

TERMS OF REFERENCE

FOR THE CREATION OF A NEW COOMET PORTAL

(EXPLANATORY NOTE)

on 38 pages

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1 INTRODUCTION

The COOMET portal is designed to ensure openness and accessibility of information about the activities of the Euro-Asian Cooperation of National Metrological Institutions (COOMET).

The work is aimed at the creation of a single official portal of the Euro-Asian Cooperation of National Metrological Institutions with a domain-specific modern design and a convenient system of content moderation and administration, which allows both authorized and unauthorized Internet users to get any posted information promptly and in a convenient format.

The newly created COOMET portal shall perform the following main tasks:

- Provision of easy and intuitive access of unauthorized users to general information by developing common navigation, adaptive information retrieval mechanism throughout the portal;
- Provision of a comfortable environment for the organization of collective work of authorized users by creating personal accounts to carry out activities within COOMET structural units: meetings, projects, discussions.
- Provision of structured templates to maintain publicly accessible information of the portal;
- Application of single entry and non-duplication principles by using a database and integration cooperation with third party DBs, as well as use of common directories and classifiers;
- Convenient and user-friendly design of navigation elements by using standard icons for actions familiar to users, unified icons for similar operations and hyperlinks for easy navigation both within and beyond the portal;
- Correct display of the portal on various devices, including tablets and smartphones;
- Easy and intuitive editing of materials posted on the portal by providing editing and content management environment;
- Creation of a unified portal administration system (authorities assignment, access control, backup, content import/export and other administrative functions);
- Filling of portal sections with materials (data migration), posted in the relevant sections of the current versions of COOMET resources on the Internet.

The following principles shall underpin the creation of a new COOMET portal:

- Common navigation throughout the portal for easy interaction with it;
- Adaptive information retrieval mechanism that makes it possible to search not only in section or subsection materials, but also throughout the whole pool of information in the publicly accessible part of the portal;
- Unification of system of information and graphic material presentation: page templates, fonts, styles and design elements;
- Application of common means for the creation and centralized management of the portal structure, and for posting of information materials on the portal – content management system;
- Creation of a unified portal administration system to manage users, role model; assignment of authorities to users within a role model, access control, backup, content import/export, view of user activity logs and fulfillment of other administrative functions;
- Cross-browser compatibility: compatibility with all modern versions (and two previous versions) of popular browsers (Google Chrome, Mozilla FireFox, Safari etc.)

The COOMET portal shall provide the following information **for unauthorized Internet users**:

- about the organization, its vision, mission, objectives and fields of cooperation;
- information about COOMET member countries;
- about the organization's structure, participants and activities within the structure;
- historical background of the organization;
- about the fundamental COOMET documents and publications;
- about programs and results of comparisons within COOMET;
- training materials in text and video formats;
- news, including photo and video materials;
- event announcements.

For authorized users the portal shall provide a comfortable environment in which COOMET structural units can work, as well as communicate and discuss any issues arising during their work.

2 ARCHITECTURE OF THE COOMET PORTAL

The COOMET portal shall include the following components:

- Subsystem «External portal»;
- Subsystem «Personal account»;
- Subsystem of content management;
- Subsystem of integration.

The subsystem «External portal» shall ensure functioning of publicly accessible services of the portal, providing information about COOMET activities designed for unauthorized Internet users.

The subsystem «Personal account» shall provide

- the opportunity to maintain information about the work of COOMET structural units;
- data to review the results of work of COOMET structural units;
- the opportunity to discuss various issues in an informal communication environment;
- the opportunity to conduct surveys among the organization's participants.

The subsystem of content management is designed to provide an environment for the maintenance and posting of information on the publicly accessible pages of the portal. The subsystem shall implement posting functions and enable administration of the register of authorized users, maintenance of the role model of portal users, view of portal functioning logs and setting of portal component functioning parameters.

The subsystem of integration shall ensure automatic interaction with external information systems and databases. It is required for prompt submission of information from the BIPM key comparison database (KCDB).

3 FUNCTIONAL REQUIREMENTS

The portal shall be implemented in two views: Russian and English, with the same structure, and shall be adapted for viewing on desktop computers and laptops, and on mobile devices.

3.1 EXTERNAL PORTAL

Publicly accessible information shall be posted on the homepage of the portal and on other pages, navigable from the homepage.

A fixed upper block – "heading" and a lower block – "footer" shall be available on each publicly accessible page of the portal.

In the "footer" of the portal page, there shall be a site map containing a tree of pages, and only sections of the first level shall be shown, with an option of moving to a section by clicking on its name.

An option to review documents, links to which are given in the text of portal pages, shall be implemented by both opening a document in a new browser tab and by downloading it to the user's device.

All pages of the external portal shall contain text, photo and video materials, links to documents and to other portal pages.

All information about the COOMET structure and personalities, available for unauthorized portal users, shall be maintained in the subsystem "Personal account" by authorized users having the appropriate rights. Other information, available for unauthorized portal users, shall be maintained in the subsystem of content management by authorized users having the appropriate rights.

The structure of pages, containing similar information, shall be identical and shall be built from the same information blocks. Page templates shall be laid out at the stage of the portal technical design.

3.1.1 Main sections of the external portal

The COOMET portal shall contain the following main sections:

- Homepage;
- COOMET member countries;
- Information about COOMET;

- Cooperation;
- Subscription to COOMET news;
- Creation and sending of appeals to the secretariat of the organization;
- News;
- Publications;
- Event announcements;
- CMCs and comparisons:
 - Calibration and measurement capabilities;
 - Comparisons;
- Knowledge transfer.

3.1.2 Homepage

The homepage block, showing information about COOMET member countries, shall display flags and country names made in the form of active links to the pages of COOMET member countries.

In addition to the text information about the mission, vision of COOMET and link to the COOMET history page, **the Information about COOMET block** shall contain graphic representation of the COOMET structure (as shown in Fig.1), the modules of which shall be made as active links to the pages of COOMET structural units:

- COOMET Committee;
- COOMET Presidential Council;
- COOMET Secretariat;
- Technical Committees of the 1st level:
 1. Joint Committee for Measurement Standards;
 2. Technical Committee for Legal Metrology;
 3. COOMET Quality Forum;
 4. Technical Committee for Information and Training;
 5. Technical Committee for Prospective Research Areas.
- Appeal Board on Comparisons of National Measurement Standards and CMC Review;
- Task Groups.

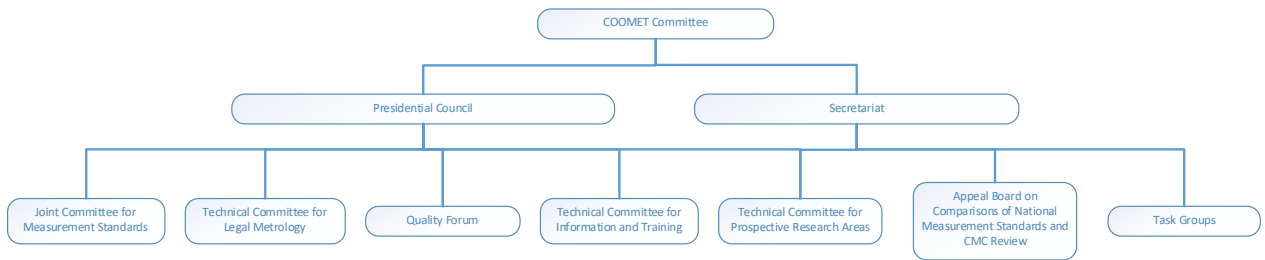


Fig. 1. Flowchart of the COOMET structure.

The "Cooperation" block shall be presented in the form of various text information, which can also generally contain photo and video materials, lists and hyperlinks to third party resources and documents. Information about COOMET liaison organizations can be given as a list of organization names, including their logos. All items of the list shall be made in the form of active links; when clicking on them the user shall be moved to official pages of the organizations on the Internet.

The Subscription to COOMET news block shall offer the unauthorized user an opportunity to enter their email to which they want to receive COOMET news.

The block for creating appeals to the COOMET secretariat shall provide an option of typing a text message and attaching files of specific formats to the appeal, as well as giving the email address to which they want to receive a reply.

3.1.3 News

The news page shall consist of blocks, each containing one news item, including date, heading, text and photo and video materials, as required. There shall be the Subscription to COOMET news block on that page, similar to that on the portal homepage.

This section of the portal shall be maintained in the subsystem of content management.

3.1.4 Event announcements

The event announcements page shall consists of blocks that are similar in structure to news blocks. There shall be a calendar additionally available on that page, showing the current month and two subsequent months, where all announced events are marked. When the user chooses a date on the calendar, they shall be moved to the corresponding event announcement. The calendar shall enable flipping through the past period and future period. The dates of the past events shall be highlighted in a way different from that for the dates of events scheduled for future periods.

This section of the portal shall be maintained in the subsystem of content management.

3.1.5 CMCs and comparisons

The main page of this section shall be in the form of various text information, which can also generally contain photo and video materials, links to documents and internal and external resources.

This section of the portal shall be maintained in the subsystem of content management.

The subsections "Calibration and measurement capabilities" and "Comparisons" shall consist of information about COOMET works and information about the works received from the KCDB through API.

Each of the subsections shall enable users to search, sort and filter the provided data by all visible fields.

Since the registers are maintained by receiving data (updates) using the API of the KCDB, all data shall be in the source language (in English), however for the Russian version of the portal the names of the register columns shall be in Russian.

3.1.6 Knowledge transfer

On this page, all training materials intended for a wide range of users shall be available for view and downloading.

The page shall consist of materials, each of which shall be described by the following characteristics: representation language, heading (topic), brief description (summary), subject field (selected from the directory), file(s)/photos/videos – depending on the form of training material presentation.

This section of the portal shall be maintained in the subsystem of content management.

3.2 PERSONAL ACCOUNT

The personal account is designed to offer an opportunity for authorized users to work, to maintain data necessary for work by COOMET officials, to provide an informal environment to discuss some issues arising during work, in the form of a forum, and to conduct surveys among COOMET participants in the form of a questionnaire.

The personal account shall enable maintenance of registers and lists required both to display information in the public part of the portal, and to support the work of participants of COOMET structural bodies within the organization.

To achieve these goals, the role model shall be implemented and user access rights shall be delimited for work with the portal in accordance with their functions within the role model.

Maintenance of registers shall only be available for authorized users having the corresponding rights. The rights for maintaining information about the work performed within technical committees and for maintaining registers shall be given in the context of technical committees and subcommittees, as well as in the context of registers. The rights shall be assigned in the subsystem of content management.

The following objects shall be formed as part of the information, to which access shall be systemized in the form of registers:

- Register of COOMET participants;
- Register of structural units;
- Register of persons;
- Register of projects;
- Register of reference materials of composition and properties of substances and materials;
- Countries directory;
- List of subject fields;
- Register of survey forms;
- Register of questionnaires.

For all objects, the functions of search, sorting, filtration of existing records, making changes to records, creation/posting and deletion of records, as well as export of lists, generated as a result of imposition of filters and choice conditions, to a file shall be available to users depending on their rights.

Apart from registers, personal account users shall be enabled to discuss different topics and issues in the forum format.

For users with the appropriate rights the function shall be available to draw up survey forms (questionnaires), post them, collect and analyze questionnaire data.

3.2.1 Functional authorization block

To implement this block, a register of portal users shall be maintained in the subsystem of content management.

This block shall provide opportunities for portal user authorization, logging out of the closed part of the portal at the user's command, automatic logging out of users after reaching the time threshold of inactivity in the system.

3.2.1.1 USER AUTHORIZATION

In the context of providing access to the external portal functions, an authorized user is the user who completed identification and authentication.

Users of the subsystem "Personal account" shall be authorized based on the identification information stored in the subsystem of content management.

The facts of authorization with the indication of the user and organization data shall be recorded in the user action log.

3.2.1.2 LOGOUT OF THE SUBSYSTEM «PERSONAL ACCOUNT»

Logout of the subsystem shall be performed at the user's command. After logging out the user shall be redirected to the homepage of the portal.

The fact of logging out of the subsystem shall be recorded in the user action log.

3.2.1.3 AUTOMATIC LOGOUT OF THE SUBSYSTEM «PERSONAL ACCOUNT»

Automatic logout of the subsystem shall be performed when the time of user's inactivity, set in the portal functioning settings, is exceeded. After automatic logout, the user shall be redirected to the homepage of the portal.

The fact of automatic logging out of the subsystem shall be recorded in the user action log.

3.2.2 Role model

For the performance of work of COOMET participants within their interests and for the operation of structural units, a role matrix shall be created and maintained, based on which persons will be provided with access to objects and functions on them within the scope of their competences.

The roles of users of the subsystem "Personal account", formed at the time of drawing up these terms of reference, are given in Table 1.

The role model can be refined at the technical design stage.

Table 1. Roles in the subsystem «Personal account»

No.	NAME	ACTION WITH OBJECTS	FUNCTIONAL AREA
1	Secretariat	<ul style="list-style-type: none"> – Creation; – Change; – Posting; – Deletion 	– Functional block of surveys (questionnaires) maintenance
		<ul style="list-style-type: none"> – Creation; – Change; – Deletion 	<ul style="list-style-type: none"> – Register of COOMET participants; – Register of structural units; – Register of persons; – Register of projects; – Countries directory; – List of subject fields
2	TC Secretary	<ul style="list-style-type: none"> – Creation; – Change; – Deletion 	Only for the specific technical committee, to which the user belongs: <ul style="list-style-type: none"> – Register of structural units
3	TC participant	<ul style="list-style-type: none"> – Creation; – Change; – Deletion 	– Register of structural units (only entry of information about working groups within the TC, to which the user belongs)
4	TC 1.12	<ul style="list-style-type: none"> – Creation; – Change; – Deletion 	– Register of reference materials of composition and properties of substances and materials
5	Forum moderator	<ul style="list-style-type: none"> – Creation; – Change; – Deletion 	– Forum ¹ : sections, subsections, topics
6	COOMET participant	– View	– All registers of subsystem «Personal account»
		<ul style="list-style-type: none"> – Creation; – Change; – Deletion 	– Forum: topics, posts

¹ The scope of responsibilities and the range of objects that can be affected by the forum moderator shall be prepared by the organization and approved in COOMET documents.

3.2.3 Register of COOMET participants

The register of COOMET participants shall enable entry, processing and storage of attributes providing the most comprehensive presentation of national institutes in English and in Russian, while keeping information about the record status, time and author of the changes made.

The default sorting of the register is by COOMET member country.

The register layout shall be prepared at the technical design stage.

3.2.4 Register of structural units

The register of structural units shall enable entry, processing and storage of attributes providing the maintenance of the hierarchical structure of COOMET, as well as personalities, relating to the elements of structural units in English and in Russian, while keeping information about the record status, time and author of the changes made.

The default sorting of the register is by hierarchy level, then – by name.

The register layout shall be prepared at the technical design stage.

The initial data entry shall be at the stage of data migration and shall include all structural units and their content available at the time of migration.

The flowchart of the COOMET structure (see Fig. 1) does not contain any hierarchical links to technical committees of the second level, subcommittees, fields and working groups, which allows changing information about them without affecting the structural flowchart. Thus, entry of the following new structural units by COOMET staff, having the appropriate rights (see Table 1), shall be made possible:

- Technical Committee of the second level;
- Subcommittee;
- Field;
- Working Group;
- Task Group.

In addition to entry of new structural units, it shall be possible to correct the membership (persons) of structural units at all hierarchy levels.

3.2.5 Register of persons

The register of persons shall enable entry, processing and storage of attributes providing the most comprehensive presentation of personalities in English and in Russian, while keeping information about the record status, time and author of the changes made.

The default sorting of the register is by name (field concatenation, patronymic name – if any).

The register layout shall be prepared at the technical design stage.

3.2.6 Register of projects

The register of projects, on which work is performed within COOMET structural units, shall enable entry, processing and storage of attributes reflecting along with the name, project description and its author, field of cooperation, also the most detailed description of partners, interested organizations that are not COOMET members, as well as the schedule of preparation and its results, including information about the registration in the KCDB (for key and supplementary comparisons, if any) in English and in Russian, while keeping information about the record status, time and author of the changes made.

Regarding each project register item, the following status model shall be implemented (see Fig.2):

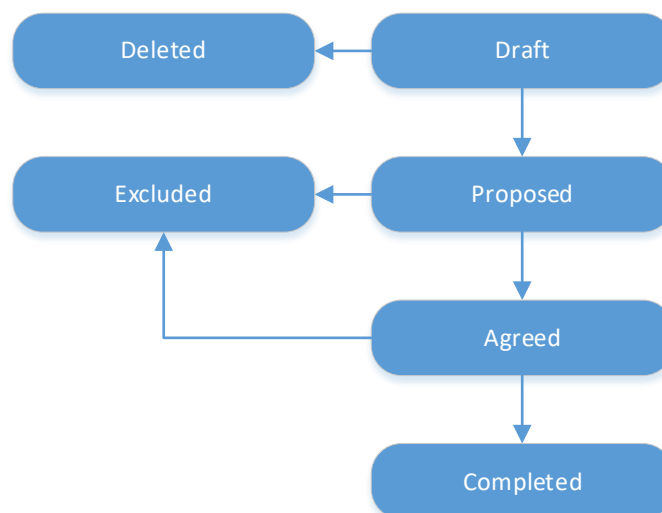


Fig. 2. Status model for project register item

In editing the already posted project register item, the user shall be able to undo the amendments made or to save the record on the portal.

Table 2 lists acceptable actions on the project register item depending on its status.

The default sorting of the register is by date of status assignment (starting from the most recent).

Table 2. Acceptable actions on the project register item depending on its status

NO	STATUS	PROCEDURE FOR STATUS ASSIGNMENT	SET OF ACCEPTABLE ACTIONS
1	Draft	Automatically, when creating a new register item	– View; – Editing; – Deletion; – Posting
2	Deleted	At the user's command. Only for records that were in the «Draft» status	
3	Proposed	Automatically, after posting the record that was in the «Draft» status	– View; – Editing
4	Agreed	At the user's command	– View; – Editing
5	Completed	At the user's command	– View
6	Excluded	At the user's command	– View

3.2.7 Register of reference materials of composition and properties of substances and materials

The register of reference materials of composition and properties of substances and materials, on which work is performed within Technical Committee TC 1.12, shall enable entry, processing and storage of attributes, currently maintained in the register, in English and in Russian, while keeping information about the record status, time and author of the changes made.

The default sorting of the register is by the indicator of exclusion from the register (excluded ones are at the end), then – by name.

3.2.8 Countries directory

To keep information about COOMET participants, a member countries directory shall be maintained. For that purpose the All-Russian Classifier of Countries of the World shall be used, which shall be manually supplemented with the status of a country in COOMET.

The default sorting of the register is by country code.

3.2.9 List of subject fields

To keep information about projects, developed by COOMET participants, the following list of subject fields shall be maintained:

- Acoustics, Ultrasound and Vibration;
- Electricity and Magnetism;
- Flow Measurement;
- Ionizing Radiation and Radioactivity;
- Length and Angle;
- Mass and Related Quantities;
- Photometry and Radiometry;
- Physical Chemistry;
- Thermometry and Thermal Physics;
- Time and Frequency;
- Reference Materials;
- General Questions Concerning Measurements (General Metrology);
- Legal Metrology;
- Quality Management Systems;
- Information and Information Technology;
- Training and Raising Proficiency Level of Experts;
- Improvement of COOMET Performance.

The list of subject fields shall be maintained simultaneously in two languages: in Russian and in English.

Mapping of values of the list to subject fields used in the KCDB, as well as to subcategories available in the DB and comparison types, shall be implemented in the directory. There can be no correlation for the fields that do not involve conduct of comparisons.

3.2.10 Forum

To access the forum functionality, a control element shall be provided in the personal account of the authorized use; the forum main page shall be opened in a new browser tab when the user accesses the control element.

On the main page of the forum there shall be a list of thematic sections (for instance, the main forum with general issues, then- by committees), inside which lists of projects, discussed at the forum within committees/subcommittees/working groups, shall be given. In case of a large number of discussed topics, multi-page layout of the forum main page is possible.

For each thematic section, a moderator shall be appointed from authorized users of the portal. The composition of thematic sections, as well as responsibilities and functional capabilities of the moderator shall be developed by the COOMET responsible staff and set out in organizational documents, after that they will be reflected in implementing the matrix of rights of authorized users.

Portal authorized users shall be able to create topics for discussion and participate in the discussions by publishing their posts in the selected topic.

Post publication shall be possible both in the form of a separate post, and in the form of a reply to one of the previous posts in the selected topic. It shall be possible to attach files to a post, use icons of a "smile" type and standard text formatting functions (for instance, highlighting, font size setting, using of options italics/bold/underlined).

Requirements to attached files shall be prepared at the technical design stage. The forum main page layout and topic templates, including entry of a new topic/post, shall be developed at that stage.

3.2.11 Functional block of surveys (questionnaires) maintenance

The authorized user of the external portal, having the appropriate rights, shall be able to draw up survey forms (questionnaires) to study opinions of COOMET participants on the issues defined in the questionnaire.

To implement the functions related to work with questionnaires, they shall be shown to the user in the form of a register. In addition to standard functions, the user shall be able to get the following statistical data on a questionnaire:

- Number of users, to which the questionnaire was shown;
- Number of users, who completed the questionnaire;
- Number of days of showing the questionnaire.

The following status model shall be implemented for each item of the survey forms (questionnaires) register (see Fig.3):

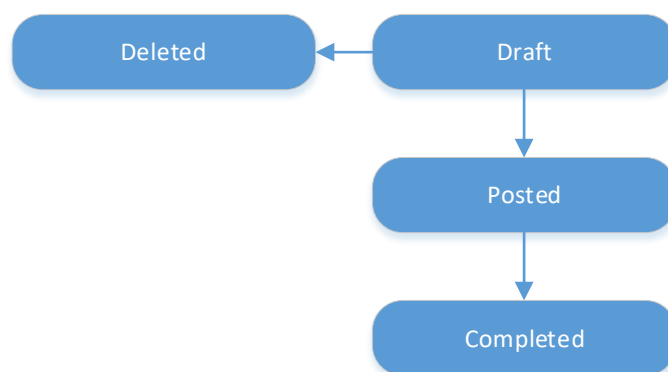


Fig. 3. Status model for items of survey forms (questionnaires) register

Table 3 lists acceptable actions on an item of survey forms (questionnaires) register depending on its status.

Table 3. Acceptable actions on an item of survey forms (questionnaires) register depending on its status

NO	STATUS	PROCEDURE FOR STATUS ASSIGNMENT	SET OF ACCEPTABLE ACTIONS
1	Draft	Automatically, when creating a new register (survey) item	<ul style="list-style-type: none"> – View; – Editing; – Deletion; – Posting
2	Deleted	At the user's command. Only for records that were in the «Draft» status	
3	Posted	Automatically, after posting the questionnaire that was in the «Draft» status	<ul style="list-style-type: none"> – View
4	Completed	At the user's command	<ul style="list-style-type: none"> – View

The register of survey forms (questionnaires) shall enable entry, processing and storage of attributes providing the most comprehensive presentation of survey forms in English and in Russian, while keeping information about the questionnaire posting, record status, time and author of the changes made.

The default sorting is by publication date, drafts first (without publication date).

For each posted survey form (questionnaire) the copies of replies, completed by users, shall be kept. It shall be possible to get statistical information in tabular form based on the replies collected from users, and to upload the data in MS Excel format. The form of presentation of statistical information shall be developed during technical design.

The register of questionnaires shall enable receipt, processing and storage of attributes that make it possible to show most fully not only replies to the questions of a questionnaire, but also information about the users who have completed the questionnaires.

The default sorting is by date of questionnaire completion, most recent first.

3.3 SUBSYSTEM OF CONTENT MANAGEMENT

The subsystem of portal content management is intended for work of portal authorized users.

To implement the functions of the subsystem, a replicable software product shall be selected (content management system (CMS)) in view of the functional requirements below and non-functional requirements in 4.3.

Requirements for the functional authorization block are similar to those in 3.2.1.

3.3.1 Block of role model maintenance

The role model shall be maintained in the context of access to portal subsystems: for the subsystem "Personal account" and for the subsystem of content management.

In order to fill the portal (subsystem "External portal") with content, and to perform administrative management functions, a role matrix shall be created and maintained for the subsystem of content management.

The roles of users of the subsystem of content management, formed at the time of drawing up these terms of reference, are given in Table 4.

The role model can be refined at the technical design stage.

Table 4. Roles in the subsystem of content management

NO.	NAME	ACTION WITH OBJECTS	FUNCTIONAL AREA
1	Editor	<ul style="list-style-type: none"> – Creation; – Change; – Posting; – Deletion 	– Subsystem «External portal» (block of publicly accessible information maintenance)
2	Administrator	<ul style="list-style-type: none"> – Creation; – Change; – Deletion 	– Register of users;

No.	NAME	ACTION WITH OBJECTS	FUNCTIONAL AREA
			<ul style="list-style-type: none"> – Block of maintaining role models of subsystem "Personal account" and subsystem of content management; – Block of setting the parameters of portal functioning
		– View	<ul style="list-style-type: none"> – Error log; – User action log

3.3.2 Register of users

The register shall enable entry, processing and storage of the following attributes of users (in Russian and in English):

- Logical user name (unique in the system);
- Password (shall be unavailable for viewing);
- User:
 - Last name;
 - First name;
 - Patronymic name (if any);
 - Structural unit (multiple choice from the register of structural units);
 - Position;
 - Email address;
 - Role for Forum (optional);
 - Status (active/access is blocked).

The portal shall allow for performing the functions of search, sorting, filtration of existing records, making changes to records, creation/posting and deletion of records, as well as export of files, generated as a result of imposition of filters and choice conditions, to a list.

Users shall be able to change their passwords (with the confirmation of the new password).

When viewing the list of register items, the following attributes shall be displayed to the user:

- Logical user name;
- Full name;

- Structural units
- Role for Forum;
- Status.

The default sorting is by last name.

3.3.3 Block of publicly accessible information maintenance

To maintain information on the portal pages, available for unauthorized users, a content management system (CMS) shall be used.

When referring to the CMS at a certain address on the Internet, the user shall enter a login and password, necessary and sufficient to perform actions in accordance with the user role.

On the CMS navigation panel, portal sections shall be displayed that represent the subsystem "External portal". When accessing the sections, materials currently available on the portal, shall be accessible to the user. Depending on the material type, operations with published materials, options to create and post new materials shall be available to the user.

All actions of users in the CMS shall be registered in the user action log.

To maintain materials, the following templates shall be prepared at the technical design stage:

- Template of page «COOMET Committee»;
- Template of page «COOMET Presidential Council»;
- Template of page «Technical Committee»;
- Template of page «News»;
- Template of page «Event announcements»;
- Template of page «Publications»;
- Template of page «Cooperation»;
- Template of page «Knowledge transfer».

The CMS shall support the following major principles of work with text, photo and video materials:

- Dates shall be entered from the calendar or by putting digits in the interface fields corresponding to the day, month and year;
- Photo materials shall be in the ... format, with a resolution of..., the file with the materials shall not exceed...;

- Video materials shall be in the ... format, with a resolution of..., the file with the materials shall not exceed...;
- Standard text formatting functions shall be available for the user: change of font size, weight, slant, underlining and highlighting (at least 3 colors), right/left, width and center alignment of a text block, entry of unnumbered lists;
- Special control symbols shall be provided to place a hyperlink and file (link to a file) inside the text.

3.3.4 Functional block of automatic logging

The functional block shall enable the automatic generation of the following logs:

- Error log;
- User action log.

Logs shall be generated automatically. Information from logs shall be accessible for view from the subsystem of content management. All actions, except for log record view, shall be forbidden.

The error log shall contain information about errors related to the portal functioning. All exceptions caught shall be recorded in the log. The log shall ensure keeping of the following attributes:

- date/time of the event;
- program component/module where the error occurred;
- text message of the exception.

The user action log shall contain information about the following operations performed by users of the subsystem "Personal account" and subsystem of content management:

- authorization attempt;
- logout of the subsystem, including automatic logout;
- creation of a register entry;
- modification of a register entry, including any change in status;
- deletion of a register entry;
- change of component functioning parameters.

The log shall ensure keeping of the following attributes:

- date/time of the performed operation;

- user (according to the register of users);
- performed operation;
- additional parameters of the operation: register, register item identifier, authorization result etc.

3.3.5 Block of setting portal component functioning parameters

For authorized users of the subsystem of content management with the "Administrator" role, the following portal functioning parameters shall be available for setting:

- Period of inactivity of the authorized user of the subsystem "Personal Account", preceding the automatic logout of the system, in seconds;
- Period of inactivity of the authorized user of the subsystem of content management, preceding the automatic logout of the system, in seconds;
- URL of the KCDB interface to get information;
- ...

The list of settings, available for viewing and editing from the subsystem of content management, can be changed and supplemented at the technical design stage.

3.4 SUBSYSTEM OF INTEGRATION

The system of integration is designed for interaction with related systems.

Data from the international comparison database shall be obtained by calling the corresponding API of the KCDB (<https://api-bipm.timsoft.com/api/kcdb/swagger-ui/index.html?configUrl=/api/kcdb/v3/api-docs/swagger-config#/cmc-search-data-controller/xsdSchema>).

At the technical design stage, the possibility of obtaining data from the KCDB in asynchronous mode shall be considered, and the need for keeping data in the subsystem of integration shall be elaborated in order to provide users with the obtained data in the absence of connection with the KCDB.

At the technical design stage, the principles of obtaining and keeping information, received through integration interaction, shall be defined, and services shall be developed that are required to implement the portal tasks.

Interaction with digital objects of COOMET member countries is a prospect for the portal development and shall be envisaged at subsequent stages of the COOMET resource development, after the requirements for data exchange formats and protocols have been formed and presented on the COOMET portal.

4 NON-FUNCTIONAL REQUIREMENTS

4.1 INFORMATION SUPPORT

The continuity of composition of the information, currently available on the following COOMET websites, shall be ensured on the portal:

- <https://www.coomet.net/>;
- <http://www.coomet.org/>.

All necessary information shall be migrated. The composition of the information to be transferred and its structure shall be defined at the technical design stage.

4.2 LINGUISTIC SUPPORT

Interaction of the user with software components of the portal shall be carried out in Russian and in English.

All documentation, prepared as part of creating a new portal, shall be in Russian. The need for translating the submitted documentation into English shall be decided within the work of the Euro-Asian Cooperation of National Metrological Institutions, and translation shall be made using the resources of COOMET.

4.3 SOFTWARE

The portal software (SW) shall consist of general and special purpose software.

Design solutions, applied in the development of the portal and (selection) of the content management system (CMS), shall ensure the possibility of its further development, upgrade and expansion of its functionality.

It is allowed to use general software (GSW), included in the Unified Register of Russian Programs, in the design and development of the portal for electronic computers and databases, or to use open-source software.

The site shall be implemented in view of the possibility to function under an open-source operating system (OS).

The portal shall use freely distributed software as a content management system (CMS) and database management system (DBMS).

The CMS shall allow posting of all necessary information in a simple and convenient way that does not require special knowledge in the informational and technical field or involvement of specialists in programming.

Special purpose software (SSW) of the portal shall be developed in a high-level programming language.

In developing special purpose software, it is not allowed to use libraries, created by third party developers that require additional paid licensing, and closed-source libraries.

Source codes of the special software shall be provided with comments in Russian or in English sufficient for understanding the logic of the portal software functioning.

4.4 HARDWARE

The hardware of the portal shall include:

- Server infrastructure;
- User work stations.

In order to reduce the total cost of ownership (TCO), the portal server infrastructure shall be deployed using virtualization technology.

To conduct preliminary tests and to test the capabilities of the created portal, the server infrastructure shall be deployed in two circuits: in a test circuit and in a productive circuit. The number and main characteristics of the test circuit servers can be reduced as compared to the productive circuit.

The composition of the server infrastructure and characteristics of virtual servers of the productive and test circuits shall be defined at the technical design stage.

In portal user workplaces, the OS shall be installed that supports functioning of web browsers.

4.5 ORGANIZATIONAL SUPPORT

Following the approval of these terms of reference, organizational documents shall be prepared, which describe rules for (processes of) maintaining publicly accessible information and registers of the portal, and which also reflect the peculiarities of work with the "Forum" section. The provisions of document "Rules of Procedure" shall be revised according to the capabilities and attributes describing the register of projects.

After putting the created portal into commercial operation, the previously valid documents, reflecting the peculiarities of work with the site and portal, shall become invalid.

4.6 NUMBER AND QUALIFICATIONS OF STAFF

The number and qualifications of the portal maintenance staff shall be determined in view of the following requirements:

- portal structure and configuration shall be designed and implemented in such a way as to minimize the number of the maintenance staff;
- software and hardware complex (SHC) of the portal shall not require the formation of shifts of the maintenance staff for round-the-clock service and the permanent presence of staff at the control console.

All information of the portal shall be posted in a simple and convenient way (inter alia, using the CMS) that does not require special knowledge in the informational and technical field or involvement of professional coders.

To ensure operation of the portal, maintenance staff is required, who shall perform the following roles, while not being users of the applied part of the portal:

- specialist of the first line technical support;
- system administrators;
- network equipment engineers;
- information security (IS) engineer;
- SSW administrators.

Role functions of the maintenance staff are given in Table 5.

Table 5. Role functions of the maintenance staff

ROLE	ROLE FUNCTIONS
Specialist of the first line technical support	<ul style="list-style-type: none"> – receipt and processing of user requests; – answers to questions on the portal operation; – assignment of a category to the request and their distribution among the appropriate specialists
System administrator, virtual infrastructure administrator	<ul style="list-style-type: none"> – administration of the virtual infrastructure of the portal SHC; – monitoring of operation of the virtual infrastructure of the portal SHC; – administration of the GSW; – recovery of portal components after failure.
Network equipment engineer	<ul style="list-style-type: none"> – maintenance of the portal network infrastructure;
IS engineer	<ul style="list-style-type: none"> – management (administration) of the portal information security system; – incident identification and responding to them; – management of the information security system configuration; – control (monitoring) of the security level of information contained on the portal;
SSW administrator	<ul style="list-style-type: none"> – control of correct operation of the portal SSW; – update of versions of the portal SSW; – generation of reports on the portal operation

Combination of any roles is not recommended. Outsourcing of several functions is possible.

Staff activities on the operation of portal components shall be regulated by job descriptions.

Specialized staff training or control of their knowledge and skills is not foreseen.

The software and hardware complex of the portal shall not require the formation of shifts of the maintenance staff for round-the-clock service and the permanent presence of staff at the control console.

4.7 PURPOSE INDICATORS

The COOMET portal shall provide for uninterrupted operation with the following purpose indicators:

- number of concurrent authorized users of the internal portal is 5 persons;
- number of concurrent unauthorized users is 1000 persons;
- time for information retrieval at the user's request is no more than 5 seconds;
- external portal response time when performing operations on navigation and display of statistical information with the above number of concurrent users is no more than 3 seconds.

4.8 RELIABILITY

The software and hardware complex (SHC) shall ensure functioning of the portal 24 hours a day, 7 days a week, 365/366 days a year, with breaks for routine maintenance.

Routine maintenance in terms of backing up data shall not require shut down of portal components.

Routine maintenance in terms of installing updates of the general and special purpose software shall not result in breaks in the portal operation of more than 5% of annual operation time.

Routine maintenance of the portal hardware shall be in accordance with the requirements and instructions, established by hardware manufacturers.

The portal shall remain operational and recover its functions in the following extraordinary situations:

- in case of electrical power failure in the hardware of the SHC, resulting in the OS reboot, recovery of the operation of portal components shall occur after the OS restart and running of the executable file of the component;
- in case of errors in the operation of the SHC hardware (except for data and program storage), recovery of the operation of portal components rests on the OS;
- in case of errors related to the software of the SHC (OS and device drivers), performance restoration rests on the OS.

The portal shall enable correct handling of emergency situations, caused by improper actions of users, a wrong format or invalid input data. In the specified cases, the portal SW shall give the appropriate messages to the user and record them in the appropriate logs, after that it shall return to the operating condition that was before the incorrect (unacceptable) command or incorrect data entry.

In case of failures in the operation of the SHC hardware, recovery of the normal operation of portal components shall take place after:

- reboot of the operating system;
- running of the executable file of the component and re-entry of the lost data.

4.9 ERGONOMICS

User interaction with the portal shall be via a graphical user interface (GUI). The portal interface shall be intuitive and convenient, shall not be overloaded with graphic elements and shall enable quick display of screen forms. Navigation elements shall be in a user friendly form. Tools for editing information shall comply with the adopted arrangements in terms of using functional keys, operation modes, search, window system. Input/output of data of the portal, reception of control commands and display of results of their execution, shall be in an interactive mode. The interface shall meet today's ergonomic requirements and provide easy access to the portal major functions and services.

The portal structure shall be common to the Russian and English areas of the portal.

The interface shall be designed to use primarily a manipulator of the "mouse" type or a touchpad for mobile devices, thus the portal shall be managed with a set of screen menus, buttons, icons and similar elements. The keyboard input mode shall be primarily used in filling and/or editing text and number fields of screen forms when working with the content management system.

The portal shall be optimized for viewing with resolutions of 1366*768, 1920*1080, 3840*2160 without a horizontal scrollbar and without empty (white) fields for main resolution types, and also for viewing on mobile devices without the need for continuous image scaling to get readable text and provide navigation. Scrolling of blocks shall be avoided when scrolling the page, and manageable scaling shall be enabled in changing page display scale by means of a browser or in using non-standard screen sizes and their resolutions.

The web interface of portal components shall be correctly displayed on various mobile devices, including tablets and smartphones. The mobile version shall be optimized for the most common models of smartphones at the time of development.

All inscriptions of screen forms, as well as messages displayed to the user (except for system messages) shall be in Russian and in English in accordance with the portal version used by the user.

Screen forms of individual components shall be designed in view of unifications requirements:

- all screen forms of the user interface shall be made in a common graphic design, with the same arrangement of the main control and navigation elements;

- similar graphic icons, buttons and other control (navigation) elements shall be used for similar operations. Terms used for standard operations (add informational entity, edit data field) and sequence of user actions shall be unified;
- external behavior of similar interface elements (response to hovering the mouse pointer, focus switching, pressing a button) shall be similarly implemented for identical elements.

4.10 OPERATION

A group of specialists shall be established or invited, who understand the logic and processes of the portal operation, automated processes and processes of integration with the related systems (management team), to conduct operation.

As part of the operation conduct, the management team shall arrange for diagnostics of failures occurring during operation, fixing of detected errors, implementation of improvements, optimization and adaptation of the developed functionality in accordance with change requests and incidents arising during operation.

The timeframe for incident elimination and making changes shall be determined depending on the criticality of the incident and on the labor intensity of making the requested changes, for which purpose an operating regulation should be prepared that includes a service level agreement (SLA).

4.11 PROTECTION OF INFORMATION AGAINST NON-AUTHORIZED ACCESS

The portal shall be resistant to DDoS attacks.

The protection of information against non-authorized access shall be achieved through:

- mechanisms (ways) of user authentication;
- protection of user identification information, stored and processed on the portal;
- control of rights of access to protected resources and information;
- minimization of access rights;
- mechanisms (ways) of the portal authentication when interacting with external information systems;
- maintenance of the integrity of information, transferred/received via communication channels;

- backup and recovery;
- control of integrity of processed and technological data of the portal;
- mechanisms for security event logging;
- antivirus protection.

Information on the portal shall be protected from loss and unauthorized access at the stages of its transfer and storage.

5 REQUIREMENTS FOR THE COMPOSITION AND CONTENT OF WORKS ON THE PREPARATION OF THE AUTOMATION OBJECT FOR LAUNCHING THE PORTAL

To ensure launching of the portal, the following activities shall take place:

- preparation of the server infrastructure of the test circuit, including:
 - deployment of virtual servers of the test circuit;
 - deployment and configuration of the general software;
 - deployment and configuration of the special purpose software;
- preparation of the server infrastructure of the productive circuit, including:
 - deployment of virtual servers of the productive circuit;
 - deployment and configuration of the general software;
 - deployment and configuration of the special purpose software;

Before putting the portal into permanent operation, data migration shall be performed, in addition to meeting the requirements for organizational support.

The organization shall adopt documents, describing the rights and obligations of COOMET officers regarding the performance of roles on the portal, including work of the forum of the subsystem "Personal account".

6 DOCUMENTATION REQUIREMENTS

In the course of work, the following documents shall be prepared:

- Explanatory note to the technical design;
- User manual;
- Administrator manual;

All the above documents shall be prepared in Russian in electronic form. At the decision of the authorized COOMET body, the documents can be translated into Russian by COOMET participants.

The software source codes shall be provided with comments sufficient for understanding the logic of the software functioning. The software source codes shall have instructions for assembling executable modules.