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EUROMET – COORDINATING METROLOGY IN 21ST CENTURY EUROPE

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Abstract: EUROMET is the regional collaboration of National Metrology Institutes (NMIs) in Europe. Since the signature of the CIPM Mutual Recognition Arrangement in 1999 EUROMET has concentrated on the evaluation of CMCs and NMI quality systems. Meanwhile, the iMERA project is exploring the many issues associated with a coordinated metrology research programme. Plans for a research network will be well advanced by the time of the IMEKO Congress.

Keywords: National Metrology Institutes; Mutual Recognition Arrangement; research coordination.

1. INTRODUCTION TO EUROMET

EUROMET was established in 1987, by the signature of a Memorandum of Understanding. Its 34 members include the NMIs in all the member States of the European Union and the European Commission's Institute for Reference Materials and Measurements (IRMM) at Geel in Belgium. With the original aims of developing a closer collaboration between Members, optimising the utilisation of resources, improving measurement services and ensuring accessibility to national facilities, EUROMET quickly established a portfolio of projects. Over the last decade these have been largely intercomparison projects to support the CIPM Mutual Recognition Arrangement.

In addition to the General assembly, which meets annually, there are 12 EUROMET Technical Committees. These Committees have now evaluated some 10000 European entries for the Key Comparisons Database as well as reviewing a large number of entries from other regions. At the same time, the Technical Committee for Quality (formerly QS-Forum) has reviewed the Quality Management Systems of 92 laboratories in 29 countries.

2. MERA, iMERA AND THE EMRP

The MERA (Metrology for the European Research Area) study, completed in 2004, looked at the options for closer collaboration between the NMIs in Europe. It concluded that there is considerable scope for these laboratories to collaborate in long-term and short-term research programmes, given appropriate strategic planning arrangements and increased sharing of facilities. This will best be achieved through evolution rather than revolution, as there is a clear need for the continuation of existing national services in metrology, with access to local technical competence being highly valued by the customers of most NMIs. While some rationalisation of calibration services has taken place, the local delivery of services is also valued and service devolution is not an issue for most NMIs. The MERA study also concluded that EUROMET would have to evaluate its own structures and might need to become a legal entity in order to play an active role as the coordinator of research programmes.

Following the completion of the MERA study, the European Commission agreed to support an "ERA-NET" Coordinating Action to explore and resolve the issues raised by MERA, preparing the way for a European research programme in metrology. This contract started on 1st April 2005 and will run for three years. There are 20 partners: 14 NMIs, the IRMM and five national ministries. iMERA (implementing Metrology in the European Research Area) has already concluded that there would be substantial benefit from a coordinated research programme, jointly funded by national governments and the European Commission and delivered by the NMIs.

3. COORDINATING RESEARCH

EUROMET NMIs are now considering how best to coordinate their research programmes in order to reduce duplication and exploit the synergies which exist between research groups in the various laboratories. The iMERA project, with supporting funding from the European Commission, is currently addressing the issues and barriers which arise. The iMERA partners are conducting foresight exercises to establish the priorities for European metrology research as well as addressing operational questions associated with funding, intellectual property and staff mobility. A small, jointly funded collaborative project has

also been launched to test the mechanisms for transnational funding.

The overall aim of iMERA is to prepare for an extensive programme of metrology research to be undertaken by the EUROMET NMIs from 2007 onwards. With funding provided jointly by the participating countries and the European Commission, this programme will create world-leading research teams to address the issues associated with the development of the SI as well as the underlying measurement needs of emerging technologies. This category includes not only nanotechnology and biotechnology, but also software applications, environmental measurements and the evaluation of new materials.

The iMERA project has the following specific objectives:

- the development of a process for metrology foresight and innovation;
- increased sharing of facilities and completion of joint pilot projects;
- the development of procedures to recognise collaborative R&D in national funding decisions;
- evaluation of the merits of transnational joint research programmes, leading to action to establish a single such programme with European Commission funding;
- to address the needs of recent EUROMET members;
- to adapt EUROMET structures;
- the education and exchange of personnel; and
- intellectual property and legal issues.

The iMERA work programme is divided into six work packages:

WP 1 – Systematic exchange of information and best practice.

WP 2 – Strategic activities, exchange of best practice in generic activities.

WP 3 – Joint Activities, foresight and innovation.

WP 4 – Trans-national activities, education and exchange of personnel.

WP 5 – Article 169.

WP 6 – Dissemination, governance and management.

iMERA will enable the national governments from participating countries to increase significantly the national and European impact of their investment in research and development in metrology. First, exchange of information between the national programmes will enable best practice to be identified and adopted. Then, building on this, a substantial increase in project level collaboration is foreseen. Strategic activities have led to the launching of joint research projects, with defined work plans, resources, responsibilities and time scales. Access to special metrological facilities available in just a single or few countries are being opened to other users and the viability of joint investments in new facilities is being explored. The final aim of the project is a joint metrology R&D programme. Scope, stakeholder needs, national funding contributions, legal issues, obstacles for national participation and appropriate organisational structures must be addressed. This phase culminates in the preparation of a European Metrology Research Programme with the prospect of launching the initiative in a joint action between the European Commission and interested countries utilising Article 169 of European Treaty.

4. THE FUTURE – A EUROPEAN RESEARCH PROGRAMME

The main objective of the European Metrology Research Programme is to implement a coordinated approach to planning and delivering the research needed to develop the SI system and to underpin new and emerging technologies. Based on extensive foresight studies, the programme will be developed around a core of 20 or so NMIs participating in specific projects with clear objectives, milestones and deliverables. A common project management structure will ensure that projects are completed on time and within pre-agreed budgets. Individual NMIs will participate on the basis of their expertise and the availability of resources. It is anticipated that NMIs outside Europe will be able to collaborate in these projects, although they will not, of course, have access to European Commission funding.

The benefits of such a programme are self-evident. By sharing facilities, pooling resources and avoiding duplication, the European NMIs will be able to increase substantially the amount of research undertaken and multiply the impact of that research on science, technology and society. Under EUROMET's direction, the European Metrology Research Programme will shape the future of metrology, not only in Europe, but around the world.

The key to securing European Community support for a coordinated research programme is Article 169 of the European Treaty. This little-used article says that

> *"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."*

There are two significant features of Article 169, which provide a basis for research collaboration in a specific field such as metrology. The reference to "several Member States" means that an R&D programme need not include all the Member States of the European Union and the Article

foresees the creation of structures specifically for the execution of individual programmes.

A network of European NMIs will be able, by working together in EUROMET and collaborating with NMIs elsewhere, to provide a wide range of calibration services and deliver a more extensive research programme than they could individually. The implementation of the CIPM MRA has ensured confidence in the equivalence of measurement standards, and the EMRP, with or without European Commission funding, will ensure that those standards continue to meet the demands of European industry, trade and health services. The whole will undoubtedly be greater than the sum of its parts.

The iMERA workpackages have undertaken essential preparation work, and progress with the project has convinced the European Commission that there is scope for a metrology research programme. The first draft proposal for the 7th EU Framework Programme included provision for one or more Article 169 collaborations, with metrology being a leading candidate. The European Metrology Research Programme (EMRP) would be a seven-year programme with funding from national governments and the European Commission. It will be open to all NMIs with metrology R&D programmes, as well as to those committed to launching one. Participation will be limited to Member States, with normal Framework Programme derogations.

The EMRP will establish a coordinated research programme involving collaboration between NMIs and Designated Institutes. It will address metrology themes supporting innovation, quality of life and priorities for the development of the SI units. It is envisaged that proposals will be developed in EUROMET Technical Committees and funded from a "virtual common pot." The structure will call for common management of projects and increased mobility of researchers.

The management and delivery of the EMRP would require the creation of a legal entity and plans are under way to establish EUROMET as an association (e.V.) under German law. This will be an association of EUROMET members, some of whom will also be partners in the EMRP, which will be managed by an EMRP Board within EUROMET. A Research Council will identify research priorities and provide guidance to the EMRP Board, and the whole programme will be managed and monitored by an enlarged EUROMET secretariat.

It is expected that decisions on the value and contents of the 7th Framework Programme will be taken before the end of May, requiring confirmation by the European Parliament and the Council of Ministers. If the EMRP is approved, EUROMET will be established as a legal entity before the end of 2006, so that it will be ready to sign a contract with the European Commission early in 2007. Calls for research proposals will follow in the spring, with the first joint research contracts in the summer heralding the birth of the European Metrology Research Programme.

By the time of the IMEKO Conference, it will be clear whether funding for the EMRP features in the European Community's support for scientific research in the period 2007-2013. If it is excluded for budgetary or other reasons, EUROMET will have to decide whether to proceed on the basis of pooled national funding. The evident benefits to all concerned should ensure the emergence of a strong joint metrology programme in Europe, backed by collaboration with NMIs elsewhere in the world, to address common research goals and make the best use of the resources in the European NMIs. EUROMET's role in formulating and coordinating this programme will ensure its successful delivery.