The COOMET project 703/UA-a/16 “Analysis of approaches to the metrological control of measuring systems” has been carried out by DP NDI Sistema, Ukraine since 2016. In the course of the implementation of the topic, a questionnaire was developed to study materials on the legislative and regulatory documents of COOMET member countries.

A comparative analysis of the legislative and regulatory framework on the metrological control of measuring systems in COOMET member countries is carried out, the directions, methods and means of metrological control of measuring systems common to COOMET member countries are determined.

The analysis of the legislative and normative-methodological base for metrological control of measuring systems in COOMET member countries showed the following:

Issues of metrological control and supervision of SIT in all COOMET member countries are regulated by laws and government acts. Besides. Metrological control issues are regulated by documents of state metrological services and leading metrological institutes.

At the same time, it should be noted that the issues of metrological control of measuring systems are not highlighted in legislative acts, which is why the specifics of metrological control of measuring systems at the places of implementation and operation are not taken into account.

In addition, the laws of a number of COOMET member countries use the concepts of “metrological supervision” (Azerbaijan), “metrological control and supervision” (Uzbekistan), which slightly distinguishes the metrological control standards of SIT in these countries from the rest.

In general, the areas of distribution of metrological control in COOMET member countries coincide. So, the requirements of metrological control apply to those measurements, the results of which are used in trade operations and mutual settlements between buyers and sellers, in the field of healthcare, in protecting the environment, ensuring safety at the workplace and preventing accidents, when monitoring road safety and evaluating the technical condition of vehicles, in measurements used on behalf of government, arbitration, prosecutors, judicial x bodies, at designated conformity assessment bodies in the military field.

There are certain differences in the forms of metrological control.

So in the Republic of Azerbaijan, state regulation in the field of ensuring the uniformity of measurements is carried out in the following forms:
- approval of the type of reference materials or type of measuring instruments;
- verification of measuring instruments;
- metrological examination;
- state metrological supervision;
- certification of measurement procedures (methods);
- accreditation for activities in the field of ensuring the uniformity of measurements and / or the provision of services, with the exception of state metrological supervision.

In the Republic of Belarus, metrological control includes:
- type approval of measuring instruments;
- metrological certification of measuring instruments;
- verification;
- calibration;
- metrological confirmation of the suitability of measurement procedures. The rules for the implementation of metrological control are established by the State Committee for Standardization of the Republic of Belarus.

In the Republic of Armenia, metrological control includes:
- type approval of measuring instruments;
- verification of measuring instruments;
- metrological examination of measuring instruments.

In the Republic of Kazakhstan, the objects of state metrological control are:
- standards of units;
- measuring instruments;
- measurement procedures;
- the number of packaged goods in packages of any kind during their packaging, sale and import;
- activities of individuals and legal entities to ensure the uniformity of measurements in terms of compliance with metrological rules and norms;
- the amount of goods alienated during the commission of trade operations.
(In principle, the last two objects can be attributed to the category of objects of state metrological supervision).

Metrological control includes:
- tests of measuring instruments,
- metrological certification,
- verification
- calibration of measuring instruments.

In Cuba, metrological control is established in the Metrology Law (Decree Law 183 of Metrology, under review), to guarantee metrological activity, applied to measurements, measuring instruments, quantities of products, prepackaged and prepackaged products, verification and calibration; control marks and metrological supervision.

Metrological control includes:
- type approval of measuring instruments;
- verification of measuring instruments;
- state metrological supervision;
- metrological control of prepackaged goods
- authorization and register of legal persons for the performance of work and (or) the provision of services in the field of legal metrology.

In the Republic of Moldova, metrological control is carried out in accordance with the provisions of the general regulations of legal metrology in the following ways:
- type approval;
- primary verification;
- primary calibration of CE;
- market surveillance.

In the Russian Federation, state regulation in the field of ensuring the uniformity of measurements is carried out in the following forms:
- approval of the type of reference materials or type of measuring instruments;
- verification of measuring instruments;
- metrological examination;
- federal state metrological supervision;
- certification of measurement techniques (methods);
- accreditation of legal entities and individual entrepreneurs for the performance of work and (or) the provision of services in the field of ensuring the uniformity of measurements.

In the **Kyrgyz Republic**, when carrying out measurements related to the sphere of state regulation, approved type measuring instruments that have passed verification are used.

In the **Republic of Uzbekistan**, the objects of state metrological control and supervision are:
- standards;
- measuring instruments;
- test tools;
- standard samples of the composition and properties of substances and materials;
- information and measuring systems;
- measurement procedures;
- other objects provided by the norms and rules of metrology.

State metrological control is carried out in the form of:
- tests and approval of types of measuring instruments;
- metrological certification of measuring instruments, test instruments and measurement procedures;
- verification, calibration of measuring instruments, including standards;
- accreditation of metrological services, centers, laboratories for the right to test,
- verification, metrological certification of measuring instruments and measurement procedures,
- calibration of measuring instruments, testing instruments and other specific types of metrological activity;
- assessment of the quality of measurements, tests and other types of metrological activity.

In the **Republic of Tajikistan**, state metrological control is carried out by the state metrological services of the authorized body in the following forms:
- type approval of measuring instruments;
- verification of conformity of measuring instruments (based on the results of which a verification certificate is issued);
- verification of the use of recommended measurement methods;
- verification of compliance with metrological norms and rules.

In **Ukraine**, the concept of “metrological control” is not explicitly available in the legislation. The concept of “legally regulated measuring instruments” has been introduced, which is subject to conformity assessment with the requirements of the Technical Regulations upon commissioning with the issuance of a type approval certificate and verification during operation.

For measuring instruments that do not fall within the scope of legal metrology, a procedure for assessing compliance with regulatory requirements on a voluntary basis is allowed. Verification of measuring instruments that are not used in the field of legally regulated metrology and are in
operation, produced on a voluntary basis. Means of measuring equipment that are used in and / or outside the scope of legislation are subject to voluntary calibration.

The possibility of harmonization of the general directions of metrological control of measuring systems on the basis of the OIML D16 document "Principles of ensuring metrological control" is evaluated.

So, in the international document OIML D 16 “Principles of ensuring metrological control” it is provided that the metrological control system may include the following provisions:

- testing and approval of the type of SIT;
- requirements for installation and installation of SIT;
- verification both primary and during operation;
- requirements for environmental conditions;
- special requirements for the operator and maintenance personnel;
- requirements for the operation of SIT, certification of test equipment.

Thus, it should be recognized that the requirements for metrological control set forth in legislative and regulatory international documents are significantly wider than those in the national documents of COOMET member countries, where metrological control is limited to the technical side of the matter (type approval, verification, examination) and other factors contributing to the improvement of the quality of metrological monitoring of SIT are not taken into account. This circumstance suggests considering and agreeing on the expansion of the concept of “metrological control” in the regulatory documents of COOMET member countries.

The developed recommendations for the metrological control of measuring systems in COOMET member countries can become the main development of the corresponding COOMET publication (new COOMET project 778/UA-a/19 is proposed at present) “Development of COOMET Recommendations “Metrological control of measuring information systems. The main provisions”

In the course of the topic, it is proposed:

- establishing the basic principles of metrological control of measuring information systems.
- establishment and regulation of agreed forms and methods of metrological control of measuring information systems.
- the establishment of the range of metrological characteristics of the measuring channels of measuring information systems, the regulation of the main methods for their determination during metrological control.

The recommendation is supposed to be used in the development of new and revision of the current documentation for measuring information systems to assess the error (uncertainty) of measurement results in order to mutually recognize their results.

COOMET Topic Coordinator 703/UA-a/16
Head of Research and Development Enterprise Scientific Research Institute “System”

A. Krichevets
## COMPARATIVE TABLE
of the forms of metrological control of measuring instruments in COOMET member countries

<table>
<thead>
<tr>
<th>COOMET member countries</th>
<th>type approval</th>
<th>verification</th>
<th>calibration</th>
<th>metrological examination</th>
<th>conformity assessment</th>
<th>certification of measurement procedures</th>
<th>metrological certification of measuring instruments</th>
<th>supervision</th>
</tr>
</thead>
<tbody>
<tr>
<td>Azerbaijan</td>
<td>+</td>
<td>+</td>
<td>-</td>
<td>+</td>
<td>-</td>
<td>+</td>
<td>-</td>
<td>+</td>
</tr>
<tr>
<td>Armenia</td>
<td>+</td>
<td>+</td>
<td>-</td>
<td>+</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Belarus</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>-</td>
<td>-</td>
<td>+</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Kazakhstan</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>+</td>
<td>-</td>
</tr>
<tr>
<td>Kyrgyzstan</td>
<td>+</td>
<td>+</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Cuba</td>
<td>+</td>
<td>+</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>+</td>
<td>-</td>
</tr>
<tr>
<td>Moldova</td>
<td>+</td>
<td>+</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>+</td>
<td>-</td>
</tr>
<tr>
<td>Russia</td>
<td>+</td>
<td>+</td>
<td>-</td>
<td>+</td>
<td>-</td>
<td>+</td>
<td>-</td>
<td>+</td>
</tr>
<tr>
<td>Tajikistan</td>
<td>+</td>
<td>+</td>
<td>-</td>
<td>-</td>
<td>+</td>
<td>-</td>
<td>+</td>
<td>-</td>
</tr>
<tr>
<td>Uzbekistan</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>-</td>
<td>+</td>
<td>+</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Ukraine</td>
<td>+</td>
<td>+</td>
<td>-</td>
<td>-</td>
<td>+</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>