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30 YEARS TO COOMET: RESULTS AND PROSPECTS OF COOPERATION

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The history of Euro-Asian Cooperation of State Metrological Institutions (COOMET) began three decades ago, on June 12, 1991, when the COOMET Memorandum of Understanding was signed. COOMET is an officially recognized regional organization on metrology, as well as a regional organization on legal metrology. Cooperation in COOMET allows its member countries to successfully solve urgent metrological problems facing the national economies in the context of market globalization, as well as to integrate into the international metrological system. This article briefly reviews the history of COOMET and its major achievements. An assessment of the COOMET effectiveness is given, and promising directions of COOMET development are outlined.

Keywords: metrology, national metrology institute, measurement standard, calibration and measurement capabilities, comparisons, legal metrology.

History of COOMET and its members. On June 12 in 1991, in Warsaw, the COOMET Memorandum of Understanding marked the appearance of the Regional Metrology Organization (RMO)–COOMET as an organization of national metrology organizations of Central and Eastern Europe. COOMET is an abbreviated form for Cooperation in metrology.

COOMET was established during the period of dissolution of the Council for Mutual Economic Assistance (Comecon). The 37th meeting of the Metrology Section of the Comecon Standing Committee on Standardization in Ulan Bator (June 1990) supported the proposal for a radical restructurization of cooperation, the main content of which had been the autonomy of cooperation in metrology (apart from cooperation in standardization) at the level of national state metrology institutions. This decision had been preceded by a great deal of work by metrologists in the Comecon countries aimed at developing a new form of cooperation in the context of imminent social and political changes and an inevitable dissolution of Comecon [1]. This explains the urgency of creating an RMO to preserve the accumulated experience, strong professional ties between participating organizations, and personal contacts of specialists. The desire to continue fruitful cooperation in the field of metrology became the driving force in the preparation and approval of the constituent documents of COOMET.

Initially, the COOMET Memorandum of Understanding was signed by 5 countries – Bulgaria, Poland, Romania, the USSR, and Czechoslovakia. However, 2 weeks later, the dissolution of Comecon was announced.

At the suggestion of the Chairman of the Section on Metrology V. I. Belotserkovsky, whose proposal was supported by the representatives of other countries, Deputy Chairman of the Polish Committee for Standardization, Measures, and Quality Z. Referovski was entrusted with the task of coordinating the organization of future multilateral cooperation and the creation of an RMO. The candidacy of Referovski was not accidental due to his ample experience as the Deputy Director of the International Bureau of Legal Metrology (BIML), which made him aware of the situation in the field of international cooperation in metrology. In addition, Referovski maintained strong contacts with representatives of numerous international and regional metrological organizations, was fluent in many foreign languages, and was an active advocate of developing

TABLE 1. Dynamics of Membership in COOMET

Number of members	Date of joining, d.m.y	Country
5	12.06.1991	Bulgaria, Poland, Romania, USSR, Czechoslovakia
7	13.11.1991	Germany, Cuba
8	02.06.1992	Ukraine
9	08.12.1992	Belarus
9	17.03.1993	Slovakia (for Czechoslovakia), Russia (as the assignee of the USSR)
10	04.04.1995	Lithuania
11	24.04.1997	Moldova
12	11.11.1998	Kazakhstan
12*	25.05.2000	Kyrgyzstan
13	06.05.2002	North Korea
14	27.05.2004	Uzbekistan
15	04.09.2006	Georgia
17	24.04.2007	Azerbaijan, Armenia
18	18.11.2009	Tajikistan
19	05.06.2013	Bosnia and Herzegovina
20	16.04.2014	Turkey
21	20.04.2016	China

* Since June 2000, Poland terminated its membership in COOMET, limiting itself to cooperation in EUROMET (currently EURAMET).

TABLE 2. COOMET Presidents and Heads of Secretariat

Years	Country	President	Head of Secretariat
1991–1994	Poland	Z. Referovski	M. Klyarner-Snyadovska
1994–1998	Slovakia	R. Spurny	E. Kromkova
1998–2001	Russia	V. Belotserkovsky	B. Gorshkov
2001–2007	Belarus	N. Zhagora	L. Astafieva
2007–2012	Ukraine	G. Sidorenko	P. Nyezhamkov
2012–2018	Russia	V. Krutikov	S. Komissarov
2018 to present	Belarus	V. Hurevich	N. Liakhova

cooperation between metrologists from Eastern and Central Europe. Z. Referovski was elected the first President of COOMET and, after completing his term, was awarded the title of Honorary COOMET President for his great contribution [2].

The subsequent increase in the number of COOMET members was associated with the collapse of the USSR and, to a large extent, with the growing international recognition of COOMET activities.

In 2000, the expanding geographical boundaries of COOMET led to its renaming as the Euro-Asian Cooperation of National Metrological Institutions. As a result, a number of associate members from Asian COOMET countries received the status of full members and joined the RMO (Table 1).

In 1994, the functions of the presiding country in COOMET were transferred from Poland to Slovakia. The subsequent chronology of chairmanship in COOMET is shown in Table 2. Each presiding country has contributed greatly to improving the efficiency and international recognition of COOMET.

TABLE 3. Membership in COOMET and the Metre Convention

No.	Country	Membership in COOMET, year of signing the Memorandum	Participation in the Metre Convention, year of signing
1	Azerbaijan	Full member, 2007	Associate member of CGPM, 2015
2	Armenia	Full member, 2007	–
3	Belarus	Full member, 1992	Metre Convention member, 2020
4	Bulgaria	Full member, 1991	Metre Convention member, 1911
5	Bosnia and Herzegovina	Associate member, 2013	Associate member of CGPM, 2011
6	Germany	Associate member, 1991	Metre Convention member, 1875
7	Georgia	Full member, 2006	Associate member of CGPM, 2008
8	Kazakhstan	Full member, 1998	Metre Convention member, 2008
9	China	Associate member, 2016	Metre Convention member, 1977
10	North Korea	Associate member, 2002	–
11	Cuba	Associate member, 1991	Associate member of CGPM, 2000
12	Kyrgyzstan	Full member, 2000	–
13	Lithuania	Full member, 1995	Metre Convention member, 2015
14	Moldova	Full member, 1997	Associate member of CGPM, 2007
15	Russia	Full member, 1991	Metre Convention member, 1875
16	Romania	Full member, 1991	Metre Convention member, 1884
17	Slovakia	Full member, 1993	Metre Convention member, 1922
18	Tajikistan	Full member, 2009	–
19	Turkey	Associate member, 2014	Metre Convention member, 1875
20	Uzbekistan	Full member, 2004	Associate member of CGPM, 2018
21	Ukraine	Full member, 1992	Metre Convention member, 2018

The heads of COOMET and its structural bodies (CSBs) had to overcome a number of difficulties on the way of establishing and developing cooperation, in order to turn the organization into a full-fledged member of the international metrological community along with such RMOs as AFRIMETS (Intra-Africa Metrology System), APMP (Asia Pacific Metrology Programme), EURAMET (European Association of National Metrology Institutes), and SIM (Inter-American Metrology System). It is pertinent to note that the COOMET Memorandum of Understanding initially contained a number of provisions, which were not characteristic of other RMOs at that time. For example, the COOMET scope covered not only research, but also legal metrology. This allowed COOMET to obtain the status of a regional organization for legal metrology. Among other distinctive features were the equal status of associate and full members of COOMET, as well as 2 official languages – English and Russian (compared to English in other RMOs) [2].

According to Table 1, COOMET includes national metrological institutions from 21 countries representing various regions. Table 3, along with the status of COOMET membership, contains information on the participation of the members in the Metre Convention.

Development of COOMET activities. In order to meet the highest standards of quality and efficiency, COOMET is continuously working on improving its processes and activities. One of such measures was the formation of a clear organizational structure and the introduction of 3-year development programs. The latter allowed the level and efficiency of cooperation within the RMO to be significantly raised.

At the 10th meeting of the COOMET Committee (Alma-Ata, 2000), in addition to the above-mentioned decision to rename the organization, the institute of COOMET Vice-Presidents was introduced and the COOMET Presidential Council

TABLE 4. Allocation of Responsibilities among the President and Vice-Presidents for 2021–2024

Activity	Name
General supervision over COOMET activities, coordination of cooperation between COOMET and international metrology organizations	COOMET President Valery Hurevich (Belarus)
Cooperation in the field of measurement standards, joint scientific research	COOMET Vice-President Evgeny Lazarenko (Russia)
Cooperation in the field of legal metrology	COOMET Vice-President Frank Lienesch (Germany)
Cooperation in the field of development and assessment of quality management systems	COOMET Vice-President Nino Mikanadze (Georgia)
Cooperation with regional metrology organizations; information and knowledge transfer	COOMET Vice-President Pavel Neyezhnikov (Ukraine)
Cooperation with countries with emerging metrology systems	COOMET Vice-President Zhanat Begaydarov (Kazakhstan)

was established. The Council started to include the President, 4 Vice-Presidents, and the Head of the COOMET Secretariat. Each member of the Council was assigned a set of delegated responsibilities and supervised areas (Table 4).

At the time of its formation, the Presidential Council included the representatives of Belarus, Germany, Russia, Slovakia, and Ukraine, which made it possible to form an active core of COOMET. This core continues to play an important role in organizing COOMET activities, particularly in the periods between COOMET Committee meetings. This core is continuing to function at the present time. In 2018, the representative of Slovakia in the Council was replaced by a representative of Georgia. In 2021, at the initiative of the COOMET President, the representative of Kazakhstan joined the Council. The representative of Kazakhstan was commissioned to coordinate a new COOMET direction – cooperation with countries, whose metrological systems are in a phase of development. The post of a new Vice President was introduced following the results of a questionnaire survey conducted among the COOMET participants in 2021 with the purpose of assessing the satisfaction with the work of the Presidential Council.

The COOMET organizational structure, which was introduced in 2002 in accordance with the COOMET Development Program and the Memorandum of Understanding, implied the creation of structural and working bodies in all areas of cooperation [2]. Such an approach allowed more highly-qualified specialists to be involved in cooperation within COOMET. This structure, with some changes and amendments, has been preserved to this day. Figure 1 shows the organizational structure of COOMET, updated in accordance with the decisions of the 31st meeting of the COOMET Committee (June 15–17, 2021).

COOMET is run by two governing bodies (COOMET Committee and Presidential Council) and 15 COOMET structural bodies (CSBs), which include the Joint Committee for Measurement Standards, all technical committees (TCs) and the Quality Forum. More than 250 specialists from COOMET member countries participate on a permanent basis as members of the COOMET Committee, heads and members of the CSBs, subcommittees (SCs) and working groups (WGs). Taking into account the coordinators and participants of various COOMET thematic projects, about 300 specialists annually participate in cooperation.

Currently, the work of TC 5 “*Joint scientific research in the field of metrology*” has been suspended. However, the authors hope that its work will be resumed in the near future at a new qualitative level, taking into account Task F “*Organization of innovative scientific research in the field of metrology*” of the COOMET Strategy for 2020–2025.

An important criterion for the activity of countries within COOMET is the management of various structural bodies. At present, the representatives of Belarus are in charge of 2 CSBs, Russia – 9 CSBs, Georgia – 1 CSB, Moldova – 1 CSB, and Ukraine – 4 CSBs. This group of countries also includes Germany, which headed TC 2 “*Legal Metrology*” and the Quality Forum for a number of years, Lithuania, whose specialists coordinated the work of TC 1.6 “*Mass and Related Quantities*,” and, of course, Slovakia, whose representatives (M. Bily, S. Musil, and E. Kromkova) stood at the origins of the COOMET Quality Forum and, in fact, were the developers of the entire scheme for assessing quality management systems (QMS) of National Metrology Institutes (NMIs) and designated institutes (DIs) of COOMET member countries. At the 30th meeting of the COOMET Committee in 2020, a decision was made to amend the COOMET Memorandum of Understanding in terms of limiting the term of office of the current CSB chairpersons to 2 four-year periods. The intention was to allow all countries to undergo experience in managing CSBs.

In 2014, this document was updated to include a new classification category “Programs – P,” regulating cooperation policy issues and outlining the short-, medium- or long-term activities of the RMO as a whole or its CSBs.

At present, COOMET functions on the basis of 28 documents, 31 recommendations, 6 programs and 13 information materials, which are posted on COOMET information resources (Euro-Asian Cooperation of National Metrological Institutions: [website]. URL: www.coomet.org, www.coomet.net).

In 2005, the Concept of Cooperation and Related Activities of COOMET was adopted. Considering that 15 years have passed since then, the COOMET Development Program for 2017–2019 announced the need for its updating. However, in 2020, the COOMET Committee made a decision on the inexpediency of developing an updated version of the Concept. The main prerequisite for this decision was the creation in 2018 of a working group to develop a COOMET development strategy (hereinafter the WG for Strategy).

The main goal of the WG for Strategy was preparation of proposals for determining the institutional status of COOMET. The assigned tasks concerned the development of proposals on the following topics: the mission and vision of COOMET; strategic tasks of COOMET; the organizational and legal form of COOMET; funding mechanisms; identification of COOMET assets.

The discussion of issues concerned with changing the institutional status of COOMET and its possible future forms is currently impeded by the ongoing pandemic. Among other questions discussed by the WG for Strategy are the possibility of registration of a legal entity in one of the participating countries and the feasibility of implementing a *permanent* COOMET Secretariat. At present, the scheme of a *rotational* Secretariat is used, when the activities are carried out by specialists of the NMI represented by the President. Some RMOs have already undergone reorganization: EURAMET, WELMEC, and SIM have been registered as legal entities, and discussions are still underway in AFRIMETS and APMP. The WG for Strategy is planning to present the final proposals on a possible institutional status of COOMET in 2022. Any fundamental changes will be effected only under the support of all COOMET members.

In 2020, at the 30th meeting of the COOMET Committee, the following provisions were approved:

COOMET mission: raising the level of metrology development, support and expansion of an integrated measurement infrastructure for countries in the Euro-Asian region and other interested countries in order to promote innovation, competitiveness, trade, consumer safety, sustainability and international recognition in every national metrology institute;

COOMET vision: an efficient, representative, and competent regional metrological organization, recognized by the international community.

At the same meeting, the COOMET Strategy for 2020–2025, a roadmap for its implementation, as well as the COOMET Development Program for 2020–2022, were unanimously adopted. The Roadmap and the Development Program detail measures and actions aimed at improving the activities of COOMET [3].

The COOMET Strategy, developed by the WG for Strategy, is based on 7 strategic objectives:

facilitation of international recognition of national measurement standards;

facilitation of recognition of QMS of the national metrology institutes (NMIs) and designated institutes (DIs) of COOMET member countries;

support of COOMET member countries in gaining the status of membership in the Metre Convention;

facilitation of international practice in legal metrology;

facilitation of advanced training and knowledge transfer in COOMET member countries;

organization of innovative scientific research in the field of metrology;

COOMET internal development and external representation.

The problem of institutional status is inextricably linked with the need to update the fundamental COOMET documents defining membership in the RMO, in order to attract active cooperation within COOMET of all NMIs and DIs. The questions of institutional status and funding COOMET activities are relevant tasks that should be solved by COOMET in the nearest future.

Brief review of COOMET achievements. The global pandemic Covid-19 has led to the reorganization of international cooperation in all fields of science and technology, including metrology. These force majeure circumstances have required transition to remote work within COOMET, which was successfully done in 2020 [3]. The introduction of

videoconferencing into COOMET activities (using the Zoom platform) was a forced step in the context of the pandemic; however, it proved effective in maintaining the ongoing work of the RMO.

In 2019, the meeting of the COOMET Committee was held in the traditional off-line format, while all subsequent meetings of the Committee were either postponed or held online [4]. During 2020–2021, 2 meetings of the COOMET Committee, 3 meetings of the Presidential Council, as well as meetings of almost all CSBs were held using the Zoom platform. Under the auspices of COOMET, webinars were also organized with the participation of a large number of interested specialists from the participating countries:

COOMET webinar to discuss a draft COOMET Strategy for 2020–2025 (July 13, 2020);

COOMET webinar on joint scientific research (September 23, 2020);

COOMET webinar on KCDB 2.0 for TC 1.6 “Mass and Related Quantities,” TC 1.4 “Flow Measurement,” TC 1.5 “Length and Angle” and TC 1.3 “Electricity and Magnetism” (October 8, 2020);

COOMET webinar on the exchange of working experience with KCDB 2.0 for the Chairs of COOMET TCs (January 26, 2021);

COOMET webinar “Role of measurement uncertainty in conformity assessment decisions in legal metrology” (April 6, 2021);

COOMET webinar “30 years to COOMET” (June 15, 2021).

An important condition for the efficiency of COOMET activities is cooperation in all areas of activity. Jointly implemented cooperation projects form the COOMET Work Program, which currently includes 154 topics.

More than 60% of the total number of COOMET projects are devoted to cooperation in the field of measurement standards and the implementation of the Agreement on Mutual Recognition of National Measurement Standards and Certificates of Calibration and Measurement Issued by NMIs (CIPM MRA): key, supplementary, or pilot comparisons (all topics on comparisons form the COOMET Program of Comparisons (COOMET P2), approved annually by the President of COOMET). The Comparison Program is also conducted in an online format on the website www.coomet.org. In total, the Comparison Program (as of 20 June, 2021) includes 93 topics, of which by types of measurements: acoustics, ultrasound, vibration (AUV) – 5, electricity and magnetism (EM) – 9, length (L) – 16, mass and related quantities (M) – 22, flow metering (F) – 2, photometry and radiometry (PR) – 16, physical chemistry (QM) – 12, ionizing radiation and radioactivity (RI) – 3, thermometry and thermal physics (T) – 6, and time and frequency (TF) – 2.

In addition to NMIs and DIs of COOMET member countries, NMIs from Brazil, Great Britain, Ireland, Mongolia, Poland, Saudi Arabia, USA, Thailand, Czech Republic, Switzerland, South Africa, South Korea, as well as the International Atomic Energy Agency (IAEA), participate in COOMET comparisons.

Based on the results of key comparisons, the degree of equivalence of national measurement standards is determined. Data on key comparisons are published in the form of tables and diagrams for each measured quantity and placed in the KCDB database, which is a freely accessible web resource on the website of the International Bureau of Weights and Measures (BIPM) (KCDB, www.bipm.org/kcdb). This information is also presented in the form of scientific articles in BIPM journals, for example [5–9].

COOMET NMIs/DIs provide a list of metrological services – calibration and measurement capabilities (CMC), confirmed by the issuance of appropriate certificates, which are recognized by all CIPM MRA participants.

COOMET member countries are actively involved in the formation of the KCDB database in terms of CMC entries. The share of CMCs of COOMET member countries, published in the KCDB and recognized at the international level, comprises 30%. Directly through COOMET, CMCs are represented by Azerbaijan, Belarus, Georgia, Kazakhstan, Cuba, Russia, Uzbekistan, and Ukraine. Bulgaria, Germany, Slovakia, Bosnia and Herzegovina, Moldova, Lithuania, Romania, and Turkey submit CMCs via EURAMET, China – via ARMR.

As of June 20, 2021, KCDB has published 7624 CMC entries from COOMET member countries, of which 2691 CMC entries were from countries representing them through COOMET. It should be noted that, in terms of the number of CMC entries published in KCDB, such COOMET member countries as Russia, China, and Germany, confidently occupy the first three places among the countries participating in the CIPM MRA Agreement. Table 5 demonstrates the current situation on the number of published CMCs of COOMET member countries.

TABLE 5. CMC Entries by Member Countries

Country	CMC entries	Country	CMC entries
Azerbaijan	31	Cuba	113
Belarus	296	Lithuania	73
Bulgaria	222	Moldova	76
Bosnia and Herzegovina	74	Russia	1802
Germany	1579	Romania	232
Georgia	62	Slovakia	379
Kazakhstan	79	Turkey	591
China	1717	Ukraine	308

The CMC expertise, as well as planning and coordination of regional comparisons, is provided by the Joint Committee for Measurement Standards. This Committee interacts with the Quality Forum, which is responsible for evaluating the QMS of NMIs/DIs. Among the COOMET publications regulating the activities of COOMET within the framework of the CIPM MRA, the following recommendations should be noted:

COOMET R/GM/7:2021 “Procedure for an Intraregional Review of Calibration and Measurement Capabilities of COOMET NMIs and Designated Institutes and an Interregional Review of Calibration and Measurement Capabilities of NMIs and Designated Institutes of Other Regional Metrology Organizations;”

COOMET R/GM/11:2021 “Regulations on Comparisons of Measurement Standards of COOMET National Metrology Institutes and Designated Institutes;”

COOMET R/GM/12:2021 “Rules for Maintaining of the COOMET Program of Comparisons;”

COOMET R/GM/14:2016 “Guidelines for Data Evaluation of COOMET Key Comparisons;”

COOMET R/GM/19:2016 “Guideline on COOMET Supplementary Comparison Evaluation;”

COOMET R/AQ/9:2019 “Recommendation on the Evaluation of Quality Management Systems of National Metrology Institutes/Designated Institutes;”

COOMET R/AQ/13:2019 “Rules and Procedure for the Evaluation of the Quality Management Systems of National Metrology Institutes/Designated Institutes.”

Along with comparisons, the effective functioning of the QMS institutes is an important criterion of confidence in CMC. The Quality Forum as a CSB was established in 2002. The main direction of its activity is the coordination of COOMET activities on the development of QMS, as well as achieving consistency in understanding the requirements of ISO/IEC 17025, ISO 17034 and their implementation in NMIs and DIs of COOMET member countries.

Information about the NMIs recognized within the framework of COOMET QMS and the appointed institutes of the COOMET member countries is given in Tables 6 and 7.

In 2021, a fundamentally new algorithm was implemented for external peer-review audits of the QMS of those NMIs/DIs of Russia, Kazakhstan, Belarus, and Ukraine, whose COOMET certificates of recognition were expired. Hybrid inspection of DIs by COOMET auditors and 1–2 technical experts was conducted. Other technical experts participated in external peer review by evaluating the submitted documentation and working with the laboratories of the audited NMIs/DIs online by videoconferencing.

It is important to note that the Joint Committee for Measurement Standards coordinates the work of all COOMET Technical Committees in terms of:

preparation and implementation of the Roadmap for the Implementation of Decisions Related to the Redefinition of the Basic Units of the International System of Units (SI) (COOMET P6/2021 program);

formation and implementation of a plan for the development of COOMET recommendations containing requirements for the calibration of various groups of measuring instruments;

TABLE 6. COOMET Confirmation of QMS Recognition in Accordance with ISO/IEC 17025

NMIs/DIs	Certificate of recognition	Issue date	Expiry date	Types of measurement
VNIIM (Russia)	QSF-R79	04.03.2021	04.03.2026	AUV, EM, L, RI, T, M, QM
VNIOFI (Russia)	QSF-R76	04.03.2021	04.03.2026	PR, QM
VNIIFTRI (Russia)	QSF-R78	04.03.2021	04.03.2026	AUV, EM, RI, T, M, QM, TF
VNIIMS (Russia)	QSF-R75	04.03.2021	04.03.2026	L, EM
BelGIM(Belarus)	QSF-R70	20.11.2020	01.10.2021	AUV, EM, RI, T, M, QM, TF, L, PR
NSC “IM” (Ukraine)	QSF-R68	27.02.2020	01.10.2021	EM, RI, T, M, TF, L, PR
DP “Ukrmetrteststandard” (Ukraine)	QSF-R69	27.02.2020	01.10.2021	AUV, EM, M, L, PR, QM
DP NDI “Systema” (Ukraine)	QSF-R72	20.11.2020	15.02.2022	AUV
INIMET(Cuba)	QSF-R67	20.11.2020	04.10.2023	M, L, QM, T, TF
CENTIS-DMR (Cuba)	QSF-R66	20.11.2020	04.10.2023	RI
CPHR (Cuba)	QSF-R65	20.11.2020	04.10.2023	RI
SE Ivano-Frankivskstandardmetrology (Ukraine)	QSF-R73	20.11.2020	04.10.2023	M
KazStandard (Kazakhstan)	QSF-R81	15.04.2021	15.04.2026	M, L, QM, T
NIM (Moldova) (starting from 17.07.2019, CIPM MRA is realized through EURAMET)	QSF-R52	31.01.2018	31.01.2023	EM, T, RI, M, L, PR
GeoSTM (Georgia)	QSF-R74	28.01.2021	04.10.2023	EM, M, T, RI, L
AzMI (Azerbaijan)	QSF-R71	20.11.2020	31.01.2023	T, RI, EM, M

TABLE 7. COOMET Confirmation of QMS Recognition in Accordance with ISO 17034

NMIs/DIs	Certificate of recognition	Issue date	Expiry date	Types of measurement
VNIIM (Russia)	QSF-R80	04.03.2021	04.03.2026	Gases, inorganic solutions, organic solutions, electrolytic conductivity, high-purity substances, food products, advanced materials, coatings, films and nanomaterials
VNIOFI (Russia)	QSF-R77	04.03.2021	04.03.2026	Inorganic solutions, metals and alloys, biological fluids and materials
BelGIM(Belarus)	QSF-R59	02.10.2019	01.10.2021	Gases, pH, electrolytic conductivity
DP “Ukrmetrteststandard” (Ukraine)	QSF-R61	02.10.2019	01.10.2021	Gases, pH, electrolytic conductivity
KazStandard (Kazakhstan)	QSF-R60	02.10.2019	15.02.2022	Gases, pH

development of CSB working programs aimed at implementing the strategic tasks and mission of COOMET, as well as modern tasks of metrology concerned with sustainable development of economy and society;

development of recommendations on ensuring traceability of measurement results/standards in COOMET (topic 812/RU/20, coordinator VNIIM, Russia), etc.

Under the auspices of the Joint Committee for Measurement Standards, the innovative project 825/BY/21 “Development of the COOMET concept on digitalization in the field of metrology” was launched. This topic is relevant for the entire international community, which is particularly evident in the context of the pandemic. In the course of the implementation of this topic, it is proposed to develop a concept for the use of digital technologies in the field of metrology, covering the following aspects:

- use of digital calibration certificates;
- application of FAIR data;
- use of digital technologies in COOMET activities;
- use of cloud technologies in the field of metrology in COOMET member countries;
- development of unified approaches to the creation and maintenance of national information funds in the field of ensuring the uniformity of measurements in COOMET countries.

Within COOMET, cooperation is actively developing in the field of reference materials (RMs) of composition and properties of substances and materials. The importance of this cooperation is explained by the role of RMs in the system of metrological support of production, testing of products and materials. Created within the framework of joint projects, COOMET RMs can be freely applied in the member countries without additional research in economic, scientific, and technical cooperation [10]. At present, the register and database of COOMET RMs contain information on 117 types of RMs.

Cooperation in the field of legal metrology is coordinated by TC 2 and is based on up-to-date information on modern principles and approaches, international and European norms. TC 2 is aimed at solving a wide range of legal metrology problems associated with harmonization of national requirements in COOMET countries.

At the 31st meeting of the COOMET Committee (2021), the Working Program of TC 2 “Legal Metrology” for 2021–2023 was approved, a significant part of which covers such topics as the translation of publications of the International Organization of Legal Metrology (OIML) into Russian. Thus, the translation of the following documents was carried out: OIML D1:2020, ILAC-G24/OIML D 10:2007, OIML D 11:2013, OIML D 30:2020, OIML D 31:2019, OIML D 32:2018, OIML D 33:2019, OIML R 75-3:2006, OIML R 125:1998, OIML R 137-1/2:2012, OIML R 137-3:2014, OIML G 14:2011.

Currently, the OIML website contains a link to the Federal Information Fund for Ensuring the Uniformity of Measurements in Russia – FSIS *Arshin* (<https://fgis.gost.ru/fundmetrology/registry>), where the interested users can find information about the versions of publications in Russian. The documents translated by COOMET are published on the website of this fund (for example, OIML B 18:2018, OIML G 1-106:2012, OIML R 87:2016, OIML R 79:2015, OIML G 21:2017, etc.). Translations prepared within the framework of COOMET can be further used in the development of COOMET recommendations and/or introduced into the work of COOMET member countries by issuing national normative legal acts or national standards.

In addition, the following COOMET projects are being implemented within the framework of TC2:

716/BY-a/17 Development of rules for setting up reverification and recalibration intervals for measuring instruments used in the field of legal metrology (coordinator – BelGIM, Belarus);

797/BY/19 Review of approaches to the metrological support of medical measuring instruments (coordinator – BelGIM, Belarus);

827/RU/21 Translation of the UNIDO-OIML Brochure “Certification of measuring instruments” (coordinator – VNIIMs, Russia);

844/UA/21 Drawing up a List of adopted rules, guides, recommendations in the field of legal metrology of other RLMOs, which are of interest to COOMET member countries, and agreement on the possibility of their application in COOMET member countries (coordinator – SE “Ukrmetrteststandart,” Ukraine) etc.

COOMET activities in the field of information and training are traditionally carried out along two directions: through the activities of the COOMET Secretariat in terms of maintaining information resources, preparing reports on COOMET activities, coordinating work on updating COOMET publications, ensuring public relations, as well as through TC 4 “Information and Training.” Thus, among the applied tasks of TC4, it is important to note the work related to ensuring the implementation of the CIPM MRA within COOMET, for example, in terms of developing a software application for running the COOMET Comparison Program online). The databases developed by VNIIFTRI (Russia) on COOMET, COOMET RMs, and other topics are of great importance for the participants.

TC4 is also responsible for identifying needs and resources, coordinating work and supporting capacity building activities in the field of training and knowledge transfer, organizing and conducting training events under the auspices of COOMET. This work is regulated through the development of 2-year plans of COOMET training events. Over the entire history of TC 4, more than 100 training sessions have been organized and carried out both by TC 4 and jointly with other CSBs and the COOMET Secretariat.

At the 31st meeting of the COOMET Committee in 2021, the Work Program of TC 4 for 2021–2023 was approved, which, among other things, provides for the following projects:

development of an internal procedure for assessing training needs and planning training events within COOMET (project 829/UA/21; coordinator NSC “Institute of Metrology (IM),” Ukraine);

formation of a list of fundamental documents of international metrological organizations that require translation into Russian and development of a schedule of translations;

development of a methodology for organizing and conducting interactive or e-learning through COOMET web resources and preparation of proposals on the topics of such training;

conducting a survey about the needs of COOMET NMIs concerning personnel training in the format of internships and about the possibilities of such training in the NMIs of COOMET member countries, etc.

COOMET pays much attention to the training and advanced training of metrology specialists. Over the years of cooperation, a new generation of COOMET employees has been raised up, and an experienced highly-professional team has been formed. Today, the COOMET team consists of both young specialists and those who stood at the origins of COOMET traditions. Since 2005, the international competition “The Best Young Metrologist of COOMET” has been held every two years. The 9th International Competition was held online on April 21–22, 2021.

Since its inception, COOMET has been working in close cooperation with international and regional metrological organizations. COOMET is a member of the Joint Committee of Regional Metrology Organizations and the BIPM (JCRB), maintaining close ties with the OIML in accordance with the agreement signed with the BILM in 1993. Cooperation of COOMET with international (CIPM, BIPM, OIML) and regional (AFRIMETS, APMP, EURAMET, WELMEC, SIM, GULFMET) metrological organizations continues, aimed at strengthening business contacts. Thus, in April 2018, a Memorandum of Understanding was signed with EURAMET, the main goal of which is to strengthen the interaction of the two organizations and facilitate the participation of COOMET members in European metrological research programs. At the 55th meeting of the Euro-Asian Council for Standardization, Metrology, and Certification of CIS countries, held in June 2019, an updated Protocol of Cooperation and Interaction in the Field of Metrology with COOMET was signed.

COOMET today is an active participant in the international metrological community, which contributes to both ensuring the uniformity of measurements in the Euro-Asian region and developing national metrological infrastructures of the member countries in accordance with international requirements.

Conclusion. The achievements of COOMET, as an officially recognized RMO and a regional organization for legal metrology, indicate that COOMET carries out large-scale practical work in many areas of cooperation, acting as a forum for metrologists of the Euro-Asian region and other countries.

Cooperation in COOMET allows its member countries to successfully solve metrological problems facing national economies in the context of market globalization, thereby facilitating the international exchange of goods and services.

REFERENCES

1. V. I. Belotserkovsky and B. P. Gorshkov, “COOMET – 15 years of cooperation (the history of creation and results of activities of the Euro-Asian Cooperation of National Metrological Institutions),” *Zakonod. Prikl. Metrol.*, No. 3, 58–62 (2006).
2. V. I. Belotserkovsky and B. P. Gorshkov, “20 years of COOMET – We measure together for a better tomorrow,” *Zakonod. Prikl. Metrol.*, No. 3, 7–12 (2011).
3. V. L. Hurevich and N. D. Liakhova, *Measur. Techn.*, **63**, No. 12, 1012–1018 (2021), <https://doi.org/10.1007/s11018-021-01885-6>.
4. N. Liakhova, *29th COOMET Committee Meeting*, Dresden, Germany, April 3–4, 2019, *OIML Bull.*, **LX**, No. 3, 12–13 (2019).
5. B. Khlevnoy, O. Tarasova, D. Scums, et al., *Metrologia*, **57**, 02002 (2020), <https://doi.org/10.1088/0026-1394/57/1A/02002>.

6. P. Carroll and Iu. Chelidze, *Metrologia*, **57**, No. 1A, 03004 (2020), <https://doi.org/10.1088/0026-1394/57/1A/03004>.
7. A. Aslanyan, E. Aslanyan, E. Oboznyi, et al., *Metrologia*, **57**, No. 1A, 07003 (2020), <https://doi.org/10.1088/0026-1394/57/1A/07003>.
8. A. V. Mingaleev, A. B. Yakovlev, B. Mickan, et al., *Metrologia*, **57**, No. 1A, 07026 (2020), <https://doi.org/10.1088/0026-1394/57/1A/07026>.
9. Kravtsov V. and Mitiurev A., “COOMET supplementary comparison on wavelength for fiber optics,” *Metrologia*, **58**, No. 1A, 02002 (2021), <https://doi.org/10.1088/0026-1394/58/1A/02002>.
10. V. L. Hurevich, “COOMET. Quality of measurements as the focus of attention,” *Mir Izmer.*, No. 3, 14–20 (2019).