

# **Future Developments in EUROMET**

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## **Abstract**

In 1987 EUROMET was established as a cooperation of European National Metrology Institutes with the objective to promote the co-ordination of metrological activities and services with the purpose of achieving higher efficiency. The Mutual Recognition Arrangement of the CIPM of 1999 gave EUROMET as a Regional Metrological Organisation additional tasks in particular to review its members' calibration and measurement capabilities as well as their quality management systems. Now that the CIPM-MRA is in routine operation the time has come for EUROMET to focus again on research activities. EUROMET is starting to set up the structures to move from individual cooperation projects between NMIs to a coordinated European Metrology Research Programme.

## **1. Introduction**

Europe has a long tradition in scientific metrology in many cases dating back to the beginning of the 20<sup>th</sup> century or even before. However it took until 1987 for the European National Metrology Institutes (NMIs) to create EUROMET the European cooperation in measurement standards. The membership of EUROMET has continuously expanded over the years, in particular after the fall of the iron curtain in Europe, and at present stands at 33 NMI members plus the Joint Research Centre of the European Commission represented by IRMM.

The highest authority of EUROMET is the General Assembly (GA) with a delegate from each member. They elect every two years the chairman and the secretary who will represent EUROMET. They also elect the members of the EUROMET Executive Committee which supports the Chairman between the meetings of the GA.

The main work is performed by 12 Technical Committees in which all NMIs can delegate a contact person. For the details of the structure and the technical scopes of the TCs see Figs 1 and 2. Ten of these TCs deal with technical matters while the TC for Interdisciplinary Metrology (TC-IM) is tasked with horizontal issues in particular those arising from the CIPM-MRA. A separate TC for quality management system review (TC-Q) has been established which is reviewing the quality management systems (QMS) of the NMIs and the Designated Institutes under the umbrella of the Mutual Recognition Arrangement of the International Committee of Weights and Measures (CIPM-MRA).

The technical work of the EUROMET TCs falls in four separate categories :

- Co-operation in Research
- Comparisons
- Traceability
- Consultation on Facilities

Since the creation of EUROMET about 900 projects have been completed or are presently being executed.

Research co-operation projects are agreed upon by the interested partners and are conducted without exchange of funds. In many cases such research projects have been successfully submitted for co-funding to the European Community within the research frame work programmes.

Comparison projects have always been very important for the EUROMET NMIs in order to assure consistency regarding the traceability to the SI throughout Europe. With the CIPM-MRA of 1999 the conducted comparisons have now become mostly either regional key comparisons or supplementary comparisons of the CIPM-MRA.

Providing traceability is a key activity within EUROMET. Not all the NMIs need to operate primary realizations of the SI but to a large extent can rely on traceability of their national measurement standards to such realizations provided by other European NMIs.

Consultation on facilities are normally bilateral co-operations where an experienced NMI provides advice and support to another NMI that expands into new technical area.

The tasks of EUROMET as a Regional Metrological Organisation (RMO) within the framework of the meter convention have been described in detail already in previous NCSLI conferences and will not to be repeated here in detail.

After about 6 years into the execution of the CIPM-MRA the protocols are now firmly established and with more than 10.000 peer reviewed entries in the BIPM database by EUROMET NMIs alone the system is working highly successful.

Therefore the time has come to address now other needs in particular relating to metrological research matters.

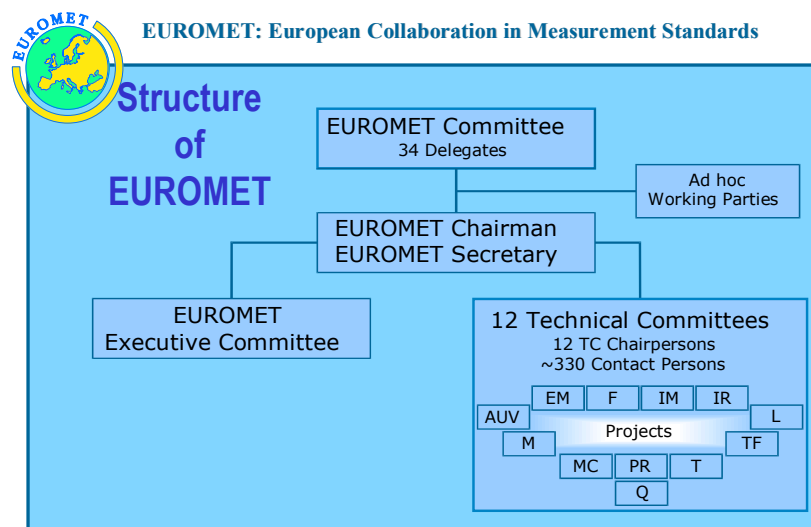


Figure 1. Structure of EUROMET



### Technical scope of EUROMET

- Acoustics, Ultrasound, and Vibration
- Electricity and Magnetism
- Flow
- Ionising Radiation
- Length
- Mass and Related Quantities
- Metrology in Chemistry
- Photometry and Radiometry
- Thermometry
- Time and Frequency
  
- Interdisciplinary Metrology
- Quality

Figure 2. Technical scope of EUROMET

## 2. iMERA: A European network for research in metrology

During the years 2002 and 2003 a study had been performed by EUROMET NMIs and co-funded by the European Community through the 5<sup>th</sup> framework programme, to look at the long term needs of European metrology. The study in particular addressed the question how the increasing needs in classical fields due to growing complexity and requirements for lower uncertainty could be met, when simultaneously new needs arise in areas like nano- and biotechnology, clinical chemistry, life science, and food safety.

Consultation with industry and other users of metrological services clarified that local delivery of services and expertise are highly valued in particular as they are provided in the national language. Today most NMIs offer only those services that are essential for local industry and for societal needs. In most countries an additional devolution of services is in general no option.

However it was noted that the areas where most synergetic effects could be achieved were the fields of long term strategic R&D activities and a better sharing of high level facilities. It was therefore recommended that EUROMET should move from the traditional cooperation in research which started after the agreement of national research projects to a new coordination phase where first cooperation possibilities are identified and then coordinated projects are agreed. In order to achieve these goals EUROMET should evaluate its structures in order to optimize them for the recognized needs.

As the consequence 14 EUROMET NMIs and 5 national ministries responsible for national metrology research programmes created a network to begin coordinated metrological research in identified strategic areas. The network will also establish the joint use of special facilities available at NMIs. This network, named iMERA for implementing the metrological research area (in Europe) was started in April 2005 and is supported by the European Community within the 6th framework programme.

For the list of partners see Fig 3. The objectives of the network are shown in Fig 4.



## EUROMET: European Collaboration in Measurement Standards

### iMERA partners

- |  |                      |
|--|----------------------|
| ■ National Physical Laboratory   | UK (coordinator)     |
| ■ Department of Trade and Industry   | UK                   |
| ■ Bundesministerium für Wirtschaft und Technologie   | Germany              |
| ■ Physikalisch-Technische Bundesanstalt  | Germany              |
| ■ Bureau National de Métrologie  | France               |
| ■ Istituto Nazionale di Ricerca Metrologica  | Italy                |
| ■ National Testing & Research Institute  | Sweden               |
| ■ Slovak Office of Standards, Metrology and Testing  | Slovakia             |
| ■ Slovak Institute of Metrology  | Slovakia             |
| ■ Ministry of Economic Affairs – Competition Directorate   | The Netherlands      |
| ■ Van Swinden Laboratorium   | The Netherlands      |
| ■ Danish Institute for Fundamental Metrology   | Denmark              |
| ■ Swiss Federal Office of Metrology and Accreditation  | Switzerland          |
| ■ Justervesenet  | Norway               |
| ■ Czech Office for Standards, Metrology and Testing  | Czech Republic       |
| ■ Czech Metrology Institute  | Czech Republic       |
| ■ The Central Office of Measures   | Poland               |
| ■ Metrology Institute of the Republic of Slovenia  | Republic of Slovenia |
| ■ Centre for Metrology and Accreditation   | Finland              |
| ■ Institute for Reference Materials and Measurement - Joint Research Centre of the European Commission |                      |

Figure 3. iMERA partners



## EUROMET: European Collaboration in Measurement Standards

### iMERA objectives

#### “From Collaboration to Co-ordination”

- Metrology foresight and innovation
- Sharing facilities and pilot research projects
- Developing procedures to recognise value of collaborative R&D in national funding decisions
- Evaluating merits of transnational joint research programmes and options for Article 169 action
- Addressing needs of new EUROMET members
- Adapting EUROMET structures
- Education and exchange of personnel
- Intellectual Property Rights (IPR) and legal issues

Figure 4. iMERA objectives

### 3. Special Facilities

Participation in high level metrological research is often hindered by lack of access to the necessary research equipment. On the other hand expensive equipment available in NMIs is often underused. The reasons for this can be either a lack of sufficient national activities or research projects within the NMI or a shortage of qualified personnel.

In order to avoid unnecessary duplication of facilities, to provide access to those researchers who have no facilities of their own and to allow a more efficient use of the existing facilities a pool of “Special Facilities” will be established that will be available for use by all EUROMET researchers.

To test this concept “pilot facilities” have been identified which will be used to gain experience with the shared use of such facilities. These “pilots” will set up user support groups and establish their terms of reference for external use.

In a first step 12 pilot facilities have been chosen located within PTB (6), NPL(3), DFM (2) and INRIM (1). For all these pilot facilities interest has been expressed by other NMIs to use them for their own research purposes. The pilot phase will now run for 18 months and the experience will then be evaluated in order to establish rules for future use.

#### **4. The European Metrology Research Programme (EMRP) a co-ordinated multi-annual research programme for Europe**

The core objective of iMERA is to prepare the European NMIs for the development and execution of a coordinated European Metrological Research Programme EMRP. An additional objective is to obtain co-funding of this programme by the European Community based on Article 169 of the European Treaty.

Article 169: “In implementing the multiannual framework programme, the Community may make provision, in agreement with the Member States concerned, for participation in research and development programmes undertaken by several Member States, including participation in the structures created for the execution of those programmes”. This article enables the European Commission to co-fund a research programme even if not all Member States are participating.

During 2005 the European Commission had been in touch with several European Research Area Networks and has encouraged them to develop proposals for Article 169 based research programmes that should be funded parallel to the FP 7 which is scheduled to run from 2007 to 2013.

At the time of writing (mid April 2006) 4 proposals, among them the EMRP were on the short list of the European Commission. The approval of Art. 169 research programmes are based on a co-decision by both the European Council of Ministers and the European parliament. As the requested financial support by the European Commission from the member countries for the 2007 to 2013 budget has not been granted in full, the European Commission faces the difficult task to reduce the research funding level from anticipated 73 Billion € to about 46 Billion €, this includes also the provision for Art. 169 activities. At the time of submission of this paper the decision of the European Commission on the revised budgets were not yet available, but expected soon. By the time the paper will be presented to the NCSLi 2006 the funding situation will hopefully be known much clearer.

In order to start a co-funded EMRP in 2007, the main tasks are now the following:

- Develop the EMRP
- Create the new structures necessary for the execution of the EMRP

##### **4.1 The programme**

A workshop with the iMERA team and the Chairpersons of the EUROMET TCs had been held on October 19 and 20, 2005 in Ljubljana, Slovenia where the decision was made to develop a set of metrological road maps for each TC to identify triggers and targets for European metrology for about the next 15 years. In the discussion it became clear that not all research subjects are presently covered by the existing TC structure. The decision was therefore taken to establish four “Focus Groups” for the areas

- Bio-technology
- Metrology for New Materials
- Software and Mathematical Tools for Metrology
- Metrology for Life Science

The first focus group is now part of the TC MetChem, the other three are part of the TC INTMET. Road maps had been worked out by the end of March as an input to the development of the EMRP. A first discussion of roadmaps was performed on March 14/15, 2006 in Teddington, UK at the meeting of the EUROMET Executive Committee with the TC Chairs. About 60 road maps form now the technical reference to the EMRP.

Two workshops will follow in May 2006 in Paris to start the writing of the EMRP and to further plan the way to provide foresight information for future updates and for stakeholder consultation. The aim is to have a first draft ready by the fall of 2006 and the finalized version by the end of the year 2006.

## **4.2 The structures**

The EMRP, when co-funded by the European Community, will be executed by its own legal entity. The European Commission has suggested that the members of the legal entity should be the NMIs of the participating countries mandated through their responsible ministries. The European Community contribution will be received by the legal entity and will be used in accordance with the European Commissions funding rules to support the EMRP. The EMRP will be co-funded by the national contributions of the participating countries. Only those countries and their NMIs can join the legal entity that operate a national research programme, or are determined to do so by the time of the planned EMRP. At the time of writing the funding contribution of the European Community is planned to be 250 Million € over the period from 2007 to 2013. At present it is the intention of 18 NMIs to join the legal entity with possible two more NMIs once they have removed some legal or administrative obstacles.

Another 250 Million € will be national contributions provided by the participating countries corresponding to a 50:50 co-sharing model. The committed national contributions vary from country to country. The anticipated spread will range from about 16 Million € per year down to about 100 k€ per year.

The legal entity for the EMRP needs to be in place when the co-decision of the Council of Ministers and the European Parliament will be made. Therefore it needs to be established in 2006. After looking at several options regarding suitable legal entities, the iMERA partners came, at a workshop in Berlin in December 2005, to the conclusion that an Association of Public Utility under German Law (e.V) would be the most suitable option.

While in principle it would be possible to set up a legal entity only for the administration of the EMRP and operate this entity separate from EUROMET, it is highly desirable to keep all European metrological activities in one institution. The Executive Committee of EUROMET therefore supports a solution that would allow to operate the existing EUROMET activities and the planned EMRP activities under the roof of a single entity. That means EUROMET as an RMO would become a legal entity. This solution will be discussed at the 2006 GA of EUROMET which will be held in Vienna, Austria at the end of May/beginning of June.

## **5. Conclusion**

The start of a European coordinated Metrological Research Programme will be a great step forward for European metrology. Co-funding of such a programme by the European Community would provide a significant boost to metrological research and would allow to execute a large number of innovative and cutting edge research projects.

At present the European Metrological Research Programme and the concept for the required legal structures are being developed in order to be ready for the implementation of the research programme in 2007. These developments will bring Europe's National Metrology Institutes much closer together and will strengthen the role of EUROMET as the metrological organisation of European National Metrology Institutes.