

CONCLUSIONS OF THE SEMINAR

i) Discussion immediately after the Seminar

The floor was first opened up for general declarations or comments.

Comment: It has been said that metrology is a basis for other sciences and technical activities but a basis is like a root: it is invisible and this is perhaps the reason why it is so difficult to make policy makers sensitive to the importance of metrology and to the need to allocate it appropriate financial and human resources. A solution would perhaps be to associate metrology with other disciplines, in particular quality, accreditation and standardization in order to form a large entity which would be more visible. Communication should not follow metrological actions, but rather anticipate them in order that these actions may be influenced by groups of persons (e.g. consumers) who would then understand these actions and participate in their promotion. The transversal character of metrology should be more marked by associating really non-metrologists with metrological activities. Last but not least, assistance to developing countries should be carried out by experts having wise views and not willing to impose costly solutions just because they have been implemented in developed countries.

Mr. Magaña reacted to these comments by explaining that, in each OIML Member State, it is the difficult responsibility of the OIML Member to explain the role of the OIML to decision makers who have an economic culture but, in general, no technical culture. Cooperation between metrology (including legal metrology) and other connected activities exists, as shown by e.g. the work of the Joint Committee for Guides in Metrology within which the OIML and the BIPM work in close cooperation with ISO, IEC, ILAC, IFCC, IUPAC and IUPAP, and also a recently established BIPM/OIML/ISO/IEC/ILAC/UNIDO working group aimed at reflecting on the coordination of their activities related to problems of development. However, it is obvious that metrology is a discipline by itself which should not be merged with other activities. In particular, experts working in the field of metrology should be good metrologists, and not general technical advisors. Concerning the experts in legal metrology, a list is maintained by the OIML.

Comment: It is pity that the participation in this seminar has been limited to legal metrology specialists, including manufacturers of measuring instruments subject to legal metrology controls. It would have been appropriate to have a broader participation, e.g. the World Bank, which could not attend. However, a current theme of work for the World Bank is 'building institutions for market' which is closely connected with trade metrology. However, there is no mention of legal metrology and even of measurements in the two hundred page development report.

Mr. Magaña agreed with the concerns expressed. He also said that it would perhaps be interesting to ask sociologists or journalists to attend this seminar and give their 'external' views concerning metrology.

Comment: Contributions from African metrologists were excellent and showed that lot still had to be done by the OIML in its program aimed at improving legal metrology resources in developing countries.

Comment: It was suggested to extend the analysis made during this seminar by considerations and discussions on costs-benefits of legal metrology and the introduction of the concept of risk analysis in determining the requirements on the instruments and the surveillance of the instruments.

Comment: It would be appropriate to reflect about the role of the State in new conditions and the risk that the interconnection between legal metrology and the State might disappear.

Before closing the meeting, the Chairperson noted that the Seminar "*What will legal metrology be in the Year 2020*", held in Saint Jean de Luz, France, on 26-27 September 2002, was attended by nearly 150 participants coming from 45 countries. Practically all Regional Legal Metrology Organizations were represented as well a number of industrial associations.

A total of 22 lectures were given, dealing with a number of matters of interest for future developments of legal metrology at the national, regional and international levels. It was decided to make them available by appropriate means including the OIML web site and Bulletin (on a selective basis) and through complete proceedings to be sent to all participants and to OIML Members and Liaison Organizations.

The CIML President and the BIML Director were requested to inform the International Committee of Legal Metrology about the output of the Seminar so that the CIML may use the views expressed by lecturers and participants in the definition of the long-term policy and strategy of the OIML.

The floor was then given over to Mr. Gerard Faber, CIML President, for the closure of the meeting.

Mr. Faber expressed, on behalf of all participants, his satisfaction and thanks to the BIML for the way in which this Seminar had been organized, and to all the lecturers for their very interesting and fruitful contributions and for the many hours they had spent in preparing their presentations. He also noted the active participation of all those attending the meeting and their pertinent questions and comments. He also expressed the hope that the output of the Seminar would be largely disseminated through e.g. information to be published in national technical journals in addition to the information directly made available by the BIML through the OIML web site, Proceedings and Bulletin.

Mr. Faber said that when reporting back to the CIML, he would suggest that this Seminar should not be considered as an isolated event, but should constitute the first of

a series of meetings aimed at looking at the various trends and parameters which will contribute to a successful development of legal metrology activities and of the OIML.

To conclude, Mr. Faber affirmed that the complete proceedings of this Seminar, including the conclusions, will constitute the material he will use when working on new strategies.

ii) Report by the BIML, published in November 2002

Note from the BIML: This report contains certain proposals for action on the part of the OIML that are derived from the lectures delivered in Saint-Jean-de-Luz. These will be considered by the Presidential Council and by the International Committee of Legal Metrology.

1 Background

The idea of organizing a Seminar on *Legal Metrology in 2020* was put forward in 2001 by Jean-François Magaña, BIML Director. The main objectives were:

- To consolidate and broaden views concerning the foreseeable developments in metrology and legal metrology and to analyze their social and economic role, as already evoked in particular during the International Symposium held in Braunschweig in 1998 *The Role of Metrology in Economic and Social Development* and in the Birkeland Report *Legal Metrology at the Dawn of the 21st Century*; and
- To open the floor to OIML Member States and Corresponding Members, to Regional Legal Metrology Organizations and to manufacturers and users of measuring instruments with a view to sharing experience about the most predictable developments in legal metrology during the next two decades.

The Seminar, held in Saint-Jean-de-Luz (France) on 26–27 September 2002, reviewed the evolutions that legal metrology is facing, and the long term perspectives in the context of which the goals of legal metrology will have to be attained.

The most clear-cut developments that can be observed relate to the fundamental economical, political and technical background of metrology and legal metrology.

2 Globalization of economies

The first point that appears clear to all observers is the tendency towards the globalization of economies. The shift from local to national economies started centuries ago, but the worldwide development of this trend has shown such an acceleration over the last twenty years that no activity in any country can be isolated from the influence and competition of the rest of the world.

The development of international trade has allowed commodities and industrial products to circulate throughout the world and although tariff and technical barriers to

trade still remain, worldwide competition has become a reality. No industry in any part of the world can ignore what competitors from other countries, even far away, are developing and providing. Barriers to trade are a false protection for industry, because they are a burden for clients who demand the best possible products and services.

The globalization of financial markets and their interconnection using new information technologies results in the development of multinational industrial groups that are able to better develop new products and new technologies, and hence allocate their production resources worldwide in the most strategic way. The trend is now that manufacturers of measuring instruments are merging (or have already merged) into large multinational companies. Small manufacturers may still exist when small segments of markets remain, but they mainly adapt components or modules developed and produced by these multinational manufacturers.

In the not too distant future, it is likely that all technical progress and all new technologies in measuring instruments will emanate from a limited number of multinational manufacturers and be used worldwide, and very often at a lower cost than traditional technologies. National manufacturers will probably limit their activity to adapting these international products to specific local needs.

3 International geopolitical background

It became increasingly apparent that individual countries could not handle the problems raised by this globalization on a stand-alone basis. International organizations were set up to consider issues that states could not manage independently and as a result economic and social issues have been addressed (UNDP, UNICEF, UNESCO, FAO, WHO, etc.). This is now being extended to environmental issues.

International trade has been facilitated, organized and developed by setting up the GATT then the WTO, and the OIML was formed in 1955 to facilitate international trade in measuring instruments and to help developing countries to set up national legal metrology systems.

In the second half of the twentieth century, two trends were observed:

- The founding of small independent states, brought about by people's increasing right to determine their own future; and
- The constitution of regional structures grouping countries together to better deal with globalization issues, aid development and form politically organized zones.

The international landscape is made up of a larger number of small countries and also of regional groups of countries which may have no formal political existence, but which do have a growing economical influence.

The gap between industrialized countries and developing countries still remains, although some former developing countries have significantly expanded their development. This question of development has increasingly been taken into consideration, and support offered to developing countries is now quite an important issue in each international summit and within all international organizations.

4 Political evolutions

Most developed countries have adopted a liberal economic approach whereby the state avoids any unnecessary constraints on the economy and withdraws as few resources as possible from it. The state is then limited to fundamental tasks.

This results in progressively reducing the resources allocated by the state to activities which are deemed to be transferable to the private sector or ones that could conceivably be financed by industry.

Metrology is often considered as a necessity for industry that should be financed by the private sector, and legal metrology is too often considered as an old fashioned regulatory task that could be replaced by standardization and the promotion of quality, both voluntary. In nearly all industrialized countries, the resources allocated by the state to metrology and to legal metrology are constantly diminishing. Most political decision-makers are primarily economists or lawyers and they have a relatively low level of metrological awareness.

The schemes generally recommended by international funding agencies are the following: develop education, facilitate private activity and free trade, limit the role of the public administration to fundamental tasks, and develop basic infrastructures.

Metrology has to date rarely been considered as a major issue for developing countries. However, some international organizations (essentially the WTO and UNIDO) have understood that an adequate metrological infrastructure is necessary for development. At the July 2001 G8 summit in Genoa, the development of metrological infrastructures was identified as a key issue for the development of African countries.

The situation in 2020 will doubtless be that efforts made by the state in the field of metrology in each industrialized country will be significantly less than today, while some potential in metrology will probably exist in what are today developing countries, so long as the development programs are efficient enough.

5 Technologies

New technologies have transformed all aspects of the economy and day-to-day life in a major way, and of course they have deeply affected measuring instruments and legal metrology. Industrial products are no longer limited to material artifacts but their value is now largely composed of “intelligence”, thus allowing them to analyze their environment and their interfaces, and to adapt their behavior to these interactions.

People’s consumption of information has considerably increased, and will continue to do so. We are entering a post-industrial civilization in which most human production and economic value will come from information management and delivery. Metrology is a fundamental tool for societies in this new context.

As far as legal metrology is concerned, the context in 2020 will be quite different from the context we have witnessed over recent years:

- “Stand-alone” instruments will give way to systems that are integrated in networks, perform complex functions, associate different kinds of measurements and manage numerous measurement results. The elements of these systems will

not be complete instruments but sensors, modules of instruments and data processing systems, all of which will interact with each other;

- Instruments and systems will be able to carry out tasks that are presently reserved only for metrology or other specialized bodies: self-verification, self-calibration, maintenance assistance and adaptation of their behavior to environmental conditions or to measuring conditions. Future instruments and systems may even be able to develop relatively intelligent fraudulent behavior and to prevent such behavior from being detected by legal metrology officials;
- The scope of these measuring systems will be considerably enlarged. They will cover a wide variety of measurements and quantities in nearly all fields of human activity. The integration of measuring devices in global networks, often using the internet, will require legal metrology to address the entirety of these networks.

6 Consequences for legal metrology

All these changes will have major consequences for legal metrology at both national and international levels.

At national level, legal metrology authorities will have to face up to the new, considerably higher stakes of metrology. They will have to carry out their tasks with limited or partial resources, and still address a wider scope of measurements and advanced technologies. They will need new skills to deal with these new fields and technologies, probably with fewer staff. They will have to demonstrate the utility of legal metrology to political decision makers whose awareness of technical issues will be very low.

Legal metrology authorities will have to develop new ways of ensuring confidence in measuring systems and in measurements, and to replace the traditional conformity assessment procedures by new ones. Type approval and initial verification will often be obsolete concepts. Confidence in measuring systems and in measurements will have to result from a global approach to the whole life cycle of instruments and measurements, from design to maintenance and use. Establishing this confidence will also need a global approach on the part of all the bodies and users involved.

The reduction in national public resources for legal metrology in industrialized countries and the limitation of public resources available in developing countries will require that some technical activities be delegated to private bodies. This approach has already been adopted by some countries. In others, this will result in a major transformation of the tasks and necessary skills of the public bodies in charge of legal metrology implementation.

Legal metrology authorities will not be able to fulfill their mission using only their own national resources: sharing facilities and resources with neighboring countries will be necessary. Cooperation and coordination at regional and international levels will be the only way for national legal metrology bodies to fulfill their mission. National legal metrology bodies will have to specialize in specific and complementary technical fields and rely on other countries' bodies for the other fields. Conformity of instruments to type, and more generally market surveillance, will have to be organized in cooperation with other countries.

International harmonization, mutual confidence and mutual recognition among legal metrology bodies and authorities are not only a necessity for trade facilitation, but also for fulfilling the missions of legal metrology at national level. Legal metrology work will have to be globalized, or it will be ineffective.

Sharing resources will be generalized in regional legal metrology organizations:

- This will be developed in industrialized regions in order to respond to the demand to decrease the cost of legal metrology infrastructures while addressing all the new fields of legal metrology. Regional networks will then constitute virtual legal metrology institutes;
- This will also be necessary in order to build a shared metrological infrastructure for developing countries, so as to set up a network that is able to answer the needs of these countries at a reasonable cost.

In regions in which such a network has not been developed, countries will not be able to answer the needs for legal metrology correctly and will face difficulties in their economic and social development.

These regional networks will have to base their activities on mutual international and inter-regional exchange of information, mutual confidence and international harmonization. The role of the OIML will be to provide harmonization of the technical and metrological requirements, but also to combine all these cooperations into a global legal metrology system and to move towards a global international conformity assessment scheme based on mutual confidence among its members.

The acceleration in the rate of technical progress will also have to be answered by a considerable acceleration of OIML technical work. This is a challenge for our Organization as it is an outstanding challenge for all standardization bodies. New information technologies will be widely used by the OIML and new working methods will have to be implemented.

7 Between now and 2020

The metrology community should study these trends and be prepared for these developments.

To face the questions raised by technological developments, the OIML must considerably accelerate its technical work, since the typical period required for the development of measuring instrument types is not longer than just a few years. The requirements laid down in OIML Recommendations must be as functional as possible so that they do not depend on changing technologies, and when necessary these requirements must be revised very quickly.

The OIML must also urgently begin to study the general structure of conformity assessment procedures in order to adapt them to new technologies, to the new structure of measuring systems and to that of production and maintenance. An OIML Document should be produced to give guidance on the new skills required by enforcement authorities and conformity assessment bodies. Such skills are required for legal metrology authorities, enforcement officers and conformity assessment officers, due to the evolution in technologies.

Member States must seriously consider the present redundancy of legal metrology institutes at international level and should engage in a thorough reflection on the need to reorganize and coordinate them so as to be more effective. Some redundancy is necessary for exchanging experience and information and to maintain mutual confidence. But too much redundancy is a waste of resources and does not allow all the necessary fields of concern for legal metrology to be covered. The current mentality is not yet ready to envisage such reorganizations at regional and international levels.

The OIML has not yet developed a guidance document concerning the fundamental tasks of governments and public administrations in legal metrology. This policy issue is close to being a political issue and is rather difficult to elaborate on. However the revision of OIML D 1 *Law on Metrology* should succeed in starting such a discussion.

Increasing the awareness of metrology and legal metrology is an urgent need, and the OIML must work actively on this issue. It is necessary to raise the awareness of political decision makers in all countries, as well as the awareness of development agencies so that they seriously take metrology into account in their programs. It is also necessary to raise the awareness of the public as to the role of metrology and legal metrology.

Developing mutual confidence and mutual recognitions is also a priority for the OIML. The draft Mutual Acceptance Arrangement which is in progress is only a first step towards an international conformity assessment system. This step must be achieved urgently in order to proceed to the next steps. The final goal is that in 2020, Member States will be able to rely on and participate in an OIML conformity assessment program and take it into account in their legal metrology systems.

This will require that Member States strongly commit themselves to developing mutual confidence, not only offering elements to provide confidence to others, but also being willing to recognize other Members' certifications. Mutual confidence and recognition is necessary for all OIML Member States and requires effort, open-mindedness and a broad sense of common interest.

8 Conclusion

OIML Member States have the responsibility for legal metrology in their countries, but they also share the responsibility for the OIML's success or failure to meet these objectives. Failure in this respect would dramatically affect their national metrology systems.

All those who participate in OIML work must consider that the progress of our projects is of common interest. They do not have to put aside national interests, but they must be highly committed to building an international and global legal metrology system.

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