GUIDE

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Guide to the use of online technology for conducting CEEMS activities in a post-COVID world

Guide pour l'utilisation des technologies en ligne pour la conduite des activités des CEEMS dans un monde post-COVID

OIML

ORGANISATION INTERNATIONALE
DE MÉTROLOGIE LÉGALE

INTERNATIONAL ORGANIZATION
OF LEGAL METROLOGY

Contents

Foreword

The International Organisation of Legal Metrology (OIML) is a worldwide, intergovernmental organisation whose primary aim is to harmonise the regulations and metrological controls applied by the national metrological services, or related organisations, of its Member States.

The main categories of OIML publications are:

- **International Recommendations (OIML R)**, which are model regulations that establish the metrological characteristics required of certain measuring instruments and which specify methods and equipment for checking their conformity. OIML Member States shall implement these Recommendations to the greatest possible extent;

- **International Documents (OIML D)**, which are informative in nature and which are intended to harmonise and improve work in the field of legal metrology;

- **International Guides (OIML G)**, which are also informative in nature and which are intended to give guidelines for the application of certain requirements to legal metrology; and

- **International Basic Publications (OIML B)**, which define the operating rules of the various OIML structures and systems.

OIML Draft Recommendations, Documents and Guides are developed by Project Groups linked to Technical Committees or Subcommittees which comprise representatives from OIML Member States. Certain international and regional institutions also participate on a consultation basis. Cooperative agreements have been established between the OIML and certain institutions, such as ISO and the IEC, with the objective of avoiding contradictory requirements. Consequently, manufacturers and users of measuring instruments, test laboratories, etc. may simultaneously apply OIML publications and those of other institutions.

International Recommendations, Documents, Guides and Basic Publications are published in English (E) and translated into French (F) and are subject to periodic revision.

Additionally, the OIML participates in Joint Committees with other Institutions for the development of **Vocabularies (OIML V)** and **Joint Guides** and periodically commissions legal metrology experts to write **Expert Reports (OIML E)**. Expert Reports are intended to provide information and advice, and are written solely from the viewpoint of their author, without the involvement of a Technical Committee or Subcommittee, nor that of the CIML. Thus, they do not necessarily represent the views of the OIML.

This publication – reference OIML G 23:2022 (E) – was developed by the CEEMS Advisory Group (CEEMS AG). It was approved for final publication by the President of the International Committee of Legal Metrology in January 2023.

OIML Publications may be downloaded from the OIML website in the form of PDF files. Additional information on OIML Publications may be obtained from the Organisation's headquarters:

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Explanatory note

This OIML Guide began life as a response to the decision by the OIML's CEEMS Advisory Group at its October 2020 meeting that it should draw up a strategy for the application of online technology to capacity building and other CEEMS activities[1]. In practice the situation has changed rapidly over the past two years as the legal metrology community, and all those who work with them, have had to make many changes as a result of the challenges created by the COVID-19 pandemic.

This Guide has therefore developed into a source of advice on how everyone involved in delivering or benefitting from CEEMS activities can make the best use of online technology. It is focused very much on matters that are of particular significance to CEEMS, but much of the analysis and the advice is relevant to how the wider legal metrology community can make the best use of online technology.

At the same time, the Guide also makes a number of recommendations, in particular concerning how the OIML and its key bodies can best support the efforts to make the most efficient use of online technology. It is very much hoped that most of these recommendations will be picked up in the various work programmes of those bodies.

The situation on the use of online technology will no doubt continue to evolve rapidly. It is therefore expected that this Guide will be updated regularly, in close cooperation with the OIML Digitalisation Task Group (DTG), established in 2022, which also supported it. Indeed, it is a recommendation of this Guide that the DTG consider the development of a future Digital Technology Guide which would support the wider legal metrology community.

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[1] "CEEMS activities" is not a precisely defined term, but for the purposes of this Guide it is taken to include:
- development and dissemination of documents and other training materials aimed at the CEEMS community;
- development and delivery of various forms of training materials, events and courses;
- consultancy, advisory services and study visits by experts from countries with established metrology systems;
- informal contacts between legal metrology staff in different countries;
- secondments and study visits by CEEMS staff to other countries;
- persuading development agencies to allocate priority to metrology; and
- persuading government decision-makers and budget holders of the importance of legal metrology.

Chapter 1: Introduction

At the meeting of the OIML's CEEMS Advisory Group (CEEMS AG) in October 2020 there was a substantial discussion of the challenges which will face the legal metrology communities following the changes brought about by the COVID-19 pandemic.

There was general agreement that for the foreseeable future, legal metrology authorities should plan on the basis of:

- continued restrictions on travel, in particular international travel;
- more staff expected to work from home rather than at their normal place of work;
- changes in governments' short-term priorities leading to legal metrology staff being moved to other duties; and
- reduced funding for legal metrology activities.

In summary, the main effect of the pandemic is that there are likely to be fewer, less experienced staff.

At the same time, the challenges posed by having fewer, less experienced staff in countries and economies with emerging metrology systems mean that the objective at the heart of CEEMS activities – increasing skill levels in the legal metrology community – is more important than ever. Delivering those activities will require even greater use both of new ways of working and traditional types of CEEMS assistance activities – updated to the post-COVID world.

A number of "traditional" tools used in CEEMS programmes were identified:

- documents and other training materials aimed at the CEEMS community;
- various forms of training materials, events and courses;
- study visits by experts from countries with established metrology systems;
- informal contacts between legal metrology staff in different countries;
- secondments and study visits by CEEMS staff to other countries;
- persuading development agencies to allocate priority to metrology; and
- persuading government decision-makers and budget holders of the importance of legal metrology.

Ideally all of these should continue to be used. However, all of these activities would need to be carried out in a different way, in most cases using online technology.

In addition, a number of technological issues were identified which might act as obstacles to the effective use of online technology within the CEEMS community.

The outcome of the Advisory Group's discussion was a recommendation that a strategy paper be prepared on the *Application of Online Technology to Capacity Building and other CEEMS Activities*. This present Guide is that strategy.

In parallel with this project, at its 56th Meeting in 2021, the CIML noted the importance of digitalisation to improve the way in which legal metrology authorities, and the OIML itself, carry out their functions and provide products and services. These developments are critical to all organisations in enabling them to deliver on their mandate in a more responsive, sustainable and inclusive manner, but they can be of particular significance within the CEEMS community since the use of online technology may allow authorities in those countries and economies to "leap-frog" to the most modern ways of operating. The OIML has established a Digitalisation Task Group (DTG) which will play a key role within the OIML to propose, consider, advance and deliver on strategic and practical issues related to digitally transforming the Organisation. This Guide therefore also considers the way in which initiatives on applying online technology to legal metrology functions can be integrated with the other recommendations we make.

The following seven chapters are structured as follows:

Chapter 2:   Technical work – developing documents and materials aimed at the CEEMS community

This is largely based on OIML experience in using online meetings to conduct PG, TC/SC and plenary OIML meetings.

Chapter 3:   e-Learning

This is mainly concerned with summarising the work that has been done within the OIML since the 54th CIML Meeting in Bratislava in 2019. Strictly speaking, "e-Learning" (sometimes described as "web-based training") is distinct from all the other topics covered in the strategy, as it is concerned primarily with the documents and other materials which can be accessed online by legal metrology officials engaged in "self-learning". However, in practice interactive training activities often involve providing materials which can be studied either before the course or after it. Moreover, recorded versions of interactive courses may also be made available on the same platforms as other "e-Learning" materials.

Chapter 4:   Delivering interactive training

Even though greater use of e-Learning materials may replace a certain amount of training that was traditionally delivered through "chalk and talk", there is still much to be gained through students being able to ask questions, and the learning that comes from students themselves discussing the answers. This chapter draws on the experience of training providers such as the PTB, as well as lessons learned from the BIPM's programme of delivering laboratory-based programmes online.

Chapter 5:   Delivering consultancy and advisory support to the CEEMS community

This is primarily a consideration of how consultancy and advisory support (including fact-finding studies and assessments) by experts from countries with established metrology systems can be delivered when travel by such experts is heavily restricted.

Chapter 6:   Maintaining contacts across the metrology world

This chapter discusses how to find other ways of stimulating informal contacts between legal metrology staff in different countries (such as typically happen on the margins of international meetings or training events) and provide for alternatives for the secondments and study visits to other countries by CEEMS staff which are such an important element in the way metrology has functioned.

Chapter 7:   Engagement outside the metrology world

This chapter puts forward proposals to make greater use of OIML D 1:2020 *National metrology systems – Developing the institutional and legislative framework*.

Chapter 8:   Digital transformation of legal metrology functions

This chapter looks at the digital transformation agenda and the work being undertaken by the OIML's Digitalisation Task Group. In many respects, the application of online technology to CEEMS activities is a part of the wider digitalisation many legal metrology authorities are carrying out, and both can be affected by some of the technological issues identified at the October 2020 meeting – choice of platforms and software, availability of hardware, overcoming technological barriers, etc.

In most cases a common structure is adopted in these chapters:

- a review of the current position and existing use of online technology;
- an assessment of how these activities are likely to develop in a post-COVID world;
- an analysis of the obstacles to the more effective use of online technology; and
- recommendations aimed at both those conducting CEEMS activities and those who are intended to be the beneficiaries.

Across the various chapters there are some common themes.

First, the landscape of available online technology is continually developing, with new "apps" becoming available all the time. This strategy should not, therefore, be seen as a one-off initiative. There is a need to make sure that the necessary resources are put in place to provide ongoing expert advice on the technology that is available and how to use it.

Second, there is an understandable tendency to consider things from the point of view of those organising and delivering the capacity building and other CEEMS activities. For such providers, using online technology often provides enormous benefits – massively reduced travel and accommodation costs, the ability to reach much larger audiences, cheaper access to simultaneous translation, etc. For the beneficiaries, however, the benefits are often not so clear cut. They may be faced with additional hardware and communication costs. The reduced access to personal interactions makes it more difficult to ask questions about specific issues. It is vital, therefore, that efforts are constantly made to look at online CEEMS activities from the point of those in the CEEMS community that they are intended to benefit.

Third, although face-to-face meetings involve both preparation and follow-up activities, the amount of effort and resources which need to be devoted to preparation and follow up (sometimes described as the "asynchronous stages") are very different. This will often require both providers and beneficiaries to completely rethink how they approach activities which are delivered online.

Chapter 2: Developing documents and materials aimed at the CEEMS community

A key element of activities supporting legal metrology authorities, and their staff, in the CEEMS community consists of developing documents aimed specifically at that community. These documents may be developed either by the OIML or by Regional Legal Metrology Organisations (RLMOs), and occasionally by other organisations. They are usually prepared in the same way as other "technical work", that is through initial drafting in Project Groups or Working Groups, followed by a formal approval process. In the case of the OIML this involves the creation of Project Groups, usually governed by OIML B 6 *Directives for OIML technical work*. Traditionally face-to-face physical meetings, both at Project Group or Technical Committee level and at the CIML level have been an essential part of this process. RLMO procedures are often very similar.

Current situation

The COVID-19 pandemic and the accompanying restrictions have put an end, for the time being, to almost all face-to-face meetings. Video-conferencing technology has made it possible to replace these with online meetings, and in many cases technical work has continued by this means. The OIML has built up considerable experience in using online meetings to conduct business at Project Group, TC/SC and CIML meeting levels. RLMOs similarly report that they have been able to continue carrying out much of their work using online meetings, including their annual plenary meetings.

With travel restrictions beginning to ease, face-to-face meetings may well resume, but it is likely that not all potential participants will be able to attend. As a result, attention is switching to so-called "hybrid" meetings, where some participants are physically present and others participate online.

Collaborative meetings in a post-COVID world

For international work, online meetings offer several advantages over traditional face-to-face meetings:

- they can be arranged much more quickly than in-person meetings;
- the costs are much lower for participants, as online meetings do not involve travel and accommodation costs;
- much larger numbers of people can be included in a meeting; and
- because they are quicker and cheaper to organise, online meetings can take place much more frequently.

Online video-conferencing also offers important advantages over teleconferencing:

- it is easier to share visual aids; and
- participants are easier to identify and discussion can be structured more effectively (i.e. the chair of the meeting can choose when to allow participants to speak).

For all these reasons, we can expect online meetings to continue to play an important part in the development of documents and other materials aimed at the CEEMS community. This will continue even after travel restrictions following the COVID pandemic are eased and should be supported. Indeed, it seems likely that as hybrid meetings increasingly become accepted, there will be a need to further develop the skills in managing and using online technology in these more complex environments.

Obstacles to the effective use of online technology

Online meetings differ from more traditional meetings in several ways. The challenges these differences represent need to be recognised and addressed:

a) Organising and chairing an online meeting requires skills in operating the technology. A major issue here is the proliferation of different platforms and applications. Each different platform/application has different functionalities and operates differently. Moreover, many are subject to frequent updates which change the functionalities. The situation becomes even more difficult when some authorities require the use of their own propriety software for security reasons. All of this complicates the task of training those who organise or chair online meetings. The problem is much reduced if authorities habitually use the same platform/application. After examining the range of options available, the OIML has chosen to use Zoom as its preferred video-conferencing tool. The BIML is therefore well placed to offer advice on how best to operate the Zoom product.

b) Organising the logistics of an online meeting is a specialised task. Technical problems often have to be handled in "real time". Therefore, except in the case of the simplest and most straightforward meetings, it is not a good idea to expect the person chairing an online discussion also to act as "host" for the meeting. The host functions, which include checking the credentials of participants and addressing connection issues, require their own specialised training.

c) The roles of chair and secretariat/host may be performed from different locations. In a traditional meeting the chair and secretariat invariably work closely together, even if they are from different organisations. With home-working often being required in various parts of the world during the pandemic, it is now much more likely that the chair and the host will be in different locations. This actually offers an opportunity for CEEMS countries to play a more active role in chairing online meetings, as the hosting responsibilities can be undertaken by another country or organisation with better trained staff. The BIML is well placed to offer this support if required.

d) Participating in an online meeting requires skills in operating the technology. The points about the proliferation of different platforms noted in a) above also apply to the training needs of participants in a meeting. Indeed, the training challenges are particularly acute for those who are less experienced in participating in online meetings, which will often be the case in the CEEMS community.

e) Participating in an online meeting requires a good quality connection and equipment. The implications of this are considered in Chapter 8.

f) Participants will often be in different time zones. This introduces a significant limit on the duration of an online meeting. Unlike a physical meeting, which can reasonably last a whole day or even several days with appropriate breaks, an online meeting has to be structured to last a maximum of 3–4 hours.

g) Participants do not have an opportunity to meet "on the margins". The implications of this are considered in Chapter 6.

h) Online meetings require careful preparation. Except where they are used for "brainstorming ideas", traditional meetings – in particular those carrying out technical work – are usually preceded by preparatory drafts or discussion papers. These can be circulated either through email groups or using web-based collaboration tools such as the OIML website "Workspace". This is a vital part of the process, as it allows for a much wider range of stakeholders to be consulted. Because online meetings can be arranged much more quickly and frequently, there is a danger that this process is cut short or circumvented. Moreover, because online meetings are typically shorter than traditional ones, the opportunity for in-meeting discussion and exchanges of views will be reduced. It is therefore important that issues for discussion and decision are very clearly defined prior to an online meeting.

i) <u>Decision-making rules need to be appropriate for online meetings</u>. Where there is a formal approval process such as that specified in OIML B 6-1, it is important to ensure that rules designed for face-to-face meetings are applied in an appropriate way. Those rules typically provide both for online decision-making and for in-meeting decision-making, and there needs to be clarity about which procedure is being adopted when an online meeting is asked to take decisions.

j) <u>"Hybrid meetings" pose additional challenges in ensuring that online participants have the same opportunity to contribute as those who are physically present</u>. There is a lot less experience of conducting meetings in this way and it will be important to build up the necessary expertise quickly.

Recommendations

1 Organisers of online meetings should ensure there is a clear understanding about which individuals are tasked with a) chairing the meeting, b) recording its discussion and decisions, and c) acting as "hosts" in terms of permitting participation and addressing technical connection issues. Ultimate responsibility for all three tasks should remain with the convener/secretariat. Organisers of online meetings should also conduct one or more "test runs" if the size and importance of the event require it.

2 Except where there are strong reasons for using another platform, the latest version of Zoom should be the default option for online meetings held within the international legal metrology community. Zoom has been found to be the most accessible platform for OIML Members, and has proved cost-effective and fit-for-purpose for the OIML.

3 The BIML should prepare and disseminate separate advice/guidance on a) chairing Zoom meetings, b) acting as host for Zoom meetings, and c) participating in Zoom meetings. In all cases the objective is to ensure that everyone is in a position to make the best use of all the functions offered.

4 The BIML should also prepare and disseminate advice/guidance on organising "hybrid" meetings, taking account of the developing experience in conducting such meetings.

5 The OIML should be authorised to offer the service of acting as host for other organisations organising online meetings related to international legal metrology <u>on a cost recovery basis</u>.

6 The OIML should be asked to explore best practice mechanisms for informal online chat sessions to facilitate relationship building amongst participants engaged in technical work (see also Chapter 6.)

7 The BIML should be asked to consider whether there is a need to make any changes to B 6-1:2019 to confirm that the current in-meeting voting rules are appropriate to decisions taken during an online meeting of a PG or TC/SC. No problems have yet been encountered and since the rules have a broad scope, it is possible that no changes will be needed.

Chapter 3: e-Learning

"e-Learning" (sometimes described as "web-based training") as it is used by the OIML refers primarily to documents and other materials which can be accessed online by legal metrology officials engaged in "self-learning". "e-Learning" is distinct from most of the other areas considered in this strategy because it is not based on real-time interaction between people. There may be interactive elements such as tests or quizzes, but the interaction is with the programme itself rather than with a trainer in real time. In that sense, it is the electronic equivalent of studying with a book or manual as opposed to sitting in a classroom or attending a lecture or seminar. There are nevertheless important links with other forms of online training, such as those examined in Chapter 4.

This was identified as a key topic even before the COVID-19 pandemic – a workshop at the 54th CIML Meeting in Bratislava in 2019 was devoted to the topic. The OIML has for some years hosted on its website e-Learning material originally prepared in collaboration with the ACP EU TBT Programme, and has also provided links to other websites where e-Learning material can be found. The 2019 workshop launched a strategic review of the OIML's approach to e-Learning which has been developed over the past three years.

In practice, interactive training activities will often involve providing materials that can be studied either before the course or after it. Moreover, recorded versions of interactive courses may also be made available on the same platforms as other "e-Learning" materials. Combining various forms of training is central to the concept of "blended learning" which takes account of different individuals' circumstances and preferences.

Current situation

OIML work since the Bratislava workshop has confirmed that there is a role for the OIML to act as the host for certain e-Learning packages. There are several advantages to this:

a) it improves accessibility – the OIML website is already a valuable resource recognised across the legal metrology world;

b) it provides authority – the OIML has access to technical experts who can confirm the quality and relevance of the material;

c) it guarantees that the material will be kept up-to-date – OIML experts can also identify when material needs to be updated;

d) it makes it easier to access experts with the high levels of competence required to create e-Learning content of high quality; and

e) it can simplify the learning experience of students – if standard software is used it reduces the need for students to become familiar with the way in which several different platforms work.

Implementing this approach requires both sufficient capacity on the OIML's servers and agreement on which software platform is best suited to users in the legal metrology community. The OIML has had to install new servers to meet this and other needs and there was an initial delay in this because of sourcing difficulties during the COVID-19 pandemic. However, the new servers are now operational and this will allow expansion of the e-Learning material to meet a much wider range of needs.

Alongside this, it has been confirmed that the Moodle platform offers the best basis for legal metrology practitioners across the world to access these resources.

e-Learning in a post-COVID world and remaining obstacles

Using digital technology to access training material will be increasingly important as legal metrology authorities address the challenges posed by recovery from the pandemic. The substantial savings in time and cost which e-Learning offers will be particularly important as budget pressures increase. e-Learning

should also be much easier to access now that the pandemic has made legal metrology staff much more familiar with using online technology as part of their work. As with all training, however, it is important that sufficient time is made available for staff to study.

For the OIML, there will need to be a continued commitment of resources to ensure that material is kept up-to-date and covers all the areas of interest to legal metrology staff. In most cases it will be necessary to use content which has been prepared by experts outside the BIML, but consideration should be given to the BIML developing e-Learning packages on areas in which it has specific expertise, such as the OIML-CS or the OIML's own procedures. In addition, in some cases relevant training material will continue to be hosted by other organisations; it is therefore in everyone's interest that the OIML continues to signpost such resources and provide links from its own website.

Recommendations

1   The OIML should continue to allocate priority to hosting e-Learning material on its website where they and the content owners/providers agree this is the best way of making this available to legal metrology practitioners.

2   The OIML should keep the material on its website under review, updating or removing material that is no longer current.

3   The OIML should seek out experts who have high levels of competence in creating good quality e-Learning, as well as knowledge of technical requirements and issues.

4   The OIML should examine whether any of the e-Learning packages would benefit from new interactive features such as tests, certificates of completion, digital badges, etc.

5   The project group undertaking the revision of OIML D 14 *Training and qualification of legal metrology personnel* should be asked to consider the role of e-Learning and online assessment in the revised Document.

6   The OIML should consider rebranding some of the material where this is acceptable to the content owners/providers and it is cost-effective to do so.

7   The OIML should explore how its e-Learning material can be made more accessible in other languages.

8   The OIML should consider developing its own e-Learning packages on subjects such as the OIML-CS or the conducting of technical work.

9   Links to other organisations' websites offering relevant e-Learning should continue to be offered and should have appropriate prominence. The collaboration with the BIPM in developing material should be extended.

Chapter 4: Delivering interactive training courses

Classroom-based learning and practical demonstrations have traditionally been a fundamental part of meeting training needs within the CEEMS community. The OIML Training Centres (OTC) concept, and the later OIML Training Events (OTE) are built around such activities. They are also a valued part of the support delivered by the major international aid agencies and are an established part of the support which many of the RLMOs deliver in capacity development. Providing expert trainers is one of the most cost-effective ways in which countries with more established legal metrology systems can support capacity development in other parts of the world. Using "train the trainer" methodology, such activities can support a broader structure of training across the CEEMS community.

Interactive training may take the form of single events or a series of similar events. They can differ significantly over the number of participants, the number of trainers, and the degree of interactivity and may be described as "lectures", "seminars", "workshops", etc. What they have in common, and what distinguishes them from e-Learning, is the involvement of one or more trainers in real time – sometimes called "synchronous learning". For the purposes of this chapter the phrase "training courses" will be used to cover all such events.

Current situation

Training courses in the traditional manner have been effectively impossible during the COVID-19 pandemic. This is mainly due to international travel restrictions. In addition, reprioritisation and changes to working practices have made it much more difficult to put together suitable groups of participants over the past eighteen months. However, some training activities that were previously planned and budgeted for have been successfully delivered online. The video conferencing software used for online meetings works well for trainers using a traditional-style presentation slide pack. Moreover, there are functions which allow participants to ask questions and there is also the option of using "chat room" facilities to carry out group discussions. Nevertheless, there are special skills that are required to make best use of online training technology and the use of online technology for training is not yet widespread.

The experience of the PTB in adapting its aid activities for online delivery is particularly instructive. They have developed training both for their own staff and for their contracted experts, which recognises both the opportunities and the challenges which online delivery presents. In addition, they have put together a library of ideas and tips which may be helpful to those designing and delivering online training. NMIA has also developed extensive experience with transitioning classroom training to instructor led online training.

Training in a post-COVID world

From the point of view of the trainers and those who fund the provision of training, use of online technology offers several significant advantages:

- the costs are much lower for trainers, as they do not involve travel and accommodation costs;
- much larger numbers of people can attend a virtual training course[2]; and
- because they involve more but shorter sessions, participants may find it easier to fit training sessions into their schedules.

It is therefore likely that online training will continue to be increasingly used for meeting CEEMS needs, even after travel restrictions following the COVID pandemic are eased.

It is also likely that some training products will develop in a similar way to the "hybrid" meetings discussed in Chapter 2. The model where course participants are able to meet physically and the trainers

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[2] But note that experience suggests there is still value in limiting the number of participants in order to ensure engagement with the trainer and achievement of learning outcomes.

contribute online has the potential to realise some of the cost benefits of online training while retaining some of the advantages of the classroom environment.

Obstacles to the effective use of online training

Similar to the situation with online meetings, delivering training online differs from organising and delivering traditional training courses in several ways. With the increased availability of e-Learning products, there may in any case be a reduced need for interactive training requiring the real-time presence of expert lecturers. However, this makes it even more important that where interactive training is provided online, the distinctive challenges which arise need to be recognised and addressed:

a) Organising and delivering an online training course requires skills in operating the technology. As with online meetings, the proliferation of different platforms and applications can present problems for trainers and more especially for the course participants. Each different platform/application has different functionalities and operates differently. Moreover, some are subject to frequent updates which change the functionalities. The situation becomes even more difficult when some authorities block the use of certain platforms on their equipment for security reasons. These problems are much reduced if those offering online training habitually use a limited range of platforms/applications. The OIML's preferred video-conferencing tool, Zoom, is well-suited to basic online training courses as well as to other types of meeting, although some other platforms (e.g. WebEx) offer dedicated training modes that provide enhanced functionality for delivering training.

b) Organising the logistics of an online training course is a specialised task. Similar to the situation with online meetings, it is not good practice for facilitators or trainers to be expected also to act as "host". Functions such as checking the credentials of participants and addressing connection issues require separate specialised training.

c) The presenters and facilitators can participate from different locations. This also provides potential cost savings in putting together an appropriate selection of presenters. However, it strengthens the case to have a specialised facilitator who can provide continuity if there are technical problems with a remote presentation.

d) Participating in online training requires skills in operating the technology. Unlike the situation with online meetings, participants in training may have little experience in operating videoconferencing software, so time needs to be found to allow familiarisation with the software.

e) Participating in online training requires good quality connections and equipment. A pre-course connection check is a vital component to ensure participants and hosts can connect before the course itself starts. There may be particular problems when providing training to more junior staff who may not have access to the most up-to-date equipment. These problems can be addressed by having the participants in a "classroom" setting, but that in turn requires the classroom to have good quality screens and speaker systems.

f) Presenters and course participants will often be in different time zones. Combined with the limits on users sitting comfortably in front of a screen, this will usually mean that individual training sessions cannot last more than 3–4 hours. Some experts recommend that individual sessions should not last more than 2.5 hours and no more than two sessions in a day for engagement and learning outcomes. Courses that might have been delivered over one or two days may therefore need to be spread over several days or even weeks.

g) Course participants are not able to meet face-to-face with each other or with the presenters for informal discussions. This makes it more important to find other ways for course participants to work together and to be able to ask questions about their specific interests. Various software packages have been developed to facilitate more informal networking on the margins of online events. These are considered further in Chapter 6.

h) <u>The limited time available during online sessions means more information needs to be gathered in preparation</u>. With traditional courses there is normally time for participants to introduce themselves or to take part in "ice breakers". There is much less time for this in online training, so it is important that the registration stage is used to gather more information about the participants, their expectations about the training, and the ground they wish to cover. Information about the use of the software should also be circulated in good time before the training begins.

i) <u>Collaborative tools which can be used by course participants are even more important in the context of online training</u>. Collaborative tools which allow participants to exchange ideas have been a feature of some traditional training workshops, etc. for many years, but they are even more useful when participants and presenters are not in the same room. However, there is even more variety in the collaborative tools available than there is with videoconferencing software, so it is vital that participants are given time to make themselves familiar with each of the tools which will be used.

Recommendations

1   Organisers of online training should ensure there is a clear understanding about how the following tasks will be distributed: a) facilitating an online event, b) presenting or lecturing at individual sessions, c) checking the credentials of those participating, and d) addressing technical connection issues.

2   Both legal metrology authorities and organisations which commission online training and organisations which deliver such training should give careful consideration to the platform which will be used for the principal presentations. Wherever possible, this should be a platform which all the participants are familiar with.

3   Full use should be made of all the techniques that would be used in conventional face-to-face training, including small group discussions, collaborative sharing of ideas, etc. It is important that both commissioners and deliverers keep themselves up-to-date about new products which make online working more effective.

4   The BIML should explore with the PTB and other organisations involved in the delivery of online training how advice on good practice relating to online training (including "hybrid" formats) can be made more widely available.

5   The OIML should be prepared to offer the service of providing technical support to training providers on the same cost recovery basis as it supports organisations organising online meetings related to international legal metrology.

6   The experts database compiled by the CEEMS Advisory Group and made available on the OIML website should be expanded so that experts can provide information on their experience in delivering online training. The CEEMS Advisory Group should take responsibility for maintaining the experts database, which requires regular updating. OIML Member States and Corresponding Members should be asked to expand the experts database by re-nominating experts who can support CEEMS training and consultancy activities.

Chapter 5: Delivering consultancy and advisory support to the CEEMS community

Support for the CEEMS community has for a long time been organised through visits to CEEMS authorities by experts from countries with established metrology systems. Providing consultancy and advice typically requires a larger number of smaller meetings than those considered in Chapters 2 and 4, often involving activities such as fact-finding missions and assessments.

Current situation

Travel restrictions heavily affected the delivery of international consultancy and advisory support during the COVID-19 pandemic. Whereas international travel used to be the preferred method of cooperation, especially when it comes to individual consultations and tasks such as fact-finding missions and assessments, the shift to online collaboration has forced advisors to switch gears and adopt new strategies.

Consultancy and advisory support in a post-COVID world

There are a number of benefits which can be realised by greater use of online technology to deliver consultancy and advisory support. The main advantages of virtual consultancy are

- the possibility to combine synchronous (meetings) with asynchronous work (e.g. provision of written information and offline tasks),
- the possibilities for improved sustainability of consultancy services rendered, as different formats for knowledge management and follow-up are part of the design;
- the possibilities for spontaneity and quick reaction to CEEMS community members' urgent needs,
- the possibilities to involve participants from different locations in the world who might otherwise be too busy to travel to a physical meeting, or for whom it might be too costly, and
- higher cost- and resource-efficiency and easier reach-out to a more diverse target audience.

Remote consulting can be a highly interactive format that flexibly addresses the current situation and needs of a partner organisation from the CEEMS community. As a context-specific format, remote consulting provides support for individual local challenges.

Obstacles to the effective use of online technology

Providing online consultancy and support involves tackling all the technical and organisational challenges raised by online meetings as described in Chapter 2. In addition, however, providing longer-term individual consultancy and support using online technology presents particular management and conceptual challenges. In the past, international travel missions took place within a restricted time frame, in which as many appointments and working sessions as possible were organised. Virtual consultancy missions cannot be compressed in this way and must be spread out over longer periods of time. They also have to be adapted individually to capacities and technical limitations of the parties involved, to leave no one behind. Furthermore, they have to be creative in making up for on-site presence, as it is a challenge to gain a clear understanding of the situation and the context without being on site. Therefore, the advisor might need more working time than usual to prepare the mission.

Greater use of online technology also requires a reassessment of the relationship between synchronous working (everyone contributes at the same time) and asynchronous working (tasks can be handled by contributors individually or in smaller teams, at different times). This rethinking presents both an opportunity and a challenge. It is an opportunity to increase the efficiency of the consultancy for all sides by reducing the number and length of meetings and allowing team members the flexibility to decide when is the best time for them to do the asynchronous work. At the same time, this mode of

working comes with the challenge of finding the right balance between the synchronous and asynchronous components as well as keeping the group together so that all advisees are informed, engaged, and accountable to perform their tasks "offline".

In remote work, many sensory perceptions are missing. For example, it is impossible to observe and experience the partner organisation from the CEEMS community with its status symbols, its physical building and surroundings, its atmosphere and staff, or to compare it to other organisations in the same city and country. Similarly, it is hardly possible to observe partners in their everyday environment and their interaction with colleagues or with outsiders, nor is it possible to experience the customs and culture in the partner country.

The lack of such immediate and direct observations can lead to (partially) wrong assumptions of the partner's context, misinterpretations of situations and, ultimately, lower quality of results (e.g. pre-assessments, conceptualisation of consultancy activities, or project evaluations). It might even be the cause of unintended negative effects, as decisions are taken based on incomplete or inaccurate information.

Finally, because many of the "experts" involved in providing consultancy and advisory services come from the most developed economies, this has led to organisational structures where the support and analysis is also concentrated in those countries. Quite a few of the above-mentioned challenges can be mitigated by involving local staff in the management of the consultancy. Such local staff can be used both for support processes and to accompany the consultancy on the side of contents.

Regarding support processes, is useful to have a local interlocutor who knows how to deal with the virtual tools used, has direct contacts with all involved stakeholders, and manages the calendar to ensure the smooth implementation of planned meetings. If interpretation is needed, a local interpreter who is involved throughout the whole consultancy mission provides the most efficient possibility.

In terms of content-related questions, a local focal point who has the overview over the contents discussed and who acts as the direct contact person for the advisor can go a long way to bridging the gap of missing context information and more difficult assessment of the situation on the ground. This person can then also be in charge of following up on the "asynchronous" parts of the mission, making sure that questions are collected for the Q&A sessions and that the right participants take part in the right meetings. Of course, the focal point could also cover the support processes mentioned above, depending on their availabilities and the size of the mission.

For any local staff involved, the consultant should make sure to meet with them individually beforehand to clarify roles, needs, and communication channels. A well-functioning communication channel needs to be established, so as to ensure the possibility to communicate changes or needs at short notice.

Recommendations

1 Advisors/consultants should receive specialist training in delivering online consultancy, as it comes with its own challenges.

2 Consultants and CEEMS community members should take time to clearly define the objectives and modes of cooperation before beginning the mission. They should be as realistic as possible and adapt their objectives to the capacities that are available. They should adapt their collaboration formats (e.g. videoconference, mobile messenger call or chat) to the objectives and capacities available on both sides.

3 In general, a remote consultancy mission has to start with a decision about the objectives of the mission, based on the advisees' specific needs, and detailed planning regarding the communication channels. Surveys can be a valuable tool in gathering essential information. Any information that can be shared as documents/slides or survey results should be prepared beforehand and shared via email or through alternative channels (videos, chat messages,

e-learning modules). Then, personal video-conferences or mobile messenger talks can be organised for milestone meetings, meaning: a kick-off of the mission, assessment interviews, consultancy on key issues which are not available in alternative formats, and Q&A-sessions to follow up on pre-shared documents. As such, the scarce and often technically challenging time spent in videoconferences can be used in the most effective way.

4 During the meetings, the advisors should use open and simple questions as much as possible, in order to ensure that the advisees can follow. A mix of methods is always recommended, e.g. discussions, quizzes and videos in addition to presentations and Q&A sessions.

5 In general, advisors should try not to plan too much content/too long presentations per videoconference, as partners will likely have difficulties to follow. Rather, contents should be broken down into smaller pieces and enough time should be allocated for questions and discussions. Unilateral provision of information should be avoided as much as possible during videoconferences, e.g. by recording the speech and making it available before the meeting. At the beginning of the meeting the consultant should verify how exactly the participants would most benefit from the meeting, including whether additional urgent topics have arisen, etc. The meeting time should be flexible enough to cater for such newly arising topics. It is recommended to close the meeting with a short feedback session and a clear identification of the next steps. After each consultancy session, the consultant or the partners should draft brief minutes with "to-do" tasks, conclusions, and key points which can be taken as the basis for the next meeting.

6 When preparing these training/consultancy sessions, Baseline assessment through individual interviews with involved stakeholders from the CEEMS community are the recommended format. These talks can be flexible in terms of timing and communication channels. Advisors should prepare their guiding questions and ideally share them in advance with the interviewee, so that they can prepare accordingly. During interviews, in general, cameras should be switched on all the time, unless the internet connection does not allow it, to be able to understand each other better, in addition to just words. However, it should be kept in mind that some interviewers or interviewees prefer to interact without switching on the camera, because they can better concentrate and develop empathy by just following the voice, or because it creates a "safe space" not to be observed. The main challenge of virtual interviews compared to face-to-face ones is to build up an atmosphere of trust in which the interviewee feels comfortable to share information openly and freely. The main advantage is easier access to diverse interviewees, by reaching those in remote areas or by including an interpreter.

7 Time is the key aspect to consider when decisions about synchronous and asynchronous working are taken, especially if the advisor is in another time zone than the concerned CEEMS community member. Consultants and organisers of advisory services should plan for extra time for the preparation and follow-up of meetings, rather than assuming that virtual collaboration *per se* takes less time.

8 As the goal is to manage everyone's time as efficiently as possible, synchronous work, i.e. meetings in which all the participants are present at the same time, should be as short as possible but as long as necessary to achieve the objective of the collaboration.

9 It is important to carefully think through and design the sequence of asynchronous/synchronous work as a process over a longer period (e.g. two to four weeks). To achieve a smooth and efficient collaboration, the tasks to be completed before, during and after the meeting need to be planned in detail. For example, documents need to be prepared and distributed well in advance, when it is expected that all contributors read or comment on the document before a meeting.

10 It is essential to be *conscious of missing perceptions.* Advisors need to be conscious of possible bias and ensure through their different communication channels that they are getting the fullest

possible picture. Documentation of previous missions as well as a thorough collection of information on the current situation of legal metrology in the concerned CEEMS community members are necessary to avoid duplication of work or misunderstandings. Trust needs to be established and actively maintained in order to be able to implement a virtual consultancy mission successfully.

11 Local focal points should be involved in planning and managing the mission, both from a technical and a content viewpoint. They should be encouraged to contribute to a realistic assessment and interpretation of the situation. Recruitment and staffing policies may need to be revised to ensure that there are sufficient local staff with the necessary skills.

12 Advisors should be flexible, and prepared to adapt to changing circumstances, for example differences in the quality of internet connections. They should prepare for such situations, e.g. by technical pre-checks, by appointing a co-moderator, or by practicing and repeating the use of online tools.

13 The BIML/CEEMS Advisory Group secretariat should disseminate best practices and foster peer-to-peer learning among advisors and the members of the CEEMS community.

Chapter 6: Maintaining contacts across the metrology world

Both international meetings of the kind discussed in Chapter 2 and traditional training courses of the kind mentioned in Chapter 4 have the additional benefit of stimulating informal contacts between legal metrology staff in different countries. These are typically developed on the margins of international meetings or training events – at a minimum during breaks but often as a result of organised social events and through staying in the same hotels.

In addition there is an important dimension of CEEMS activities which consists of arranging secondments and study visits to other countries by CEEMS staff. Inspired initially by the BIPM's programme, and then developed through the *Scholarship programme for future leaders in CEEMS* proposal discussed at the 2019 CEEMS AG meeting, it had been hoped that these sorts of initiative could play an increasingly important role in capacity building within the CEEMS legal metrology community.

Current situation

These types of contact have been severely impacted by the COVID-19 pandemic. Face-to-face contacts between metrologists in different countries almost completely ceased during the period of international travel restrictions. New secondments and study visits have become impossible. In addition, reprioritisation and changes to working practices have meant that there is much less time available to build informal contacts.

Some attempts have been made to recreate more informal interactions, especially during online training events, using specially developed platforms and software. In addition, the use of "chat room" facilities – either for break-out sessions or for socialising – can increase the opportunities for informal contacts. These can be included both in programmes for training sessions and in international meetings. However, in practice there is usually very limited time available, for reasons that have already been discussed, during most online meetings and events, so the scope for adding on opportunities for informal contacts will usually be very limited.

Informal contacts in a post-COVID world

Unlike the position with international meetings or the provision of training, there are few positive advantages in using online technology to develop informal contacts. Nevertheless, because informal contacts are themselves usually a secondary element to these other activities, and for reasons which have already been noted, there is likely to be a permanent shift towards conducting more of these activities online. It is unlikely that the sort of informal contacts seen prior to the pandemic will ever return to previous levels, even once most restrictions on international travel have been lifted.

This means that some fundamental rethinking is required if legal metrologists are not to become increasingly isolated from the knowledge and experience of their colleagues in other countries. There are four elements to addressing this question:

a) The importance of informal contacts formed during international meetings and of face-to-face training has to be taken into account when decisions are made on whether a particular meeting should be held, or a training need met, online.

b) Where meetings or training take place online, specific attention should be paid to including facilities for informal interactions.

c) The place of secondments and study visits in CEEMS programmes should be re-examined. With fewer opportunities available for legal metrology officials to meet colleagues in other countries through formal meetings and training events, the benefits of offering secondments or study visits are likely to be even more important than previously identified.

d) New approaches to providing support to colleagues in other countries using online technology should be explored. One possibility which both the OIML and the RLMOs might want to consider is organising "mentor" programmes. While mentoring has for some time been a feature of capacity development in individual countries, the traditional pattern of regular meetings is not well-suited to mentoring across borders. Online technology such as video-conferencing, however, could open up much wider possibilities in this field.

Obstacles to effective development and maintenance of international contacts

Developing and maintaining contacts between colleagues requires both time and money. If new approaches to fostering informal contacts in the legal metrology world are to be successful, there are several issues to be addressed:

a) Budgets, and in particular travel budgets, are likely to be under considerable pressure for some time to come. Even when it once again becomes possible to resume international travel there is likely to be strong resistance to carrying out those activities face-to-face which it appears possible to conduct online. However, it is already apparent that considerable savings in travel costs are likely to be realised once the pandemic is over, so the question is really about making a case for some of these savings to be applied in a way which best meets the needs of capacity development in the CEEMS community.

b) Time available for "adding on" informal networking to online events is extremely limited. Where this is proposed, it should be integrated into the planning of online activities at an early stage.

c) Specialised online networking software can be complex and difficult to operate. The considerations identified in Chapter 4 are very relevant here.

d) Secondments, study visits, and mentoring programmes all require additional time commitment from more experienced legal metrologists. The benefits which well-functioning metrology systems present for all parts of the world, including the most advanced economies, have to be emphasised when such programmes are being promoted.

e) For secondments, study visits, and mentoring programmes to be successful, considerable effort has to be applied to choosing the right candidates. There are also significant logistical obstacles in organising such programmes, requiring a lot of preparation by the "host" or "mentor". Organisations such as the OIML and the RLMOs can play an important role in ensuring that there is the right level of commitment.

Recommendations

1 Legal metrology authorities should take into account the additional benefit which attendees can derive from establishing contacts with colleagues in other countries when deciding whether to be represented at in-person meetings or face-to-face training. They should set travel budgets accordingly.

2 Organisers of online meetings or training activities should include in their initial planning a consideration of how informal contacts between participants can be encouraged.

3 Advice or guidance from the BIML on international online meetings and the advice on good practice relating to online training mentioned in Chapter 5 should include information about suitable software/platforms for informal networking during online meetings and training.

4 The CEEMS AG should revisit the 2019 proposals on a scholarship programme for future leaders in CEEMS with a view to introducing a suitable pilot once restrictions on international travel are largely removed. OIML Member States and Corresponding Members should be asked to respond to an updated document and submit to the OIML a list of areas where support can be

provided and detailed training courses (including attachment training and online training). The hope is to provide a 3–5 year scholarship programme for future leaders using a formal application process and suitable monitoring and evaluation to ensure good quality results which meet the needs of individuals and organisations.

5   The CEEMS AG should be asked to conduct an enquiry about whether there would be support among OIML Members for the organisation of a mentoring programme for the benefit of senior CEEMS legal metrology officials.

Chapter 7: Engagement outside the metrology world

Most of the important decisions about the way in which legal metrology is organised and funded are taken by policy-makers who have limited direct experience of metrology issues. Ensuring that such policy-makers have a good understanding of the contribution a legal metrology system can make to the prosperity and quality of life of a country's citizens is therefore one of the objectives of the OIML identified in OIML D 1:2020 *National metrology systems – Developing the institutional and legislative framework*. One of the advantages of holding the annual CIML meeting (and, every four years, the OIML Conference) in various locations is the opportunity this presents to involve the higher levels of government in the work being done by a country's legal metrology authorities. Regular RLMO meetings can also be used for such work. The travel programmes of the BIML Director and Assistant Directors and attendance by the CIML President or Vice-Presidents at other events (e.g. World Metrology Day events) can also serve a similar purpose.

Current situation

The COVID-19 pandemic effectively entailed the cancellation of all travel and events which have in the past provided a platform for the OIML to reach out to senior policy-makers. None of the substitute online activities have had a similar outreach. In effect, this aspect of CEEMS activity has ceased altogether.

Conducting high level engagement in a post-COVID world

If the OIML (and the RLMOs) are able to resume their annual cycle of meetings after travel restrictions are eased (even if those meetings take place on a hybrid basis) this will restore the means which have previously been used for raising the profile of legal metrology in individual countries. However, the pandemic has also coincided with greater awareness of the environmental impact of international travel. Moreover, pressures on travel budgets are likely to intensify as authorities seek to recover from the financial impact of the pandemic. It is, therefore, unlikely that the amount of travel by senior figures within the OIML will return to pre-pandemic levels in the near future, if at all.

Fortunately, the revised OIML D 1 was conceived as a vital tool to promote legal metrology, and metrology in general, to a wider audience of senior policy-makers. We therefore have an opportunity to consider how it can now best be used to supplement and to some extent replace the more traditional forms of engagement. This may involve new types of activity for the BIML and new forms of co-operation with others involved in assisting the CEEMS community. Another possible avenue for the promotion of metrology is alliances with other technical/quality infrastructure organisations, such as standards, conformance and accreditation bodies.

Recommendations

1. The OIML and the RLMOs should take into account the additional benefit which international meetings offer in terms of engagement with senior policy-makers when deciding when and how to resume face-to-face meetings.

2. The CEEMS Advisory Group should prepare a Project Proposal for the preparation of a "user friendly" version of OIML D 1 which is designed explicitly for audiences outside the metrology world.

3. The CEEMS Advisory Group should establish a Project Group which, with BIML support, can develop an online training course on the use of OIML D 1. A model for this may be the online training course designed by the OIML and the PTB for type approval authorities in ASEAN – delivered in June/July 2021.

4   The BIML should be asked to explore with other organisations which are active in assisting the CEEMS community (including other technical/quality infrastructure organisations) how the document mentioned in 2) and the online training product mentioned in 3) can be most effectively distributed.

Chapter 8: Digital transformation of legal metrology functions

Issues described variously as "digitalisation", "digital transformation", "digitisation" and "the digital agenda" have been recognised as being significant within the OIML for a number of years. There is, as yet, no consensus on the exact meaning of the terms most frequently used, but it is clear that together they cover a number of different areas, including:

a) The regulatory and enforcement challenges posed by the increased use of digital technology in measuring instruments. Often referred to as "Industry 4.0", this trend was highlighted at the 52nd CIML meeting in 2017, and creates a pressing need for the OIML's technical work to keep abreast of developments in measuring instrument technology.

b) Changed expectations on how the legal metrology community carries out its dealings with business and the general public. Mirroring developments seen in other parts of the Quality Infrastructure, this has led to initiatives such as digital standards, e-certificates, and increasing use of online transactions for matters such as the payment of fees.

c) Increased use of digital technology within legal metrology authorities and the organisations that support them. This strategy document is one response to this trend, focussing on the way in which "CEEMS activities" are carried out. But this is only part of the wider question of how digitalisation can improve the way in which legal metrology authorities, and the OIML itself, carry out their functions and provide products and services.

In October 2021, at its 56th meeting the CIML noted the importance of all these aspects and following that meeting the OIML established a Digitalisation Task Group which is already playing a key role within the OIML in proposing, considering, advancing, and delivering on strategic and practical issues related to digitally transforming the Organisation. Addressing digital issues is critical to all organisations in enabling them to deliver on their mandate in a more responsive, sustainable and inclusive manner, but it can be of particular significance within the CEEMS community since the use of online technology may allow authorities in those countries and economies to "leap-frog" to the most modern ways of operating.

This chapter looks at the digital transformation agenda and the work being undertaken by the OIML's Digitalisation Task Group. In many respects, the application of online technology to CEEMS activities is a part of the wider digitalisation many legal metrology authorities are carrying out, and both can be affected by some of the technological issues identified at the October 2020 meeting – choice of platforms and software, availability of hardware, over-coming technological barriers, etc.

Current situation

There is a widespread expectation that digitalisation will be the next evolution in every aspect of legal metrology. The implementation of new technologies should provide a strong benefit for a society in which legal metrology remains important. It is also recognised that the processes involved in the digitalisation of legal metrology must be effective, transparent and trustworthy. Digitalisation cannot be regarded as a one-time process – it will be a constant series of developments.

An increasing number of metrology institutes are developing and implementing a strategy for their role in the digital transformation of the economy and society. Often these strategies are aligned and integrated with corresponding national or regional strategies and developments.

Regional metrology organisations, and to some extent RLMOs, have created task groups to further develop the individual strategies into a coherent regional strategy.

On an international level, the CIPM, the OIML and several other organisations have prepared and signed a "Joint Statement" expressing their intent to collaborate in the digital transformation. The adaption of the Joint Statement to the OIML is the general task of the OIML DTG.

Digital transformation in a post-COVID world

Most of the opportunities and challenges presented by digitalisation were apparent before the COVID-19 pandemic and the drivers behind them have not fundamentally changed. It is possible that the economic difficulties created by the pandemic have in some cases slowed some of the investment which digitalisation requires, but as the world economy recovers this seems likely to accelerate. Indeed, there are already signs that in some ways the COVID pandemic has introduced a stronger drive towards the online delivery of many services which has accelerated the digitalisation trend.

Obstacles to digitalisation in CEEMS

The initial October 2020 discussion paper identified a number of technological challenges, which are relevant to all the strands of digitalisation identified above. These include in particular:

- poor connectivity in some parts of the world;
- lack of up-to-date equipment;
- the number of different platforms now available, some of which are not used in some areas because of security concerns – this could be broadened to consider security concerns generally; and
- lack of training on using digital technology.

In addition, there are a number of attitudinal obstacles which need to be overcome. Again, these may affect all the strands of digitalisation under discussion. They include:

- a lack of understanding within the legal metrology community of the possibilities offered by digital transformation and how they can be applied to legal metrology functions;
- a widespread lack of trust in new technologies, especially among the general public; and
- legal metrology is sometimes thought to attract individuals who can be quite conservative – this may present particular challenges when changing mindsets related to legal metrology and digitalisation.

Recommendations

1   Regular attendance of a nominated CEEMS representative at the DTG meetings is strongly recommended. In addition, regular attendance of a DTG member at the CEEMS Advisory Group meetings should be established.

2   The DTG should, in consultation with the CEEMS Advisory Group, guide the development of e-Learning material about digital transformation in legal metrology.

3   The DTG should seek comments from the CEEMS Advisory Group for documents and recommendations to be submitted to the CIML or which are to be made publicly available. This is to make sure that the requirements by CEEMS are taken into consideration and that recommendations are in fact applicable for them. This is especially important for any recommendations which relate to the technical or attitudinal obstacles identified above.

4   The CEEMS Advisory Group should coordinate with the DTG to launch a survey to identify the priority needs of CEEMS in terms of advisory and other services, equipment needs, guidance documents and training courses related to digitalisation activities.

5 Based on the results of the survey, the CEEMS Advisory Group should consult with the DTG on developing proposals for initiatives in some or all of the following areas:

    a) drafting guidance documents;
    b) providing advisory or other services;
    c) making available equipment; and
    d) conducting training,

in the priority areas of digitalisation identified.

6 Based on the results of the survey, and other relevant input, the development of a new OIML Digital Technology Document should be considered by the DTG, in close cooperation with all areas of OIML work, including the CEEMS AG. This new Document should contain both a vision and recommendations regarding digital transformation in the field of legal metrology.