeting of TC 1.2), 300/BY/04, 323/UA/04, 337/BY/05, 369/BY/06; 226/DE/01; 316/UA/04; 392/UA/075; 405/RU/07;

7 on-going projects: 308/UA/04; 448/RU/08; 431/UA/08; 434/BY/08; 482/BY/09, 473/RU-a/09; 485/UA/10

and 1 permanent project 234/BY/01 developed at the 1<sup>st</sup> meeting of TC.

#### 4. Work on implementation of the CIPM MRA

##### 4.1. Status of the CMCs of COOMET NMIs in AUV

The AUV CMCs tables of Russia (COOMET.AUV.1.2001 and COOMET.AUV.5.2009), Belarus (COOMET.AUV.2.2003) and Ukraine (COOMET.AUV.3.2005 and COOMET.AUV.4.2007) are published in BIPM KCDB.

##### The AUV CMCs published in BIPM KCDB

Table 3

COOMET	APMP	EURAMET	SADCMET	SIM
COOMET.AUV.1.2001	APMP.AUV.1.2003	EUROMET.AUV.1.2001	SADCMET. AUV.1.2005	SIM. AUV.1.2003
COOMET.AUV.2.2003	APMP.AUV.2.2006	EUROMET.AUV.2.2001		
COOMET.AUV.3.2005	APMP.AUV.3.2006	EUROMET.AUV.3.2003		
COOMET.AUV.4.2007	APMP.AUV.4.2008	EUROMET.AUV.4.2004		
COOMET.AUV.5.2009	APMP.AUV.5.2009	EUROMET.AUV.5.2004		
	APMP.AUV.6.2009	EUROMET.AUV.6.2005		
		EUROMET.AUV.7.2007		
		EUROMET.AUV.8.2008		

##### 4.2. COOMET participation in interregional review of CMCs

In 2009 interregional review of the following CMCs was performed:

CMCs *	Date of publication of review results	Target date
APMP.AUV.5.2009	13.03.2009	20.03.2009
APMP.AUV.6.2009	20.03.2009	20.03.2009

\* Information was displayed at the previous meeting of JCMS

## **5. Cooperation in AUV with the relevant international and regional organizations**

TC 1.2 cooperates in AUV both with the international and regional organizations.

Starting from 2004 members of TC 1.2 attended the meetings of CIPM Consultative Committee for AUV and its Working Group “CCAUV RMO WG”; submitted proposals for expansion of the Classification of Services; initiated comparisons, and specifically, in underwater acoustics.

NMIs COOMET take an active part in key comparisons CCAUV: CCAUV.A-K1, CCAUV.A-K2, CCAUV.A-K3 (routine intercomparison), CCAUV.U-K1, CCAUV.U-K3, CCAUV.V-K1, CCAUV.V-K2 (routine intercomparison), CCAUV.W-K1.

The TC of COOMET maintains relatively close cooperation with TC AUV EUROMET, whose members took part in the meetings of TC 1.2, and in COOMET key comparisons for air acoustics and vibration (NMIs from England, Denmark, Poland and Turkey).

In turn, members of TC 1.2 participate in TC AUV EURAMET meetings. In 2009 they attended subcommittee meetings: “Ultrasound”, “Air acoustics”, “Hydroacoustics”.

In 2009 members of TC 1.2 participated in the CEI/IEC and working groups meetings: IEC/TC 29 and WG7, WG8, WG14 and WG15, IEC/TC 87.

Valentina Pozdeeva  
TC 1.2 Chairperson

## ANNUAL REPORT of Chairperson of TC 1.3 “Electricity and Magnetism”

### 1. General information

The members of TC 1.3 are the representatives of 17 countries – COOMET members: Armenia, Azerbaijan, Belarus, Bulgaria, Cuba, DPR of Korea, Georgia, Germany, Kazakhstan, Kyrgyzstan, Lithuania, Moldova, Romania, Russia, Slovakia, Uzbekistan and Ukraine.

It is known that a number of COOMET member countries submit their NMI CMC through Regional Metrology Organizations. For instance, Germany, Slovakia, Lithuania, Bulgaria and Romania present their data via EUROMET.

The main task of the formed TC is the realization of COOMET members' cooperation in the area “Electricity and Magnetism” including the following activities:

- Arranging of the key and regional supplementary comparisons of national standards of COOMET member countries;
- Preparation and intra-regional review of Calibration and Measurement Capabilities (CMCs) of the COOMET members
- Cooperation with the corresponding Technical Committees of other Regional Metrology Organizations, participation in the inter-regional CMC review

### 2. Meetings of TC

Last TC 1.3 meeting was held in Kiev in May 2009.

13 representatives from 6 COOMET countries (AZERBAIJAN, BELARUS, GERMANY, KAZAKHSTAN, RUSSIA and UKRAINE) attended the meeting. They were leading experts in the field “Electricity and magnetism” of COOMET NMIs as well as invitees.

It should be noted that there is a weak but upward trend in the quantity of countries and representatives participated in TC meetings. We are very pleased to meet our new active and interested TC members, and first of all it concerns our colleagues from Azerbaijan, Kazakhstan and Georgia.

The meeting was held accordingly to the agenda approved by meeting participants.

During the meeting was heard and presented the following:

- Report given by the chair of TC 1.3 concerning the results of work for the period under review; the report was taken into consideration;
- Report concerning progress of work on proposed and agreed-on COOMET projects, information given by all participants regarding their current problems related to “Electricity and magnetism”;

- Performance report of JCRB Committee and CCEM Working Group on cooperation with Regional Metrology Organizations (March 2009);
- Information given by participants concerning activities related to “Electricity and Magnetism”, which are carried out by their National metrological services; information concerning prospective activities aimed at establishing the measurement standard base; information concerning programmes for developing and improving the measurement standard base;
- Progress with the proposed projects. It was noted that there is no regular information on some projects which makes it impossible to assess the progress and that some projects are completed but not reported;
- Information related to participation in inter-regional review of CMC-files (EURAMET and SIM);
- Participants came to an agreement about expert groups in subareas on CMC review;
- Information given by participants concerning CMC-data. It was noted that CMC-data of Ukraine (Ukrmetrtestandart) underwent inter-regional expert examination and were posted on the BIPM website in December 2008;
- Extract from the Programme of comparison of COOMET electricity and magnetism standards. It was noted that comparisons were needed to be active for certain subareas covered by “Electricity and magnetism” so as to support CMCs;
- According to the suggestions of member countries an expert team on different kinds of measurement in CMCs review was formed and coordinated.

Minutes of the meeting were signed by all participants, translated into English and submitted to TC-members for consideration, implementation and for suggestions and additions.

### **3. State of COOMET projects**

List of the subjects and its state on February 15, 2010 is given in Annex A.

### **4. Cooperation with international and regional organizations**

Meeting of WG CCEM was held in March 2009. Dr. Alexandr Katkov (VNIIM) participated as a representative of COOMET. Information concerning this meeting was presented on the meeting of TC 1.3 in Kiev in May 2009 by Mr. Hans Bachmair (PTB).

### **5. Work in the field of the Appendix C of the CIPM MRA**

At the present time, in the BIPM database (Appendix C) COOMET presented CMC-data of Russia, Belarus, Ukraine, Germany, Slovakia, Bulgaria and Romania (these countries presented their data through EUROMET).

CMC BIPM of Ukraine (Ukrmetrtestandart, Kiev) underwent interregional expert examination in 2008 and was entered in the BIPM database. In 2009 CMC-files (NSC Institute of Metrology, Kharkov) and the second bloc of CMC-files of Ukrmetrtestandart (Kiev) of Ukraine underwent COOMET inner expert examination and were submitted for interregional review.

A lot of work on interregional CMC review of 16 EURAMET-countries (EURAMET EM.6) and 3 SIM-countries (SIM EM.3) was carried out by TC 1.3.

#### **6. Time and place of the next TC meeting**

Time and place of the next TC meeting: 23-24 of September 2010, Kishinev, Moldova.

#### **7. Proposals for COOMET Committee meeting**

As before, the problem of an active participation in TC work and in comparisons, is still unsolved for many COOMET member countries (Armenia, Kyrgyzstan, Moldova, Uzbekistan). In this connection it seems necessary to ask COOMET members from these countries to pay attention to the work (diligence) of their representatives in TC.

Tatyana Kolomiets  
TC 1.3 Chairperson

## ANNUAL REPORT of Chairperson of TC 1.4 “Flow Measurement”

### 1. General characteristic of cooperation in the field of flow measurement

The Technical committee “Flow measurement” (TC 1.4) is realized all works of COOMET on measurement assurance in the field of liquid, including oil and oil products, and gas, including natural gas, measurement.

TC 1.4 was created in May, 2002 and now is completely organized capable structure, which combines 17 correspondents of COOMET member countries.

Taking into account the broad spectrum of questions and tasks, concerned by TC 1.4, in its combination was created three subcommittees:

- SC 1.4.1 “Gas flow measurement”, the Chairperson Mr. Nikolay Martynov (BelGIM, Belarus),
- SC 1.4.2 “Oil and oil products flow measurement”, the Chairperson Dr. Gennady Homyakov (VNIIR, Russia) and
- SC 1.4.3 “Liquefied gas flowmetry”, the Chairperson Mr. Reshat Sabirgaliev (KazInMetr, Kazakhstan).

One of the primary tasks solved by TC 1.4, was and is slim that of promoting cooperation of the national metrological institutions of COOMET member countries in flow measurement with the aim of implementing the Agreement on Mutual Recognition of national standards of units of gas and liquid flow, corresponding certificates of calibration and measurements issued by national metrology institutes, and forming CMC.

Besides this primary task, during the reporting period TC 1.4 members took part in the realization of COOMET normative-legal basis, namely:

- COOMET Rules of Procedure;
- COOMET Recommendation “Regulations on comparisons of standards of COOMET national metrological institutes”, in particular, Technical protocol of comparisons and Preliminary and Final Reports (Draft A and Draft B) on comparison;

### 2. TC work on COOMET projects

Now TC1.4 has completed the work on the following projects:

- 191/RU-a/99 “Condition of the standard base of COOMET member countries in the field of gas flow and quantity measurements”. The coordinator: Mr. N.Martynov, (BelGIM), Belarus; partners: SMU (Slovakia); SE “Ivano-Frankovskstantardmetrologiya”, (Ukraine); NISM, (Kyrgyzstan); VNIIR, (Russia). the Project is completed; report with characteristics of national standards of gas flow is prepared, interested persons can get acquainted with it;
- 219/SK-a/00 “Realization of comparisons of the standard test equipment in the range of gas flow: A) (0,06 - 10) m<sup>3</sup>/h; B) (100 - 1000) m<sup>3</sup>/h”. The pilot

organization is SMU - Slovakian institute of metrology; the coordinator: Mr. Shtefan Makovnik; partners: PTB (Germany), INSM (Moldova), BelGIM, SE "Ivano-Frankovskstandartmetrologiya", LEI (Lithuania), VNIIR. Comparisons are registered in KCDB as COOMET.M.FF-S1. The results of this comparison (Draft B) is set out on site [kcdb.bipm.org](http://kcdb.bipm.org) and published in Metrological Technical addition (IOP, Electronic Journals. Metrologia).

As a new projects, on which TC are working now, should notice the following agreed projects:

- 406/UA/07 "Comparisons of national standards of volume and mass liquid flow units". The pilot organization is PTB, Germany; the coordinator is Dr. Wendt Gudrun; partners: PTB; BelGIM; VNIIR; LEI; NSC "Institute of Metrology" (Ukraine); SMU; NSC RUz (Uzbekistan). The Project is registered in KCDB as COOMET.M.FF-S2, the comparison – as supplementary. The Technical Protocol is agreed; the first step of comparison has carried out – comparison of Germany and Ukraine standards and now is being the process of the transporting of transfer-standard to Uzbekistan. During conducting the works within these comparisons there existed "roughness". However, in general, the work is going satisfactory;
- 412/UA/07 "Realization of reference gas flow meter's test rigs comparisons in flow range: (4-160) m<sup>3</sup>/h". The pilot organization is SE "Ivano-Frankovskstandartmetrologiya"; the coordinator is Mr. Denis Sereduk; partners: LEI, VGUP VNIIR, SMU, SE "Ivano-Frankovskstandartmetrologiya". The Project is registered in KCDB as COOMET.M.FF-S3, the comparison – as supplementary. The Technical Protocol is agreed; the works within the Project are conducted according to the schedule;
- 452/SK/09 "Comparison of cold water flow calibration laboratories in a range of flow rates (3 - 20) m<sup>3</sup>/h". The pilot organization is SMU; the coordinator is Mrs. Miroslava Benkova. The comparisons is international – participants calibration laboratories of COOMET and SIM: SMU; INIMET (Cuba); CENAM (Mexico); LEI; SF "Ukrmetrteststandard" (Ukraine); INSM. They are determined by coordinator of comparisons as additional. However, according to the document JCRB-11/8(5) –rev., if more than one RMO takes part in comparisons, such comparisons should be determined as COOMET key comparisons. Now, this question is being solved in KCDB. The Technical Protocol is agreed; the works are conducted according to the schedule;
- 433/BY/08 "The harmonization of normative base on metrological maintenance of turbine gas meters". The pilot organization is BelGIM; the coordinator is Mr. Nikolay Martynov; partners: BelGIM, INSM. As a result it is supposed for harmonizing to the conditions of COOMET member countries European normal EN 1261 "Turbine gas meters. General technical demands and testing methods" with the aim of creation on its base the appropriate Intergovernmental standard. As proposed Projects are the following;

- “Comparisons of national standards of the standards of liquid volume”. Additional comparisons; pilot organization – INIMET, coordinator – Dr. Jose Franko;
- “Analysis of the condition of metrological providing the measurements of flow of liquefied gas”. Pilot organization – ZKF RGP “KazInMet” (Kazakhstan); coordinator – Mr. Reshat Sabirgaliev;
- “Development of harmonized methods of conducting the measurements of natural gas with the help of meters”. Pilot organization – BELGIM; coordinator – Mr. Nikolay Martynov.

### 3. TC activity on the expertise of CMC of NMIs

In reporting period in TC 1.4

- have passed the internal and put up to the interregional expertise CMC of following NMIs:
  - VNIIR, Russia; registration in JCRB – COOMET.M.6.2005;
  - SE “Ivano-Frankovskstandartmetrologiya”, Ukraine; registration in JCRB – COOMET.M.10.2009;
- passing the internal expertise of CMC now
  - BELGIM, Belarus – expert is INIMET, Cuba;
  - NISM, Moldova – expert is BELGIM.

The CMC tables on liquid flow measurement of NSC “Institute of metrology”, Ukraine, are preparing now to the presentation on internal expertise.

Taking into account the principal notes of technical experts on CMC VNIIR and process of coming to an agreement which lasts more than 4 years, insistent recommendations of Responsible secretary of JCRB Luis Mussio and the most important – absence of trust in the quality management system of this institute, at 6<sup>th</sup> meeting of TC 1.4 (10-15 October 2009) it was decided to delete CMC of VNIIR on gas flow measurement with interregional expertise, what was made on 05.11.2009.

Interregional CMC expertise of GP “Ivano-Frankovskstandartmetrologiya” was completed successfully and their 3 entries were published at BIPM website.

Regional CMC expertise of BELGIM and NISM is being completed, CMC NSC “IM” will be presented for expertise after completing by Ukraine the comparisons on Project 406/UA/07, expert – SMU.

### 4. Interaction with international and regional organizations

The contact and cooperation were established with the Chairperson of JCRB Consultative Committee on flow measurement (CCM working group on Fluid Flow (WGFF)) Dr. Masaki Takamoto (National Metrology Institute of Japan) for more qualitative solving the tasks of TC.

With the aim coordination of works of TC 1.4 and more effective interaction with BIPM member of Committee Dr. Gudrun Wendt is included into the working group of BIPM on flowmetry (WGFF).

The TC members take direct part in

- Meeting of Working group BIPM on flow measurement (WGFF-2009), August, 2009, Ankorigh, Alaska;
- The 19<sup>th</sup> Meeting of COOMET Committee and 7<sup>th</sup> Meeting of Measurement Standards Joint Committee (Azstandard, Baku, May 20-21, 2009);
- conducting the joint works with company Emerson Process Management Ltd (Great Britain) on providing in metrological practice of Ukraine of unified notes of oil registration X-3100 and X-3400 and production of this company;
- attestation of measuring instruments within accreditation for the right of conducting metrological works in Ukraine and Europe of Western-European regional Centre of oil metrology, which is created by three beneficiary countries: Ukraine, Moldova and Belarus within the Programme of European Union “INOGATE” under the guidance of Agency “SENER” of the Netherlands and European Commission;
- workshop on the European Union Project “INOGATE” “Harmonization, adaptation of standards, rules and practices in oil and gas sector of East Europe Countries and Caucasus”. Countries-beneficiary: Azerbaijan, Armenia, Belarus, Moldova, Ukraine, February 2-3, 2009, Kharkov, Ukraine;
- COOMET workshop “Comparisons of national standards of liquid flow units”, February 23-25, 2009, PTB, Braunschweig, Germany.

## 5. Results of last Meeting of the TC and implementation of its Resolution

The last 6<sup>th</sup> meeting of COOMET TC 1.4 took place on October 10-15, 2009 in INSM, Chisinau, Moldova. 11 representatives of 6 TC 1.4 member countries: Belarus (BelGIM), Germany (PTB), Kazakhstan (KazInMetr), Moldova (INSM), Slovakia (SMU), Ukraine (NSC “Institute of Metrology”).

The meeting was passed conducted according to the Programme agreed (on e-mail) before. On all to its questions constructive decisions were adopted which is reflected in the Resolution of the Meeting.

The participants of the meeting:

- were listening with interest to the Report on Project 191/Ru-a/99 with characteristics of national standards of gas flow unit standards, paid attention to the actuality of conducting methodological works, devoted to metrological providing of flow measurements as natural so as liquefied gas;
- noticed, that posting the results (Draft B), conducted on Project 219/Sk-a/00 of comparisons (registration in KCDB – COOMET.M.FF-S1) at the website [kcdb.bipm.org](http://kcdb.bipm.org) and their publishing in Metrological Technical Annex (IOP, Electronic Journals. Metrologia), gives the possibility to the participants of

comparisons to use their results for support of their CMC;

- had constructive attention to recommendations, developments, problems, which were found in the process of conducting comparisons on Project 406/UA/07;
- great attention was paid to the approved Project 412/UA/07 of methods of comparisons, calendar and route of transfer standard of gas flow unit, Project of Technical Protocol;
- paid attention to the importance of conducting interregional comparisons on Project 452/Sk/09 for providing the unity of measurements, i.e. water flow, by various RMO;
- the following decision was taken:
  - to close the COOMET: 190/Ru-a/99, 191/Ru-a/99, 192/Ru-a/99, 219/Sk/00 and 481/UA/09, as conducted,
  - to conduct the 7<sup>th</sup> Meeting of TC 1.4 “Flowmetry” in Republic state enterprise “KazInMetr”, Kazakhstan, 25-28 October, 2010.

In general the Meeting noticed that TC 1.4 “Flowmetry” was working rather satisfactory in reporting period.

Prof. V. Bolshakov  
TC 1.4 Chairperson

## ANNUAL REPORT of Chairperson of TC 1.5 “Length and Angle”

In 2009, the chairperson of the Technical Committee “Length and Angle” was replaced. In connection with this, great organizational actions were taken including the following stages:

- The TC members were questioned to confirm their participation in the TC activities; data about country representatives in the TC were collected.

Unfortunately, we still have no feedback from many TC members confirming their participation in the activities.

- A CMC expert group was organized. The list of experts was forwarded to the Chairperson of the Joint Committee for Measurement Standards (JCMS) S. Korostin.
- The 10<sup>th</sup> meeting of the TC was organized in cooperation with VNIIM representative K. Chekirda and held on 11-13 November 2009 in Saint-Petersburg, Russia.

Special attention was given to the analysis of comparison projects carried out within COOMET, being the basic activity of the TC.

A revised list of comparison projects already in progress and planned for the subsequent years was forwarded to the Chairperson of JCMS S. Korostin.

There is a long list of comparisons of national measurement standards. These are

### Completed projects:

N	Project ID	Project name
1	460/SK/09	Comparison of 24-sided polygon
2	382/RU/07	International comparisons of national measurement standards for deviations from linearity and flatness; the measurement range for deviations from linearity is 0 to 50 $\mu\text{m}$ , the surface length is 0.4 to 5 m
3	314/UA/04	Comparison of measurement standards for involute surface
4	265/UA/02	Conducting of comparisons of highest accuracy interferometers for gauge blocks measurements (100 mm)
5	266/BY/02	Comparisons of national measurement standards for the unit of plane angle – degree
6	181/RU-a/99	Comparison of inner diameter gauges (reference rings)

### Agreed (on-going) comparison projects:

N	Project ID	Project name
1	2	3
1	390/BY/07	International comparison of length standards in the range measurement of gauge blocks (up to 100 mm)

1	2	3
2	332/RU/05	Comparisons of the external diameter (plug gauges) standards
3	315/UA/04	Metrological measurement assurance of the coating thickness and films up to 10 $\mu\text{m}$
4	313/UA/04	Comparison of flatness standards
5	283/UA/03	Comparison of range-finder equipment of higher precision
6	278/UA-a/03	Conducting of comparisons of line scales comparators
7	277/UA-a/03	Conducting of comparisons of highest accuracy interferometers for gauge blocks measurements (up to 1 m)

**Cancelled projects:**

<b>N</b>	<b>Project ID</b>	<b>Project name</b>
1	2	3
1	<b>212/RU/00</b>	Recommendations for developing, calibrating and applying coating thickness gauges
2	<b>180/RU/99</b>	Nanometrology. Comparison of small length gauges
3	<b>177/UA/99</b>	State of the measurement standard base in COOMET member countries in length and angle measurement
4	<b>173/RU/99</b>	Comparisons of crack opening gauges for non-destructive control
5	<b>158/UA/97</b>	Creation of new types of metrological lasers
6	<b>130/Ua/95</b>	Mutual comparisons of length gauges
7	<b>126/RU-a/95</b>	Comparison of length measurement standards in the range of 1 to 200 mm
8	<b>125/Ru/95</b>	Development of a template test programme for eddy-current tools of controlling the geometric dimensions of tubes and rolling defects for type approval purposes
9	<b>124/Ru/95</b>	Development of a template test programme for eddy-current and magnetic coating thickness gauges for type approval purposes
10	<b>111/UA-a/92</b>	Metrological assurance of gear parameter measurements
11	<b>110/UA/92</b>	Carrying out of activities for certification of products being an article of commerce
12	<b>109/UA/92</b>	Comparison of reference measuring instruments for gear parameters
13	<b>108/UA/92</b>	Development of methods and tools for taking into account the atmosphere refractive index along the measurement signal path of the range finder
14	<b>107/UA/92</b>	Development of an interferometer with the range of up to 100 m and relative error of $1 \cdot 10^{-7}$
15	<b>106/UA/92</b>	Development of range-finding equipment

1	2	3
16	105/UA/92	Creation of a precision laser tachymeter for length and angle measurements in construction, energy and transport engineering
17	104/UA/92	Comparisons of top-accuracy range-finding equipment located in NPO "Metrology" with similar equipment of COOMET countries
18	103/UA/92	Development and certification of parameter meters for fibre-optic cables and circuits
19	100/UA/92	Development of a quantum-mechanical system of top-accuracy length and angle measurements
20	80/PL/92	Comparisons of length measurement results obtained using interferometers with stabilized lasers
21	11/RU-a/92	Unification of methods and instruments for plane angle measurements
22	10/RU-a/92	Development of harmonized verification methods and comparison tools for measuring instruments in the range of 0.5 to 200 $\mu\text{m}$
23	9/Ru/92	Metrological assurance of coating thickness and density measurement

#### Proposed projects:

N	Project ID	Project name
1	450/UA/09	Comparisons of reference instruments of unit are length for parameters of a roughness
2	443/RU/08	Comparisons of national standards in the area of measuring surface density of coatings within the range of (0.001-1.000) $\text{kg}/\text{m}^2$ and coating thickness within the range of (1-100) $\mu\text{m}$
3	440/RU/08	International comparison of stabilized He-Ne/I <sub>2</sub> lasers at 633 nm
4	370/RU/06	Interlaboratory comparison of length standards in the nanometer range

#### Regarding the completed projects:

#### Final reports of the following projects have been received:

460/SK/09 "Comparison of 24-sided polygon" from Slovakia, the report is being prepared to be sent to KCDB.

382/RU/07 "International comparisons of national measurement standards for deviations from linearity and flatness; the measurement range for deviations from linearity is 0 to 50  $\mu\text{m}$ , the surface length is 0.4 to 5 m".

**The final reports of the following projects are almost finished:**

- 314/UA/03 “Comparison of measurement standards for involute surface”.
- 265/UA/02 “Conducting of comparisons of highest accuracy interferometers for gauge blocks measurements (100 mm)”.

**The TC has not received reports of the following projects:**

- 266/BY/02 “Comparisons of national measurement standards for the unit of plane angle – degree”.
- 181/RU-a/99 “Comparison of inner diameter gauges (reference rings)”.

**Regarding the on-going projects:**

- 390/BY/07 “International comparison of length standards in the range measurement of gauge blocks (up to 100 mm)”. The pilot organization BELGIM has not provided the participating countries with the comparison report to be agreed on.
- 332/RU/05 “Comparisons of the external diameter (plug gauges) standards”, the project has not been completed yet, the transfer standards are now at the participating organizations.
- 315/UA/04 “Metrological measurement assurance of the coating thickness and films up to 10  $\mu\text{m}$ ”. The project is at the initial stage; it is considered now to combine it with proposed project 450/UA/09 “Comparisons of reference instruments of unit are length for parameters of a roughness”, since the same reference measuring instrument is used in comparisons.
- 313/UA/04 “Comparison of flatness standards”, the project has not been completed because the previous comparison results could not be presented because of the difficulties related with the surface of the comparison gauge. It was decided at the TC meeting to cancel the project and further repeat the comparison taking into account all the shortcomings of the previous project.
- 283/UA/03 “Comparison of range-finder equipment of higher precision”. It was decided at the TC meeting to cancel the project because of the difficulties with the transportation and customs procedures of the transfer standards which are complex measuring units.
- 277/UA-a/03 “Conducting of comparisons of highest accuracy interferometers for gauge blocks measurements (up to 1 m)” and
- 278/UA-a/03 “Conducting of comparisons of line scales comparators” are now prolonged because RSE “KazInMetr” expressed their wish to participate in the comparisons. The technical protocol is being agreed on now.

**Regarding the cancelled projects:**

The reasons for canceling the projects were as follows:

- no actions have been taken since the moment the projects were proposed;
- comparison projects covering early proposed projects appeared;
- not enough number of participants became interested in the proposed projects.

The TC prepared a list of **proposed projects**.

They are as follows:

- 450/UA/09 “Comparisons of reference instruments of unit are length for parameters of a roughness”. The participants are being registered and the technical protocol is being agreed on now. VNIIMS and NIICPV (Russia) have expressed their consent to participate.
- 370/RU/06 “Interlaboratory comparison of length standards in the nanometer range”. NSC “Institute of Metrology” (Ukraine) and NIICPV (pilot organization, Russia) have confirmed their participation.
- 443/RU/08 “Comparisons of national standards in the area of measuring surface density of coatings within the range of (0.001-1.000) kg/m<sup>2</sup> and coating thickness within the range of (1-100) μm”. The project is at the stage of forming the list of participants.
- 440/RU/08 “International comparison of stabilized He-Ne/I<sub>2</sub> lasers at 633 nm”. COOMET Secretariat has no filled-in form for this agreed project. BelGIM (Belarus) and VNIIM as a proposing organization are participating.

Comparisons of the involute and parameters of gears have been carried out within EURAMET. Germany (PTB), Japan (AIST), Thailand (NIMT), England (NPL, New Castle University) also participated.

**Activities of the subcommittees (SCs) of TC 1.5 and their chairpersons**

At the meeting of TC 1.5 held on 11-13 November in Saint-Petersburg a decision was made to dissolve the subcommittees within the TC.

According to the decision of the TC Dr Konstantin Chekirda was appointed VNIIM representative.

The next meeting was planned for September 2010 in Alma-Ata, Kazakhstan, at KazInMetr.

Dr Vladimir Kupko  
TC 1.5 Chairperson

**ANNUAL REPORT  
of Chairperson of TC 1.6 “Mass and Related Quantities”**

**1. General characteristic in the cooperation in the field of measurements of mass and related quantities**

Activities on 8 projects were carried out the field of mass and related quantities measurements in 2009-2010.

**COOMET M.M-K2 No. 258/RU/02** “Key comparisons in the field of kilogram multiples and submultiples”

Coordinator: VNIIM

Draft B was prepared and approved on the 14<sup>th</sup> meeting of TC 1.6. The degrees of equivalence of the national measurement standards of participants will be calculated after Draft B on CCM-K5 is published.

**COOMET M.F-K1 No. 259/RU/02** “Key comparisons in the field of force measurements in the range 20 – 1000 kN”

Coordinator: VNIIM

The comparisons were registered in the JCRB data base.

**COOMET M.H-K1; COOMET M.H-K2 No. 341/RU/05** “Key comparison of Brinell and Vickers hardness scales”

Coordinator: VNIIFTRI

The measurements have been completed. Draft B is under preparation.

**COOMET M.H No. 371/KZ/06** “Bilateral key comparison in the field of hardness measurement in the Rockwell and Super-Rockwell scales”

Coordinator: KazInMetr

Draft B was approved at the 14<sup>th</sup> meeting TC 1.6.

**COOMET M.P-K2 No. 331/LT/05** “Bilateral key comparisons in the field of measuring pressure in liquid in the range of (1-100) MPa”

Coordinator: VMC

The comparisons are still underway.

**COOMET.M.H-K1a No. 303/DE/04** “Bilateral key comparisons in the field of Vickers hardness measurement”

Coordinator: PTB

Draft B was sent for approval.

**COOMET M.P-K14 No. 444/DE/08** “Key comparisons national standards in the range 100 Pa to 5 kPa of gauge pressure”

Coordinator: PTB

The measurements are in progress.

**COOMET 397/RU/07** “Comparison of the national measurement standards in the range 1 MPa of gas absolute pressure”

Coordinator: VNIIMS

The experts in the field of pressure measurements decided after the discussions of the Technical Project at the 14<sup>th</sup> meeting of TC 1.6 to exclude it from COOMET Key Comparison Programme because the pilot laboratory has no national measurement standard for absolute pressure, which gives no opportunity to check the stability of the transfer standard.

The Draft B of project 257/SK-a/02 “Key comparisons of 1 kg mass standards of stainless steel” was published in the JCRB data base in January 2010.

## **2. State of CMC in mass and related quantities measurements of COOMET NMIs**

The following COOMET tables are published in KCDB:

- COOMET.M.1.2001 – Mass, Pressure, Force, Viscosity – Russia;
- COOMET.M.5.2005 – Pressure – Cuba;
- COOMET.M.4.2005 – Hardness – Russia;
- CMC.M.11.2009 – Hardness – Kazakhstan is under interregional review;
- CMC.M.12.2009 – Mass – Ukraine is under interregional review;
- CMC.M.13.2009 – Viscosity – Belarus is under interregional review.

## **3. TC activity on the review of CMC tables of NMIs**

The state and results of TC 1.6 activity on the expertise of CMC tables are characterized in the following way:

- APMP.M.20.2009
- APMP.M.21.2009
- APMP.M.22.2009
- APMP.M.23.2009
- SIM.M.11.2009
- EUROMET.M.11.2009
- EUROMET.M.16.2009
- EUROMET.M.17.2009

## **4. Collaboration with international regional organizations**

As it has already been mentioned one of the main tasks of TC 1.6 was and still is the promotion of cooperation between NMIs in the field “Mass and related quantities” for the purpose of implementing the Arrangement on Mutual

Recognition of national standards in COOMET member countries. For the purpose of operative solution of these tasks the experts of TC 1.6 will take part in the 12<sup>th</sup> meeting of the Consultative Committee in France on 24–26 March 2010 concerning the redefinition of the kilogram. The TC members regularly organize the activity of NMIs on the comparisons of national standards; take part in different international conferences and seminars related with measurements, calibration, estimation of measurement result uncertainty, quality control.

The members of TC 1.6 take part in the CCM Key Comparisons:

- CCM.H-K2 Key Comparison in Brinell Hardness;
- CCM.H.S1 Key Comparison of Rockwell Hardness;
- CCM.D.K3 Key Comparison of Solid Density;
- CCM.P-K3 Key Comparison Pressure Measurement in Gas;
- CCM.F-K3 Key Comparison Force 0,5- 1 MH;
- CCM.M-K5 Key Comparison in Mass Standards 200 mg, 1g, 50g, 2 kg.

Dr Natalya Domostroeva  
TC 1.6 Chairperson

**ANNUAL REPORT  
of Chairperson of TC 1.7 “Photometry and Radiometry”**

**1. General characteristic of cooperation in this subject field**

In 2009 the works were being carried out on 11 Projects. Coordinators of the Projects are Russia (9 Projects), Belarus (1 Project), and Cuba (1 Project).

**1.1. Fulfillment of tasks on agreed projects**

Project No. 168/RU/98      A state of the measurement standards base in the field of photometry and radiometry for the COOMET member countries.

Coordinator:                      VNIIOFI (Russia)

Partners:                              Germany, Ukraine, Belarus, Lithuania, Slovakia, and Russia

An analysis of a state of the measurement standards base has been carried out with the use of materials of developments and investigations performed in Belarus, Ukraine, and Russia.

**Measurement standards base of Belarus**

BelGIM's measurement standards base in the field of photometry and radiometry is presented by 3 national measurement standards: NS RB 8-02, NS RB 3-00, IS RB 13-08.

**a) The national measurement standard of the units of luminous intensity and illuminance (NS RB 8-02)**

This measurement standard obtains the units of luminous intensity, illuminance and a correlated color temperature from a national measurement standard of PTB (Braunschweig, Germany).

This measurement standard is taking part in international key comparisons of the unit of luminous intensity within the framework of COOMET where BelGIM is a Coordinator of comparisons (Project No. 368/BY/06) and in international key comparisons of the unit of luminous intensity within the framework of EURAMET (PTB is a pilot laboratory).

**b) The national measurement standard of the units of color coordinates, spectral regular transmittance and diffuse reflectance (NS RB 3-00)**

This measurement standard is based on a “Cary-500Scan” spectrophotometer (with an attachment of diffuse reflectance) operating in the (200 to 2500) nm spectral range and on sets of standard samples.

BelGIM is taking part in international comparisons that are planned to be carried out within the framework of COOMET (Project No. 429/CU/08).

**c) The initial measurement standard of the units of whiteness (IS RB 13-08)**

The measurement standard is based on an “ELREPHO” spectrophotometer, an X-RITE 8400 spectrophotometer, a “COLOR-EYE 2145” spectrophotometer, and sets of standard samples.

BelGIM is taking part in comparisons of standard samples of whiteness (Project No. 366/RU/06).

**On design of a new measurement standard**

In the 4-th quarter of 2009 there have been completed the works on creation of a national measurement standard of the unit of spectral sensitivity of radiation detectors in the (350 to 1100) nm spectral range.

The works on expanding the spectral range of the measurement standard to the IR region of the spectrum (up to 2500 nm) are now being carried out. International comparisons of BelGIM and SUM measurement standards as well as BelGIM and PTB measurement standards are planned for 2010.

**Measurement standards base of Ukraine**

In 2009 a national primary measurement standard of the units of radiation pulse average power, continuous radiation power in a light guide and a time of radiation propagation in a light guide (DETU 11-03-09) was approved by the Ukraine Gospotrestandart and was introduced in Gosreestr. At present 9 national measurement standards in the field of optical and physical measurements are functioning in Ukraine.

A list of Ukraine national measurement standards in the field of optical and physical measurements is attached.

The measurement standards have not taken part in comparisons.

**Measurement standards base of Russia**

It is presented by 15 national measurement standards (NS): 14 NS in VNIIOFI and 1 NS in VNIIM named after D.I. Mendeleev.

In VNIIOFI there were continued the works on improvement of the following national measurement standards:

- of the unit of continuous radiation luminous intensity and luminous flux;
- of the units of length and time of signal propagation in a light guide, average power, attenuation, and a wavelength for FOTS, as well as of national verification schemes according to GOST 8.195-89 and GOST 8.205-90.

There has been performed the work on restoring four national measurement standards that have suffered from gas-main fire:

- the national special measurement standard of the units of maximum strength values of pulsed electric and magnetic fields (GET 148-2009);
- the national primary measurement standard of the unit of laser radiation

average power (GET 28-2009);

- the national special measurement standard of the units of color and chromaticity coordinates (GET 81-2009);
- the national primary measurement standard of the units of radiation flux and irradiance in the (0.03 to 0.4)  $\mu\text{m}$  wavelength range (GET 162-2009).

Project No. 222/RU/01      Development of new methods and new types of high-accuracy measuring instruments intended for measuring irradiance in the (200 to 400) nm wavelength range.

Coordinator:                      VNIIOFI (Russia)

Partners:                              Ukraine, Russia

During 2009 at the NSC “Institute of Metrology” there were carried out investigations of metrological characteristics of a national primary measurement standard of the units of spectral density of radiance, spectral density of luminous intensity, and spectral density of irradiance; radiation power and irradiance (DETU 11-06-06) in the (200 to 400) nm spectral range.

Within the framework of this Project VNIIOFI has performed the following works:

- development and concordance of a Technical protocol of international comparisons between GET 162-2009 and PTB measurement standard according to irradiance of ultraviolet radiation in the (200 to 400) nm wavelength range;
- fulfillment of preliminary measurements of irradiance of hydrogen-discharge and mercury-discharge lamps (with participation of PTB);
- investigation of angular characteristics or angular dependence of radiation flux of hydrogen-discharge, xenon, and mercury-discharge lamps (with participation of PTB).

Project No. 223/RU/01      Comparison of standard measuring instruments intended for optical fiber parameters measurements.

Project No. 224/RU/01      Improvement of a system for metrological assurance of measuring instruments intended for measuring optical radiation average power in FOTS.

Project No. 225/RU/01      Comparison of national measurement standards of the unit of average radiation power in FOTS.

Coordinator:                      VNIIOFI (Russia)

Partners:                              NSC “Institute of Metrology” (Ukraine) and VNIIOFI (Russia) for all three Projects

In connection with the fact that at NSC “Institute of Metrology” (Kharkov) the works on modernization of the national measurement standard of the power unit

of weak pulsed luminous fluxes were completed only in 2009, then comparisons with VNIIOFI measurement standard have not been carried out.

At NSC “Institute of Metrology” supplementary investigations of metrological characteristics of the measurement standard have been carried out with the aim to prepare this measurement standard for planned comparisons with VNIIOFI measurement standard.

Project No. 366/RU/06      Comparison of whiteness samples with the use of a secondary measurement standard of the units of color and chromaticity coordinates.

Coordinator:                      VNIIOFI (Russia)

Partners:                          Belarus, Ukraine, and Russia

VNIIOFI has developed a Technical protocol of comparisons with taking account of increased number of participants (Ukrmetrteststandart) which is now in the process of concordance.

In connection with the fact that the measurement standard has gone out of service for a period of half a year, the dates of starting two new works approved at the TC 1.7 meeting were postponed till 2010.

These works are:

- comparisons of standard measuring means of color characteristics of reflecting, transparent, and self-luminous samples;
- elaboration of interstate standards on estimation of paper whiteness.

At NSC “Institute of Metrology” there has been elaborated, approved, and published a procedure of calculation entitled “RMU 11-054-2007. Color and Chromaticity Coordinates. Method of Calculation”. There have been given definitions of main concepts and terms used in colorimetry. According to this procedure a programme for calculation of color and chromaticity coordinates and their uncertainties with the use of spectral measurements data has been drawn up.

Project No. 368/BY/06      Comparison of national measurement standards of the units of luminous intensity and illuminance.

Coordinator:                      BelGIM (Belarus)

Partners:                          Slovakia, Russia, Belarus, and Ukraine

A Technical protocol was developed by BelGIM and was coordinated with the participants of comparisons. The Technical protocol is now sent to the CCPR WG-KC.

At NSC “Institute of Metrology” there were designed and investigated three photometers for carrying out comparisons on luminous intensity and illuminance. A new national verification scheme for measuring means of luminous quantities for Ukraine has been developed and coordinated. According to the requirements of this scheme the photometers were calibrated as working

measurement standards.

VNIIOFI has considered and agreed the Technical protocol obtained from Belgim. The works on preparing apparatus for comparisons have been performed.

Project No. 438/RU/08 International comparisons of national measurement standards of the unit of refractive index.

Project No. 439/RU/08 International comparisons of national measurement standards of the unit of an angle of rotation of a plane of polarization.

Coordinator of these Projects is VNIIOFI (Russia)

Partners: PTB (Germany), VNIIOFI (Russia), KazInMetr (Kazakhstan), and Ukrmetrteststandart (Ukraine).

The both Projects are a continuation of the works on comparisons of measurement standards of the unit of refractive index within Project No. 276/RU/03.

In 2009 the works on preparing for comparisons were performed with taking account of the results obtained in 2008 (the 1-st and 2-nd editions of a Technical protocol in the field of refractometry were developed; characteristics of transfer measurement standards that are to be designed were agreed with PTB; the 1-st edition of a Technical protocol in the field of polarimetry was developed).

Unfortunately, the date of starting comparisons in the field of refractometry is postponed till the beginning of 2010 as a result of non-fulfillment of the dates of manufacturing standard measures by ONTF Company (Ukraine).

Project No. 461/RU/09 Comparisons of measurement standards of the units of laser radiation average power at 0.532  $\mu\text{m}$  and 10.6  $\mu\text{m}$  wavelengths.

Coordinator: VNIIOFI (Russia)

Partners: VNIIOFI (Russia) and PTB (Germany)

In spite of the fact that the national measurement standard of laser radiation average power has gone out of service for a period of half a year, the 1-st stage of comparisons has been performed in PTB.

In the course of the 1-st stage with VNIIOFI measurement standard (RM-10) the following results have been obtained:

- discrepancy of measured sensitivities of measurement standards at 0.532  $\mu\text{m}$  constituted 0.29 %;
- discrepancy at 10.6  $\mu\text{m}$  constituted 0.08 %.

On suggestion of German side comparisons were also performed at 1.064  $\mu\text{m}$  wavelength; discrepancy constituted 0.38 %.

After the 2-nd stage of comparisons with PTB transfer measurement standard it

is possible to summarize the results of comparisons on the whole.

## 1.2. Fulfillment of tasks on proposed projects

Project No. 429/CU /08 Comparisons of measurement standards of the units of spectral regular transmittance in the (250 to 900) nm wavelength range.

Coordinator: INIMET (Cuba)

Partners: BelGIM (Belarus), SUM (Slovakia), Ukrmetrtest-standart (Ukraine), INMETRO (Brazil), INIMET (Cuba).

INIMET has developed a draft of a Technical protocol and has sent it to the participants for concordance.

## 2. Results of the last meeting of Technical Committee TC 1.7 “Photometry and Radiometry”

The meeting of Technical Committee TC 1.7 was held in 2009 (February) in BelGIM.

According to the agenda of the meeting the following matters were discussed:

- the results of fulfillment of the works on the agreed Projects;
- the works on the proposed Projects;
- proposals for new Projects;
- the results of fulfillment of decisions of the 7<sup>th</sup> TC 1.7 meeting;
- progress on realization of the Mutual Recognition Agreement (MRA);
- about approval of new members of TC 1.7.

## 3. Interaction with international and regional organizations in this field of cooperation

In 2009 national measurement standards took part in the following international comparisons (outside COOMET):

- The national primary measurement standard of the units of radiation flux and irradiance in the (0.03 to 0.4)  $\mu\text{m}$  wavelength range. GET 162-2001

Key comparisons K2.c on absolute spectral sensitivity of radiation detectors in the (200 to 400) nm wavelength range that are carried out by BIPM.

- The national special measurement standard of the unit of spectral density of radiance in the (0.04 to 0.25)  $\mu\text{m}$  wavelength range. GET 84-85

Key comparisons K1.b of spectral density of irradiance in the (200 to 350) nm wavelength range that are carried out by BIPM.

- The national primary measurement standard of the units of spectral regular transmittance in the (0.2 to 50.0)  $\mu\text{m}$  wavelength range, diffuse and specular reflectance in the (0.2 to 1.5)  $\mu\text{m}$  wavelength range. GET 156-91

Key comparisons on spectral diffuse reflectance coefficient CCPR-K5 and on spectral regular transmittance coefficient CCPR-K6 that are carried out by BIPM.

- The national primary measurement standard of the units of continuous radiation luminous intensity and luminous flux. GET 5-2009

Key comparisons of national measurement standards on luminous intensity K3.a that are carried out by BIPM.

- The national special measurement standard of the units of color and chromaticity coordinates. GET 81-2009

International comparisons of light-emitting diodes of 15 countries-participants from BIPM.

- The national primary measurement standard of the units of spectral density of radiance, spectral density of luminous intensity and spectral density of irradiance in the (0.25 to 25.0)  $\mu\text{m}$  wavelength range; luminous intensity and irradiance in the (0.2 to 25.0)  $\mu\text{m}$  wavelength range. GET 86-89

International comparisons of radiation thermometers based on metal-carbon eutectics that are carried out within the framework of BIPM Consultative Committee on Thermometry.

Bilateral international comparisons on spectral density of irradiance between VNIIOFI and KRISS (Korea).

International comparisons EURAMET.PR-K1a on spectral density of irradiance.

#### **4. Information on supposed venue and date of the next meeting of TC 1.7 “Photometry and Radiometry”**

The next 8<sup>th</sup> meeting of TC 1.7 is scheduled for 2010 (March) and will be held in VNIIM named after D.I. Mendeleev.

Valeriy Kuznetsov  
TC 1.7 Chairperson

## ANNUAL REPORT of Chairperson of TC 1.8 “Physical Chemistry”

### 1. General characteristic of the cooperation in the field of physical chemistry

#### COOMET TC 1.8 members:

The TC 1.8 consist of the representatives from national metrological organizations of the COOMET member countries: Azerbaijan (AZSTANDART), Armenia (ZAO “NIM”), Belarus (BelGIM), Germany (PTB), Georgia (GeoStandMetrology), Kazakhstan (KazInMetr), Kyrgyzstan (NISM), KNDR (CIM), Cuba (INIMET), Lithuania (VMT), Moldova (INSM), Rumania (NIM), Russia (VNIIM), Slovakia (SMU), Uzbekistan (SE “CNS”), Ukraine (Ukrmetrteststandart).

In 2008/2009, the work of COOMET TC 1.8 “Physical Chemistry” was carried out in the following directions:

- Organization and realization of the work on the preparation of the NMI CMC data of the COOMET member states that have signed the MRA.
- Organization and realization of the internal review of CMC for COOMET NMIs and the interregional review of NMI CMCs for other regional metrological organizations.
- Planning and organizing of international comparisons and interlaboratory researches.
- Getting the TC 1.8 members acquainted with the CCQM and COOMET documents aimed at the realization of the MRA.
- Improvement of the TC 1.8 structure.
- Promotion in rendering metrological services in the field of physico-chemical measurements.

### 2. TC work on COOMET projects

#### VNIIM is the coordinator of:

- 1 COOMET Project No. 400/RU/07 “Key comparisons of standard natural gas samples”. The Project is agreed and registered in the KCDB as **COOMET.QM-K23.b** “Standard Reference Materials – Synthetic Natural Gas”. Participants: VNIIM (Russia), BelGIM (Belarus), BAM (Germany), SMI (Czech. Rep.), SMU (Slovakia), Ukrmetrteststandart (Ukraine). This project is completed. The Report, Draft A was sent to all participants and to COOMET Secretary.
- 2 COOMET Project No. 401/RU/07 “Key comparisons of standard samples of CO gas mixtures in Nitrogen (100 and 1000ppm)”. The Project is agreed and registered in the KCDB as **COOMET.QM-K1.a** “Standard Reference Materials – Gas Mixtures CO in Nitrogen”. Participants: VNIIM (Russia),

- BelGIM (Belarus), BAM (Germany), Ukrmetrteststandart (Ukraine). The project is completed. The Report, Draft A was sent to all participants and to COOMET Secretary.
- 3 COOMET Project No. 435/RU/08 “Pilot comparisons in the field of aerosol particles mass concentration measurement”. Participants: VNIIM, VNIIFTRI (Russia) and other COOMET member countries. This is the project proposed. The Technical Protocol was sent to participants.
  - 4 COOMET Project No. 361/RU/06 – “Pilot comparisons in the field of electrical conductivity measurements”. Participants: VNIIM (Russia), VNIIFTRI (Russia), BelGIM (Belarus), Ukrmetrteststandart (Ukraine), SMU (Slovakia). This is the project agreed. Samples for comparisons have been dispatched to participants. The obtained protocols of comparisons are being analyzed.
  - 5 COOMET Project No. 362/RU/06 – “Comparisons in the field of measuring the aqueous glucose standards”. Participants: VNIIM (Russia), BelGIM (Belarus). This is the project agreed. The Technical Protocol was sent to participants. Adjustment of comparison technology is being performed.
  - 6 COOMET Project No. 375/RU/06 Pilot comparisons “Determination of gene-modified objects in food”. Participants: VNIIM (Russia), RAS Institute of Cytology (Russia), BelGIM (Belarus). This is the project agreed. Preparation of the samples is in process. Researches aimed at confirmation of the substance purity are being carried out.
  - 7 COOMET Project No. 367/RU/06 “Pilot comparisons in the field of blood elements studies”. This is the project proposed. The form of this proposed project has been sent to participants repeatedly (September, 2009).
  - 8 COOMET Project No. 483/RU/09 “Key comparisons of primary standards of concentration of components in gas media –NO in Nitrogen (100 and 1000 µmol/mol). This is the project proposed.
  - 9 COOMET Project No. 484/RU/09 “Key comparisons of primary standards of concentration of components in gas media – SO<sub>2</sub> in Nitrogen (100 and 1000 µmol/mol). This is the project proposed.

#### **VNIIFTRI is the coordinator**

- 10 COOMET Project No. 421/RU/08 “The additional comparison of pH working standards”. Participants: VNIIFTRI, VNIIM, UNIIM, NISM (Russia), BelGIM (Belarus), Ukrmetrteststandart (Ukraine), KazInMetr (Kazakhstan), CSMs of Russian Federation: Novosibirsky, Nijegorodsky, Rostovsky, Ekaterinburgskt, Khabarovsk, Rostest-Moscow, Test-S.Petersburg, UralTest. The Project is completed. The Final Report was sent to COOMET Secretary.

#### **UNIIM is the coordinator**

- 11 COOMET Project No. 436/RU/08 “Pilot comparisons in the field of moisture

mass fraction measurements in barley cereal grain”. Participants: UNIIM (Russia), BelGIM (Belarus), Ukrmetrteststandart (Ukraine), SP Technical Research Institute of Sweden (Sweden), PTB (Germany), KazInMetr (Kazakhstan). Samples have been prepared and dispatched to participants. Results of measurements have been obtained; Report A has been sent to the participants

12 COOMET Project No. 211/RU/06 “Carrying out interlaboratory comparisons on the determination of toxic microimpurities in vodkas”. Participants: UNIIM (Russia), VNIIM (Russia) and others. This is the Project proposed.

13 COOMET Project No. 479/RU/09 “Supplementary comparisons in the field of moisture mass fraction measurements in cereal grain and cereal products”. Participants: UNIIM (Russia), Ukrmetrteststandart (Ukraine), BelGIM (Belarus), SP Technical Research Institute (Sweden), PTB (Germany) and other COOMET member countries. This is the Project proposed.

### **Others COOMET Projects. TK 1.12 is the coordinator of**

14 COOMET Project No. 293/RU/03 “Development of CRMs for comparison of dry residue of Baikal water SOVB-1, birch leaf LB-1, mixture of meadow herbs Tr-1, Canadian pond weed EK-1 and perch tissue Bok-2”. Participants: BelGIM (Belarus), BAM (Germany), KazInMetr (Kazakhstan), IGC SB of RAS, VNIIM (Russia). The Project is completed. The VNIIM received a certificate of the international comparisons participant.

### **3. Results of the last meeting of TC 1.8**

The last meeting of COOMET TC 1.8 “Physical chemistry” was held in May, 13-14, 2009. The representatives from Russia (VNIIM, VNIIFTRI, VNIIOFI, UNIIM), Azerbaijan (Azstandart), Belarus (BelGIM), Ukraine (Ukrmetrteststandart) took part in this meeting. The meeting decisions were included into the Protocol (attached).

### **4. Review of the projects completed**

Three Projects were completed in 2009:

- COOMET Project No. 400/RU/07 (COOMET.QM-K23.b). The final report is at the stage of agreement with the chairperson of the Working Group on Gas Analysis (CCQM).
- COOMET Project No. 401/RU/07 (COOMET.QM-K1.a). Final report is at the stage of agreement with the chairperson of the Working Group on Gas Analysis (CCQM).COOMET.
- Project No. 293/RU/03. The CRMs are registered in the COOMET CO Register.
- COOMET Project No. 421/RU/08 RM Register. The Final Report was sent to COOMET Secretary.

## 5. Cooperation with international and regional organizations

Participation of the representatives of TC 1.8 “Physical chemistry” was organized in the following events:

- 15-th meeting of the CCQM (1 specialist from VNIIM)  
(Paris, April, 2009)
- meetings of the Working Groups of the CCQM (5 specialists from VNIIM, 2 specialists from UNIIM):
  - on Key Comparisons and CMC Quality (KCWG)  
(Paris, April, 2009)
  - on Gas Analysis (GAWG)  
(Paris, April, 2009)
  - on Organic Analysis (OAWG)  
(Paris, April, 2009)
  - on Inorganic Analysis (IAWG)  
(Paris, April, 2009)
  - on Bioanalysis (BAWG)  
(Paris, April, 2009)
- CCQM Workshop (2 specialists from VNIIM)  
(Paris, April, 2009)
- APEC Workshop on Strengthening Chemical Metrology Infrastructure – Part II  
(Singapore, August, 2009)
- ANMET-APEC Seminar on Traceability in Materials Testing to Reduce Technical Barriers to Trade (Travel Undertaking)  
(Taiwan, September, 2009)
- GAS-2009 International Symposium and Exposition (participation in Symposium of 1 specialist from VNIIM)  
(The Netherlands, February, 2009)

## 6. Activities for the implementation of the CIPM MRA

### 6.1. Organization and realization of works on preparation of the CMC data:

**6.1.1.** The COOMET review of CMCs for cycle X was completed. The results were published in Appendix C (MRA), at that 1 new position on the gas analysis, 9 new positions on the inorganic analysis of the VNIIM, 3 new position on electrochemical analysis of the Ukrmetrteststandart were introduced.

**6.1.2.** At present, the International CMC Database (Appendix C) contains 243 positions of VNIIM, 4 positions of UNIIM, 7 positions of VNIIFTRI, 7 positions of Ukrmetrteststandart, 2 positions of BelGIM.

Distribution of the COOMET CMCs according to measurement categories is the following:

gas analysis– 185; organic solution – 21; inorganic solution – 13; metals – 16; sediments, soils, ores and particles – 4; biological fluids and materials – 0; high purity chemicals – 3; foods – 5; water – 1; advanced materials – 0; electrochemical analysis – 15.

**6.1.3.** Arrangements made for the COOMET CMCs review of cycle XI are as follows:

It was completed the intraregional review of the COOMET CMCs claimed by:

VNIIM (Russia): in the field of gas analysis (12 new positions, 6 corrected former positions and 1 deleted former position), inorganic analysis (17 positions);

Ukrmetrteststandart: in the field of gas analysis (2 new positions);

BelGIM: in the field of gas analysis (2 new positions);

UNIIM in the field of high purity chemicals (1 position).

Reviewers: SMU (Slovakia), Ukrmetrteststandart (Ukraine), BelGIM (Belarus)

All CMCs were presented for interregional review.

**6.2. Participation in international comparisons and interlaboratory research**

Planning and organization of participation of the active COOMET member states in the international (key and pilot) comparisons are provided.

CCQM, BIPM and EUROMET comparisons:

Comparison	COOMET NMI	Status
1	2	3
CCQM-K66 – Purity analysis of Methane	VNIIM (Russia)	Preliminary Report
CC QM-K65 – Mercaptans in methane	VNIIM (Russia) - coordinator	Final Report
CCQM-K68 – N <sub>2</sub> O at ambient level	VNIIM (Russia)	Report, Draft A
CCQM-K71 – Stack Gas mixture	VNIIM (Russia)	Report, Draft A
CCQM-K74 – Nitrogen dioxide (10 □mol/mol) in Nitrogen	VNIIM (Russia)	In progress
CCQM-K76 – Sulfur dioxide (10 □mol/mol) in Nitrogen	VNIIM (Russia)	Planned

1	2	3
CCQM-P91 – Pyrethroids in apple juice	VNIIM (Russia)	Report, Draft A
CCQM-P113 – Relative quantification of genomic DNA fragments extracted from a biological tissue	VNIIM (Russia)	Final Report
CCQM-P102 – Quantification of cells with specific phenotypic characteristics	VNIIM (Russia)	Planned
CCQM-P100.3 – Determination of low levels of Hg in natural water	VNIIM (Russia)	Report was sent to coordinating laboratory
CCQM-P119 – Lead in solder	VNIIM (Russia)	Final Report
CCQM-P111 –Seawater salinity	VNIIM, VNIIFTRI (Russia) Ukrmetrteststandart (Ukraine)	Final Report
CCQM-P118 – Toxic Metals in Algae	VNIIM (Russia)	Preliminary report
CCQM-P94.1 – Quantification of DNA methylation	VNIIM (Russia)	In progress
CCQM-K79 – Comparison of value-assigned CRMs and Proficiency Testing Materials for Ethanol in Aqueous Matrix, 0.1 mg/g to 500 mg/g	VNIIM (Russia)	Samples with certificates was sent to coordinating laboratory
CCQM-K34.2 – Assay of Potassium hydrogen phtalate	VNIIM (Russia)	Final Report
EURAMET 934 – TILSAM method	VNIIM (Russia)	In progress
EURAMET 1092 – Ethanol in Nitrogen	VNIIM (Russia)	Report was sent to coordinating laboratory
APMP.QM-P14 – Benzoic acid and sorbic acid content in curry paste	VNIIM (Russia)	In progress
APMP.QM-K41 - H <sub>2</sub> S in Nitrogen	VNIIM (Russia)	In progress

**7. Information on the prospective place and date for the next meeting**

The next meeting of TC 1.8 “Physical chemistry” will be held in September, 16-17, 2010 (St Petersburg, VNIIM).

Prof. Leonid Konopelko  
TC 1.8 Chairperson

Yuriy Kustikov  
TC 1.8 Deputy Chairperson

**ANNUAL REPORT**  
**of Chairperson of**  
**TC 1.9 “Ionizing Radiation and Radioactivity”**

**General information on cooperation in the subject field**

Comparison activity is going on as the main TC direction.

**CMC review**

Review of CMCs has been made in framework of the project 175/RU/99 “A status of a measurement standard base in the field of ionizing radiation and radioactivity for the member countries of COOMET” (S. Korostin, VNIIFTRI, MenCSM)

In the framework of the inter-regional reviewing SIM and EURAMET CMCs (EURAMET.RI.10.2009 – GAEC (Greece); EURAMET.RI.9.2009 – PTB (Germany)) were reviewed.

**Project fulfillment**

**318/RU/04** Regional key comparison of national measurement standards of the Kerma in air for the energy of gamma radiation Co-60 COOMET.RI(I)-K1 (L. Buermann, PTB)

The next NMIs participated in the project: VNIIM (Russia), BelGIM (Belarus), PTB (Germany), RMTC (Latvia), SMU (Slovakia), CHPR (Cuba). The comparison is completed. The final report is published in the KCDB BIPM and “Metrologia Technical Supplement” ([Metrologia, 2010, 47, Tech. Suppl., 06008](#)).

**319/Ru/04** “Comparison measurements of radionuclide volume sources” COOMET.RI(II)-S2.Cs-137, COOMET.RI(II)-S2.Eu-152 и COOMET.RI(II)-S2.Sr/Y90 (S. Korostin, VNIIFTRI)

The next NMIs participated in the project: NSC IM (Ukraine), BelGIM (Belarus), VNIIFTRI (Russia), PTB (Germany), NCM (Bulgaria), CETIC-DMR (Cuba), MoE-ISR (Israel), SMU (Slovakia), RMTC (Latvia). The comparison is completed. The final report is published in the KCDB BIPM and “Metrologia Technical Supplement” ([Metrologia, 2010, 47, Tech. Suppl., 06009](#))

The Draft A of the COOMET.RI(II)-S2.Sr/Y90 should be finished this year.

**423/RU/08** “Standardization of Eu-152 radionuclide solution (key comparison COOMET.RI(II)-K2.Eu-152)” (coordinator – I. Kharitonov, VNIIM)

The next NMIs participated in the project: VNIIM (Russia), BelGIM (Belarus), CENTIS-DMR (Cuba). Comparison is in progress.

**New comparisons**

In accordance with TC decision the next projects were proposed:

- 389/RU/07 “Comparison of the well-type ionization chamber (IC) calibrations factors for the medical radionuclides (“Dosecalibrators”)” (S. Korostin, VNIIFTRI);
- 445/DE/08 “Comparison of the national standards of air kerma for Cs-137 at protection level” (L. Buermann, PTB);
- 446/DE/08, 447/DE/08 “Comparison of the national standards of air kerma for low-energy x-rays” (L. Buermann, PTB);
- 410/UA/07 “COOMET Regional comparisons of National standards of gamma-radiation Co-60 absorbed dose to water” (N. Kravchenko, NSC IM);
- 462/RU/09 “Comparison of the calibration factors neutron response/fluence for the standard neutron sources: Am-Be, Cf-252, Cf-252 in the sphere Ø30 cm filled with D<sub>2</sub>O” (N. Moiseev, VNIIM);

All comparisons are at the stage of the creation of participants list and TP creation.

#### **TC recommendations for future activity**

TC Meeting recommends starting the next project:

- “Development of the recommendation “Procedure of attestation measurement techniques used software. Common requirements”.
- The plan for activity comparisons should be developed before the next Meeting.

#### **TC 1.9 meeting**

8<sup>th</sup> TC 1.9 Meeting took place 21-22 October 2009 in NISM Chisinau, Moldova.

9<sup>th</sup> TC 1.9 Meeting is scheduled for May 2009 in Minsk, Belarus.

Prof Vladimir Yarina  
TC 1.9 Chairperson

Dr Sergey Korostin  
TC 1.9 Secretary

**ANNUAL REPORT**  
**of Chairperson of**  
**TC 1.10 “Thermometry and Thermal Physics”**

**Activities in TC 1.10 “Thermometry and Thermal Physics”**

In 2009 the work of National Metrology Institutes of the COOMET member countries in the field of thermal measurements and thermophysical quantities was focused on implementing the decisions adopted by the TC 1.10 meeting in September 2008. Our priority for this year was to organize and carry out regional comparisons aimed at supporting measurement capabilities of National Metrology Institutes.

1. The report on the comparisons of national measurement standards of the unit of temperature in the range from 0 °C to the freezing point of zinc performed within project No. **285/RU-a/03** was presented at the 25<sup>th</sup> meeting of the Consultative Committee on thermometry and after that the report was discussed and approved by Committee’s two working groups, WG7 and WG8. On the basis of their review the results of the comparisons were included into the BIPM database. As a result, the internationally recognized degree of equivalence was determined for the National Measurement Standards of the unit of temperature of Belarus, as well as the Slovak Metrology Institute. Due to the equivalence evaluation of temperature National Measurement Standards of BELGIM its measurement capabilities in the field of thermometry were submitted for international review.

2. To support measurement capabilities claimed by NSC “Institute of Metrology”, in 2008, a new project No. **417/UA-a/08** “Supplementary comparisons of National measurement standards of the unit of temperature in the range from 0 °C to the freezing point of zinc” has been started. The project is agreed upon and registered in the BIPM. The specialists of the NSC “Institute of Metrology” were provided with a standard thermometer calibrated at the D.I. Mendeleev VNIIM. Now the measurements at NSC “Institute of Metrology” are completed and the thermometer is delivered to the VNIIM for control measurements.

3. A new project No. **395/BY/07** “Key comparisons of the triple point of water of the national standards of the unit of temperature” has been started to support the CMCs of National Metrology Institutes at the temperature of the triple point of water. The BELGIM was appointed project coordinator. At present, the project is agreed by all the participants and registered in the BIPM. The protocol of the comparisons has been drawn up and agreed upon.

4. In the framework of project No. **387/UA/07** “Comparison of the National Measurement Standards of the unit of temperature in the reference freezing points of silver, gold and copper” it is planned to carry out regional key comparisons of national measurement standards of Ukraine, Slovakia and Russia to support the CMCs of the NSC “Institute of Metrology” and the Slovak Metrology Institute in radiation thermometry. Joint measurements (with VNIIM

experts) for graduation of the transfer standard at the temperature of copper freezing point were conducted in November 2009 at NSC “Institute of Metrology”.

5. In the framework of project No. **228/UA-a/01** the work on preparing National Standards of combustion energy based on benzoic acid is underway.

At the meeting of the working group on thermophysical quantities WG9 which took place on May 21, 2008 in Paris, the representatives from China expressed their interest in joining the comparisons mentioned above in which only two states, Russia and Ukraine, were participating. 3 types of high-purity benzoic acid were proposed as the objects of comparison: the first one is produced in Russia (K-3 trademark), the second – in China, the third – in the USA (39i). VNIIM’s offer to the American partners to join the comparison did not get any respond.

In March 2009 the National Metrology Institute of Romania addressed TC 1.10 with a request to participate in this comparison. The pilot laboratory has developed a draft of a new Technical Protocol of the comparison.

The Protocol will be submitted for discussion; if an agreement of all the comparison members will be reached new participants will be allowed.

#### **Results of the last TC 1.10 meeting**

The last meeting of COOMET Technical Committee TC 1.10 “Thermometry and Thermal Physics” was held on 14 October 2009 at NSC “Institute of Metrology”.

18 persons from 6 COOMET member countries participated in the meeting.

The agenda of the meeting contained the following points:

- the main results of the meeting of WG-8 of the Consultative Committee for Thermometry;
- discussion of the state of work with COOMET projects in the area of thermometry and thermal physics;
- proposals for new projects within further cooperation in the area of measurement of temperature and thermo-physical quantities;
- increase of responsibilities for complying with the provisions of an agreed comparison protocol;
- organization of COOMET TC 1.10 activities in the area of humidity measurement;
- organization, within COOMET, of a review of documents relating to the measurement capabilities of National Metrology Institutes for temperature and other thermo-physical quantities;
- development of draft procedures for inter-regional CMC review;
- current state of the measurement capabilities of the National Metrology

Institutes from COOMET in the data base of the International Bureau of Weights and Measures;

- date and venue of the next meeting of TC 1.10.

The Chairperson of TC 1.10 informed the participants of the main results of the meeting of WG-8 of the Consultative Committee for Thermometry. He particularly dwelled on the following:

- arrangement of the next key comparisons;
- classification of service categories in the area of thermal quantities measurement;
- development and improvement of review procedures for CMCs submitted for the BIPM data base;
- results of the consideration of CMCs submitted to WG-8 for approval;
- interactions between MRA and ILAC.

The following projects for calorimetry, contact thermometry and thermal conductivity proposed by the participants can be named:

- regional comparisons of national measurement standards for combustion energy using high purity graphite;
- regional comparisons in the area of gas calorimetry with gas mixture samples;
- regional comparisons of copper cells for contact thermometry;
- regional comparison of S-type thermocouples in the temperature range of 300 °C to 1100 °C;
- pilot comparisons in heat conductivity in the range of 0.03 to 0.05 W/(m·K) in the temperature range of 10 to 40 °C;
- regional comparisons of temperature unit measurement standard in the mercury point.

As a result of the meeting COOMET Secretariat registered the following proposed projects:

- 486/RU/10 Regional comparisons of copper cells for contact thermometry;
- 487/RU/10 The regional comparisons of thermocouples of types S in the temperature range of 300 °C to 1100 °C;
- 488/RU/10 Regional comparisons of national standards of the energy of combustion by means of gas mixes;
- 489/RU/10 Regional comparisons of national standards of the energy of combustion by means of high-purity graphite.

The participants of the meeting seconded the proposal of the Chairperson of Eastern Siberian Subsidiary of FGUP “VNIIFTRI” (Russian Federation)

O. Podmurnaya with regard to the establishment of a working group for humidity measurements within TC 1.10.

Special attention was paid to the organization of an intra-regional review of the documents relating to the measurement capabilities of an NMI, and problems of the quality of such a review.

It was proposed to have the next meeting of the TC in October 2010 in Chisinau at the National Institute of Standardization and Metrology of Moldova.

Prof Anatoliy Pokhodun  
TC 1.10 Chairperson

## ANNUAL REPORT of Chairperson of TC 1.11 “Time and Frequency”

### 1. General characteristic of the work:

For the period elapsed the work on 4 projects was carried out on the field “Time and Frequency”. They are:

- 12/RU-a/92 “ERP determination on the basis of the data from the observatories of COOMET countries” (permanent metrology work);
- 15/RU-a/92 “Intercomparisons of the National time scales” (permanent metrology work);
- 17/RU-a/92 “Research into the primary caesium frequency standards” (permanent metrology work);
- 174/RU-99 “The state of affairs in time and frequency standards of the COOMET members”.

In 2009 a special meeting of COOMET Technical Committee TC 1.11 “Time and Frequency” was not to be held.

### 2. CMC review

Review of CMCs has been made for Republic of Belarus and Ukraine. The inter-regional reviewing for Ukraine is completely finished, for Republic of Belarus it is in the final stage of consideration.

### 3. Review of work fulfilled

Project 12/RU-a/92 “ERP determination on the basis of data from observatories of COOMET countries”  
(permanent metrology work)

Similarly with previous years, in 2009 the observatories in Russia, Ukraine, Uzbekistan, Bulgaria, Poland, Czech Republic continued to make routine star and satellite observations and then transmitted the observation data to the ERP processing and calculating centre, that is division for metrology of time and space at FGUP “VNIIFTRI”. An exchange of ERP observing data and calculating results was made between the countries-participants and the International and National Centres for ERP determination. The calculations of the pole coordinates and duration of the day by the results of GPS observations at the stations on the territory of Russia were made on a regular basis. The accuracy of ERP determination by means of all the techniques of the countries-participants was about 0.001" and 0.2 ms with regard to the pole coordinates and to the Universal Time, correspondingly. These values closely approach to the accuracy of products of the International Earth Rotation Service (IERS).

The main features on changing for the rotation velocity of the Earth are in the following: the local minimum for this quantity was to be held in 2008, but since 2009 the velocity is going to previous value for 2008.

Project 15/RU-a/92 “Intercomparison of the National Time Scales”  
(permanent metrology work)

Comparisons of the UTC(SU) (Russia) with the UTC(BY) (Republic of Belarus), UTC(GUM) (Poland) and UTC(UA) (Ukraine), and UTC (KZ) (Republic of Kazakhstan) were made in 2008. A mutual exchange of measuring data was performed.

To perform intercomparisons the specialists of FGUP “VNIIFTRI” used the following receivers: multichannel receivers GPS/LONASS TTS-3 after calibration procedure using GPS TTR-6 and K-161 receivers for the GLONASS signals.

The comparisons between UTC(SU) and UTC(BY) were made under a tracking schedule by GLONASS overlapping observations (several sessions per day) and GPS common-views (daily average data in the CGGTTS.V1 format). The multichannel receiver GPS/LONASS 001 06 is used.

During the period under review three time scale corrections in UTC(BY) were made: on 9 March at MJD=54899, - 300 ns; on 7 July, MJD=55119, - 300 ns; on 14 November MJD=55149, 100 ns.

Comparisons between UTC(SU) and UTC(GUM) were performed by using the GPS common-views receiver. An 8-channel AOS SRC TTS-2 receiver was used in GUM.

Comparisons of UTC(SU) with UTC(UA) were made by GPS common-views (daily average data ) by using receiver TTS-2. During the period under review two time scale corrections in UTC(UA) were made: on 16 August at MJD=55059, - 100ns; on 6 October, MJD=55109, - 100ns.

The comparisons between UTC(SU) and UTC(KZ) were made under GPS common-views (daily average data in the CGGTTS.V2 format). The multichannel receiver GPS/LONASS TTS-3 is used in KazInMetr Centre.

During the period under review three time scale corrections in UTC(KZ) were made: on 23 January at MJD=54899, - 300 ns; on 2 February, MJD=54864, - 400 ns; on 13 May MJD=54969, 1000 ns.

Figure 1 below demonstrates an interposition of time scales of the COOMET Laboratories in 2009 with regard to the International UTC time scale obtained by GPS signal comparisons.

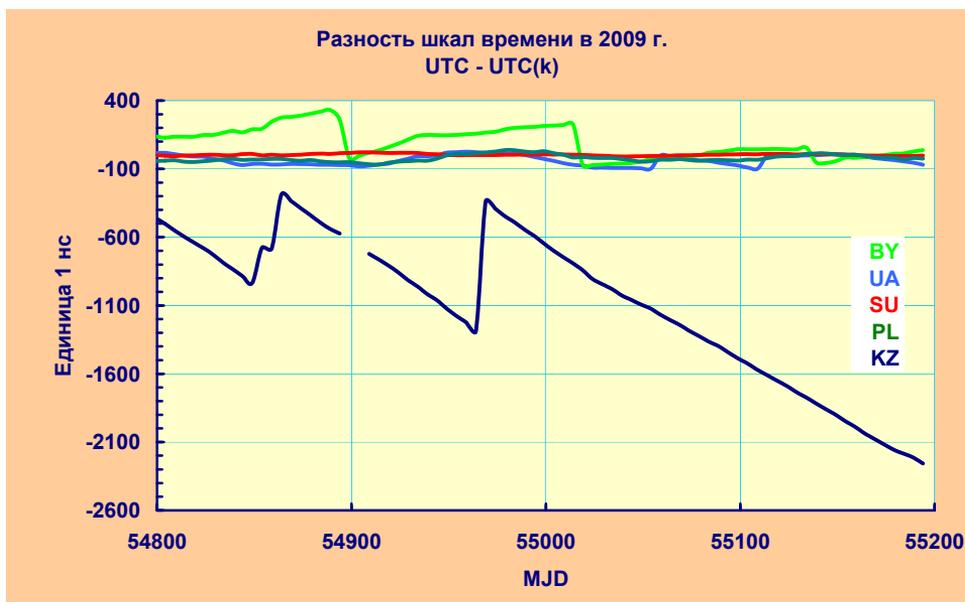


Fig.1. Interposition of time scales of the COOMET Laboratories in 2009 with regard to the International UTC time scale obtained by GPS signal comparisons

Table 1 below shows a status of time scales and frequency units for the COOMET participants with regard to the UTC scale, performed corrections and also an information of the time links used.

Table 1

	BY	KZ	PL	SU	UA
Time scale difference UTC - UTC(i) (ns) for 29.12.2009, MJD = 55194	37.6	-2256.3	-24.6	-2.3	-69.0
Normalized frequency difference $\Delta f/f[\text{UTC} - \text{UTC}(i)]$ (in units $\times 10^{-14}$ )	1.89	-12.54	0.04	-0.02	-0.78
Type A uncertainty of time comparison (ns)	$\leq 7.4$	$\leq 20.1$	$\leq 5.2$	$\leq 5.3$	$\leq 6.6$
Time comparison links	GPS	GPS	GPS	GPS	GPS

Up to now, no measuring data from time services of Bulgaria and Slovakia was received.

Project 17/RU-a/92 “Research into the Primary Caesium Standards”

In 2009 at “VNIIFTRI” (Russia) as in the previous years the work on the primary frequency standards was carried out in two basic lines: effective maintenance of the primary caesium frequency standard on thermal atoms MCS-102 and development of a caesium fountain standard.

The stated type B uncertainty for the MCS 102 is estimated to be  $3.0 \times 10^{-14}$  as in the previous year. In this estimation we taken into account an inhomogeneous of C-field, uncertainties of electronics, microwave leakage, Rabi and Ramsey pulling, microwave spectrum, etc. As a result, an RMS normalized frequency deviation for month overlapped intervals from the mean one per year was  $(0.7 \pm 0.9) \times 10^{-14}$ .

Table 2 contains the relative differences for unit of frequency for the best cesium standards in 2009.

Table 2  
Averaged (per month) values for the relative differences for unit of frequency reproduced by cesium standards in TAI scale for 2009

Unit  $1 \times 10^{-14}$

MJD averaged	PTB Cs1	PTB Cs2	NMIJ-F1	SYRTE-JPO	SYRTE-F01	SYRTE-F02	NIST-F1	BIPM Estimate	MIIP 102
54844	0.98	-0.37	-0.26	–	-0.55	-0.65	-0.53	-0.57	-1.0
54874	1.30	-0.36	-0.58	-0.81	-0.51	–	-0.58	-0.52	1.1
54904	0.10	-0.14	-0.62	-0.57	-0.43	–	-0.41	-0.43	0.8
54934	-0.69	-0.55	-0.62	-0.43	-0.47	-0.51	-0.68	-0.51	0.6
54964	0.64	-0.43	-0.56	-0.52	-0.46	-0.44	-0.69	-0.48	-0.2
54994	-0.26	-0.93	-0.57	-0.56	–	–	-0.59	-0.53	-0.3
55024	0.83	-0.30	-0.48	-0.39	–	–	–	-0.45	1.3
55059	0.08	-0.72	–	-0.46	-0.42	-0.53	–	-0.53	–
55089	-0.53	0.14	–	-0.35	-0.49	-0.60	–	-0.53	0.8
55119	1.15	-0.08	–	-0.13	-0.26	-0.39	-0.64	-0.39	-0.1
55149	1.21	-0.57	–	-0.16	-0.28	-0.40	-0.42	-0.35	-0.3
55179	-0.20	-0.16	–	-0.25	–	-0.45	-0.41	-0.40	–
$\Delta f/f_{cp}$	0.4	-0.4	-0.5	-0.4	-0.4	-0.5	-0.5	-0.5	0.3
CKO( $\delta_M$ )	0.6	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.6
. n	12	12	7	11	9	8	9	12	10

Figure 2 demonstrated the relative differences for unit of frequency averaged (per month) for two years period of observations for PTB Cs1, PTB Cs2, MIIP102 cesium standards.

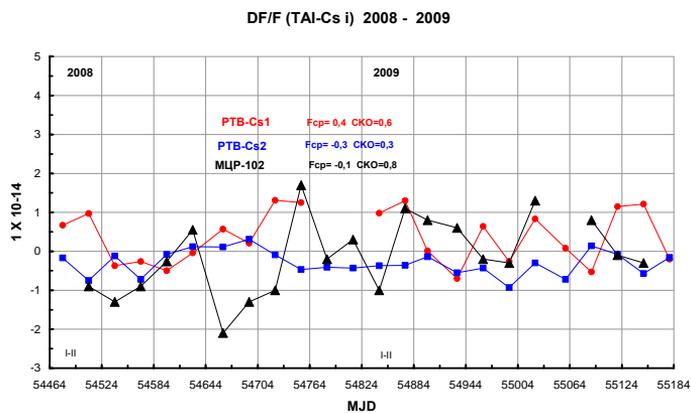


Fig.2

Project 174/RU-99 “The state of affairs in time and frequency standards of the COOMET members”

No information on the changes in an apparatus structure of standard facilities has been received from the majority of the participating countries. For the time keeping and the regular comparison National time scale Ukraine has received the multichannel receivers GPS/LONASS TTS-3 (made in Poland) and hydrogen maser produced in USA (SYMMETRICOM).

#### 4. TC recommendation for future activity

The TC Meeting (April 2008, Minsk, Republic of Belarus) recommended to start new projects: “Comparison for time and frequency domain” (In progress, Suggested coordinator – VNIIFTRI); “New work for time servers” (In progress, Suggested coordinator – Republic of Belarus).

#### 5. Collaboration with international and regional organizations

- Bureau Internationale on Poids et Mesures (**BIPM**), regular data exchange to contribute to the TAI;
- Comite Consultatif du Temps et des Frequences (**CCTF**), participation in the work of the CCTF and its Working Groups;
- Consultative Committee for Length (**CCL**), participation in elaboration of recommendations on redefinition of a second;
- International Telecommunication Union (**ITU**), participation in the work of 7A Group;
- International Earth Rotation Service (**IERS**), a regular data exchange;
- International Geodetic Service (**IGS**), observation and processed data exchange;
- International Laser Ranging Service (**ILRS**), observation and processed data exchange.

Prof Vitaliy Palchikov  
TC 1.11 Chairperson

## ANNUAL REPORT of Chairperson of TC 1.12 “Reference Materials”

### 1. General characteristic of cooperation in this subject field

The key task of TC 1.12 “CRMs” is to facilitate coordination of activity and mutual assistance to COOMET member countries in dealing with the main questions and problems, related to CRM development and use within COOMET with the view to ensure the uniformity of measurements based on CRM use.

Over the period under review in COOMET subject-field “Certified Reference Materials” the work was carried out on 26 projects (the list of the projects is attached).

The project coordinators are the experts of Kazakhstan (3 projects), Russia (22 projects) and Ukraine (1 project); the experts of metrological centres and applied-research laboratories from Armenia, Belarus, Germany, Kazakhstan, Kyrgyzstan, Moldova, Russia and Ukraine are involved in CRM certification analyses and comparisons.

The primary areas of cooperation are as follows:

- review of the current and development of new normative and guidance documents on CRM production and use (4 projects);
- development of COOMET CRMs (17 projects);
- additional certification of comparisons of CRMs, submitted by the countries (4 projects);
- organization and running the meetings of COOMET TC 1.12 “CRMs” (1 project).

Among the projects in progress the works on 15 projects are nearing completion, the results of 13 of them (11 projects on the development of COOMET CRMs and 2 projects on the review of the current COOMET normative documents) are to be submitted to the 20<sup>th</sup> COOMET Committee meeting for approval. The results of 2 projects (on-going project 186/RU/99 and project 455/RU/09 on the comparison of CRMs for composition of high-alloyed steel) were considered and agreed upon at the 14<sup>th</sup> meeting of TC 1.12 “CRMs” (October 2009).

The detailed information on the completed projects is given in sections 2 and 3 of this report.

The scope of works on the 9 current projects is the development and additional certification of CRMs for composition and properties of petroleum products, soils, copper, ores and concentrates of useful minerals and carrying out comparisons of CRMs for composition of graphite powder.

The Programme of the joint development of COOMET CRMs (on-going project 186/RU/99) is to be updated this year.

In order to facilitate the procedure of CRM material exchange for carrying out certification analyses and comparison tests the works on the project 451/KZ/09 “Development of the List of CRM materials subject to transportation for the purposes of metrological certification, exempted from customs duties, and taxes and granting special permissions according to Articles 1 - 3 of the Agreement of 10 February 1995” are going on.

## **2. Results of the last meeting of Contact Persons and Project Coordinators**

In October 2009 in Minsk the regular 14<sup>th</sup> meeting of TC 1.12 “Certified reference materials” (project 456/RU/08) was held. The representatives of COOMET member countries from Belarus, Germany, Kazakhstan, Russia and Ukraine, Contact Persons and the experts from different branches of national economies of COOMET member countries, participating in the development of specific types of certified reference materials took part in the work of the meeting.

At the meeting the decisions were taken to agree upon and to submit to the 20<sup>th</sup> COOMET Committee meeting:

- the documentation on 29 CRM types for their recognition as COOMET CRMs (among them one CRM type with additional agreement);
- the drafts of 2 revised COOMET Recommendations.

The total number of 29 CRM types includes 24 CRM types for composition and properties of petroleum and petroleum products (6 projects); 4 CRM types for composition of coal fly ash and microsphere products of energetic ashes (ceno- and microsphere concentrates) (4 projects) and 1 CRM type for composition of chloride-sulphate type water dry residue. The documentation for the developed CRM types was agreed upon in compliance with the established procedure and is to be submitted to the 20<sup>th</sup> COOMET Committee meeting as a List of Certified Reference Materials, agreed for the recognition as COOMET CRMs.

The developed CRMs permit the control over the reliability of analysis of petroleum and petroleum products in petroleum, gas, chemical and petroleum refining industries, including the control during the monitoring of the environment and various ecological research.

The relevance of the development and production of another CRM group, the initial materials for which are the wastes of coal combustion at the enterprises of the fuel and energy sector, is due to the increasing requirements for the ecological safety of the enterprises of the fuel and energy sector, and the need to expand the raw material base of industry, aimed at the productivity enhancement by means of disposal of the secondary raw material resource, economy of fuel and energy, reduction of areas, occupied by ash and slag heaps and abatement of wastes harmful effect on the environment. Water analysis is always an urgent problem of life support.

Among normative documents at the meeting second drafts of two revised documents were considered and agreed upon:

- COOMET Recommendation R/RM/5:2002 “Contents and rules of drawing up documents for CRMs developed within COOMET”;
- COOMET Recommendation R/RM/6:1998 “Register of certified reference materials of composition and properties of substances and materials developed within COOMET. Basic principles”.

The works on the review of the above mentioned documents are the logical conclusion of the revision of a package of COOMET underlying documents on CRMs, started in 2007. Significant changes were introduced in the content of the documents, resulting from the requirements of their harmonization with ISO/REMCO Guides and COOMET documents D3/2008 and R/RM/4:2008, approved in 2008.

In 2010 the procedure of agreement of the developed draft documents with COOMET relevant Technical Committees is completed.

The Programme of joint CRM production within COOMET (the on-going project 186/RU/99), updated as of October 2009 was endorsed.

Of special interest was the discussion of the report on the project “Pilot comparisons of certified reference materials for composition of alloyed steel 5XB2CΦ (CRM 918-90Π), X6BΦ (CRM 1527- 84Π) and 31X19H9MBBT (CRM 2251-82)”. The outcome of works was considered both from the point of view of the organization of the experiment within the project and evaluation of the obtained results and from the point of view of methodology of carrying out CRM comparisons as a whole, including organizational and guidance issues. From the results of the discussion the report of the completed works was endorsed, it was taken into consideration, that the methods, used to evaluate the obtained results, confirmed the values of CRM certified characteristics and permitted the assessment of measurement capabilities of participating laboratories in the frameworks of the programme. The Project Coordinator was recommended to submit CRMs, used in comparisons for the recognition as COOMET CRMs. The works on the preparation of the documents to implement this decision are currently underway.

The discussion of the methodology and organization of works during the comparison of certified reference materials as a whole revealed the need for development of the common COOMET document, regulating the content and procedure of works on CRM comparison within COOMET and recommended algorithms for the evaluation of the obtained results. The form of the proposed project “COOMET Recommendation. The content and procedure of works on CRM comparison within COOMET” is being prepared.

In the course of consideration of the works in progress on 9 current projects the Programmes of Works were agreed upon and CRM samples for analyses were exchanged.

The problems, relating to CRM shipment are still urgent. To facilitate this procedure the works were started on the project 451/KZ/09 “Development of the List of CRM materials subject to transportation for the purposes of metrological

certification, exempted from customs duties, and taxes and granting special permissions according to Articles 1 - 3 of the Agreement of 10 February 1995". At the meeting the progress of the project was considered and the next working stages were agreed upon.

At the meeting the draft Programme of joint CRM production within COOMET (the on-going project 186/RU/99) as of October 2009 was considered and agreed upon, which made it possible to start the works on 3 new projects and once again confirmed its significance as the source of preparing new proposals for initiating new projects on the development of new COOMET CRMs.

From the results of the meeting the minutes were drawn up, translated into English and posted on COOMET website /www.coomet.org/.

The main outcome and decisions, taken at the 14<sup>th</sup> meeting of COOMET TC 1.12 "CRMs" are highlighted in the article to be published in the journal "Certified reference materials" (No. 1, 2010).

### **3. Review of the finalized projects in the subject field "Certified Reference Materials"**

Among the finalized projects is the project 455/RU/09 "Pilot comparisons of certified reference materials for composition of alloyed steel 5XB2CΦ (CRM 918-90Π), X6BΦ (CRM 1527- 84Π) and 31X19H9MBBT (CRM 2251-82)", the information on which is given in section 2.

As a result of the consideration of documentation at the planned COOMET JCMS and Committee meetings the following projects can be considered as finalized:

- |                   |   |
|-------------------|---|
| Project 352/RU/06 | "Development of CRMs for fractional composition of petroleum products (petroleum fuel)" |
| Project 353/RU/06 | "Development of CRMs of petrol antiknock value (octane number) by motor method"         |
| Project 354/RU/06 | "Development of CRMs of petrol antiknock value (octane number) by research method"      |
| Project 355/RU/06 | "Development of CRMs of sulphur content in petroleum and petroleum products"            |
| Project 356/RU/06 | "Development of CRMs of saturated vapour pressure in petroleum and petroleum products"  |
| Project 357/RU/06 | "Development of CRMs for composition of benzene in petrol"                              |
| Project 454/RU/09 | "Development of CRM for composition of KATEK coal fly ash (ZUK- 2)"                     |
| Project 457/RU/09 | "Development of CRM for composition of below cenosphere concentrate (CBC-1)"            |

- Project 458/RU/09 “Development of CRM for composition of magnetic microsphere concentrate (CMM-1)”
- Project 459/RU/09 “Development of CRM for composition of Moscow cenosphere concentrate (CMC-1)”
- Project 467/KZ/09 “Development of CRM for composition of chloride-sulphate type water dry residue, containing copper, zinc, lead, cadmium, selenium, mercury, cobalt, nickel”
- Project 413/KZ/07 Revision of COOMET document R/RM/6:1998 “COOMET Recommendation. Register of certified reference materials of composition and properties of substances and materials developed within COOMET. Basic Principles”
- Project 414/UA/08 Revision of COOMET document R/RM/5:2002 “COOMET methodical recommendation. Contents and rules of drawing up documents for CRMs developed within COOMET”

In 2009 the annual updating of the Programme of joint CRM development within COOMET in the framework of the on-going project 186/RU/99 was performed, which after the 14<sup>th</sup> meeting of TC 1.12 “CRMs” was updated as of 1 January 2010, submitted to COOMET Secretariat and posted on COOMET site.

#### **4. Liaisons with international and regional organizations**

For coordination of CRM problems under consideration within COOMET, the liaisons with the leading international organizations ISO/REMCO, OIML TC 3/SC 3, CIS (NTCMetr), COMAR and others are regularly maintained; UNIIM experts participate in the international meetings of these organizations. Representatives of these organizations participate in the meetings of TC 1.12 “CRMs”, providing the necessary information on the activity of their organizations.

The articles highlighting cooperation within COOMET are regularly published in “Certified Reference Materials” journal, including the information, covering CRM activity in the framework of other international organizations: ISO/REMCO, COMAR, BIPM, JCRB, OIML and CIS.

#### **5. Information on the scheduled venue and date of the next meeting of COOMET Contact Persons and Coordinators**

The 15<sup>th</sup> meeting is scheduled in Yerevan (Armenia) in September or October 2010, preliminary consent was received.

#### **6. Proposal to the agenda of the 20<sup>th</sup> COOMET Committee meeting**

I suggest, that the following points should be included in the section “Submittal of COOMET publications, developed and updated in 2009 for approval”:

1. - updated Recommendation R/RM/5:20\_\_ “Contents and rules of drawing up documents for CRMs developed within COOMET”,
  - updated Recommendation R/RM/6:\_\_\_\_\_ “Register of certified reference materials of composition and properties of substances and materials developed within COOMET. Basic Principles”
2. Submission of CRMs, developed within COOMET, for recognition as COOMET CRMs and information on the progress of the Register of COOMET CRMs.

The draft resolutions on the suggested points will be submitted later on.

Prof Vladislav Leonov  
TC 1.12 Chairperson

**LIST**

of the projects carried out in the subject field “Certified Reference Materials” in the period under review (2009-2010)

<b>ID</b>	<b>Project No.</b>	<b>Sta-tus</b>	<b>Name of the project</b>
1	2	3	4
1.	186/RU/99	A	Development of the Programme of joint CRM production within COOMET
2.	352/RU/06	A	Development of CRMs for fractional composition of petroleum products (petroleum fuel)
3.	353/RU/06	A	Development of CRMs of petrol antiknock value (octane number) by motor method
4.	354/RU/06	A	Development of CRMs of petrol antiknock value (octane number) by research method
5.	355/RU/06	A	Development of CRMs of sulphur content in petroleum and petroleum products
6.	356/RU/06	A	Development of CRMs of saturated vapour pressure in petroleum and petroleum products
7.	357/RU/06	A	Development of CRMs for composition of benzene in petrol
8.	358/RU/06	A	Development of CRMs of oxygenate content in petrol
9.	413/KZ/07	P	Revision of COOMET document R/RM/6:1998 “COOMET Recommendation. Register of certified reference materials of composition and properties of substances and materials developed within COOMET. Basic Principles”
10.	414/UA/08	P	Revision of COOMET document R/RM/5:2002 “COOMET recommendation. Contents and rules of drawing up documents for CRMs developed within COOMET”
11.	415/RU/08	A	Development of CRMs for composition of soil agrochemical parameters (2 types)
12.	418/RU/08	A	Development of CRMs for composition of ilmenite concentrate (SO-35)
13.	451/KZ/09	P	Development of the List of CRMs to be transported for metrological certification, which are exempted from customs duties, taxes and granting special permissions according to Articles 1-3 of the Agreement of 10 February 1995.

1	2	3	4
14.	454/RU/09	A	Development of CRM for composition of KATEK coal fly ash (ZUK- 2)
15.	455/RU/09	A	Pilot comparisons of CRMs for composition of alloyed steel, type 5XB2CΦ (CRM 918-90II), X6BΦ (CRM 1527-84II) and 31X19H9MBBT (CRM 2251-82)
16.	456/RU/09	A	Organization and holding the 14 <sup>th</sup> meeting of COOMET Technical Committee 1.12 “Certified Reference Materials” (TC 1.12 “CRMs”)
17.	457/RU/09	A	Development of CRM for composition of concentrate of below cenospheres (CBC-1)
18.	458/RU/09	A	Development of CRM for composition of concentrate of magnetic micropheres (CMM-1)
19.	459/RU/09	A	Development of CRM for composition of concentrate of Moscow cenospheres (CMC-1)
20.	463/RU/09	P	Additional certification of CRM 8515-2004 for composition of iron ore (SO-20)
21.	464/RU/09	P	Additional certification of CRM 8516-2004 for composition of manganese ore (SO-21)
22.	465/RU/09	P	Development of CRM for composition and properties of coal, T rank (SO-34)
23.	466/RU/09	P	Development of CRM for composition of zirconium concentrate (SO-36)
24.	467/KZ/09	P	Development of CRM for composition of chloride-sulphate type water dry residue, containing copper, zinc, lead, cadmium, selenium, mercury, cobalt, nickel
25.	474/RU/09	P	Development of CRM for composition of copper
26.	475/RU/09	P	International comparison tests of CRMs for composition of graphite powder SOG-21 (a set of 5)

## ANNUAL REPORT of Chairperson of TC 2 “Legal Metrology”

This annual report is based on information and decisions made at 10<sup>th</sup> meeting of TC 2 which took place on 15–16 September 2009 in Vilnius and includes activities beside them.

The **main objective** of Technical Committee TC 2 is the **exchange of information regarding the development of legal metrology** in COOMET member countries. This is a favourite topic in the TC 2 meeting. The **second objective** of TC 2 is **to encourage a uniform interpretation and application of general technical requirements** related to metrology. These objectives are achieved by TC 2 through meetings, subject workshops, training courses and qualification upgrade.

### TC 2 Meeting

The 10<sup>th</sup> TC 2 meeting “Legal metrology” took place in Vilnius, Lithuania, 15–16 of September 2009. It was locally organized by State Metrology Service (VMT). The meeting of TC 2 was attended by 13 representatives from 7 COOMET member countries (*Annex 1*).

The TC 2 meeting is used to summarize the information about development in legal metrology and to establish a working programme for development of actual fields in legal metrology. Therefore the number of participants should be as much as possible.

As input for the development of legal metrology systems in the COOMET countries, a reflection of developments in OIML, WELMEC and APLFM was given on the meeting. On the European process of concentrating in conformity assessment of measuring instruments or its production was informed. It was a great interest to pursue this process. The actual forcing of market surveillance in Europe was pointed out. In this time there was not great interest on this topic in COOMET members but it could be a future topic.

The partitioning of tasks in legal metrology between government, national metrology institutes (NMI's) and testing laboratories is an ongoing process in COOMET countries. Questions of assessment of verification laboratories and other bodies are in focus of actual and future work. According to this, the establishment of the subcommittee “Competence Assessment of Bodies in Legal Metrology” and the appointment of the chairperson was continued and finished.

One of the primary tasks of legal metrology is the control of pre-packaged goods. In this field the acceptance of labels have to arise given in responsibility by producers. Focusing this topic the subcommittee “Control of Pre-Packages” forced their work on a mutual acceptance agreement in this regard.

### New structure of TC 2

As result of an analysis was found, the former structure of TC 2 for future developments not grown. As a focus of the meeting a proposal for the

restructuring of the TC was therefore presented and discussed. The reorganisation aims to deal future topics in the new and broader SC's. In this way the problem of the lengthy introduction of new SC's should be reduced.

As result of a generalization (1) existing SC's was combined to such ones with a more general matter. Secondly, the activities with other TC'/SC's within the entire COOMET structure should be better coordinated (2). As result of the generalization and the coordination, we could get the following new structure of TC 2:

### **New SC 2.1 Harmonization of Regulations and Norms**

Chair: Chairperson of former SC 2.3, **Y. Loukashov (RU)**

Tasks: (1) acceptance or adaption of approved international or regional documents (i.e.: VIML, OIML Documents, WELMEC Guides, EC Recommendations)

(2) coordination of activities with SC 4.1 (new 5.1) and SC 1.1

### **New SC 2.2 Technologies of Measuring Devices and Systems in Legal Metrology**

Chair: Chairperson of former SC 2.2, **M. Shabanov (BY)**

Tasks: (1) development of test procedures for measuring instruments (MI), including software, measuring systems, but also data transfer and other future technologies

(2) coordination of activities with instrument specific SC's and activities with SC 4.x "Training and Qualification"

### **New SC 2.3 Competence Assessment of Bodies in Legal Metrology**

Chair: Chairperson of former SC 2.4, **O. Maletskaya (UA)**

Tasks: (1) development of criteria for assessment of verification labs and other parties

(2) coordination of activities with SC 3.2, SC 4.x "Training and Qualification"

### **New SC 2.4 Legal Metrological Control (LMC)**

Chair: Chairperson of former SC 2.5, **R. Genkina (RU)**

Tasks: (1) establishment of Projects's for the elements of LMC (Surveillance QM, Market Surveillance, Field Surveillance)

(2) coordination of activities with similar TC's and SC's in OIML and RMO

For effectiveness of work, regarding liaisons with and development in OIML and other regional metrology organizations RMO's, the information of COOMET representatives, who are also involved with OIML, WELMEC and APLMF should be used. This is necessary because it is not possible for TC 2

chair and TC 2 members to attend at all international meetings in legal metrology. For improvement of this process a contact list of representatives of COOMET, which are also active in OIML and other RMO's was prepared (*Annex 2*)

### Work programme of TC 2

At the Meeting the work programme of TC 2 2010-2011 was discussed and updated.

Finalized projects were removed. As result of 10<sup>th</sup> TC 2 Meeting 4 new projects and one seminar was proposed for the working programme for 2010-2011:

Project ID	Project name	Coordinator
<b>Chairperson TC 2: Correspondence with OIML, RMOs and NMIs</b>		
new	Preparation a questionnaire among the COOMET members for building up a list of experts in legal metrology	O. Kühn (LMET, Germany)
<b>new SC 2.1 Harmonization of Regulations and Norms</b>		
old SC 2.3 Harmonization of metrological requirements and norm		
new	Translation of international vocabulary of legal metrology (VIML)	Russia, Belarus
<b>new SC 2.2 Technologies of Measuring Devices and Systems in Legal Metrology</b>		
old SC 2.2 Requirements for Software Controlled Measuring Instruments and its Testing		
new	Analysis of new technologies for measuring instruments	O. Kühn (LMET, Germany)
<b>new SC 2.3 Competence Assessment of Bodies in Legal Metrology</b>		
old SC 2.4 Assessment of Technical Competence of Verification Laboratories		
new	Requirements for the testing laboratories involved in type approval testing	M. Shabanau (BelGIM, Belarus)
<b>new SC 2.4 Legal Metrological Control (LMC)</b>		
old SC 2.5 Control of Pre-Packages		
new	Planning the participation on WELMEC-Seminars on conformity assessment and market surveillance of MID-Instruments	O. Kühn, A. Kögler (Germany)

### Further Activities

The first draw of Memorandum of Understanding (MoU) between OIML and regional legal metrology organizations was reflected in COOMET members and is revised with some modifications to OIML. The signing of a Memorandum of Understanding, is a further step supporting the harmonization in legal metrology within the COOMET member states in view of Europe and Asia and is supported by Chair of TC 2.

In the SC 2.4 “Legal Metrology Control” the topic “pre-package control” was forced. A draft “The agreement about mutual acceptance of quantity correspondence signs of goods in packages” was realized.

In order to launch the EU process of conformity assessment and its potentials, the attendee of interested COOMET members to a seminar “Metrology & Conformity Assessment” was supported by TC 2 chair and coordinated by German COOMET secretary Annette Kögler. 11 representatives from 6 COOMET members are indicated to take part. It will be held on 1 March 2010 in Brussels.

### **Next TC 2 Meeting**

The next TC 2 Meeting is planned for September 2010 in Slovakia at Slovak Metrology Institute (SMU).

Dr Olaf Kühn  
TC 2 Chairperson

**List of participants  
of the meeting of COOMET Technical committee  
TC 2 “Legal metrology”**

15-16 September 2009  
Vilnius, Lithuania  
organized by the State Metrology Service (VMT)

Country	Name	
<b>BELARUS</b>	1.	Prof. Nikolai Zhagora, BelGIM
	2.	Mr Maxim Shabanov, BelGIM
<b>GERMANY</b>	3.	Dr Olaf Kühn, LMET, TC 2 Chairperson
<b>LITHUANIA</b>	4.	Mr Ignas Stankovicus, VMT Director
	5.	Mr Osvaldas Staugaitis, VMT
	6.	Mr Viktoras Zabolotnas, VMT
	7.	Mrs Kristina Blinkeviciene, VMT, TC 2 member
	8.	Mrs Gerda Krukonene, VMT
	9.	Mrs Irena Lazdauskaite, VMT
<b>RUSSIA</b>	10.	Prof. Lev Issaev, VNIIMS
<b>SLOVAKIA</b>	11.	Mrs Anna Nemechkova, SMU
<b>UKRAINE</b>	12.	Mrs Inna Lyba, NSC “IM”
<b>UZBEKISTAN</b>	13.	Mr Gayrat Gaziyev, NIISMS

Annex 2

Country Level

Contact persons of COOMET-TC 2, OIML, WELMEC, APLMF

Country	TC 2 contact person			OIML contact person		WELMEC		APLFM	
	Name	Institute	Member	Correspondent Member	Name	Name	Name		
Armenia	Ms. Rima Danielyan	NIM	-	-	-	-	-		
Azerbaijan	Mr. Sardar Aslanov	“AZSTANDARD” Agency	-	-	-	-	-		
Belarus	Prof. Nikolai Zhagora	BelGIM	Dr. Valery Koreshkov						
Bulgaria	Mr. Ivan Machulekov	BIM	Dr. Katerin Katerinov		Dr. Katerin Katerinov				
Cuba	Dr. C. Martin Antunez	NC	Mr. Martin Antunez Ramirez						
DPR of Korea	Mrs. Jo Sun Bok	CIM		Dr. Choe Hui Jong			Dr. Choe Hui Jong		
Georgia	Mr. Alexander Borokhovich	GeoStandMetrology	-	-			-		
Germany	Dr. Olaf Kuhn	LMET	Prof. Roman Schwartz				-		
Kazakhstan	Mrs. Lubov Galitsyna	KazInMetr	Mr. Gabit Mukhambetov				-		
Kyrgyzstan	Mr. Ulan Turdukulov	NISM		Mr. Atabhanov Patidin			-		

		TC 2 contact person			OIML contact person		WELMEC	APLFM
Country	Name	Institute	Member	Correspondent Member	Name	Name	Name	
Lithuania	LT	Mr. Viktoras Zabolotnas	VMT	Mr. Osvaldas Staugaitis	Mr. Ignus Stankovicus	-	-	
Moldova	MD	Mrs. Elena Hanganu	"Moldova-Standard"	Mr. Sergui Baban	-	-	-	
Romania	RO	Mr. D. Dinu	BRML	Prof. Fanel Iacobescu	Prof. Fanel Iacobescu	-	-	
Russia	RU	Dr. Valery Skovorodnikov	VNIIMS	Prof. Lev Issaev	Prof. Vladimir Krutikov; Dr. Sergey Kononogov; Prof. Lev Issaev; Sergey Komissarov	-	-	
Slovakia	SK	Mrs. Anna Nemečková	SMU	Eng. Iveta Botkova	Mr. P. Obdrzalek	-	-	
Ukraine	UA	Dr. Boris Markov	NSC "IM"	Dr. Goryslav Sydorenko	-	-	-	
Uzbekistan	UZ	Mr. Andrey Sadikov	SE "CNS Uz"	Mr. Rahimberdi Buriev	-	-	-	

## **ANNUAL REPORT of Chairperson of Technical Committee of Quality Forum (3.1)**

### **1. General characteristic of cooperation**

In view of the increasing process of globalization in metrology, the International Arrangement of Mutual Recognition of Measurement Standards (MRA) was concluded under the aegis of BIPM. One of the requirements of this arrangement is to implement a Quality Management System (QMS) at national metrology institutes in accordance with ISO/IEC 17025:2005 and ISO Guide 34. 2004 was the year when the transient period of the MRA elapsed which means that an NMI wishing to publish its calibration and measurement capabilities (CMCs) in the international data base of BIPM must confirm these CMCs not only through international comparisons but also through its recognized QMS. COOMET Quality Forum (QF) as a structural body of COOMET was established in 2002. The basic task of COOMET QF is to coordinate and help COOMET member countries in implementing and applying QMS in metrology institutes in accordance with the MRA requirements. The participants of cooperation within the QF are all COOMET member countries wishing to participate. The QF is also open for other countries. The QF organizes two-three days' meetings to discuss QMS presented by COOMET NMIs (written and oral presentations of QMS of COOMET NMIs). Documents about QMS of COOMET NMIs are approved and fundamental problems of cooperation within this field are solved. 22 NMIs from 17 COOMET member countries now cooperate within the QF at the meetings of the QF. COOMET QF has its Technical Committee which solves the main problems related with the activities of COOMET QF and which has designated representatives of COOMET countries as its members. The earlier approved list of auditors and technical experts of COOMET is being updated. The task of the auditors and technical experts of COOMET is to carry out peer reviews of QMS of COOMET NMIs. Documentation about the rules and procedure for carrying out these peer reviews of QMS has been developed. In case of positive results of the peer review of a QMS the NMI receives recognition of its QMS for five years by the decision of the Technical Committee of COOMET QF.

### **2. Results of the last meeting of the QF**

During the reported period the 11<sup>th</sup> meeting of the Technical Committee of the QF was held (4 Dec 2009, Chisinau); it was held immediately after the workshop for COOMET auditors who will participate in peer reviews of QMS of COOMET NMIs. A training peer review of the QMS of INSM (Moldova) was held during the workshop.

The document "Recommendation for Evaluating the Quality Management System of National Metrology Institutes" and some appendices to it were finally agreed on at the meeting of the TC of COOMET QF. "Recommendation. Order and Procedure for Evaluating the Quality Management System of National

Metrology Institutes” and some of its appendices were finally approved. The dates for revising and drawing up new required documents of COOMET Quality Forum were agreed on.

The dates for peer reviews and QMS presentations for 2010 were agreed on. The Recognition Certificate of 7 COOMET NMIs expires in 2010. The peer reviews of the QMS of Russian VNIIM, VNIIMS and VNIIOFI as well as the presentation of the QMS of Belarusian BelGIM and Ukrainian NSC “Institute of Metrology” and Ukrmetrteststandart are planned in June 2010. The peer reviews of the QMS of Russian VNIIOFI, Belarusian BelGIM and Ukrainian NSC “Institute of Metrology” and Ukrmetrteststandart are planned in autumn 2010.

The results of the peer review of the QMS of KazInMetr (Almaty, Karaganda, Astana, 16-20 Nov 2009) were considered at the meeting. It was decided that COOMET recognition of the QMS of KazInMetr would be granted after the on-site review of the elimination of the revealed non-conformities.

*During the 10<sup>th</sup> meeting of COOMET Quality Forum held on 29-30 April 2009 immediately after the meeting of the Technical Committee of COOMET Quality Forum Russian NMIs (VNIIOFI, VNIIM, VNIIFTRI, VNIIMS) submitted their QMS for repeat review (after a five-years' period). Geostandart presented the system of metrology of Georgia, and Rostehregulirovanie presented the system of metrology of Russia. This information was given in the previous annual report for April 2008 – April 2009.*

Most COOMET NMIs now have the status of COOMET recognition of their QMS.

#	NMI	QMS status	Issued
1	VNIIM (Russia)	Recognition Certificate	20.09.2005
2	VNIIOFI (Russia)	Recognition Certificate	20.12.2005
3	VNIIFTRI (Russia)	Recognition Certificate	20.12.2005
4	VNIIMS (Russia)	Recognition Certificate	20.12.2005
5	BelGIM (Belarus)	Recognition Certificate	20.12.2005
6	NSC “IM” (Ukraine)	Recognition Certificate	20.12.2005
7	Ukrmetrteststandart (Ukraine)	Recognition Certificate	20.12.2005
8	UNIIM (Russia)	Recognition Certificate	30.03.2007
9	SNIIM (Russia)	Recognition Certificate	30.03.2007
10	DP “NDI “Systema” (Ukraine)	Recognition Certificate	30.03.2007
11	DP “Ivano-Frankovskstandart metrologiya” (Ukraine)	Recognition Certificate	8.04.2008
12	INIMET (Cuba)	Recognition Certificate	8.04.2008
13	CENTIS-DMR (Cuba)	Recognition Certificate	8.04.2008
14	CPHR (Cuba)	Recognition Certificate	8.04.2008

COOMET Quality Forum has its Internet page where COOMET approved documents, information on the meetings of QF, minutes, contact data of the QF members, presentations of the QMS of NMIs are posted. It is planned to change the Internet page in view of the implementation of a new Internet page within COOMET.

### 3. Overview of projects

There are now three projects registered within COOMET Quality Forum:

- 230/SK/01 “Interpretation and implementation of the quality systems of COOMET members RMOs in conformity with the ISO 17025 (INSISK)”.
- 280/BY/03 “Organization and holding of the meetings of COOMET Quality Forum and TC 3.1, as well as the training workshop “Philosophy of Development and Implementation of Quality Management Systems according to ISO/IEC 17025 in Testing and Calibration Laboratories” – completed.
- 360/SK/05 Holding the seminar “Quality and Metrology” – the seminar was postponed for an uncertain period.

Two training workshops were held in the reporting period within COOMET Quality Forum and financed by PTB:

- 1) Implementation of QMS in NMs according to ISO/IEC 17025 (Tbilisi, Georgia, 14-15 Oct 2009).

The target group of the workshop were quality managers of COOMET NMs.

- 2) Training of COOMET auditors who will carry out peer reviews of QMS of COOMET NMIs (Chisinau, Moldova, 1-3 Dec 2009).

### 4. Cooperation with international organizations

During the meetings of JCRB held twice a year the representatives of COOMET QF inform about the activities of the QF and confirm that COOMET develops its activity in the implementation of QMS in accordance with the requirements of the MRA.

COOMET QF always tries to harmonize its valid rules and procedures with the rules adopted by JCRB.

### 5. The next meeting of COOMET QF

The next 11<sup>th</sup> meeting of COOMET QF is scheduled in June 2010 in Russia. It is planned to present the results of the peer reviews of KazInMetr, the repeat peer reviews (after a 5 years' period) of Russian VNIIM, VNIIOFI, VNIIMS. Repeat oral presentation of Belarusian BelGIM and Ukrainian NSC “IM” and Ukrmetrteststandart.

## 6. Proposals for the meeting of COOMET Committee

1. To approve the updated documents of COOMET QF “Recommendation for Evaluating the Quality Management System of National Metrology Institutes” with appendices and “Recommendation. Order and Procedure for Evaluating the Quality Management System of National Metrology Institutes” with appendices.
2. To ask COOMET Committee members to appoint candidates from their countries for the positions of members of the Technical Committee of COOMET QF on a long-term basis.

In connection with the urgent importance of the activity of COOMET QF from the point of view of globalization in metrology, let me ask all COOMET member countries represented by COOMET Coommittee members to support the activity of the QF in every possible way, because I am convinced that the implementation and application of QMS in metrology institutes are now one of the most important fields of cooperation.

Dr Stanislav Musil  
TC 3.1 Chairperson

## ANNUAL REPORT of Chairperson of TC 4 “Information and Training”

### 1. General characteristic of cooperation

The Technical Committee “Information and Training” (TC 4) was established in May 2002.

In the reporting period the activities within the TC were performed in accordance with the Working Programme of TC 4 for 2009–2011 in the five subcommittees:

- SC 4.1 “COOMET Development Based on the Analysis of International Experience”;
- SC 4.2 “Information and Information Technology”;
- SC 4.3 “Training and Raising the Proficiency Level of Experts”;
- SC 4.4 “Coordination of Work with Young Metrologists of COOMET Member Countries”;
- SC 4.5 “Support in Developing the Basic Metrological Infrastructure of COOMET Member Countries”.

### 2. Overview of the projects and their results

Activities on the following registered projects were performed in 2009:

343/MD/05      Development of recommendations on working out criteria and structure of training programmes in the field of metrology

The name of the project was changed. COOMET Secretariat sent the form of the project once again to the Caucasian and Central Asian countries as those most interested in the project. The list of the members in this project is still being formed. It was proposed at the 6<sup>th</sup> meeting of TC 4 that the Project Coordinator E. Hanganu should render this project into the rank of agreed projects.

391/RU/07      Working out of an internships programme within the COOMET framework

An analysis of the training courses of foreign specialists was carried out and the experience of such courses in other countries was studied within the project. As a result of the analysis there are considerable differences in the targets, forms, periods of training as well as the level of trainees’ proficiency. It was proposed at the 6<sup>th</sup> meeting of TC 4 that the Project Coordinator V. Ivanov should render this project into the rank of agreed projects, prepare informational material on this project and a draft training programme within COOMET.

404/RU/07      Development of the procedure and technology for the presentation on the COOMET website of data on calibration and measurement services (CMS) of metrological centres (laboratories) not published on the BIPM website

The project aims at posting of a data base on the COOMET website and providing an open on-line access to it for organizations that can be possible users of the metrological services. A Draft Recommendation “Procedure for forming, reviewing and publishing calibration and measurement services (CMS) of metrology laboratories (centres) of partner countries on the COOMET website” was developed in 2009.

The draft was submitted at the 14<sup>th</sup> meeting of COOMET President’s Council. As a result of the discussion COOMET Secretariat distributed the draft recommendation among the TC 4 members for comments.

#### 478/UA/09      Creation of a COOMET working web-portal

The following actions will be carried out within the project: development of the global concept and the interaction design; technical implementation of internal document handling of the structural bodies and the organization as a whole; elaboration of state-of-the-art screen-design and navigation interface. Extension of the database and information resource taking into account the needs of both the members of the organization and potential users of COOMET services is planned.

A secure user account administration and web-portal maintenance rules will be developed. A  $\beta$  version of the web-portal was discussed at the 14<sup>th</sup> meeting of COOMET President’s Council.

A training workshop for on-line editors is planned in March 2010.

#### **The following COOMET projects are completed:**

#### 251/BY-a/01      Development and realization of suggestions for improvement of COOMET website

Activities on the updating of the website were performed in 2009 and anew project was initiated. The project was completed in view of the new project 478/UA/09.

#### 393/RU/07      Development of criteria for assessing qualification of the metrology experts

The target of the project is to create a normative base with the requirements for the competence of metrology experts to be used when assessing (certifying) the competence of specialists performing expert activities in metrology. Within the implementation of the project recommendations for the content of criteria for assessing the qualification of metrology experts were developed. Taking into account that each country uses, along with the relevant international documents, its own normative base regulating the requirements for these activities, these recommendations should be considered as a specific example of an approach to the content of criteria for assessing the qualification of metrology experts performing activities or participating in:

**accreditation** of laboratories and centres for various types of metrology activity;

**testing** of measuring instruments, measuring systems, defects samples;

**certification** of measuring instruments and systems, software of measuring instruments, quality management systems, defect samples;

**certification** of testing equipment, measurement procedures, reference materials of the content and properties of substances and materials;

**review** of draft technical regulations, programmes and national standards, draft normative documents, technological and design documentation.

453/BY/09 Organization and holding of III Competition of Young Metrologists of COOMET Member Countries on 14–15 April 2009 in Minsk, Republic of Belarus

28 young metrologists from Belarus, Russia, Germany, Ukraine, Uzbekistan, Cuba, DPR of Korea.

As a result of the competition:

The 1<sup>st</sup> place was given to Natalya Chervyakovskaya (BelGIM, Belarus);

The 2<sup>nd</sup> place was given to Makram A. Zebian (PTB, Germany);

The 3<sup>rd</sup> place was given to Dmitriy Gogolev (VNIIMS, Russia).

The winner in the Best Report in English is Dmitriy Solomakho (Belarusian National Technical University).

The members of the Competition Commission proposed introducing changes in the evaluation criteria in COOMET Recommendation R/GM/18:2008 “Procedure of the International Competition “The Best Young Metrologist of COOMET”. A revised recommendation was considered at the 14<sup>th</sup> meeting of COOMET President’s Council. It is recommended to take into account not only the scientific component (e.g. when defending the thesis) but also the social and economic effect of the activity when evaluating its novelty.

472/AM/09 Preparing and conducting the workshop “Calibration and Verification – Differences between Obligatory and Facultative Measurements”

The workshop Семинар “Calibration and Verification - Differences between Obligatory and Facultative Measurements” within SC 4.5 was held on 14–16 July 2009 in Yerevan, Armenia.

Terminological and organizational aspects of calibration and verification were considered during the workshop for SC 4.5 members, scientific custodians of national measurement standards and employees of the NMIs from Central Asian and Caucasian states participating in verification and calibration activities.

The following points were discussed at the workshop:

- clarifying the relationship between scientific, industrial and legal metrology;
- clarifying the differences between calibration and verification;

- clarifying the relationship between calibration, quality management and accreditation;
- the importance of the RMO COOMET as a gate to international recognition of measurement results of its member NMIs;
- developing ways to come to CMCs in Central Asian and Caucasian states.

476/GE/09      Preparing and conducting the workshop “Implementation of Quality Management Systems at NMIs according to ISO/IEC 17025”

The workshop “Implementation of Quality Management Systems at NMIs according to ISO/IEC 17025” within SC 4.5 was held on 14–15 October 2009 in Tbilisi, Georgia.

Procedures and documents of a quality management system in accordance with ISO/IEC 17025 were considered during the workshop for the employees of the NMIs from Central Asian and Caucasian states carrying responsibility for the implementation and functioning of quality management systems.

The following points were discussed at the workshop:

- fundamentals of a quality management system (QMS) in NMIs;
- relationship between QMS at NMIs and CIPM MRA;
- role of Quality Managers / Vice-Directors for quality in the process of implementing QMS in NMIs;
- main steps towards implementation of QMS in NMIs and towards peer-reviews of COOMET;
- management and technical requirements of ISO 17025;
- structure of document “Calibration Procedure with Uncertainty Assessment”.

### **3. Results of the TC meeting**

*The sixth meeting* of TC 4 was held on 28 April 2009 at PTB (Braunschweig, Germany). 17 representatives of nine countries, TC 4 members and invitees participated in the meeting.

The participants of the meeting exchanged information on the activities of the NMIs of COOMET member countries in the field of training experts, information and information technology in 2008–2009, discussed the Working Programme of TC 4 for 2009–2011, and the implementation of COOMET projects.

The modernization of the COOMET website was vividly discussed. A prototype of the modernized COOMET website was presented. The participants were informed on the number of visits to the existing website as a whole and to its parts. COOMET Website Administrator V. Bugayev gave a number of critical comments however the idea about a working web-portal of COOMET for the purpose of enlarging the communication capabilities for cooperation and

document exchange within the organization. The participants of the meeting found it appropriate to start the modernization of the website taking into account the discussion.

The date and venue of the next TC meeting in 2010 will be agreed on in working order.

#### **4. Results of the training workshop for COOMET auditors carrying out peer reviews of Quality Management Systems of NMIs in accordance with ISO/IEC 17025**

The training workshop for COOMET auditors carrying out peer reviews of Quality Management Systems of NMIs in accordance with ISO/IEC 17025 was prepared by TC 3.1 and held on 1–3 December 2009 at NCSM (Chisinau, Moldova).

30 representatives of 12 COOMET member countries and JCRB Executive Secretary L. Mussio participated in the workshop.

The following points were discussed at the workshop:

- fundamentals of QMS at NMIs;
- COOMET rules and procedures for QMS evaluation;
- technical requirements in accordance with ISO/IEC 17025.

Following the theoretical part of the workshop the participants carried out a training peer review of the QMS of an NCSM laboratory.

The workshop was concluded with a test of the knowledge of ISO/IEC 17025 and COOMET rules of QMS evaluation.

#### **5. Activities for the implementation of the CIPM MRA**

The following is posted and updated on the COOMET website by the Secretariat and Web Administrator, Chairperson of SC 4.2 “Information Technology” Dr V. Bugayev:

- Programme of COOMET Comparisons in pdf;
- Data base of Calibration and Measurement Capabilities (CMC) of COOMET member countries;
- Data base of international comparisons with participation of COOMET member countries;
- Link to COOMET Quality Forum web-page maintained by the experts of Slovak NMI.

Dr Pavel Neyezhnikov  
TC 4 Chairperson



**COOMET-20/10.1**

**Members  
of COOMET Structural Bodies  
(as of 31 March 2010)**



**Joint Committee for Measurement Standards****Chairperson: Dr. Sergey Korostin**

Federal State Enterprise “Mendeleev Centre for Standardization and Metrology”, Central Division  
(CD FSE “Mendeleev CSM”)

**TC Membership:**

<b>Chairperson of TC 1.1 “General Questions Concerning Measurements (General Metrology)”</b>	<b>Dr. Anna Chunovkina</b> VNIIM
<b>Chairperson of TC 1.2 “Acoustics, Ultrasound, Vibration”</b>	<b>Mrs. Valentina Pozdeeva</b> BelGIM
<b>Chairperson of TC 1.3 “Electricity and Magnetism”</b>	<b>Mrs. Tatyana Kolomiets</b> BelGIM
<b>Chairperson of TC 1.4 “Flow Measurement”:</b>	<b>Prof. Vladimir Bolshakov</b> NSC “IM”
<b>Chairperson of TC 1.5 “Length and Angle”</b>	<b>Dr. Vladimir Kupko</b> NSC “IM”
<b>Chairperson of TC 1.6 “Mass and Related Quantities”</b>	<b>Dr. Natalya Domostroeva</b> VNIIM
<b>Chairperson of TC 1.7 “Photometry and Radiometry”</b>	<b>Mr. Valery Kuznetsov</b> VNIIOFI
<b>Chairperson of TC 1.8 “Physical Chemistry”</b>	<b>Prof. Leonid Konopelko</b> VNIIM
<b>Chairperson of TC 1.9 “Ionizing Radiation and Radioactivity”</b>	<b>Prof. Vladimir Yarina</b> VNIIFTRI
<b>Temporarily Acting Chairperson of TC 1.10 “Thermometry and Thermal Physics”</b>	<b>Dr. Anatoly Pokhodun</b> VNIIM
<b>Chairperson of TC 1.11 “Time and Frequency”</b>	<b>Prof. Vitaly Palchikov</b> VNIIFTRI
<b>Chairperson of TC 1.12 “Reference Materials”</b>	<b>Prof. Vladislav Leonov</b> UNIIM

## TC 1.1 “General Metrology”

Chairperson: **Dr. Anna Chunovkina**

All-Russian Scientific Research Institute of Metrology (VNIIM)

Country		Contact person (TC member)	NMI
Azerbaijan	AZ	Mr. Azer Gurbanov	“AZSTANDARD” Committee
Armenia	AM	Mr. Vahan Sahakyan	NIM
Belarus	BY	Ms. Nadezda Lyakhova	BelGIM
Bulgaria	BG	Mrs. Stefka Hristova	BIM
Cuba	CU	Mr. Eduardo Perez	INIMET
Georgia	GE	Mr. Revaz Jvania	GEOSTM
Germany	DE	Prof. Dr. Manfred Kochsiek	PTB
Kazakhstan	KZ	Mr. Zhanat Begaidarov	KazInMetr
Kyrgyzstan	KG	Mr. Ulan Turdukulov	CSM
DPR of Korea	KP	Dr. Chang Myong Il	CIM
Lithuania	LT	Mrs. Kristina Blinkeviciene	VMT
Moldova	MD	Mr. Yuri Friptuleak	INSM
Romania	RO	Dr. A. Millea	INM
Russia	RU	Dr. Anna Chunovkina	VNIIM
Slovakia	SK	Dr. Robert Spurný	SMU
Tajikistan	TJ	Mr. T.Shakirjanov	Tajikstandard
Uzbekistan	UZ	Mr. Ravshan Rahmanov	SI “CNS Uz”
Ukraine	UA	Dr. Goryslav Sydorenko	NSC “IM”

There is no intent to establish subcommittees within the TC.

**TC 1.2 “Acoustics, Ultrasound, Vibration”****Chairperson: Mrs. Valentina Pozdeeva**

Belarussian State Institute of Metrology (BelGIM)

**Coordinators in the fields:**

“Acoustics in air” – Mr. Anatoly Konkov, VNIIFTRI, Russia

“Vibration” – Mr. Viktor Smirnov, VNIIM, Russia

“Underwater acoustic” – Dr. Alexander Isaev, VNIIFTRI, Russia

Country		Contact person (TC member)	NMI
Azerbaijan	AZ	Mr. Arif Huseinov	“AZSTANDARD” Committee
Armenia	AM	Mr. Ararat Bagdasaryan	NIM
Belarus	BY	Mrs Valentina Pozdeeva	BelGIM
Bulgaria	BG	Mr. Marin Chushkov	BIM
Cuba	CU	-	-
Georgia	GE	Mr. Guram Tsiklauri	GEOSTM
Germany	DE	Dr. Thomas Fedtke	PTB
Kazakhstan	KZ	-	-
Kyrgyzstan	KG	-	-
DPR of Korea	KP	Mr. Chong Tae Ho	CIM
Lithuania	LT	Mrs. Tatiana Zaploskene	SC VMS
Moldova	MD	Mr. Pavel Andoni	INSM
Romania	RO	Mrs. A. Popescu	INM
Russia	RU	Dr. Alexander Enyakov	VNIIFTRI
Slovakia	SK	Mr. Ján Šebok	SMU
Uzbekistan	UZ	Prof. Ortagoli Hakimov	SI “CNS Uz”
Ukraine	UA	Dr. Vladimir Chaly	DP NDI “Systema

There is no intent to establish subcommittees within the TC.

### TC 1.3 “Electricity and Magnetism”

**Chairperson: Mrs. Tatyana Kolomiets**

Belarussian State Institute of Metrology (BelGIM)

**WG Coordinators:**

“**High voltage and large current**” – Mr. Valeriy Kikalo (Ukraine);

“**Direct voltage, current and electric resistance**” – nominee to be specified;

“**Alternating voltage, current, electric power and impedance**” –

Mr. Oleg Velichko (Ukraine);

“**Radio frequency measurements**” – Mr. Yutiy Pavlenko (Ukraine);

“**Electric and magnetic fields**” – nominee to be specified

Country		Contact person (TC member)	NMI
Azerbaijan	AZ	Mr. Maarif Zeynalov	“AZSTANDARD” Committee
Armenia	AM	Mr. Viktor Shakhmuradyan	NIM
Belarus	BY	Mrs. Tatyana Kolomiets	BelGIM
Bulgaria	BG	Mrs. Petya Aladzhem	BIM
Cuba	CU	Mrs. Mirta Navarro	INIMET
Georgia	GE	Mr. Nikolay Lobjanidze	GEOSTM
Germany	DE	Dr. Hans Bachmair	PTB
Kazakhstan	KZ	Mrs. Nagima Tuymekulova	KazInMetr
Kyrgyzstan	KG	Mr. Mukan Moldobaev	CSM
DPR of Korea	KP	Mr. Jo Song Chol	CIM
Lithuania	LT	Dr. Gintautas Ambrazevicius	PFI
Moldova	MD	Mr. Leonid Ciimak	INSM
Romania	RO	Mr. R. Soviany	INM
Russia	RU	Dr. Sergey Kolotygin	VNIIFTRI
Slovakia	SK	Dr. Peter Vrabček	SMU
Uzbekistan	UZ	Mr. Andrey Sadikov	SI “CNS Uz”
Ukraine	UA	Dr. Oleh Velychko	Ukrmetrtest- standard

There is no intent to establish subcommittees within the TC.

**TC 1.4 “Flow Measurement”****Chairperson: Prof. Vladimir Bolshakov**

National Scientific Centre “Institute of Metrology” (NSC “IM”)

**Deputy Chairperson:** Prof. Natalia Kosach (NSC “IM”)**Chairpersons of SCs:****SC 1.4.1 “Gas flow measurement”:** Nikolai Martynov (BelGIM, Belarus)**SC 1.4.2 “Oil and oil products flow measurement”:** Dr. Gennady Khomyakov (VNIIR, Russia)**SC 1.4.3 “Liquefied gas flowmetry”:** Mr. Reshat Sabirgaliev (KazInMetr, Kazakhstan)

Country		Contact person (TC member)	NMI
Azerbaijan	AZ	Mr. Garalov Movlud Nasreddin ogly	“AZSTANDARD” Committee
Armenia	AM	Mr. Karapet Sargisyan	NIM
Belarus	BY	Mr. Nikolay Martynov	BelGIM
Bulgaria	BG	Mr. Ivalin Yosifov	BIM
Cuba	CU	Mr. C Jose I.Franco	INIMET
Georgia	GE	Mrs. Irma Rurua	GEOSTM
Germany	DE	Dr. Gudrun Wendt	PTB
Kazakhstan	KZ	Mr. Reshat Sabirgaliev	WKS “KazInMetr”
Kyrgyzstan	KG	Mrs. Marina Denisova	CSM
DPR of Korea	KP	Dr. Choe Yong Chol	CIM
Lithuania	LT	Dr. Antanas Pedišius	LEI
Moldova	MD	Mr. Alexander Ciorba	INSM
Romania	RO	Mr. A. Oncescu	INM
Russia	RU	Dr. Gennady Khomyakov	VNIIR
Slovakia	SK	Mrs. Miroslava Benková	SMU
Tajikistan	TJ	Mr. A.Gordeyev	Tajikstandard
Uzbekistan	UZ	Mr. Mahmud Kayumov	SI “CNS Uz”
Ukraine	UA	Prof. Vladimir Bolshakov	NSC “IM”

**Membership of Subcommittees in TC 1.4****SC 1.4.1 “Gas flow measurement”**

**Chairperson:** Nikolai Martynov, BelGIM, Belarus

**Membership:**

- Stefan Makovnik, SMU, Slovakia
- Franko Hose, INIMET, Cuba
- Alexandr Chorbe, INSM, Moldova
- Yuri Tonkonogiy, Ukraine
- Igor Petrishin, Ivano-Frankovskstandartmetrologia, Ukraine
- Gennady Reut, VNIIR, Russia
- Ulan Batanov Улан, WKF “KazInMetr”, Kazakhstan.

**SC 1.4.2 “Oil and oil products flow measurement”**

**Chairperson:** Gennady Khomyakov, VNIIR, Russia

**Membership:**

- Vladimir Chernoiivan, Ukrmetrteststandart, Ukraine
- Nikolai Martynov, BelGIM, Беларусь
- Nikolai Fedotov, OJSC “AK Transneftproduct”, Russia
- Vladimir Suharev, OJSC “Surgutneftegaz”, Russia
- Sergey Efremov, OJSC “NC Lukoil”, Russia
- Mikhail Gurevich, OJSC “IMS”, Russia
- Vitaly Pavlov, “Kaspiy truboprovod consortium-P” Ltd., Russia
- Mikhail Estin, OJSC “NK Rosneft”, Russia
- Igor Prudnikov, OJSC “Gazprom”, Russia
- Vladimir Zhdanov, OJSC “AK Transneft”, Russia

**SC 1.4.3 “Liquefied gas flowmetry”**

**Chairperson:** Mr. Reshat Sabirgaliev, KazInMetr, Kazahstan

**Membership:**

SC is in a formation stage

### TC 1.5 “Length and Angle”

**Chairperson: Prof. Vladimir Kupko**

National Scientific Centre “Institute of Metrology” (NSC “IM”)

**Deputy Chairperson:** nominee to be specified

**Executive Secretary:** Mr. Andrey Kalin (NSC “IM”)

**Chairpersons of SCs:**

**SC 1.5.1 “Measurements of length and angle”** – Dr. Y. Filatov, VNIIM, Russia

**SC 1.5.2 “Measurements of shapes of complex surfaces”** – nominee to be specified

**SC 1.5.3 “Measurements of big and extra-big lengths”** – Dr. Vladimir Kupko, NSC “IM”, Ukraine;

**SC 1.5.4 “Metrology purpose lasers”** – nominee to be specified

Country		Contact person (TC member)	NMI
Azerbaijan	AZ	Mr. Elchin Babayev	“AZSTANDARD” Committee
Armenia	AM	Mr. Eduard Rustamyan	NIM
Belarus	BY	Mrs Anna Demodova	BelGIM
Bulgaria	BG	Mr. Vesselin Gavaliugov	BIM
Cuba	CU	MSc. Alejandra Hernández	INIMET
Georgia	GE	Mr. Vaja Sikharulidze	GEOSTM
Germany	DE	Dr. Harald Bosse	PTB
Kazakhstan	KZ	Mrs. Olga Issakova	SKS “KazInMetr”
Kyrgyzstan	KG	Mrs. Galina Devyatova	CSM
DPR of Korea	KP	Dr. Kim Jin Ju	CIM
Lithuania	LT	Dr. Lilijana Gaidamovičiūtė	VMC
Moldova	MD	Mr. Tudor Birsa	INSM
Romania	RO	Mr. Dragos Boiciuc	INM
Russia	RU	Dr. Konstantin Chekirda	VNIIM
Slovakia	SK	Mr. Roman Fíra	SMU
Uzbekistan	UZ	Mr. Gayrat Tajiev	SI “CNS Uz”
Ukraine	UA	Dr. Vladimir Kupko	NSC “IM”

**TC 1.6 “Mass and Related Quantities”****Chairperson: Dr. Natalya Domostroeva**

All-Russian Scientific Research Institute of Metrology (VNIIM)

**Chairpersons of SCs:**

SC 1.6.1 “Mass” – Chairperson of TC

SC 1.6.2 “Force” – E. Galat, BelGIM, Belarus

SC 1.6.3 “Pressure” – Y. Kiselev, VNIIM, Russia

SC 1.6.4 “Hardness” – E. Aslanyan, VNIIFTRI, Russia

**Coordinators in the fields:**

“Density” – V. Snegov, VNIIM, Russia

“Viscosity” – N. Domostroeva, VNIIM, Russia

“Gravimetry” – nominee to be specified

**Official members of TC 1.6\***

Country		Contact person (TC member)	NMI
Azerbaijan	AZ	Ms. Tamilla Shabiyeva Mr. Elchin Babayev	“AZSTANDARD” Committee
Armenia	AM	Mr. Eduard Rustamyan	NIM
Belarus	BY	Mrs. Ludmila Evsievich	BelGIM
Bulgaria	BG	Mrs. Nadia Vladimirova	BIM
Cuba	CU	Mr. Augusto Maury	INIMET
Georgia	GE	Ms. Irma Rurua	GEOSTM
Germany	DE	Dr. Wladimir Sabuga	PTB
Kazakhstan	KZ	Mr. Chingis Kuanbaev	KazInMetr
Kyrgyzstan	KG	Mrs. Ekaterina Kotova	CSM
DPR of Korea	KP	Dr. Pak Jin	CIM
Lithuania	LT	Mrs. Iona Milkamanaviciene	VMC
Moldova	MD	Mr. Konstantin Lukianik	INSM
Romania	RO	Mr. V. Petrescu	INM
Russia	RU	Dr. Nikolay Chalenko	VNIIM
Slovakia	SK	Dr. Robert Spurný	SMU
Tajikistan	TJ	Mr. D. Rakhimov	Tajikstandard
Uzbekistan	UZ	Mr. Makhmud Kayumov	SI “CNS Uz”
Ukraine	UA	Mrs. Liliya Teplitskay	NSC “IM”

\* According to the proposal of the TC Chairperson a status of full members of TC is introduced

**Full Members  
of TC 1.6 “Mass and Related Quantities”**

Country	Contact person (TC member)	NMI
<b>Belarus (BY)</b>	Evgeny Galat	BelGIM
	Nikolai Martynov	BelGIM
<b>Germany (DE)</b>	Wladimir Sabuga	PTB
	Michael Glasser	PTB
<b>Lithuania (LT)</b>	Ilona Milkamanaviciene	VMT/VMC
	Ksaveriya Dapkyavichene	VMT/VMC
<b>Russia (RU)</b>	Natalia Domostroeva	VNIIM
	Edward Aslanyan	VNIIFTRI
	Vladimir Gorobey	VNIIM
	Vladimir Borovkov	VNIIFTRI
	Alexander Ostrivnoy	VNIIM
	Viktor Snegov	VNIIM
	Yuri Kiselev	VNIIM
<b>Slovakia (SK)</b>	Robert Spurný	SMU
<b>Ukraine (UA)</b>	Liliya Teplitskay	NSC “IM”

**Membership of Subcommittees in TC 1.6**

<b>SC 1.6.1 “Mass”</b>
------------------------

**Chairperson:** Chairperson of TC

**Membership:**

- M. Glasser, PTB, Germany
- L. Evsievich, BelGIM, Belarus
- R. Spurny, SMU, Slovakia
- V. Snegov, VNIIM, Russia
- L. Teplitskay, NSC “IM”, Ukraine
- A. Maury, INIMET, Cuba

**SC 1.6.2 “Force”**

**Chairperson:** E. Galat, BelGIM, Belarus

**Membership:**

- A. Ostrivnoy, VNIIM, Russia
- N. Chalenko, VNIIM, Russia
- G. Leonov, Ukmetrteststandart, Ukraine
- B. Yurev, VNIIFTRI, Russia
- A. Maury, INIMET, Cuba

**SC 1.6.3 “Pressure”**

**Chairperson:** Yu. Kiselev, VNIIM, Russia

**Membership:**

- V. Gorobey, VNIIM, Russia
- W. Sabuga, PTB, Germany
- V. Borovkov, VNIIFTRI, Russia
- N. Martynov, BelGIM, Belarus
- K. Dapkyavichene, VMC, Lithuania
- N. Vinokurov, NSC “IM”, Ukraine
- Peter Farar, SMU, Slovakia
- M. A. Alvares, INIMET, Cuba

**SC 1.6.4 “Hardness”**

**Chairperson:** E. Aslanian, VNIIFTRI, Russia

**Membership:**

- Konrad Herrmann, PTB, Germany
- Evgeny Galat, BelGIM, Belarus
- Irina Kolozinskaya, NSC “IM”, Ukraine
- Viktor Pivovsrov, VNIIFTRI, Russia
- Viktor Perekrest, Rostest-Moscow, Russia
- Yuri Dronov, Ivanovo CSM, Russia
- Igor Kaliko-Shulish, Ural CSM, Russia
- Ber Smushkovich, JSC “Tochpribor”, Russia
- A. Maury, INIMET, Cuba

**TC 1.7 “Photometry and Radiometry”****Chairperson: Mr. Valery Kuznetzov**All-Russian Scientific Research Institute of Optical and Physical  
Measurements (VNIIOFI)**Deputy chairperson:** Sergey Anevsky (VNIIOFI)**Responsible Secretary:** Olga Minaeva (VNIIOFI)**Secretary:** Natalia Pichikyan (VNIIOFI)**Chairperson of WGs:**“**Photometry**” – Viktor Saprizky (VNIIOFI)“**Radiometry**” – Boris Chlevnoy (VNIIOFI)“**Spectrophotometry**” – Svetlana Morozova (VNIIOFI)“**Calorimetry**” – Tatyana Gorshkova (VNIIOFI)“**Measurements of laser radiation**” – Leonid Grishchenko (NSC “IM”)“**Measurements of parameters of fiber optics data transmission system**”  
– Sergey Tikhomirov (VNIIOFI)“**UV-spectroradiometry**” – Sergey Anevsky (VNIIOFI)

Country		Contact person (TC member)	NMI
Azerbaijan	AZ	Mr. Maarif Zeynalov	“AZSTANDARD” Committee
Armenia	AM	Mr. Kamo Movsisyan	NIM
Belarus	BY	Mrs Olga Tarasova	BelGIM
Bulgaria	BG	Mr. Nikolay Aleksandrov	BIM
Cuba	CU	Mrs. Sandra Pedro	INIMET
Georgia	GE	Mr. Raul Kankia	GEOSTM
Germany	DE	Dr. Klaus Stock	PTB
Kazakhstan	KZ	-	-
Kyrgyzstan	KG	-	-
DPR of Korea	KP	Dr. Choe Il	CIM
Lithuania	LT	Mr. Tadas Juodelis	VMT
Moldova	MD	-	-
Romania	RO	Mr. M. Simionescu	INM
Russia	RU	Mr. Valery Kuznetzov	VNIIOFI
Slovakia	SK	Dr. Peter Nemeček	SMU
Uzbekistan	UZ	Mr. Mavlan-Kariev Abdubori	SI “CNS Uz”
Ukraine	UA	Mr. Leonid Grishchenko	NSC “IM”

## TC 1.8 “Physical Chemistry”

**Chairperson: Prof. Leonid Konopelko**

All-Russian Scientific Research Institute of Metrology  
(VNIIM)

**Deputy Chairperson:** Yuri Kustikov (VNIIM)

**Responsible Secretary:** Anna Kolosova (VNIIM)

**Secretary:** Olga Bulatova (VNIIM)

**Chairpersons of SCs:**

SC 1.8.1 “Electrochemistry” – Dr. Oleg Karpov (VNIIFTRI, Russia)

Country		Contact person (TC member)	NMI
Azerbaijan	AZ	Ms. Raisa Musayeva Ms. Emma Nabieva	“AZSTANDARD” Committee
Armenia	AM	Mr. Garik Martirosyan	NIM
Belarus	BY	Mrs Nina Khairova	BelGIM
Bulgaria	BG	Mrs. Dimka Ivanova	BIM
Cuba	CU	Mrs. Sandra Pedro	INIMET
Georgia	GE	Ms. Izolda Garsevanishvili	GEOSTM
Germany	DE	Dr. Bernd Güttler	PTB
Kazakhstan	KZ	Mrs. Bibinur Janasbayeva	KazInMetr
Kyrgyzstan	KG	Mrs. Tamara Savina	CSM
DPR of Korea	KP	Dr. Chong Yun Gyo	CIM
Lithuania	LT	Dr. Evaldas Naujalis	SC VMS
Moldova	MD	Mr. Sergey Chapa	INSM
Romania	RO	Mr. P. König -Georgescu	INM
Russia	RU	Prof. Dr. Leonid Konopelko	VNIIM
Slovakia	SK	Dr. Viliam Pätoprstý	SMU
Uzbekistan	UZ	Mr. Mavlan – Kariev Abdubori	SI “CNS Uz”
Ukraine	UA	Dr. Mikhail Rozhnov	Ukrmetrtest- standard

### Membership of Subcommittees in TC 1.8

#### SC 1.8.1 “Electrochemistry”

**Chairperson:** Dr. Oleg Karpov (VNIIFTRI, Russia)

**Membership:** Gulmira Bekturganova, KazInMetr, Kazakhstan

#### SC 1.8.2 “Metals and alloys”

**Chairperson:** N.P. Muravskaya (VNIIOFI, Russia)

**Membership:**

**TC 1.9 “Ionizing Radiation and Radioactivity”****Chairperson: Prof. Vladimir Yarina**

All-Russian Scientific Research Institute of Physicotechnical  
Measurements (VNIIFTRI)

**Coordinators in the fields:**

“Dosimetry” – Dr. I. Moiseev (VNIIM, Russia)

“Radioactivity measurements” – Dr. Igor Kharitonov (VNIIM, Russia)

“Neutron measurements” – Dr. Ludwig Büermann (PTB, Germany)

Country		Contact person (TC member)	NMI
Azerbaijan	AZ	Mr. Rauf Akbarbayov	“AZSTANDARD” Committee
Armenia	AM	Mr. Ovik Vardanyan	NIM
Belarus	BY	Mr. Valery Milevsky	BelGIM
Bulgaria	BG	Mr. Rosen Ivanov	BIM
Cuba	CU	Dra C Pilar Oropesa	CENTIS
Georgia	GE	Mr. Simon Sukhishvili	GEOSTM
Germany	DE	Dr. Ludwig Büermann	PTB
Kazakhstan	KZ	-	-
Kyrgyzstan	KG	Mr. Igor Ershov	CSM
DPR of Korea	KP	Dr. Chang Myong Il	CIM
Lithuania	LT	Mr. Arunas Gudelis	Institute of Physics
Moldova	MD	Mr. Yuri Friptuleak	INSM
Romania	RO	Mr. A. Druker	INM
Russia	RU	Prof. Dr. Vladimir Yarina	VNIIFTRI
Slovakia	SK	Mr. Jozef Dobrovodský	SMU
Uzbekistan	UZ	Mr. Petr Gluhov	SI “CNS Uz”
Ukraine	UA	Dr. Nikolay Kravchenko	NSC “IM”

There is no intent to establish subcommittees within the TC.

**TC 1.10 “Thermometry and Thermal Physics”****Chairperson: Dr. Anatoly Pokhodun**

All-Russian Scientific Research Institute of Metrology (VNIIM)

**Secretary:** Mrs. Rimma Segienko (NSC “IM”, Ukraine)

Country		Contact person (TC member)	NMI
Azerbaijan	AZ	Mr. Azer Bagirov	“AZSTANDARD” Committee
Armenia	AM	Mr. Kamo Movsisyan	NIM
Belarus	BY	Mr. Petr Krivonos	BelGIM
Bulgaria	BG	Mr. Sasho Nedialkov	BIM
Cuba	CU	Mr. Hermes Rozsa	INIMET
Georgia	GE	Mr. Omar Dalakishvili	GEOSTM
Germany	DE	Dr. Steffen Rudtsch	PTB
Kazakhstan	KZ	Mrs. Kuralay Dusesbaeva	SKS “KazInMetr”
Kyrgyzstan	KG	Mrs. Marina Denisova	CSM
DPR of Korea	KP	Mr. Kim Dong Myong	CIM
Lithuania	LT	Mrs. Lidija Safonova	PFI
Moldova	MD	Mr. Konstantin Bordianu	INSM
Romania	RO	Dr. I. Asavinei	INM
Russia	RU	Dr. Anatoly Pokhodun	VNIIM
Slovakia	SK	Dr. Juraj Ranostaj	SMU
Uzbekistan	UZ	Mrs. Nadjmitdinova Assiyam	SI “CNS Uz”
Ukraine	UA	Mrs. Rimma Segienko	NSC “IM”

There is no intent to establish subcommittees within the TC.

## TC 1.11 “Time and Frequency”

**Chairperson: Dr. Vitaly Palchikov**All-Russian Scientific Research Institute of Physicotechnical  
Measurements (VNIIFTRI)**Deputy Chairperson:** Mrs. Elena Zagirova (VNIIFTRI, Russia)

Country		Contact person (TC member)	NMI
Azerbaijan	AZ	Mr. Imran Agaev	“AZSTANDARD” Committee
Armenia	AM	Mr. Viktor Shakhmuradyan	NIM
Belarus	BY	Mr. Alexander Galygo	BelGIM
Bulgaria	BG	Mrs. Tzvetanka Aleksandrova	BIM
Cuba	CU	-	-
Georgia	GE	Mr. Guram Tatishvili	GEOSTM
Germany	DE	Dr. Andreas Bauch	PTB
Kazakhstan	KZ	Mr. Berikbergen Elubaev	SKS “KazInMetr”
Kyrgyzstan	KG	Mr. Nurlan Ysakov	CSM
DPR of Korea	KP	Dr. Hong Chol Ho	CIM
Lithuania	LT	Dr. Rimantas Miškinis	PFI
Moldova	MD	Mr. Anatolie Voda	INSM
Romania	RO	Dr. F. Cretu	INM
Russia	RU	Dr. Vitaly Palchikov	VNIIFTRI
Slovakia	SK	Mr. Pavol Doršic	SMU
Uzbekistan	UZ	Mr. Hikmat Mahmudov	SI “CNS Uz”
Ukraine	UA	Dr. Alexander Tcachuk	NSC “IM”

There is no intent to establish subcommittees within the TC.

**TC 1.12 “Reference Materials”****Chairperson: Prof. Vladislav Leonov**

Urals Scientific Research Institute of Metrology (UNIIM)

**Deputy Chairperson of TC:** Igor Dobrovinskiy (UNIIM, Russia)**Responsible Secretary:** Emiliya Burykina (UNIIM, Russia)

Country		Contact person (TC member)	NMI
Azerbaijan	AZ	Mr. Nazim Sattarzade	“AZSTANDARD” Committee
Armenia	AM	Ms. Narine Oganyan	NIM
Belarus	BY	Mr. Valery Makarevich	BelGIM
Bulgaria	BG	Mrs. Ljudmila Dimitrova	BIM
Cuba	CU	Mrs. Sandra Pedro	INIMET
Georgia	GE	Mr. Temur Philishvili	GEOSTM
Germany	DE	Dr. Wolfram Bremser	BAM
Kazakhstan	KZ	Mrs. Vera Donbaeva	KazInMetr
Kyrgyzstan	KG	Mrs Nataliya Shelepina	CSM
DPR of Korea	KP	Mr. Chong Ryong Sok	CIM
Lithuania	LT	Mr. Audrius Misiunas	PFI
Moldova	MD	Mrs. Adelaida Andriesh	“Moldova- Standart”
Romania	RO	Mr. C. Botgros	INM
Russia	RU	Prof. Dr. Vladislav Leonov	VNIIOFI
Slovakia	SK	Mrs. Anna Mathiasová	SMU
Uzbekistan	UZ	Mrs. Larisa Kim	SI “CNS Uz”
Ukraine	UA	Mr. Andrey Ivkov	NSC “IM”

There is no intent to establish subcommittees within the TC.

## TC 2 “Legal Metrology”

**Chairperson: Dr. Olaf Kühn**

Thuringian State Bureau for Metrology and Verification (LMET)

**Chairpersons of SC:**

**SC 2.1 “Harmonization of Regulations and Norms”** – Dr. Yuri Loukachov (VNIIMS, Russia),

**SC 2.2 “Technologies of Measuring Devices and Systems in Legal Metrology”** – Mr. M. Shabanov (BelGIM, Belarus);

**SC 2.3 “Competence Assessment of Bodies in Legal Metrology”** – Mrs. Olga Maletskaya (NSC “IM”, Ukraine);

**SC 2.4 “Legal Metrology Control”** – Mrs Ruf Genkina (VNIIMS, Russia)

Country		Contact person (TC member)	NMI
Azerbaijan	AZ	Mr. Tahir Shafiyev	“AZSTANDARD” Committee
Armenia	AM	Mr. Robert Dayan	NIM
Belarus	BY	Prof. Nikolai Zhagora	BelGIM
Bulgaria	BG	Mr. Ivan Machulekov Mrs. Pavlina Danailova	BIM SAMTS
Cuba	CU	Dr. Martín Antunez	NC
Georgia	GE	Mr. Alexander Borokhovich	GEOSTM
Germany	DE	Dr. Olaf Kühn	LMET
Kazakhstan	KZ	Mrs. Lubov Galitsyna	KazInMetr
Kyrgyzstan	KG	Mr. Nurgazy Botoyev	CSM
DPR of Korea	KP	Mr. Li Song Han	CIM
Lithuania	LT	Mrs. Kristina Blinkeviciene	VMT
Moldova	MD	Mrs. Elena Hanganu	“Moldova- Standart”
Romania	RO	Mr. D. Dinu	PE3M
Russia	RU	Dr. Valery Skovorodnikov	VNIIMS
Slovakia	SK	Mrs. Anna Nemečková	SMU
Tajikistan	TJ	Mr. D.Rakhimov Mr. T.Shakirjanov	Tajikstandard
Uzbekistan	UZ	Mr. Sadikov Andrey	SI “CNS Uz”
Ukraine	UA	Dr. Boris Markov	NSC “IM”

## Membership of Subcommittees in TC 2

### SC 2.1 “Harmonization of Regulations and Norms”

**Chairperson:** Dr. Yuri Loukachov (VNIIMS, Russia)

**Membership:**

### SC 2.2 “Technologies of Measuring Devices and Systems in Legal Metrology”

**Chairperson:** Mr. M. Shabanov (BelGIM, Belarus)

**Membership:**

### SC 2.3 “Competence Assessment of Bodies in Legal Metrology”

**Chairperson:** Mrs. Olga Maletskaya (NSC “IM”, Ukraine)

**Membership:**

### SC 2.4 “Legal Metrology Control”

**Chairperson:** Mrs Ruf Genkina (VNIIMS, Russia)

**Membership:**

- Nadezhda Lyakhova, BelGIM, Belarus
- Eduard Rustamyan, ZAO “NIM”, Armenia
- Andrey Sadykov, Uzbekistan
- Ivan Chizhik, Ukraine
- Dr Martin Antunez, NS, Cuba

**COOMET Quality Forum****Chairperson: Dr. Stanislav Musil**

Slovak Institute of Metrology (SMU)

**TC 3.1 “Quality Forum Technical Committee”****Chairperson: Dr. Stanislav Musil**

Slovak Institute of Metrology (SMU)

**Deputy Chairperson:** Mrs. Natalya Muravskaya, VNIIOFI**Secretary:** Mrs. Ekaterina Kromkova, SMU

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Belarus	BY	Mrs. Irina Voytek	BelGIM
Bulgaria	BG	Mrs. Tzvetanka Aleksandrova	BIM
Cuba	CU	Mr. Antonio Lopez	INIMET
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Germany	DE	Dr. Andreas Odin	PTB
Kazakhstan	KZ	Mrs. Aigerym Raissova	KazInMetr
Kyrgyzstan	KG	Mrs. Liliya Dikambaeva	CSM
DPR of Korea	KP	Mr. Seung Myong Song	CIM
Lithuania	LT	Mrs. Irena Lazdauskaitė	VMT
Moldova	MD	Mr. Sergey Chapa	INSM
Romania	RO	Mr. Dragos Boiciuc	INM
Russia	RU	Dr. Nataly Muravskaya	VNIIOFI
Slovakia	SK	Dr. Stanislav Musil	SMU
Uzbekistan	UZ	Mr. Jahongir Abduqodirov	“UZSTANDARD” Agency
Ukraine	UA	Mrs. Viktoriya Postnikova	NSC “IM”

**Observers of TC:**

**Dr. Andreas Odin** (PTB, Germany)

**Mrs. Irena Lazdauskaitė** (VMT, Lithuania)

**Honorable members of TC:**

**Dr. Vladimir Belotserkovsky** (Rostechregulirivanie)

**Prof. Matej Bily** (SMU, Slovakia)

**Subcommittees in TC 3.1**

<b>SC 3.1 “NMI Quality Management Systems”</b>
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**Membership:**

- Nuris Valdes, INIMET, Cuba

## TC 4 “Information and Training”

**Chairperson: Dr. Pavel Neyezhnikov**

National Scientific Centre “Institute of Metrology” (NSC “IM”)

**Secretary: Mrs. Yuliya Bunyayeva** (NSC “IM”)

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**Chairperson of SC 4.1**  
**“COOMET development based on analysis of international experience”** Dr. Pavel Neyezhnikov  
 (NSC “IM”, Ukraine)

**Chairperson of SC 4.2**  
**“Information and Information Technology”** Dr. Vitaly Bigayev  
 (VNIIFTRI, Russia)

**Chairperson of SC 4.3**  
**“Training and raising proficiency level of experts”** Dr. Viktor Ivanov  
 (VNIIMS, Russia)

**Chairperson of SC 4.4**  
**“Coordination of work with young metrologists of COOMET Member Countries”** Mr Vladimir Lobko  
 (BelGIM, Belarus)

**Chairperson of SC 4.5**  
**“Support in developing basic metrology infrastructure of COOMET Member Countries”** Mr Dauren Sharipov  
 (KazInMetr, Kazakhstan)

Country		Contact person (TC member)	NMI
Azerbaijan	AZ	Mr. Talat Mustafaev Mr. Orkhan Iskandarov	“AZSTANDARD” Committee
Armenia	AM	Ms. Narine Oganyan	NIM
Belarus	BY	Mrs. Lidia Astafijeva	BelGIM
Bulgaria	BG	Mrs. Tzvetanka Aleksandrova	BIM
Cuba	CU	Mr. Fernando Arruza	INIMET
Georgia	GE	Mr. Shota Gloveli	GEOSTM
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Kazakhstan	KZ	Mrs. Karlygash Sattybayeva	KazInMetr
Kyrgyzstan	KG	Mrs. Liliya Dikambaeva	CSM
DPR of Korea	KP	Mr. Jin Gyong Man	CIM
Lithuania	LT	Mrs. Kristina Blinkeviciene	VMT
Moldova	MD	Mrs. Elena Hanganu	“Moldova- Standart”
Romania	RO	-	-

Russia	RU	Mr. Viktor Ivanov	VNIIMS
Slovakia	SK	Dr. Stanislav Ďuriš	SMU
Tajikistan	TJ	Mr Said Mavlonov Mr. Farhod Shukurov	Tajikstandard
Uzbekistan	UZ	Mr. Rustam Djabbarov	SI "CNS Uz"
Ukraine	UA	Dr. Pavel Neyezhmakov	NSC "IM"

### Membership of Subcommittees in TC 4

#### SC 4.1 "COOMET development based on analysis of international experience"

**Chairperson:** Dr. Pavel Neyezhmakov, Head of COOMET Secretariat  
National Scientific Centre "Institute of Metrology" (NSC "IM")

**Membership:**

Country		Contact person (SC member)	NMI
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Uzbekistan	UZ	Prof. Ortagoli Hakimov	SI "CNS Uz"
Moldova	MD	Mr. Yriy Friptulyak	NISM
Tajikistan	TJ	Mr Said Mavlonov	Tajikstandard
Ukraine	UA	Dr. Pavel Neyezhmakov	NSC "IM"

#### SC 4.2 "Information and Information Technology"

**Chairperson:** Vitaly Bugayev, VNIIFTRI, Russia

**Membership:**

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Cuba	CU	Dra C Ysabel Reyes	INIMET
Kazakhstan	KZ	Mrs. Lubov Galitsyna	KazInMetr
Moldova	MD	Mrs. Elena Hanganu	"Moldova- Standart"
		Mr. Yuri Friptuleak	NISM

Tajikistan	TJ	Mr Said Mavlonov	Tajikstandard
Uzbekistan	UZ	Mr. Mahmud Kaumov	SI “CNS Uz”

### SC 4.3 “Training and raising proficiency level of experts”

**Chairperson:** Viktor Ivanov, VNIIMS, Russia

**Membership:**

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Cuba	CU	Mr. Luis Gonzalez	INIMET
Kazakhstan	KZ	Mrs. Lubov Galitsyna	KazInMetr
Tajikistan	TJ	Mr. Farhod Shukurov	Tajikstandard
Uzbekistan	UZ	Mr. Latipov Vafo	SI “CNS Uz”

### SC 4.4 “Coordination of work with young metrologists of COOMET Member Countries”

**Chairperson:** Mr Vladimir Lobko, BelGIM, Belarus

**Membership:**

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Georgia	GE	Mr. Malkhaz Lashauri	GEOSTM
Germany	DE	Mr. Thorsten Dziomba	PTB
Kyrgyzstan	KG	Mr. Niyaz Asylbayev	CSM
Moldova	MD	Mrs Marina Gavrilovich	“Moldova- Standart”
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Tajikistan	TJ	Mr. Farhod Shukurov	Tajikstandard
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Ukraine	UA	Mrs. Yuliya Bunyayeva	NSC “IM”

<b>SC 4.5 “Support in developing basic metrology infrastructure of COOMET Member Countries”</b>
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**Chairperson:** Mr Dauren Sharipov, KazInMetr, Kazakhstan

**Membership:**

Country		Contact person (SC member)	NMI
Azerbaijan	AZ	Mr. Garalov Movlud Nasreddin oglu	“AZSTANDARD” Committee
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Georgia	GE	Ms. Nino Mikanadze	GEOSTM
Germany	DE	Mrs. Annette Kögler	PTB
Kazakhstan	KZ	Mr. Dauren Sharipov	KazInMetr
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Moldova	MD	Mr. Sergey Chapa	NISM
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Uzbekistan	UZ	Mr. Mahmud Kaumov	SI “CNS Uz”
Ukraine	UA	Dr. Pavel Neyezhmakov	NSC “IM”
		Mrs. Yuliya Bunyayeva	NSC “IM”

## List of Acronyms

Acronym	Country	Name
“AZSTANDARD” Committee	Azerbaijan	State Committee on Standardization, Metrology and Patents of the Republic of Azerbaijan
“Moldova-Стандарт”	Moldova	Service of Standardization and Metrology of the Republic of Moldova
“UZSTANDARD” agency	Uzbekistan	Uzbek Agency for Standardization, Metrology and Certification
BAM	Germany	Bundesanstalt für Materialforschung und –prüfung
BelGIM	Belarus	Belarusian State Institute of Metrology
BIM	Bulgaria	Bulgarian Institute of Metrology General Directorate “National Centre of Metrology” General Directorate “Measures and Measuring Instruments”
CENTIS	Cuba	Center of Isotopes
CIM	DPR of Korea	Central Institute of Metrology
DP NDI “Systema”	Ukraine	The State Enterprise “Scientific Research Institute for Metrology of Measurement and Control Systems”
GEOSTM	Georgia	Georgian National Agency for Standards, Technical Regulations and Metrology
INIMET	Cuba	The National Research Institute on Metrology
INM	Romania	National Institute of Metrology
INSM	Moldova	National Institute of Standardization and Metrology
KazInMetr	Kazakhstan	Republic State Enterprise “Kazakhstan Institute of Metrology”
KTU MI	Lithuania	Metrology Institute at Kaunas Technology University
LEI	Lithuania	Lithuanian Energy Institute
LMET	Germany	Thuringian State Bureau for Metrology and Verification
NC	Cuba	The Cuban National Bureau of Standards
CJSC “NIM”	Armenia	The Ministry of Economy of Republic of Armenia National Institute of Metrology
CSM	Kyrgyzstan	Center for Standardization and Metrology under the ministry of economic regulation of the Kyrgyz Republic
NSC “IM”	Ukraine	National Scientific Centre “Institute of Metrology”
PFI	Lithuania	Institute of Semiconductor Physics
PTB	Germany	Physikalisch-Technische Bundesanstalt

<b>Acronym</b>	<b>Country</b>	<b>Name</b>
SI “CNS Uz”	Uzbekistan	The State Institution “Centre of National Standards of Republic of Uzbekistan”
SKS “KazInMetr”	Kazakhstan	South-Kazakhstan subsidiary of Republic State Enterprise “Kazakhstan Institute of Metrology”
SMU	Slovakia	Slovak Institute of Metrology
Tajikstandard	Tajikistan	Agency on standardization, metrology, certification and trading inspection
Ukrmetrteststandard	Ukraine	All-Ukrainian State Scientific and Research Center of Standardization, Metrology, Certification and Consumer Protection
UNIIM	Russia	Urals Scientific Research Institute of Metrology
VMC	Lithuania	Vilnius Metrology Centre
VMT	Lithuania	State Metrology Service
VNIIFTRI	Russia	All-Russian Scientific Research Institute of Physicotechnical Measurements
VNIIM	Russia	All-Russian Scientific Research Institute of Metrology named after D.I. Mendeleev
VNIIMS	Russia	All-Russian Scientific Research Institute of Metrological Service
VNIIOFI	Russia	All-Russian Scientific Research Institute of Optical and Physical Measurements
VNIIR	Russia	All-Russian Scientific Research Institute of Flowrate Measurement
WKS “KazInMetr”	Kazakhstan	Western-Kazakhstan subsidiary of Republican State Enterprise “Kazakhstan Institute of Metrology”

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The edition was prepared by COOMET Secretariat.  
Published in Russian and English. Number of copies in English 25.  
Kharkov, 31 March 2010

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